

Curso MOOC “Didáctica y Pedagogía en la Educación Superior”: A Strategy for Teacher Professionalization in Latin America

MOOC Course “Didactics and Pedagogy in Higher Education”: A Strategy for Teacher Professionalization in Latin America

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Abstract

This paper presents the design, implementation, and theoretical foundations of the MOOC “Didáctica y Pedagogía en la Educación Superior” developed by the Instituto Superior Tecnológico Rey David in Ecuador. Addressing the pedagogical and technological challenges faced by university educators in Latin America, the course adopts a constructivist, student-centered approach, integrating active methodologies and educational technologies. Grounded in the TPACK framework and andragogical principles, the MOOC aims to enhance teaching competencies in resource-constrained settings. A mixed-methods approach was employed, collecting qualitative data through forums, reflective journals, and case studies, and quantitative data via participation rates and learning assessments. Results indicate significant improvements in teachers pedagogical and technological skills, though challenges such as digital divides and high dropout rates persist. The study underscores the potential of MOOCs to foster equitable and innovative higher education, aligning with Sustainable Development Goal 4. Recommendations include enhanced virtual tutoring, institutional recognition, and supportive public policies to overcome implementation barriers and promote sustainable teacher professionalization.

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Keywords: MOOC, pedagogy, didactics, higher education, teacher training, TPACK, virtual education.

Introduction

The global landscape of higher education is undergoing a profound transformation, driven by the need to address diverse learner needs, integrate emerging technologies, and ensure equitable access to quality education (Altbach & Hazelkorn, 2018). Globally, universities face mounting pressure to enhance teaching quality while adapting to digitalization and globalization trends (OECD, 2020). However, the professionalization of university educators remains a critical challenge, particularly in regions with limited resources and systemic inequities (Laurillard, 2016). This issue is especially pronounced in Latin America, where rapid expansion of higher education access has not been matched by commensurate investments in teacher training or pedagogical innovation (UNESCO IESALC, 2020; Rama, 2014)

In Latin America, the higher education sector grapples with structural barriers, including inadequate funding, uneven technological infrastructure, and a historical emphasis on content delivery over pedagogical expertise (Ferreiro & Fernández, 2018). According to UNESCO IESALC (2020), only 20% of university educators in the region have formal pedagogical training, contributing to persistent gaps in teaching quality and student outcomes. This challenge is compounded by the digital divide, which limits access to technology-enhanced learning environments, particularly in rural and underserved areas (García, 2020; Cano & Hernández, 2020). Despite these constraints, the region has seen growing interest in innovative solutions like Massive Open Online Courses (MOOCs), which offer scalable and cost-effective platforms for professional development (Christensen, 2013; León et al., 2018).

In Ecuador, these regional challenges are mirrored, with additional complexities arising from socioeconomic disparities and uneven educational policies. The country has made strides in expanding higher education access, with enrollment rates increasing by 40% between 2000 and 2018 (OECD, 2020). However, the quality of teaching remains inconsistent, as many educators lack formal training in pedagogy or technology

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ation (Cano & Hernández, 2020). In Daule, a rapidly growing city in Guayas Province, the educational landscape reflects both opportunities and challenges. Daule’s proximity to Guayaquil and its emerging status as an educational hub have spurred demand for quality higher education, yet local institutions often face resource constraints and limited access to professional development (García, 2020). The Instituto Superior Tecnológico Rey David, based in Daule, has responded to these needs by developing the MOOC “Didáctica y Pedagogía en la Educación Superior,” aimed at equipping educators with modern pedagogical and technological skills.

This initiative aligns with global and regional priorities, particularly Sustainable Development Goal 4 (SDG 4), which emphasizes inclusive and equitable quality education (UNESCO, 2017). The MOOC leverages contemporary pedagogical frameworks, including constructivism (Piaget, 1970; Vygotsky, 1978), student-centered learning (Rogers, 1983; Biggs & Tang, 2011), the Technological Pedagogical Content Knowledge (TPACK) model (Mishra & Koehler, 2006), and andragogy (Knowles, 1980).

These approaches promote active knowledge construction, self-regulated learning, and the integration of technology with disciplinary and pedagogical expertise. By adopting a virtual format, the course addresses logistical and economic barriers, making it accessible to educators in diverse contexts, from urban centers like Daule to remote areas across Latin America.

This paper explores the MOOC’s design, implementation, and outcomes, analyzing its impact on teacher professionalization in Latin America, with a focus on Ecuador and Daule. It also examines barriers such as digital divides, high dropout rates, and institutional constraints, offering strategies to enhance the scalability and sustainability of such initiatives in resource-limited settings.

Methodology

This study employed an applied mixed-methods approach to evaluate the effectiveness of the MOOC “Didáctica y Pedagogía en la Educación Superior” in enhancing university educators’ pedagogical and technological competencies. The methodology combined qualitative and quantitative data to provide a comprehensive analysis, adhering to established mixed-methods research principles (Creswell, 2014; Tashakkori & Teddlie, 1998). This approach facilitated triangulation, ensuring robust

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ngs by cross-validating qualitative insights with quantitative metrics (Johnson & Onwuegbuzie, 2004). The study was designed to address the unique challenges of evaluating open-access, online professional development in resource-constrained Latin American contexts (García Aretio, 2020).

Population and Sample

The target population encompassed university educators across Latin America, specifically those at institutions with limited access to professional development due to geographic isolation, economic constraints, or institutional limitations (??). This population included faculty from diverse higher education settings, such as public and private universities, technical institutes, and community colleges, reflecting the heterogeneity of the regions educational landscape (?).

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The sample consisted of 1,200 educators enrolled in the MOOC through an open registration process hosted on the Instituto Superior Tecnológico Rey David's online platform. Participants were primarily from Ecuador (40%), Colombia (25%), Peru (20%), and Mexico (10%), with 5% from other Latin American countries (e.g., Bolivia, Chile). The non-probabilistic, voluntary sampling method was chosen due to the open-access nature of MOOCs, a common approach in such studies (Jordan, 2014; Christensen, 2013). To enhance representativeness, the recruitment process targeted educators from varied disciplines (e.g., 30% humanities, 25% sciences, 20% engineering, 25% other) and institution types (60% public, 40% private). Demographic data, collected via a pre-course survey, indicated that 65% held master's degrees, 20% held doctoral degrees, and 15% held bachelor's degrees. Additionally, 60% were female, and 70% had over five years of teaching experience. Table 1 summarizes participant demographics, providing a clear profile of the sample (Creswell, 2014).

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Table

1: Participant Demographics

Characteristic	Number	Percentage
Country		
Ecuador	480	40%
Colombia	300	25%
Peru	240	20%
Mexico	120	10%
Other	60	5%
Academic Qualification		
Bachelor’s	180	15%
Master’s	780	65%
Doctoral	240	20%
Gender		
Female	720	60%
Male	480	40%
Teaching Experience		
Less than 5 years	360	30%
5–10 years	480	40%
More than 10 years	360	30%
Discipline		
Humanities	360	30%
Sciences	300	25%
Engineering	240	20%
Other	300	25%

Research Approach

A convergent parallel mixed-methods design was adopted, integrating

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ative and quantitative data to address the research questions comprehensively (Creswell, 2014; Tashakkori & Teddlie, 1998). This approach allowed for simultaneous collection and analysis of both data types, enabling triangulation to validate findings (Johnson & Onwuegbuzie, 2004). The study addressed three research questions:

How does the MOOC impact educators’ pedagogical and technological competencies? (Mishra & Koehler, 2006)

What are the main barriers to participant engagement and course completion? (Cano & Hernández, 2020)

How do participants perceive the applicability of the MOOC’s content to their teaching practice? (Mezirow, 2013)

Qualitative data captured participants’ subjective experiences and perceptions, while quantitative data provided objective measures of engagement and learning outcomes, aligning with the MOOC’s constructivist and andragogical foundations (Knowles, 1980; Vygotsky, 1978).

Table 2: Participant Demographics

Characteristic	Number	Percentage
Country		
Ecuador	480	40%
Colombia	300	25%
Peru	240	20%
Mexico	120	10%
Other	60	5%
Academic Qualification		
Bachelors	180	15%
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Gender		
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Teaching Experience		
Less than 5 years	360	30%
5-10 years	480	40%
More than 10 years	360	30%
Discipline		
Humanities	360	30%
Sciences	300	25%
Engineering	240	20%
Other	300	25%

Data Collection and Instruments

Data collection was designed to align with the MOOC’s objectives and theoretical frameworks, employing multiple instruments to ensure comprehensive evaluation (Creswell, 2014). The following instruments were used:

Discussion Forums: Asynchronous forums facilitated discussions on active learning methodologies, such as problem-based learning (Barrows, 1996) and flipped classrooms (Bergmann & Sams, 2012). A total of 3,500 posts were collected over eight weeks, reflecting participants’ engagement with pedagogical concepts and peer interactions (Garrison & Vaughan, 2013).

Reflective Journals: Participants submitted 800 weekly reflective entries, prompted to evaluate how MOOC content influenced their teaching practices. These journals were guided by transformative learning principles, encouraging critical self-reflection (Mezirow, 2013; Cranton, 2006).

Case Studies: A subset of 200 participants submitted case studies analyzing real-world teaching scenarios, demonstrating the practical application of MOOC content (Barrows, 1996; Yin, 2014).

Pre- and Post-Course Assessments: Standardized assessments, each comprising 30 multiple-choice questions and five open-ended items, measured knowledge of pedagogy, technological proficiency, and TPACK integration (Mishra & Koehler, 2006). The assessments were validated for reliability (Cronbach’s $\alpha = 0.85$) and content validity

by a

panel of educational experts (DeVellis, 2016).

Participation Metrics: The MOOC platform tracked engagement metrics, including login frequency, activity completion rates, and time spent on resources (e.g., videos, readings), to assess participant involvement (Jordan, 2014; Bates, 2019).

Data collection adhered to ethical standards, with informed consent obtained via an online form and anonymity ensured through pseudonymized data handling (Bryman, 2016). Participants were informed of their right to withdraw at any time, and data were stored securely in compliance with institutional guidelines (Creswell, 2014).

Data Analysis

Qualitative data from forums, journals, and case studies were analyzed using thematic analysis, following Braun and Clarke’s (2006) six-phase framework: familiarization, coding, theme generation, review, definition, and reporting. Initial codes were generated based on recurring concepts (e.g., “student-centered learning,” “digital barriers,” “TPACK application”), and themes were refined to reflect participants’ experiences (Braun & Clarke, 2006). Inter-coder reliability was established by having two researchers independently code 20% of the data, achieving a Cohen’s kappa of 0.88, indicating strong agreement (McHughan, 2012).

Quantitative data were analyzed using descriptive and inferential statistics with SPSS v.26 (Field, 2013). Participation and completion rates were calculated as percentages, and pre- and post-course assessment scores were compared using paired t-tests to detect significant improvements ($p < 0.05$) (Creswell, 2014). Effect sizes were calculated using Cohen’s d to assess the magnitude of learning gains (Cohen, 1988). Table 2 summarizes participation and completion rates, while Table 3 presents assessment results with effect sizes.

Table 2: Participation and Completion Rates

Metric	Number	Percentage
Total Enrolled	1,200	100%
Active Participants	960	80%
Completed Course	672	56%
Dropped Out	528	44%

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3: Pre- and Post-Course Assessment Results

Assessment Pre-Course Mean (SD) Post-Course Mean (SD) Cohens d

Pedagogical Knowledge	62.4 (8.7)	85.6 (6.3)	3.01
Technological Proficiency	55.8 (9.2)	78.9 (7.1)	2.77
TPACK Integration	58.3 (7.9)	82.4 (6.8)	3.24

The analysis revealed a 56% completion rate, consistent with MOOC literature (Jordan, 2014). Paired t-tests indicated significant improvements in pedagogical knowledge ($t(959)=18.2, p<0.01$), technological proficiency ($t(959)=16.7, p<0.01$), and TPACK integration ($t(959)=17.4, p<0.01$), with large effect sizes (Cohen’s $d > 2.7$) (Cohen, 1988). Qualitative themes were triangulated with quantitative findings to provide a holistic evaluation of the MOOC’s impact (Tashakkori & Teddlie, 1998)

Results

The MOOC significantly enhanced participants’ competencies in pedagogy, technology use, and TPACK integration. Qualitative analysis revealed that participants valued the student-centered approach, with 78% reporting increased confidence in applying active methodologies like problem-based learning (Barrows, 1996) and flipped classrooms (Bergmann & Sams, 2012). Reflective journals highlighted improved self-regulation and critical reflection, aligning with andragogical principles (Knowles, 1980).

However, challenges included a 44% dropout rate, attributed to digital access issues (30% of participants reported unreliable internet) and time constraints (25% cited workload conflicts) (Cano & Hernández, 2020). These findings underscore the need for strategies to address digital divides and enhance participant retention.

Conclusions

The MOOC “Didáctica y Pedagogía en la Educación Superior” offers a scalable model for teacher professionalization in Latin America, effectively integrating constructivist, student-centered, and technology-enhanced approaches. Its success in improving pedagogical and technological competencies demonstrates the potential of MOOCs to address regional educational challenges, aligning with SDG 4 (?). However,

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To enhance impact, we recommend:

Implementing virtual tutoring and technical support to reduce dropout rates.

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To enhance impact, we recommend:

Implementing virtual tutoring and technical support to reduce dropout rates.

Securing institutional recognition of MOOC certifications to incentivize participation.

Advocating for public policies that promote digital infrastructure and teacher training.

This initiative underscores the transformative potential of MOOCs in fostering equitable, innovative, and inclusive higher education in resource-constrained contexts.

Future research should explore long-term impacts on teaching practices and student outcomes.

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