




Presentation of an Interactive MOOCs Model in the Humanities

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ABSTRACT

Purpose: This study aimed to develop and validate a contextually grounded, systematic framework for designing interactive Massive Open Online Courses (MOOCs) tailored to humanities disciplines in Iranian higher education.

Methods and Materials: The study employed a sequential exploratory mixed-methods design grounded in a pragmatic paradigm. In the qualitative phase, a systematic review guided by the PRISMA framework was conducted, followed by grounded theory analysis to identify key constructs and their interrelationships. Nineteen higher education experts participated in semi-structured interviews, and thematic analysis was performed using MAXQDA software. The extracted themes were organized into causal conditions, core phenomena, strategies, context, barriers, and consequences. In the quantitative phase, a researcher-developed questionnaire was administered to 272 faculty members in educational management, higher education management, and educational research, selected through multi-stage cluster sampling. Data were analyzed using one-sample t-tests, confirmatory factor analysis, and structural equation modeling with SPSS and SmartPLS software to assess model validity and structural relationships.

Findings: The structural equation modeling results indicated statistically significant relationships among the identified constructs. Causal conditions significantly influenced the core phenomenon, which in turn significantly affected strategic dimensions. Strategies demonstrated a strong and significant impact on academic and professional outcomes. Contextual factors and barriers also showed significant effects on strategic implementation. Validation procedures confirmed high internal and external validity of the proposed framework. The model demonstrates that technological infrastructure, instructional content, learner interaction, assessment, and instructional quality collectively contribute to enhanced academic achievement and professional development within humanities-focused interactive MOOCs.

Conclusion: The validated framework provides a comprehensive and empirically supported model for the design of interactive MOOCs in the humanities, integrating infrastructural readiness, pedagogical strategy, contextual alignment, and barrier mitigation to enhance academic performance and professional growth in Iranian higher education.

Keywords: Interactive MOOCs, Humanities Education, Higher Education, Grounded Theory, Structural Equation Modeling, Digital Learning Design

1. Introduction

The rapid digital transformation of higher education has fundamentally reshaped teaching, learning, and knowledge dissemination processes across the globe. Among the most influential developments in this transformation is the emergence of Massive Open Online Courses (MOOCs), which have expanded access to education, diversified pedagogical practices, and redefined institutional boundaries. Bibliometric analyses demonstrate the exponential growth of MOOC-related research over the past decade, highlighting their centrality in higher education discourse and innovation (Irwanto et al., 2023). MOOCs have evolved from experimental open courses to complex digital ecosystems integrating multimedia resources, collaborative platforms, analytics, and adaptive technologies. This evolution reflects a broader shift toward flexible, learner-centered models aligned with the demands of the knowledge society and digital economy.

The theoretical and epistemological foundations of MOOCs are closely connected to connectivism, networked learning, and collaborative knowledge construction. Instructional design models grounded in connectivist principles emphasize interaction, distributed cognition, and active engagement as core elements of meaningful learning experiences (Rezaei et al., 2017). Similarly, analyses of the epistemological characteristics of MOOCs underline their potential to foster open knowledge networks, interdisciplinarity, and learner autonomy (Mohammadabadi & Sarmadi, 2018). From a pedagogical perspective, MOOCs are not merely digital repositories of content; rather, they function as interactive environments in which learners co-construct meaning through discussion forums, peer assessment, and project-based activities. The increasing integration of interactive videos, artificial intelligence, and adaptive learning systems further strengthens the interactive dimension of MOOCs and enhances their instructional effectiveness (Sofyan & Meinel, 2025; Zheng, 2025).

Despite their global diffusion, MOOCs operate within specific socio-cultural and policy contexts. In Iran, higher education policy has gradually recognized the strategic potential of MOOCs for expanding access and modernizing instructional delivery (Amini Abarghouei, 2021). Research examining the educational transformation associated with MOOCs in the Iranian academic system highlights both opportunities and structural challenges, including technological infrastructure, regulatory frameworks, and faculty preparedness (Zabihi, 2021). Furthermore, the

neoliberal restructuring of higher education has intensified pressures for efficiency, competitiveness, and scalability, factors that significantly influence the adoption and institutionalization of MOOCs (Bullough Jr, 2014). Consequently, understanding MOOCs in Iran requires attention not only to pedagogical innovation but also to governance, equity, and sustainability dimensions.

One of the most persistent debates surrounding MOOCs concerns their effectiveness and completion rates. Early studies revealed substantial attrition, raising concerns about learner persistence and motivation (Jordan, 2015). However, subsequent research suggests that completion rates must be interpreted in light of learner intentions, course design, and assessment structures. For example, blended MOOC models have been shown to increase student interaction, satisfaction, and learning outcomes when appropriately integrated into formal curricula (De Moura et al., 2021; Pham, 2025). Moreover, collaborative intention and peer engagement significantly predict participation and persistence in MOOC environments (Razmerita et al., 2018). These findings underscore the importance of interactive design, formative assessment, and structured learning pathways in improving academic achievement within MOOCs.

The humanities present distinctive pedagogical requirements that differentiate them from science, technology, engineering, and mathematics (STEM) fields. Humanities education emphasizes critical thinking, interpretive reasoning, dialogue, ethical reflection, and contextual analysis. Interactive digital environments can potentially support these competencies through discussion-based learning, reflective assignments, and collaborative inquiry. Studies demonstrate that MOOC-based distance education can enhance academic engagement and its components when designed to encourage interaction and reflection (Dortaj & Rajabian, 2018). Similarly, the integration of interactive features in online educational platforms has been shown to strengthen learners' sense of presence, interaction, and self-regulation (Sohrabifar, 2021). These dimensions are particularly salient for humanities disciplines, where dialogical engagement and interpretive negotiation constitute the core of scholarly practice.

Quality assurance and instructional standards remain central to the successful implementation of MOOCs. Designing and validating educational standards for virtual learning environments based on revised Bloom's taxonomy highlights the necessity of aligning cognitive, affective, and psychomotor domains within online instruction (Barari et al., 2020). The development of instructor competency

models specifically for MOOCs further indicates that faculty expertise in digital pedagogy, assessment design, and learner facilitation significantly affects course quality (Dehghani, 2020). Additionally, affective domain evaluation through student feedback contributes to continuous course improvement and enhances learner satisfaction (Wu et al., 2019). These findings suggest that interactive MOOC design must systematically integrate pedagogical quality, instructor readiness, and feedback mechanisms.

Emerging themes in e-learning literature emphasize stakeholder perspectives, technological affordances, and contextual adaptation (Choudhury & Pattnaik, 2020). The increasing convergence of mobile learning and MOOCs offers additional flexibility and accessibility, particularly in regions with limited physical infrastructure (Kaur, 2025). Furthermore, MOOCs have demonstrated potential as tools for professional development and lifelong learning, supporting educators and practitioners in updating competencies and expanding professional networks (Griffiths et al., 2022; Yilmaz, 2025). Comparative studies of distance universities illustrate how MOOCs can enhance teacher professional development and institutional collaboration (Sultana et al., 2022). For developing contexts, MOOCs also contribute to broader educational equity initiatives aligned with the Education for All (EFA) movement (Majid & Fuada, 2020).

Information and communication technologies (ICT) have reshaped learners' information-seeking behaviors and academic engagement patterns. Studies within Islamic higher education contexts reveal that digital systems influence how students access, evaluate, and utilize academic resources (Eftekhar et al., 2019). Electronic educational media have demonstrated effectiveness in knowledge dissemination and skill development across diverse disciplines (Hobbs et al., 2019). The integration of MOOCs into preliminary undergraduate programs indicates that digital learning environments can supplement traditional instruction and diversify pedagogical strategies (Raffaghelli & Ghislandi, 2018). However, ensuring technological compatibility, equitable access, and institutional support remains essential for sustainable implementation.

Recent investigations underscore the transformative potential of AI-supported learning environments in enhancing student outcomes within MOOCs (Zheng, 2025). Interactive video technologies and data-driven feedback systems provide real-time analytics that support personalized learning trajectories (Sofyan & Meinel, 2025).

These technological innovations align with broader trends in digital higher education reform and demonstrate how MOOCs can move beyond static content delivery toward dynamic, adaptive ecosystems. At the same time, effective implementation requires culturally responsive design sensitive to local educational traditions and disciplinary characteristics.

In the Iranian higher education system, MOOCs represent both an opportunity and a challenge. On one hand, they expand access, support lifelong learning, and enhance professional development opportunities; on the other hand, they demand robust technological infrastructure, pedagogical reform, and systematic quality assurance (Amini Abarghouei, 2021; Zabihi, 2021). The humanities, in particular, require interactive frameworks that preserve dialogical engagement while leveraging digital affordances. Existing literature provides valuable insights into instructional design, learner engagement, professional development, and technological innovation; however, there remains a need for a comprehensive, context-sensitive framework that integrates causal conditions, strategies, contextual factors, barriers, and outcomes within interactive MOOC design tailored to Iranian higher education in the humanities.

Therefore, the present study aims to develop and validate a comprehensive, contextually grounded framework for designing interactive MOOCs in Iranian higher education with an emphasis on the humanities disciplines.

2. Methods and Materials

In terms of purpose, this study is a foundational–applied investigation. Overall, the research methodology follows a pragmatic paradigm with a sequential exploratory mixed-methods approach. Its strategy in the interpretivist phase consisted of qualitative content analysis using a thematic analysis approach, while in the positivist phase it adopted a descriptive–analytical survey/correlational design. Based on this paradigm, the components of methodology were organized into two sections: qualitative and quantitative.

The statistical population of the present study comprised the following two sections:

Qualitative section: In the meta-synthesis stage, the statistical population included all available scientific works in domestic and international databases in order to achieve a comprehensive and in-depth understanding of the subject. The criteria for selecting articles in the meta-synthesis phase included relevance to the research topic, scientific quality,

publication date and currency, use of appropriate methodology, diversity of perspectives, citation of credible sources, and the presence of applicable findings and results. In the first stage, within the meta-synthesis section, non-probability purposive sampling was employed. In the interview stage, participants consisted of university professors during the 2022–2023 academic year and experienced higher education administrators. In this phase as well, non-probability purposive sampling was applied, and 19 interviewees were selected based on the principle of data saturation.

Quantitative section: In this section, the statistical population included all faculty members of universities in the fields of educational management, higher education management, and educational research. Based on the Morgan table, approximately 282 faculty members were selected, and questionnaires were distributed among them. Ten questionnaires were excluded due to incompleteness, and statistical analyses were conducted on 272 participants. It should be noted that multi-stage cluster sampling was used to select the sample.

The data collection instrument in the first phase of the qualitative section (meta-synthesis) consisted of a systematic review of the literature and credible scientific sources. This process involved a precise and targeted search of scientific databases, journal articles, books, and theses related to the research topic. In the second stage, semi-structured interviews were conducted. In the quantitative section, a researcher-developed questionnaire was used. This questionnaire contained 169 items rated on a five-point Likert scale and was developed through a review of theoretical foundations, prior research, and the results of semi-structured interviews.

Regarding validity and reliability in the meta-synthesis section, the researcher used the PRISMA protocol to conduct the systematic review in a precise and standardized manner. According to the PRISMA protocol, the stages of a systematic review include systematic searching, article selection, and quality assessment, including validity and reliability (Moher et al., 2009). To assess validity in the meta-synthesis phase, content validity, construct validity, and internal validity were examined. Reliability was assessed in terms of stability and reproducibility of findings. In meta-synthesis, reliability refers to whether findings obtained across different studies under similar conditions are reproducible. In the interview instrument, validity was examined through several methods, including alignment with previous studies, meaning that interview data were

compared with theoretical foundations and prior research in the relevant field. Researcher triangulation was also employed, whereby multiple researchers independently conducted analyses and compared their findings. In addition, member checking was used. The results of the analyses conducted by the researcher were shared with participants to confirm their accuracy. The themes extracted from interview analyses were provided to experts and specialists in education and human development, as well as to several interviewees, to confirm the accuracy and credibility of the findings. To assess reliability in terms of reproducibility of findings, methods such as precise documentation of the research process, intra-rater agreement—where a single researcher independently conducted analyses multiple times and compared the results—and inter-rater agreement—where multiple researchers independently conducted analyses and compared their findings—were applied, all of which were confirmed.

In the quantitative section, to determine questionnaire validity, face validity, content validity, and construct validity were examined. For face validity, the questionnaires were reviewed prior to distribution by several sample members, university experts, and higher education administrators. For content validity, CVR and CVI forms were used with the assistance of ten experts, including interview participants, university specialists, and several respondents, to evaluate the questionnaire in terms of redundant or revised items; the instrument was subsequently confirmed. Reliability was calculated using Cronbach's alpha coefficient and composite reliability. The values of both coefficients for all research variables exceeded 0.70, indicating satisfactory reliability of the measurement instrument.

For data analysis, in the qualitative section, thematic analysis was conducted using MAXQDA Analytics Pro (Version 2018). Themes and common models were identified and analyzed from the selected articles. In the quantitative section, to answer the research questions, statistical tests including one-sample t-tests, confirmatory factor analysis, and structural equation modeling were conducted using SPSS (Version 23), SmartPLS (Version 3), and Expert Choice (Version 11).

3. Findings and Results

Analysis of the First Question: What theoretical components, dimensions, and indicators characterize interactive MOOCs in the humanities?

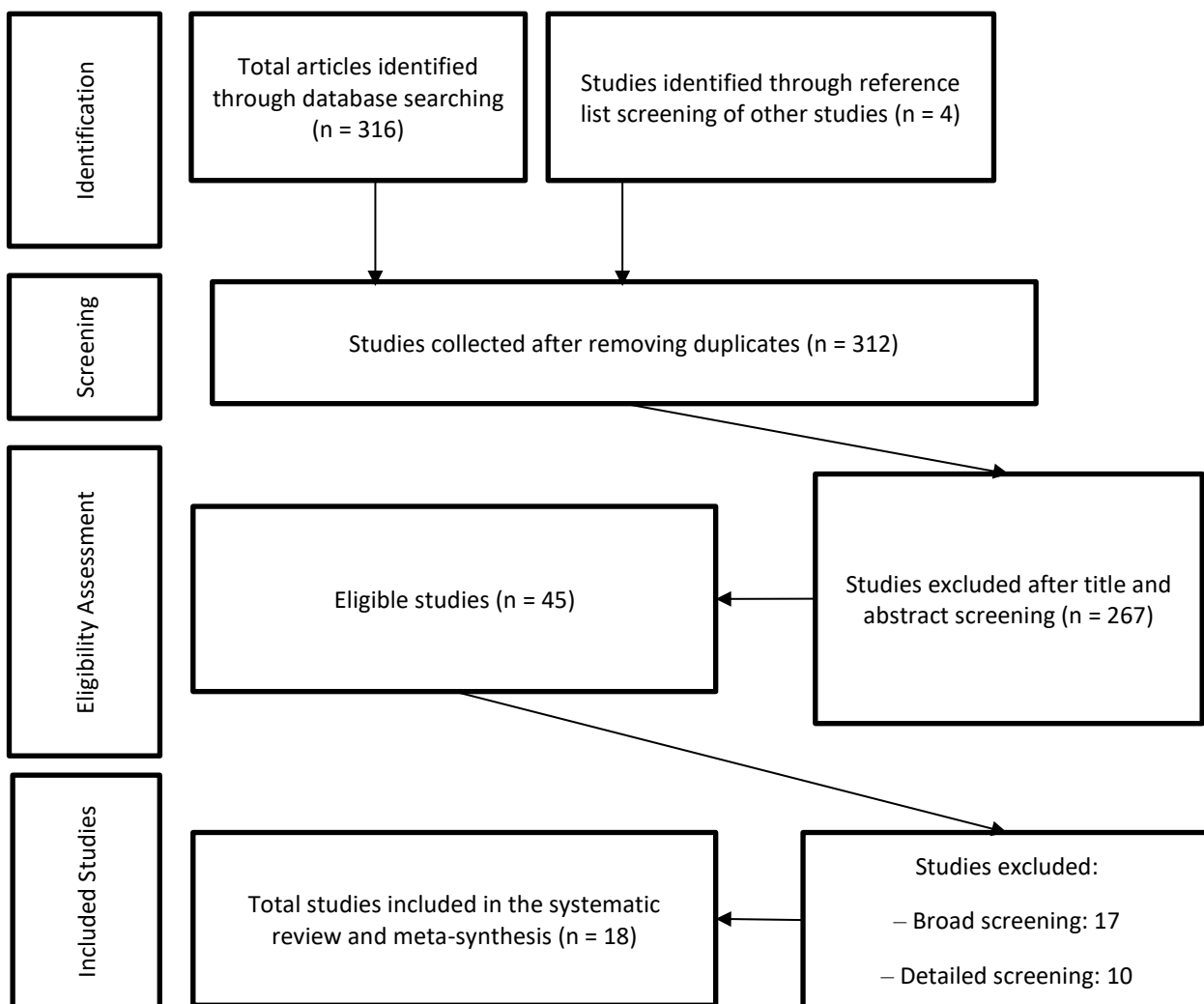
In the first (qualitative) phase of the present study, based on the findings obtained from the meta-synthesis, the dimensions, components, and indicators of interactive MOOCs in the humanities were identified. At this stage, using a meta-synthesis method grounded in a systematic review approach and following the PRISMA model, the dimensions of interactive MOOCs in the humanities were extracted. The process included several sequential stages.

The stages of conducting the meta-synthesis to identify the dimensions, components, and indicators of interactive MOOCs in the humanities were illustrated in a flow diagram

(article search process). In this phase, the applied limitations were first specified in terms of temporal scope (domestic and international), spatial scope (national and international databases), research nature (synthesis, review, and qualitative studies), and subject scope (keywords used for searching). Subsequently, both broad and detailed screening processes were conducted. The general characteristics of the selected studies for final analysis were organized according to the PRISMA model and are presented in the diagram below.

Figure 1

Final research model derived from the identified factors



As shown in the flow diagram based on the PRISMA model, after conducting the screening procedures, a total of 18 articles were ultimately selected, and their quality was evaluated and analyzed.

The results of searching all journals related to the dimensions, components, and indicators of interactive

MOOCs in the humanities, both domestically and internationally, indicated that between 2017 and 2025 domestically and between 2018 and 2025 internationally, only 18 articles—either employing a meta-synthesis approach or without meta-synthesis—were published using the keywords interactive MOOCs, instructional design,

online learning, collaborative learning, e-learning experience, and humanities disciplines in this field. Based on this review, the overall quality compliance rate of the examined articles with the checklist reporting criteria was estimated at 64%. The greatest quality deficiencies were observed in the reporting of the methodology sections, estimated at 54%. The most prominent shortcomings in the reviewed systematic studies were related to unreported errors in primary studies, errors arising from the synthesis of findings, and failure to address potential biases. Most of the identified articles were published between 2017 and 2020

domestically (68.2%) and between 2017 and 2020 internationally (64.7%). Among these, 42.5% were in the field of educational research and 33.1% in educational management. Of the total articles, 33.3% were domestic and 66.6% were international publications. After detailed examination, the selected articles were categorized into three groups based on their nature—synthesis, review, and qualitative—to enable the synthesis process. The frequency and percentage distribution of these three categories are presented in Table 1.

Table 1

Frequency and Percentage of Analyzed Articles by Nature

Nature of Articles	Synthesis	Review	Qualitative	Total
Frequency	12	3	3	18
Percentage	66.66%	16.67%	16.67%	100%

As shown in Table 1, the majority of the analyzed articles in the meta-synthesis process were synthesis studies (12 articles), followed by review (3 articles) and qualitative studies (3 articles). Regarding the quality of the selected articles, it can be stated that all articles demonstrated either

acceptable or high quality. Specifically, the quality percentage for each item was either above 75% or between 50% and 75%. If the obtained quality percentage had been below 50%, the respective item would have been classified as low quality.

Table 2

Dimensions, Components, and Indicators of Interactive MOOCs in the Humanities Extracted from the Meta-Synthesis

Construct	Dimension	Component	Indicators
Phenomenon-Centered	Instructional Content	Content Quality	Up-to-date information across various humanities fields (e.g., philosophy, psychology, history, etc.)
			Scientific credibility of sources (books, articles, and digital resources) in different disciplines
	Diversity of Teaching Methods	Use of active learning strategies such as group discussions in philosophical or social domains	Content diversity (text, images, videos) aligned with the needs of different humanities disciplines
			Alignment of content with learners' needs and course materials in various disciplines
Learner Interaction	Peer Interaction	Exchange of ideas in discussion groups focusing on humanities topics	Learner capability in understanding and analyzing content based on humanities discourse
			Application of varied instructional approaches (individual and collaborative) tailored to disciplinary needs
			Opportunities for student participation in research and scholarly projects
			Implementation of collaborative projects (e.g., research on a historical issue)
			Provision of constructive feedback in group discussions

			<ul style="list-style-type: none"> Management and coordination of group activities in specialized subject areas Utilization of social technologies to enhance interaction Participation in specialized conferences and webinars
	Instructor Interaction	Access to instructors at designated times for consultation and guidance	<ul style="list-style-type: none"> Question-and-answer sessions on various subject matters Specialized academic guidance in humanities fields Submission of feedback and suggestions within the course platform to improve content
	Online Learning Environment	Availability of online chat tools for immediate communication with peers and instructors	<ul style="list-style-type: none"> Access to resources anytime and anywhere Presence of interactive tools (e.g., surveys and online quizzes) User-friendly course platform design to engage learners Ability to personalize learner profiles to monitor progress
Evaluation	Learner Progress Assessment	Periodic assessments in various humanities topics	<ul style="list-style-type: none"> Practical and research-based projects Peer assessment to enhance learning
	Course Effectiveness Evaluation	Examination of learner satisfaction with content and instructional methods	<ul style="list-style-type: none"> Analysis of learning outcomes and academic progress Evaluation of impact on educational and research objectives Comparison of results with similar humanities courses Assessment of learner characteristics and needs Examination of social and cultural impacts of the courses

What are the causal conditions, strategies, consequences, contextual factors, and barriers of interactive MOOCs in the humanities?

To address this question, after reviewing the theoretical foundations and research background, interviews were conducted with 19 experts based on the interview protocol

presented in the appendices. Subsequently, thematic analysis was performed using a flexible approach as proposed by Braun and Clarke (2020). Through this process, the themes related to interactive MOOCs in the humanities were identified, developed, named, and interpreted.

Table 3

Dimensions, Components, and Indicators of Interactive MOOCs in the Humanities

Construct	Overarching Themes	Organizing Themes	Basic Themes	Interview Codes
Causal Conditions	Technological Infrastructure	Internet Access	Quality and speed of internet for uploading multimedia content and facilitating learning	I1, I3, I7, I15
			Equitable internet access across different geographical and social regions	I2, I9, I12, I14
			Availability of stable network infrastructure to facilitate academic communication	I5, I6, I8, I16
			Access to appropriate devices (computer, tablet, mobile) for accessing academic resources	I1, I2, I5, I13

		Educational Platforms	User-friendly design and ease of use of educational platforms	I1, I7, I12
			Availability of interactive tools (e.g., chat, polling) to encourage active participation	I1, I2, I5, I13
			Platform compatibility with various content types (text, video, audio) to support instructional diversity	I3, I6, I11, I17
			Reporting and analytics features for learners and instructors to evaluate progress	I4, I8, I10, I19
	Learning Content	Content Diversity	Inclusion of credible and diverse resources (textual, video, audio) aligned with humanities disciplines	I6, I8, I14, I15
			Up-to-date information and recent research in humanities fields	I4, I8, I10, I16
			Diversity of topics across humanities disciplines to broaden learning horizons	I1, I4, I10, I18
			Alignment of content with learners' needs and interests to increase motivation	I2, I7, I11, I19
		Compliance with Standards	Adherence to educational and scientific standards in content design and production	I2, I7, I11, I15
			Use of credible and documented sources to ensure content quality	I3, I5, I12, I16
			Alignment with officially approved academic syllabi	I1, I6, I11
			Qualitative evaluation and expert feedback to validate instructional content	I3, I8, I15
	Social Interactions	Group Collaboration	Availability of online collaboration tools to facilitate teamwork	I2, I5, I13
			Formation of small groups for joint projects and collaborative learning	I4, I9, I17
			Encouragement of idea exchange and shared experiences among learners	I5, I8, I19
			Group-based evaluation and peer feedback in the learning process	I2, I6, I14
		Instructor Communication	Online sessions with instructors for consultation and academic guidance	I3, I11, I16
			Real-time question submission and response mechanisms	I10, I14, I16
			Continuous instructor feedback to improve learning processes	I3, I4, I6, I17
			Encouragement of informal and supportive instructor-learner communication	I2, I8, I10, I14
		Learning Networks	Creation of learning groups and academic networking opportunities	I3, I9, I11
			Exchange of resources and information among learners	I5, I11, I17
			Organization of online events (e.g., webinars) to share knowledge and experiences	I6, I8, I19
			Collaboration opportunities with researchers to expand research perspectives	I5, I7, I10
Strategy	Content Design and Development	Instructional Content Diversity	Use of multimedia resources (text, image, video) to enrich learning	I2, I3, I14
			Updating instructional content according to recent developments in humanities	I4, I12, I16
			Alignment of content with diverse learner needs to promote personalized learning	I5, I8, I17
		Structured Organization	Clear and explicit course syllabi articulating learning objectives	I3, I8, I13
			Learning maps to guide learners through academic pathways	I6, I9, I10
			Appropriate scheduling of content delivery for effective comprehension	I5, I12, I14
			Division of topics into smaller segments to prevent fatigue and enhance retention	I1, I6, I9, I12

Outcome	Academic Achievement	Improved Learning	Interaction and Participation	Ongoing formative assessments to identify learner strengths and weaknesses	I3, I5, I14, I19		
				Online discussions to promote social interaction and engagement	I13, I15, I18		
				Group projects to foster collaboration and cooperative learning	I2, I5, I9		
				Use of interactive tools (polls, chat) to increase engagement	I6, I7, I10		
				Increased academic performance through enhanced learning skills	I6, I10, I13		
				Greater learner autonomy and self-management skills	I8, I11, I14		
				Improvement in writing and communication skills through feedback	I6, I8, I10, I17		
				Deeper learning and improved conceptual understanding via diverse resources	I4, I12, I13		
				Professional Development	Increased Employment Opportunities	Improved access to job postings and internships	I2, I5, I9, I16
						Alignment between learner skills and labor market needs	I6, I8, I10
Context	Learning Environment	Virtual Design		Enhanced professional networking opportunities	I2, I8, I15		
				Improved entrepreneurial competencies	I4, I7, I10		
				User-centered virtual learning design to enhance experience	I3, I12, I19		
				Creation of virtual spaces for social interaction	I3, I5, I8		
				Attractive and user-friendly graphical design	I1, I6, I11		
				Promotion of lifelong learning as a core value	I1, I4, I10		
Barriers	Technological Barriers	System Incompatibility		Encouragement of inquiry and critical thinking	I3, I4, I19		
				Integration issues among educational systems affecting learning experience	I2, I4, I13		
				Platform inability to support diverse content types	I3, I9, I18		
	Social Barriers	Lack of Social Interaction		Feelings of isolation and lack of belonging affecting motivation	I3, I5, I8, I16		
				High enrollment costs limiting access to online education	I1, I11, I12, I19		
	Economic Barriers	Limited Financial Access		Lack of financial aid or scholarships for learners in need	I10, I11, I18		

Using systematic grounded theory procedures, the key themes and the relationships among them were identified. This analysis showed that the design of interactive MOOCs in Iranian higher education, with an emphasis on the humanities, is significantly influenced by instructional content, assessment, learner interaction, technological

infrastructure, learning content, social interactions, content design and development, development of learning skills, academic achievement, professional development, the learning environment, instructional quality, and technological, social, and economic barriers. In addition, an example of the thematic template was organized as follows.

Table 4

Example of a Thematic Template

Theme	Description
Causal conditions	Technological infrastructure, learning content, and social interactions
Core phenomenon	Instructional content, assessment, and learner interaction
Strategy	Content design and development, and development of learning skills
Context	Learning environment and instructional quality
Barriers	Technological, social, and economic
Consequences	Professional development and academic achievement

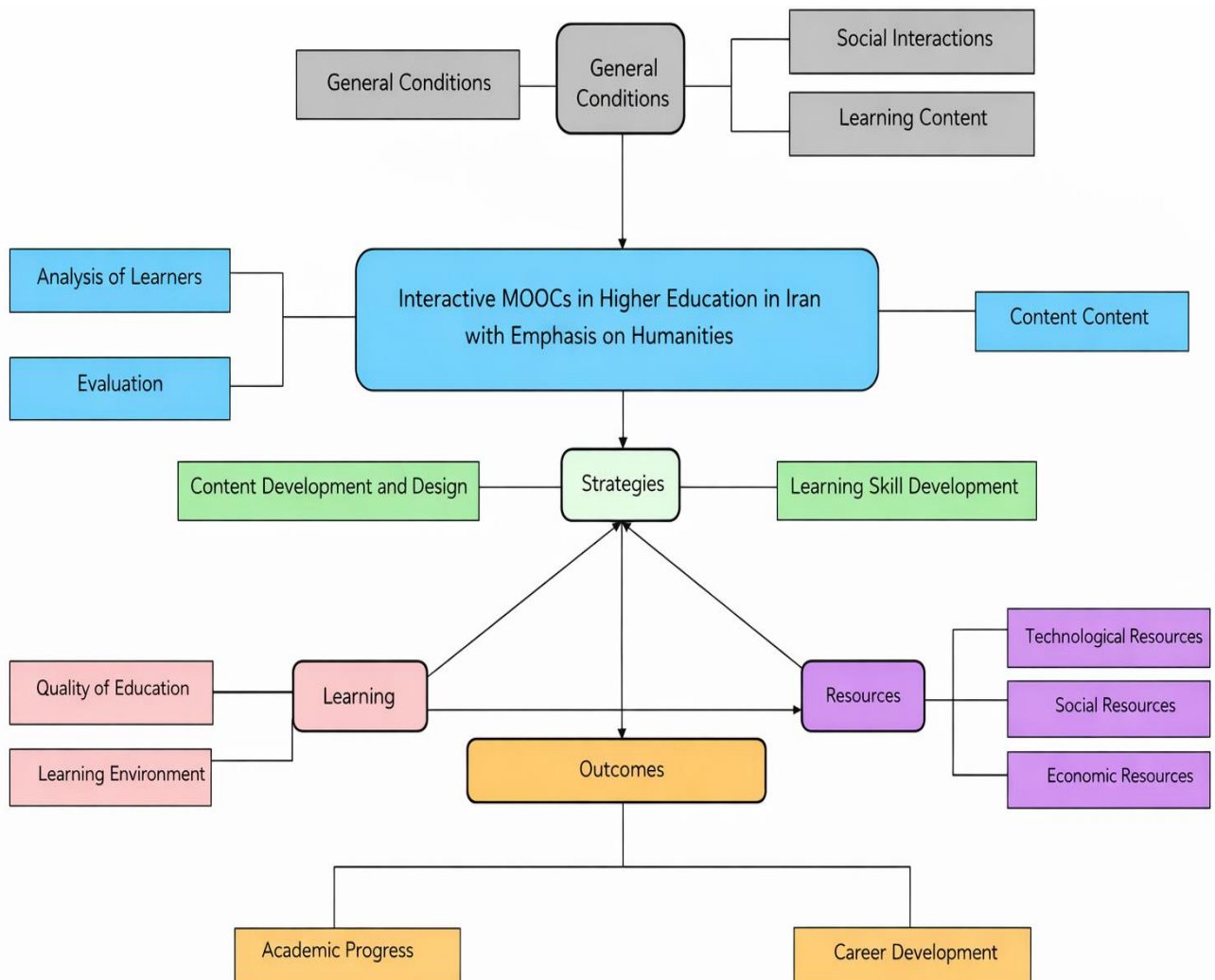
What framework can be proposed for interactive MOOCs in the humanities that is appropriate to the Iranian context?

In this section, to answer the above question, based on the themes identified through the systematic review and

grounded theory, and using the qualitative analysis software MaxQDA, the second question was analyzed. Ultimately, the conceptual model of the study was presented.

Figure 2

Final research model derived from the identified factors



How valid is the proposed indigenous framework for designing interactive MOOCs for the humanities?

A. Validation analysis of the model from the perspective of qualitative-phase participants

Model validity, as a key component of the research, not only reflects the accuracy and soundness of the results of the designed model, but also indicates its applicability in real-world settings. Accordingly, in developing a design model for interactive MOOCs specific to the humanities, the validity of the model was assessed. For this purpose, a 34-item questionnaire using a five-point Likert scale ranging from very low to very high was distributed among 19 experts (participants in the qualitative phase). This questionnaire assessed the model's external validity through the

components of purpose, research method design, control of confounding variables, and alignment, and assessed the model's internal validity through the components of logical review, expert feedback, and sensitivity analysis. In this study, a one-sample t-test was used to evaluate the validity of each component. It should be noted that, given the normal distribution of the data (skewness and kurtosis statistics within the range of -2 to +2) and the interval measurement scale, the one-sample t-test was appropriate. Overall, the results indicated high validity of the different components of the interactive MOOC design model for the humanities from the perspective of both internal and external validity. The statistical results of the one-sample t-test are presented in detail in Table 5.

Table 5

Findings of the One-Sample t Test for Assessing the Validity of the Designed Model

Component	Number of Indicators	Mean	SD	Skewness	Kurtosis	df	t	p	Mean Difference	Lower Bound	Upper Bound
External validity	23	4.20	0.85	0.50	-0.30	18	5.00	0.000	1.20	3.80	4.60
Purpose	4	4.25	0.75	0.30	-0.20	18	6.00	0.000	1.25	3.90	4.60
Research method design	4	4.35	0.80	0.40	-0.10	18	9.80	0.000	1.35	4.10	4.60
Control of confounding variables	8	4.10	0.90	0.60	-0.40	18	4.80	0.000	1.10	3.70	4.50
Alignment	7	4.30	0.70	0.20	-0.10	18	6.50	0.000	1.30	3.90	4.70
Internal validity	10	4.45	0.85	0.50	-0.30	18	10.20	0.000	1.45	4.20	4.70
Logical review	3	4.20	0.60	0.10	-0.20	18	5.80	0.000	1.20	3.80	4.60
Expert feedback	4	4.25	0.70	0.30	-0.10	18	6.10	0.000	1.25	3.90	4.60
Sensitivity analysis	3	4.65	0.65	0.20	-0.15	18	11.00	0.000	1.65	4.40	4.90

Based on Table 5, the significance level for external validity, internal validity, and all components of each validity category is less than 0.001. Moreover, the computed means range from 4.10 to 4.65, which clearly indicates statistical significance with 99% confidence. This implies that the obtained findings were not due to chance and confirms the high validity of the model. Therefore, it can be inferred that the proposed model demonstrates substantial validity.

In addition to the above, based on expert opinions, the internal validity of the designed model (Mean = 4.45; t = 10.20) is higher than its external validity. Among the components of external validity, research method design (Mean = 4.35; t = 9.80) had the highest validity. Likewise, among the components of internal validity, sensitivity

analysis (Mean = 4.65; t = 11.00) demonstrated the highest validity.

In addition to validating the model from the perspective of qualitative participants, the model's validity from the perspective of quantitative respondents was also examined in terms of internal and external validity using confirmatory factor analysis (measurement model). The relevant findings are presented below.

To examine the causal relationships among variables, structural equation modeling was employed. Accordingly, after drawing the structure, adding model constraints, and selecting the maximum likelihood method, the model was estimated and the fitted path diagram was obtained, as illustrated in the figures below. The figures present the path diagram fitted to the data.

Figure 3

Graphical representation of path coefficients in the structural model for designing interactive MOOCs for the humanities.

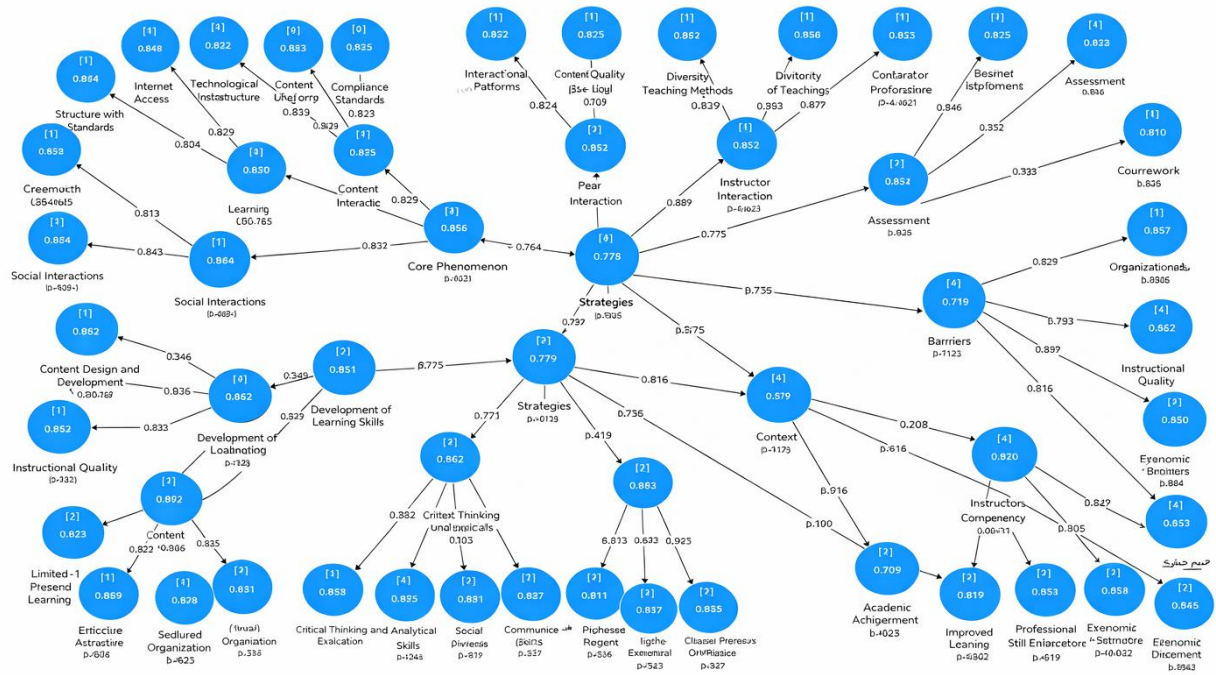
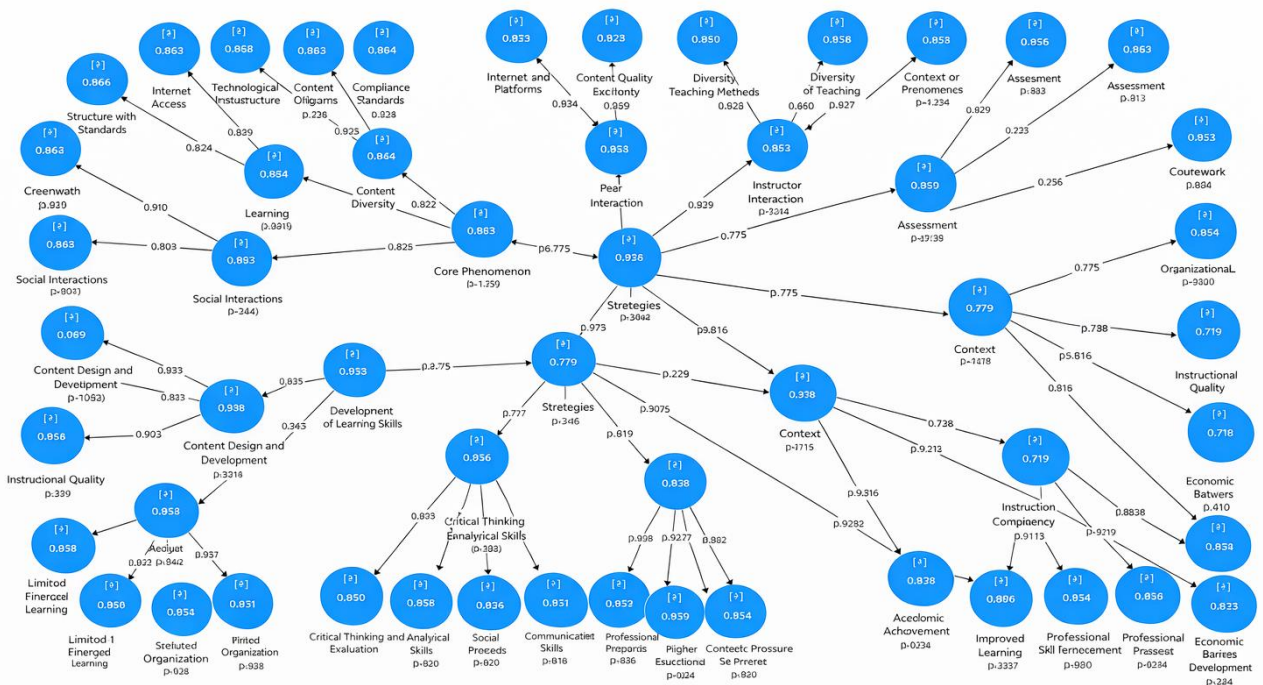


Figure 4

Graphical representation of significance coefficients in the structural model for designing interactive MOOCs for the humanities.



In Table 6, the path coefficients along with their significance values are presented. As shown, the specified paths were accepted.

Table 6

Path Coefficients, Significance Values, and Their Status

Path	Path Coefficient	t Value	Status
Causal conditions ← Core phenomenon	0.764	29.593	Confirmed
Core phenomenon ← Strategy	0.775	30.198	Confirmed
Strategy ← Consequences	0.709	28.225	Confirmed
Barriers ← Strategy	0.738	28.629	Confirmed
Context ← Strategy	0.816	31.642	Confirmed

4. Discussion and Conclusion

The findings of the present study revealed that the design of interactive MOOCs in Iranian higher education with an emphasis on the humanities is shaped by a structured configuration of causal conditions, core phenomena, strategies, contextual factors, barriers, and consequences. The causal conditions, including technological infrastructure, learning content, and social interactions, demonstrated a significant influence on the core phenomenon, which consists of instructional content, assessment, and learner interaction. This result aligns with the broader literature emphasizing the centrality of infrastructure and pedagogical design in determining MOOC effectiveness. Bibliometric analyses of MOOC research highlight that technological readiness and instructional alignment remain foundational to successful implementation (Irwanto et al., 2023). Similarly, investigations of MOOCs within the Iranian higher education policy environment underscore the importance of systemic infrastructure and regulatory coherence as prerequisites for meaningful digital transformation (Amini Abarghouei, 2021). The present findings therefore reinforce the view that without stable technological infrastructure and credible academic content, interactive MOOC initiatives cannot achieve sustainable integration within humanities education.

The identification of instructional content, assessment, and learner interaction as the core phenomenon is consistent with connectivist instructional design principles. Previous studies have shown that MOOC design models grounded in connectivism emphasize distributed knowledge, interaction, and active engagement (Rezaei et al., 2017). The epistemological analysis of MOOCs also highlights their

capacity to foster dialogical engagement and collaborative knowledge construction, particularly in disciplines that require interpretive reasoning such as the humanities (Mohammadabadi & Sarmadi, 2018). In this study, the strong structural path linking causal conditions to the core phenomenon indicates that content quality and interaction mechanisms are not isolated variables but operate as integrated elements within a systemic design. These findings correspond with research demonstrating that stakeholder-centered e-learning design enhances learner satisfaction and perceived value (Choudhury & Pattnaik, 2020; De Moura et al., 2021). Furthermore, the centrality of assessment in the model reflects prior evidence that course length, assessment structure, and feedback significantly influence participation and completion rates in MOOCs (Jordan, 2015).

The strategic dimension of the model—comprising content design and development alongside learning skill development—emerged as a mediating factor between the core phenomenon and outcomes. This result indicates that even when high-quality content and interaction are present, structured pedagogical strategies determine whether intended academic and professional outcomes are realized. Research on the development and validation of educational standards in virtual environments suggests that alignment with cognitive taxonomies and measurable learning objectives enhances instructional coherence and learner achievement (Barari et al., 2020). In parallel, competency models for MOOC instructors emphasize the importance of pedagogical expertise, digital facilitation skills, and formative assessment practices in shaping learner outcomes (Dehghani, 2020). The present findings therefore extend existing literature by demonstrating empirically that strategic pedagogical design acts as the central mechanism translating infrastructural and content conditions into measurable consequences.

The contextual factors identified—learning environment and instructional quality—exerted a reinforcing influence on strategic implementation. This finding aligns with studies showing that blended and integrated MOOC environments enhance interaction and satisfaction when embedded within supportive institutional contexts (Pham, 2025; Raffaghelli & Ghislandi, 2018). The importance of instructional quality is further corroborated by research indicating that MOOCs designed for professional development succeed when they align with teachers' needs and expectations (Griffiths et al., 2022). In the humanities, where interpretive dialogue and reflective inquiry are core pedagogical features, the learning environment must cultivate presence, engagement, and self-regulation. Studies examining interactive educational websites demonstrate that digital presence and structured interaction significantly enhance self-regulated learning (Sohrabifar, 2021). Consequently, the contextual dimension of the present model confirms that technological platforms alone are insufficient; rather, instructional climate and pedagogical culture determine the depth of learning experiences.

Barriers—technological, social, and economic—were found to significantly influence the strategic dimension of the model. This finding is consistent with the literature highlighting systemic challenges in MOOC implementation across developing contexts. Analyses of educational transformation in Iran indicate that uneven access to infrastructure and institutional resistance can hinder effective integration (Zabihi, 2021). Moreover, the broader neoliberal restructuring of higher education introduces tensions between scalability and educational quality (Bullough Jr, 2014). Economic and social pressures may also affect learners' persistence and engagement, particularly in contexts where digital equity remains uneven. The current findings echo research emphasizing that mobile and flexible learning models can partially mitigate access barriers, but only when supported by coherent institutional frameworks (Kaur, 2025).

The outcome dimension of the model comprised academic achievement and professional development. The strong structural relationships between strategies and outcomes confirm that interactive design contributes directly to improved academic performance and skill acquisition. Prior empirical evidence demonstrates that MOOC-based distance education can enhance academic engagement and its components when designed interactively (Dortaj & Rajabian, 2018). Furthermore, MOOCs have been recognized as valuable resources for professional

development and lifelong learning among educators and practitioners (Sultana et al., 2022; Yılmaz, 2025). The integration of AI-supported analytics and interactive video technologies further enhances learning outcomes by providing adaptive feedback and personalized learning pathways (Sofyan & Meinel, 2025; Zheng, 2025). The present findings support these conclusions by empirically validating that strategic pedagogical design mediates the relationship between infrastructural conditions and tangible educational gains.

An additional contribution of the study lies in its validation procedures. Both qualitative expert validation and quantitative confirmatory factor analysis indicated high internal and external validity for the proposed framework. This methodological rigor aligns with calls in MOOC research for systematic model validation and evidence-based instructional design (Irwanto et al., 2023). The emphasis on feedback, logical review, and sensitivity analysis reflects established principles of iterative design and stakeholder participation in digital learning environments (Wu et al., 2019). By incorporating these validation mechanisms, the model responds to the growing demand for context-sensitive and empirically grounded frameworks in higher education innovation.

The discussion of these findings must also consider the broader societal implications. MOOCs have been identified as potential instruments for expanding educational equity and supporting the Education for All agenda (Majid & Fuada, 2020). Within the humanities, interactive MOOCs can facilitate access to diverse perspectives, intercultural dialogue, and critical inquiry. The influence of ICT on information-seeking behavior and knowledge construction among university students further demonstrates the transformative capacity of digital environments (Eftekhari et al., 2019). When effectively designed, MOOCs can serve as integrative platforms connecting academic scholarship, professional practice, and civic engagement. The collaborative intention model suggests that peer interaction and network formation are crucial determinants of sustained engagement (Razmerita et al., 2018). Therefore, strengthening interactive components within humanities MOOCs may contribute not only to academic success but also to the cultivation of reflective, socially responsible graduates.

In sum, the findings of the present study converge with and extend prior research by presenting a comprehensive, validated framework that integrates infrastructural, pedagogical, contextual, and barrier-related dimensions

within interactive MOOC design for the humanities in Iran. The structural relationships identified in the model confirm that effective implementation depends on systemic coherence rather than isolated interventions. The humanities require interactive digital environments capable of sustaining dialogue, critical reflection, and professional growth. By empirically substantiating these interconnections, the study contributes to the evolving discourse on digital transformation in higher education.

Despite the robustness of the methodological design, several limitations must be acknowledged. The study was conducted within a specific national context, which may limit the generalizability of findings to other higher education systems with different technological infrastructures or policy environments. The reliance on self-reported data in the quantitative phase may introduce response bias. Additionally, while structural equation modeling provided evidence of significant relationships among variables, longitudinal data were not collected, limiting the ability to examine long-term impacts of interactive MOOC implementation. Finally, although the humanities were the focus of the study, disciplinary variations within humanities fields were not examined in depth.

Future research should employ longitudinal designs to examine the sustained impact of interactive MOOCs on academic achievement and professional trajectories. Comparative studies across different countries or institutional types would help assess the transferability of the proposed framework. Further investigation into discipline-specific adaptations within the humanities—such as philosophy, history, or literature—could refine pedagogical strategies. Moreover, integrating learning analytics and experimental designs may provide deeper insight into causal mechanisms. Finally, qualitative exploration of student experiences in interactive humanities MOOCs could enrich understanding of engagement patterns and identity development in digital learning environments.

Higher education institutions should prioritize strengthening technological infrastructure and ensuring equitable digital access as foundational steps in MOOC implementation. Faculty development programs must equip instructors with competencies in interactive digital pedagogy, assessment design, and learner facilitation. Curriculum planners should integrate multimedia, collaborative projects, and reflective assignments to align with humanities learning objectives. Continuous quality assurance mechanisms, including systematic feedback and

performance evaluation, should be institutionalized. Finally, policymakers should support sustainable funding models and inclusive strategies to reduce technological, social, and economic barriers to participation in interactive MOOCs.

Authors' Contributions

Authors equally contributed to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

All procedures performed in studies involving human participants were under the ethical standards of the institutional and, or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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