

Original Article

The Reality of Implementing the Massive Open Online Courses Model in Iraqi Higher Education: A Descriptive Study

Huda Abbas Kanber^{1*} , Khalid Jamal Jassim¹ 

Abstract: The integration of Massive Open Online Courses (MOOCs) into higher education requires robust quality standards and institutional support. This study evaluates the implementation of MOOC quality standards in Iraqi higher education using an integrated framework based on the Quality Matters model and the Quality Reference Framework. A descriptive-analytical design was employed. The study population consisted of 750 faculty members from public and private Iraqi universities, from which a random sample of 100 faculty members was selected, representing approximately 13.33% of the total population. The instrument demonstrated 100% expert agreement in the validity assessment and reliability coefficients ranging from 0.801 to 0.891. Only 21% of respondents were familiar with MOOCs, indicating limited awareness. Overall implementation of quality standards was moderate, with academic design scoring highest ($M = 3.746$), followed by assessment ($M = 3.730$) and interaction ($M = 3.630$). Infrastructure and technical support scored lowest ($M = 3.490$), particularly feedback ($M = 3.280$) and training ($M = 3.440$). These findings highlight gaps in faculty awareness and institutional support, underscoring the need to strengthen digital competencies, improve technical and pedagogical support, and embed evidence-based MOOC quality standards in higher education policy and institutional development.

Keywords :

Massive Open Online Courses; Higher education; Quality standards; Digital-transformation; Iraq



Author Affiliation:

¹ University of Baghdad, Baghdad, Iraq

*Corresponding author(s):

Huda Abbas Kanber, College of Islamic Sciences, University of Baghdad, Bab Al-Moadham Colleges Complex, Baghdad 10047, Iraq.

✉ huda.abbas@ircoedu.uobaghdad.edu.iq

Article History:

Received 2 April 2026; Revised 4 June 2026; Accepted 9 August 2026

Available online 21 October 2026

INTRODUCTION

Open and distance learning predates the emergence of Massive Open Online Courses (MOOCs), with its historical development extending from correspondence education to technology-mediated and online learning environments (Moore, 2023). The development of internet technologies and web-based educational platforms subsequently enabled

institutions to deliver learning materials, facilitate communication, and organize instructional activities beyond conventional classroom settings. These developments contributed to the pedagogical, technological, and organizational foundations of contemporary digital education. Pedagogically, distance education encouraged more flexible learning arrangements and greater learner autonomy (Edisherashvili *et al.*, 2022; Moore, 2023). Technologically, the evolution of distance education has been closely associated with the development of communication media and learning management systems (Keleş & Özel, 2016; Moore, 2023). Technologically, the transition toward internet-based learning environments and digital platforms expanded opportunities for delivering educational content and facilitating online interaction. In higher education, the implementation of e-learning and the development of MOOCs have further broadened the possibilities for technology-supported teaching and learning (Al-Dusaimani, 2023; Al-Obeiki, 2022; Mohammed, 2019).

However, Massive Open Online Courses (MOOCs) differ from conventional online courses in several important respects, particularly in terms of openness, scalability, and access to educational resources. MOOCs are generally designed to accommodate large numbers of participants and extend learning opportunities beyond traditional institutional boundaries, although their levels of openness, costs, and enrolment requirements vary across platforms and courses (Liyanagunawardena *et al.*, 2013; Mahajan *et al.*, 2019). Furthermore, the distinction between MOOCs and open educational resources should not be overlooked, as the availability of open learning materials does not necessarily mean that a course itself is fully open (Stracke *et al.*, 2019). Many MOOCs incorporate structured learning activities, automated assessments, discussion forums, and peer assessment to facilitate learning at scale. Nevertheless, research has identified instructional design and pedagogical quality as important considerations in the effectiveness of MOOC learning experiences (Margaryan *et al.*, 2015; Stracke & Trisolini, 2021). These characteristics provide a conceptual foundation for examining MOOC implementation in Iraqi higher education. Such an examination requires consideration not only of technology adoption but also of faculty members' awareness and knowledge, institutional readiness, instructional practices, quality assurance, and the capacity to support open and scalable online learning.

The term Massive Open Online Course (MOOC) emerged in 2008 with the introduction of the Connectivism and Connective Knowledge (CCK08) course, developed by George Siemens and Stephen Downes at the University of Manitoba, Canada. Grounded in connectivist principles, this course emphasized knowledge-network formation, collaborative learning, and the sharing of resources among participants rather than relying exclusively on instructor-directed content delivery (Dabbagh, 2016). This approach subsequently became associated with connectivist MOOCs (cMOOCs). A different model gained prominence in 2011 with the expansion of MOOCs based on more structured, instructor-led approaches, commonly known as extended MOOCs (xMOOCs). These courses typically feature organized instructional content, recorded lectures, automated assessments, and standardized learning activities. A prominent early example was the artificial intelligence course offered by Sebastian Thrun and Peter Norvig at Stanford

University, which attracted more than 150,000 registrants and helped raise international awareness of the MOOC model (Cooper & Sahami, 2013; Stracke *et al.*, 2019).

International interest in Massive Open Online Courses (MOOCs) grew rapidly in 2012, as these courses were expected to expand access to educational resources, increase instructional scalability, and connect learners worldwide with courses offered by leading institutions (Daniel, 2012). However, concerns regarding low completion rates, learner engagement, assessment quality, and financial sustainability prompted greater attention to instructional design, learner persistence, and institutional support. Subsequent research has further emphasized the importance of pedagogical quality and organizational factors in technology-enhanced learning (Al-Rahmi *et al.*, 2019; Irwanto *et al.*, 2023). Nevertheless, the applicability of these findings to specific national contexts remains an important consideration. In Iraqi higher education, investigating faculty members' awareness of MOOCs, institutional readiness, instructional quality, and technical and administrative challenges is essential to understanding the factors that may facilitate or constrain their implementation and sustainability (Al-Azawei *et al.*, 2016; AL-Tabtabai & Asadi, 2022; Ameen *et al.*, 2019).

The development of Massive Open Online Courses (MOOCs) Between 2012 and 2022, expanded considerably, reflecting the growing adoption of online learning in higher education. By the end of 2020, approximately 16,300 MOOCs had been announced or launched by around 950 universities worldwide. The number of registered MOOC learners also continued to increase, reaching approximately 220 million globally by December 2021 (Shah, 2021). This expansion coincided with the COVID-19 pandemic, which accelerated the adoption of online learning and strengthened interest in flexible, technology-supported educational models (Papadakis, 2023).

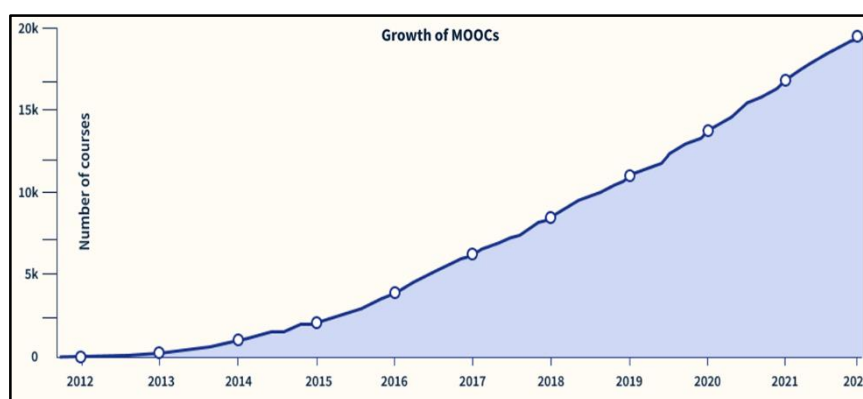


Figure 1. illustrates the growth of MOOCs between 2012 and 2022.

MOOCs attract learners from diverse geographical and educational backgrounds and cover a wide range of subjects, including artificial intelligence (AI) and machine learning (ML). Their expansion has been supported by online learning platforms such as Coursera, edX, FutureLearn, and Udacity, which provide access to courses developed by universities and other educational organizations. This development has broadened opportunities for learners to access educational resources beyond traditional institutional and geographical

boundaries. However, the availability of online platforms alone does not guarantee effective learning outcomes. Research has increasingly examined the quality of technology-supported learning, including instructional design, learner engagement, interaction, and pedagogical effectiveness (Irwanto *et al.*, 2023; Al-Rahmi *et al.*, 2019). These factors suggest that the educational value of MOOCs depends not only on technological infrastructure but also on well-designed learning activities, meaningful interaction, and learners' motivation and persistence.

Massive Open Online Courses (MOOCs) have emerged as an important development in digital higher education by expanding access to flexible and scalable learning opportunities beyond conventional institutional boundaries (Liyangunawardena *et al.*, 2013). In the Arab world, platforms such as Edraak in Jordan and Rwaq in Saudi Arabia have sought to address linguistic and cultural barriers by providing educational resources tailored to Arabic-speaking learners. However, the availability and growth of regional MOOC platforms do not necessarily indicate their systematic integration into university curricula (Ruipérez-Valiente *et al.*, 2020; Sallam, 2017). In Iraq, the use of e-learning in higher education expanded during the COVID-19 pandemic, as universities and the Ministry of Higher Education and Scientific Research promoted online instruction and blended learning to maintain educational continuity (Abdullah & Abdulla, 2021; Numan *et al.*, 2022). The Ministry of Higher Education and Scientific Research (2020a, 2020b) also reported international recognition of Iraq's efforts to implement e-learning and strengthen blended education during this period. Nevertheless, the expansion of e-learning and emergency remote teaching should not be equated with the adoption of MOOCs, which are characterized by their capacity for large-scale participation, online delivery, and varying degrees of openness. Although previous studies have examined digital learning experiences and challenges in Iraqi higher education, including technological infrastructure, internet accessibility, and institutional preparedness (Abdullah & Abdulla, 2021; Numan *et al.*, 2022), the extent to which MOOCs are understood, accepted, and implemented by university faculty members in Iraq remains insufficiently established. Further investigation is therefore needed to assess faculty members' awareness and knowledge of MOOCs and identify the institutional and technological conditions that may facilitate or constrain their adoption in Iraqi higher education.

Despite the growing development of MOOCs, their adoption and implementation in Iraqi universities remain insufficiently understood, particularly from faculty members' perspectives. Previous studies have examined MOOC development and implementation in relation to pedagogical design, institutional arrangements, technological infrastructure, and learner engagement (Liyangunawardena *et al.*, 2013; Stracke & Trisolini, 2021), highlighting the importance of instructional design and engagement in effective MOOC learning (Ogunyemi *et al.*, 2022). Accordingly, this study investigates faculty members' awareness and knowledge of MOOCs, their perceptions of quality-standard fulfillment, and the technical, administrative, and human-resource challenges affecting implementation in Iraqi universities. The findings aim to provide context-specific evidence to inform institutional planning, strengthen quality assurance, and support MOOC integration into higher education.

THEORETICAL SUPPORT

Technological and Institutional Development of MOOCs

Adham and Lundqvist (2015) examined the concepts, classifications, and historical development of MOOCs, comparing Western and Arab platforms and discussing their educational, cultural, social, and religious implications for the Arab world. Similarly, Al-Obaiki (2022) reviewed the origins, classifications, benefits, and challenges of MOOCs, highlighting the Rwaq platform as an example of MOOC development in the Arab region and discussing requirements for implementation in smart learning environments. Focusing on the Iraqi context, Abdulazeez *et al.* (2020) proposed a framework for open online learning in higher education institutions in the Kurdistan Region of Iraq. Their framework emphasized culturally responsive content, instructional support, and the improvement of teaching and learning processes, while identifying challenges related to ICT infrastructure, internet accessibility, large-scale assessment, and learner acceptance.

Taken together, these studies demonstrate a progression from conceptual discussions and reviews of MOOC platforms to the development of context-sensitive implementation frameworks. They also suggest that successful MOOC implementation requires more than the availability of digital platforms; it depends on adequate technological infrastructure, cultural relevance, institutional preparedness, and learner acceptance (Ma & Lee, 2020; Rizvi *et al.*, 2024; Ucha, 2023; Zgheib *et al.*, 2023). Research on faculty adoption further highlights the importance of perceived benefits and institutional facilitating conditions (Tseng *et al.*, 2022). However, further empirical investigation is needed to understand how faculty members' awareness and knowledge, quality assurance practices, and institutional conditions shape MOOC adoption and implementation in Iraqi higher education.

Learner Engagement and Pedagogical Effectiveness in MOOCs

Yusof *et al.* (2017) investigated learner persistence and engagement in seven MOOCs offered by Universiti Teknologi Malaysia through the OpenLearning platform. Their analysis showed a decline in digital content-viewing activity and an increase in incomplete learning tasks, suggesting difficulties in sustaining learner engagement. In a broader review, Al-Rahmi *et al.* (2019) examined 219 studies on MOOCs in higher education published between 2012 and 2017. Their review identified key research themes, including intention to use, interaction, learner engagement, and motivation, highlighting the importance of these factors in understanding MOOC adoption and learning experiences. More recently, Irwanto *et al.* (2023) conducted a bibliometric analysis of 3,201 Scopus-indexed publications on MOOCs through 2022. Their findings revealed substantial growth in MOOC research, with publication output peaking in 2021 and China, the United States, and the United Kingdom emerging as leading contributors.

Collectively, these studies demonstrate that MOOC research has increasingly examined learner engagement, interaction, motivation, and broader patterns in the development of the field, rather than focusing exclusively on technological access (Huang *et al.*, 2023; Moore & Blackmon, 2022). However, global reviews and studies conducted outside Iraq do not necessarily explain the institutional and pedagogical conditions shaping MOOC adoption in Iraqi universities. Research on faculty readiness and technology

adoption highlights the importance of instructors' technological competencies, pedagogical preparation, perceived usefulness, and institutional support (Park, 2007; Scherer *et al.*, 2023; Wang & Wang, 2009). Further context-specific investigation is therefore needed to examine faculty members' awareness and knowledge of MOOCs, quality assurance practices, and the technical, administrative, and human-resource challenges affecting their implementation in Iraqi higher education.

Contextual Adaptation of MOOCs in Iraqi and Arab Higher Education

Ali and Shiratuddin (2018) explored the perspectives of Iraqi higher education stakeholders on the potential role of MOOCs in supporting conventional education. Based on qualitative interviews conducted at the Universities of Baghdad and Tikrit, their findings highlighted the perceived importance of blended learning in addressing educational challenges and adapting online learning to local linguistic and cultural contexts. Similarly, Yaseen and Demir (2021) investigated Iraqi university English teachers' awareness of MOOCs through a questionnaire administered to 35 teachers from universities in Baghdad. Their findings indicated varying levels of awareness and attitudes toward MOOCs across the questionnaire items. In a related study, Al Musawii (2020) compared MOOCs with the blended learning model at the Arab Open University, concluding that MOOCs offer a more open and scalable approach to online education, whereas blended learning combines online instruction with other modes of educational delivery.

Taken together, these studies suggest that MOOC adoption in Arab and Iraqi higher education should be understood in relation to local linguistic and cultural contexts, institutional arrangements, and technological readiness. They also highlight the potential importance of adapting MOOC models to the needs of local educational environments. Nevertheless, further empirical research is needed to establish the current extent of MOOC implementation in Iraqi universities through a structured evaluation of faculty members' awareness and knowledge, quality assurance practices, and perceived technical, administrative, and human-resource challenges.

Research Gap and Contribution of the Present Study

Previous studies have provided valuable insights into MOOC platform development, learner engagement, and the importance of contextual adaptation in Arab and Iraqi higher education. However, the extent to which MOOCs have been implemented in Iraqi universities remains insufficiently documented through empirical investigation. Existing studies have largely addressed conceptual issues, technological development, or specific groups of learners and academic disciplines, leaving a need for a broader assessment from the perspective of university faculty members. To address this gap, the present study adopts a descriptive-analytical approach to examine MOOC implementation in Iraqi higher education across four dimensions: academic design and content quality; interaction and learning activities; electronic assessment and evaluation; and technological infrastructure, technical support, and administrative support. By integrating these dimensions, the study seeks to provide an evidence-based assessment of the current state of MOOC

implementation and identify areas requiring improvement. The findings may inform institutional planning, quality assurance, and future digital transformation initiatives in Iraqi higher education.

Definition of MOOCs (Massive Open Online Courses)

Global interest in Massive Open Online Courses (MOOCs) grew rapidly in 2012, widely recognized as “the year of the MOOC” (Daniel, 2012). Despite initial enthusiasm, concerns about educational quality and effectiveness prompted further research into MOOC design and learning outcomes. MOOCs generally provide online learning opportunities for large numbers of participants, often offering free course materials while charging for certificates or additional services (Cooper & Sahami, 2013; Gaebel, 2013). Their formats, assessment methods, and certification arrangements vary across platforms. This diversity is reflected in Clark’s classification of eight MOOC types, which distinguishes different educational purposes, instructional approaches, and patterns of learner instructor interaction, as illustrated in Figure 2.

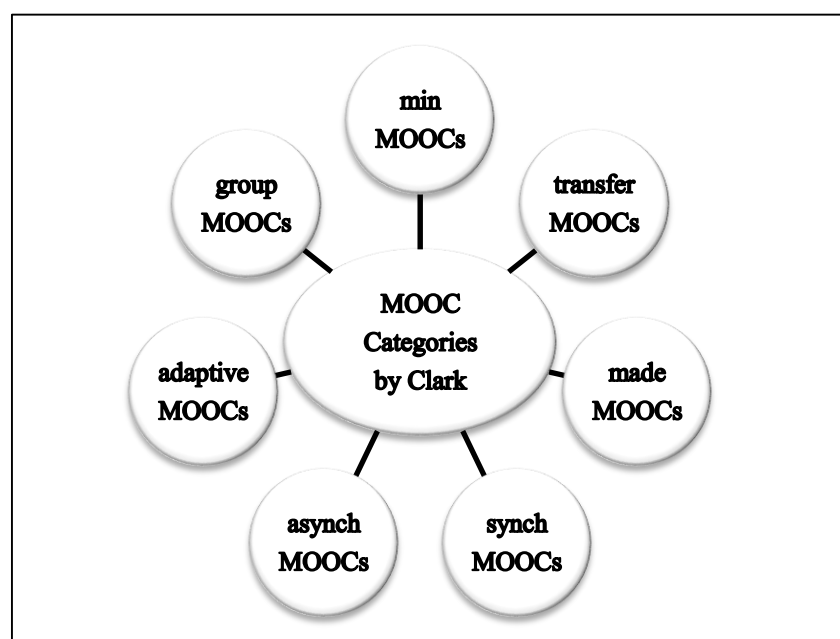


Figure 2. Types of MOOCs according to Clark's classification (2013) (Mahajan, Gupta, & Singh, 2019)

Massive Open Online Courses (MOOCs) are commonly characterized by four fundamental elements: massive scale, openness, online delivery, and structured course design (Mahajan *et al.*, 2019). *Massive* refers to the capacity to accommodate large numbers of learners, although scalability depends on course design and available resources. *Open* generally indicates broad accessibility and limited admission barriers, although fees and access conditions may vary across platforms. *Online* means that course materials, learning activities, and interactions are delivered through internet-based technologies. Finally, *course* refers to a structured learning experience with defined learning objectives, organized instructional materials, and assessment activities, such as quizzes, formative assessments, and summative examinations. Depending on the platform and course design, learners may also receive certificates upon successful completion.

Definition of E-learning

E-learning has been conceptualized as an educational approach that integrates conventional teaching practices with information and communication technologies to accommodate the needs and circumstances of teachers and learners and provide greater flexibility in terms of time, place, and learning pace (Tabbi, 2020). It is also described as an instructional approach that emphasizes instructional design, interactivity, and learner-centered learning, enabling access to educational resources across different times and locations through digital technologies (Blum-Smith *et al.*, 2021; Margaryan *et al.*, 2015; Moore & Blackmon, 2022). Furthermore, e-learning employs digital communication tools, computer networks, and multimedia applications to facilitate teaching and learning processes (Chiheb & Fennour, 2022).

In the present study, e-learning is understood as an educational approach that uses digital technologies and online resources to facilitate teaching and learning through flexible access to instructional content and interactive learning activities. This understanding emphasizes the role of technology in supporting different learning needs and improving the accessibility and organization of educational experiences.

METHOD

This study employed a descriptive-analytical research design to examine the current state of MOOC implementation in Iraqi higher education. Descriptive research aims to characterize phenomena and systematically collect information, facts, and observations about specific situations or objects (Qandilji, 1999). This approach is also consistent with established research design principles that emphasize systematically describing and analyzing phenomena in relation to the objectives of a study (Creswell & Creswell, 2023). The study population consisted of faculty members from public and private universities in Iraq. The study population consisted of 750 faculty members from public and private Iraqi universities, from which a random sample of 100 faculty members was selected, representing approximately 13.33% of the total population. A sample of 100 faculty members was selected to complete a questionnaire designed to assess the current state of MOOC implementation in their respective universities.

Table 1. Distribution of Sample Members by Specialization

Specialization	Frequency	Percentage
Scientific	26	26%
Humanities	74	74%
Total	100	100%

Table 1 shows that the majority of the participants (74%) specialize in the humanities, whereas the remaining 26% specialize in scientific disciplines. This distribution indicates that faculty members from the humanities constitute a larger proportion of the study sample. This difference in representation should be considered when interpreting the findings concerning faculty members' awareness, knowledge, and perceptions of MOOCs, as experiences with digital learning may vary across academic disciplines. However, the distribution alone does not establish that faculty members in

either specialization have greater awareness of MOOCs or face more substantial implementation challenges. Further analysis comparing responses across the two disciplinary groups would be necessary to determine whether meaningful differences exist. Therefore, the sample composition should be taken into account when interpreting the overall findings and considering their applicability to faculty members across different academic disciplines. The distribution of sample members by specialization in this study is shown in Figure 3.

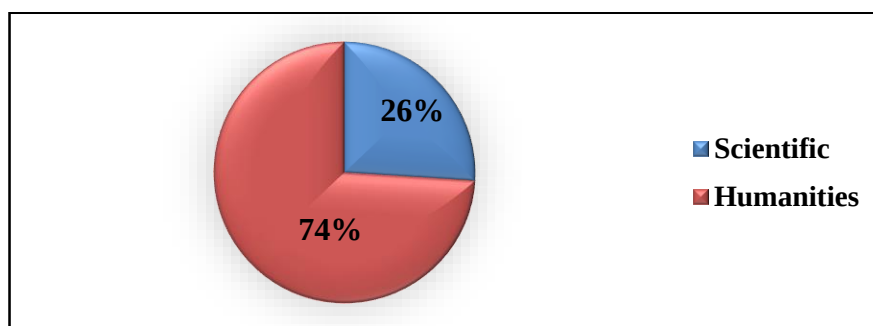


Figure 3. Distribution of sample members by specialization

Figure 3 shows that 74% of the participants specialized in the humanities, while the remaining 26% specialized in scientific disciplines. This indicates that faculty members from the humanities constituted the majority of the study sample. The distribution of sample members by academic rank in this study is presented in Table 2.

Table 2. Distribution of Sample Members by Academic Rank

Academic Rank	Frequency	Percentage
Assistant Lecturer	38	38%
Lecturer	5	5%
Associate Professor	24	24%
Professor	33	33%
Total	100	100%

Table 2 shows that the academic rank of Assistant Lecturer constituted the largest proportion of the study population, accounting for 38%, followed by the rank of Professor at 33%, then Associate Professor at 24%, and finally Lecturer at 5% of the sample, as illustrated in Figure 4.

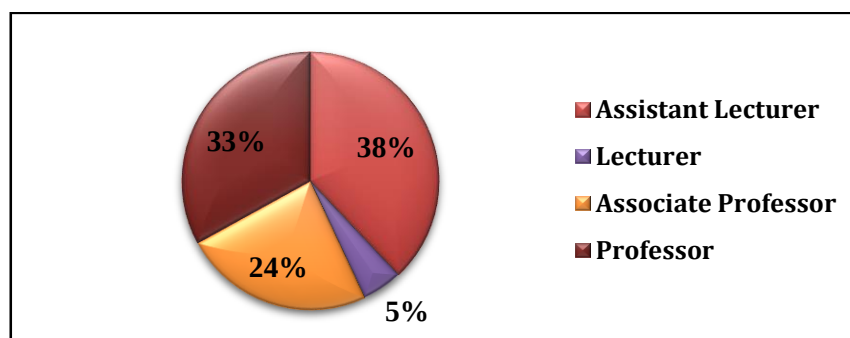


Figure 4. Distribution of Sample Members by Academic Rank

This study employed a questionnaire to examine the current state of Massive Open Online Course (MOOC) implementation from the perspective of university faculty members. Questionnaires are widely used in educational research to collect structured data on participants' perceptions and experiences (Al-Assaf, 1989; Creswell & Creswell, 2023). The instrument was developed in accordance with the study objectives, drawing on the Quality Matters (QM) model and the Quality Reference Framework (QRF). Instrument development was guided by principles of measurement and scale construction to ensure that the items corresponded to the intended assessment dimensions. The questionnaire comprised 18 items organized into four dimensions: academic design and content quality; interaction and educational activities; electronic assessment and evaluation; and infrastructure, technical support, and administrative support. Each item was rated on a five-point Likert scale ranging from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*), with the intermediate options of *Disagree* (2), *Neutral* (3), and *Agree* (4). Participants indicated their level of agreement with each statement to provide information about MOOC implementation in their respective universities.

Validity concerns the extent to which evidence and theory support the interpretation of scores obtained from a research instrument for its intended purpose (Creswell & Creswell, 2023). In this study, the face validity of the questionnaire was assessed by five expert reviewers from different academic specializations. The reviewers evaluated the relevance and clarity of the 18 items distributed across the four dimensions of MOOC implementation. All five reviewers (100%) agreed that the items were suitable for the intended assessment. This expert review provided preliminary evidence of face validity and supported the use of the questionnaire in the main study. However, expert agreement on face validity alone does not establish the instrument's construct validity or overall measurement validity.

Reliability refers to the consistency of measurements obtained from a research instrument under comparable conditions and is an important criterion for evaluating measurement quality. Various methods can be used to assess reliability, depending on the purpose of the study and the characteristics of the instrument (Al-Zubaidi *et al.*, 1981). In this study, the test retest method was employed to examine the temporal stability of the questionnaire. The instrument was administered to 20 faculty members on two occasions separated by a two-week interval. Pearson's correlation coefficient was then calculated to assess the association between scores obtained from the two administrations. The resulting coefficients for the four questionnaire dimensions are presented in Table 3. These coefficients provide an indication of the consistency of respondents' scores over time, with higher positive values indicating stronger correlations between the two administrations.

Table 3. Reliability Coefficients of the Questionnaire axes

Axes	Reliability Coefficient
Academic Design and Content Quality	0.891
Interaction and Educational Activities	0.852
Electronic Assessment and Evaluation	0.815
Infrastructure and Technical & Administrative Support	0.801

Table 3 shows that the test–retest reliability coefficients ranged from 0.801 to 0.891 across the four questionnaire dimensions, indicating good temporal consistency over the two-week interval. Academic Design and Content Quality recorded the highest coefficient ($r = 0.891$), while Infrastructure and Technical and Administrative Support had the lowest ($r = 0.801$). These findings support the questionnaire’s test–retest reliability, although correlation indicates score stability rather than absolute agreement. Data were analyzed using SPSS. Pearson’s correlation coefficient assessed test–retest reliability, while arithmetic means and standard deviations summarized faculty members’ responses regarding MOOC implementation in Iraqi higher education.

RESULT AND DISCUSSION

This section presents findings on MOOC implementation in Iraqi higher education based on questionnaire responses from 100 university faculty members selected through simple random sampling. Of the respondents, 21 (21%) were familiar with MOOCs, while 79 (79%) reported no prior awareness. This finding indicates limited MOOC awareness among the surveyed faculty members, potentially posing a challenge to broader adoption in teaching and learning. Although institutional exposure and professional development may influence awareness, these factors remain tentative explanations that require further investigation.

First Axis - Academic Design and Content Quality

This axis evaluates the core components of courses related to specialization and educational content. It includes six items. The results showed that the arithmetic mean values ranged between 3.560 and 4.000, while the standard deviation ranged between 0.869 and 1.118. These results indicate that all items within this axis were achieved from the perspective of university professors. Table 4 and Figure 5 illustrate these findings.

Table 4. Descriptive Statistics of Academic Design and Content Quality Indicators

Rank	Item No. in Questionnaire	Indicators	Mean	Standard Deviation
4	1	Clarity and precise formulation of course objectives and learning outcomes in a measurable manner	3.6000	1.11803
2	2	Currency and accuracy of the educational content provided in the course	3.7600	1.01160
3	3	Logical organization of the course and its division into clear, sequential units and lessons	3.9600	0.88882
6	4	Integration of electronic content with traditional references and sources within the discipline	3.5600	0.86987
1	5	Appropriate diversity in the use of instructional media (videos, texts, simulations) supporting learning objectives	4.0000	1.11803
5	6	Availability of clear mechanisms for calculating, issuing, and academically recognizing certificates	3.6000	1.19024
Overall axis	—	Academic Design and Content Quality	3.746	1.529

Table 4 presents descriptive statistics for six indicators of academic design and content quality. Diversity of instructional media received the highest mean score ($M = 4.00$, $SD = 1.11803$), followed by logical course organization ($M = 3.96$, $SD = 0.88882$). Integration of electronic content with disciplinary references recorded the lowest mean ($M = 3.56$, $SD = 0.86987$). The overall mean of 3.746 was above the midpoint of the five-point Likert scale, indicating generally favorable ratings. These findings highlight the relative strengths of instructional media and course organization, while suggesting room for improvement in integrating electronic content with established references. The reported overall standard deviation of 1.529 should be verified against the original statistical output.

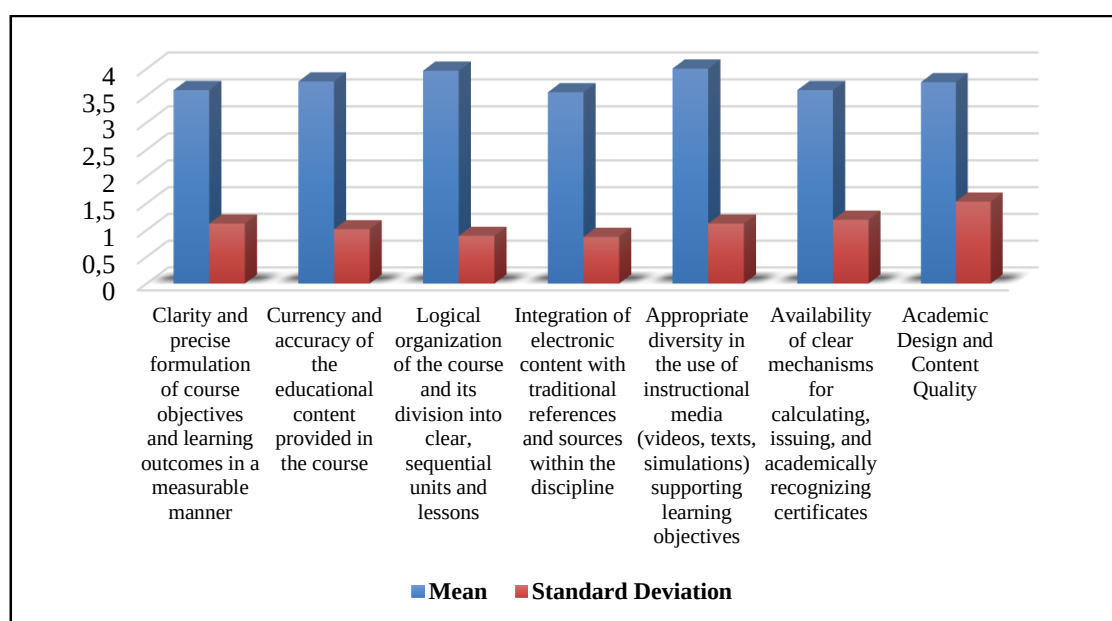


Figure 5: Mean and Standard Deviation of Academic Design and Content Quality Indicators

Figure 5 illustrates the mean scores and standard deviations for the six indicators of academic design and content quality in MOOC implementation. The highest mean was observed for the diversity of instructional media (4.00), followed by the logical organization of course content (3.96). In contrast, the integration of electronic content with traditional disciplinary references recorded the lowest mean (3.56). The standard deviations indicate varying degrees of response dispersion across the indicators, with the logical organization of course content showing a relatively lower standard deviation (0.88882) than most other indicators. Overall, the figure highlights differences in respondents' assessments of the six indicators, suggesting that the integration of electronic content with established disciplinary references may deserve further attention in efforts to improve MOOC design and content quality.

Axis Two – Interaction and Educational Activities

This dimension examines learner participation, active learning, and social and cognitive interaction in MOOCs through four items. As presented in Table 5 and Figure 6, mean scores ranged from 3.280 to 3.880, while standard deviations ranged from 1.013 to 1.339, indicating variation in faculty members' assessments. These results suggest

differences in perceptions of engagement, collaborative learning, and instructor learner communication. However, determining whether the indicators were adequately achieved requires explicit interpretation criteria. Examining each item individually can help identify strengths and areas for improvement in MOOC interaction and learning activities in Iraqi higher education.

Table 5: Descriptive Statistics of Interaction and Educational Activities Indicators

Rank	Item No. in Questionnaire	Indicators	Mean	Standard Deviation
1	1	Availability of diverse educational activities that support active learning and the application of theoretical concepts	3.8800	1.01325
2	2	Design of an environment that enables effective interaction among learners (discussions and peer assessment)	3.6800	1.02956
3	3	Ease of integrating synchronous and asynchronous interaction tools (such as virtual classrooms)	3.6800	1.03956
4	4	Efficiency of feedback mechanisms provided to students on tasks and assessments	3.2800	1.33915
Overall axis	—	Interaction and Educational Activities	3.630	1.097

Table 5 presents the descriptive statistics for the four indicators of interaction and educational activities in MOOC implementation. This indicator also had the highest standard deviation, suggesting greater variability in respondents' perceptions of feedback effectiveness. The overall mean for this dimension was 3.630, with an overall standard deviation of 1.097. These findings suggest that educational activities supporting active learning received comparatively favorable ratings, whereas feedback mechanisms may warrant further attention in improving interaction and learning activities in MOOCs. Nevertheless, the extent to which these indicators can be considered adequately implemented should be determined using explicit interpretation criteria.

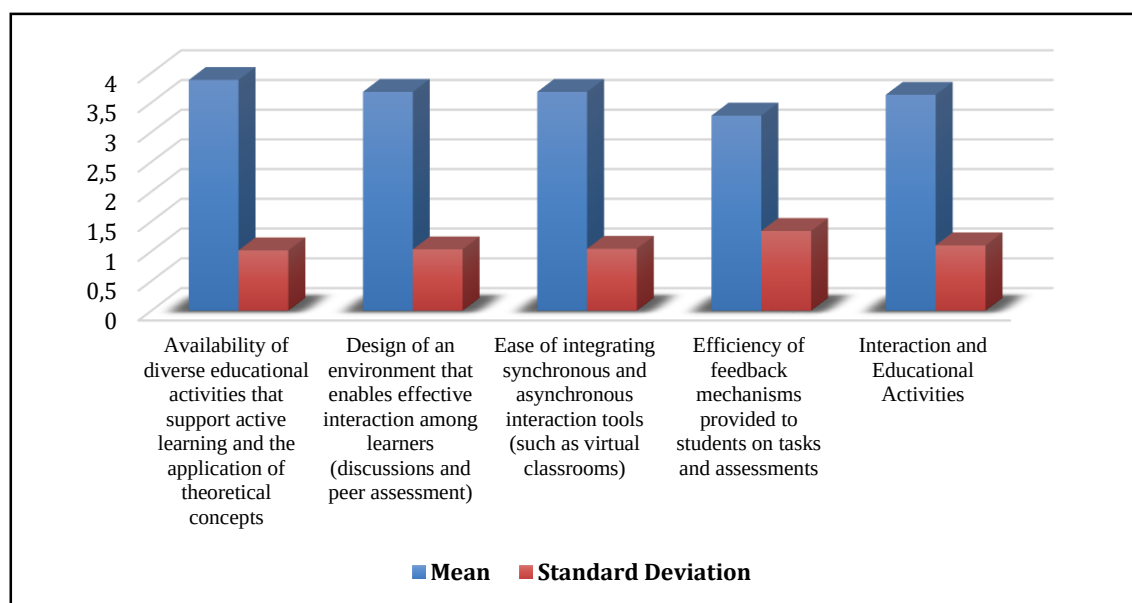


Figure 6. Mean and Standard Deviation of Interaction and Educational Activities

Figure 6 illustrates the mean scores and standard deviations for the four indicators of interaction and educational activities in MOOC implementation. The highest mean score was recorded for the availability of diverse educational activities that support active learning and the application of theoretical concepts ($M = 3.88$, $SD = 1.01325$). The design of an environment that facilitates interaction among learners through discussions and peer assessment, as well as the integration of synchronous and asynchronous interaction tools, both received mean scores of 3.68 ($SD = 1.02956$ and 1.03956 , respectively). In contrast, the efficiency of feedback mechanisms provided to students on tasks and assessments obtained the lowest mean score ($M = 3.28$, $SD = 1.33915$). This indicator also had the highest standard deviation, suggesting greater variation in respondents' perceptions of feedback effectiveness. Overall, the figure indicates that educational activities supporting active learning received comparatively favorable ratings, whereas feedback mechanisms and continuous academic communication may require further attention to enhance learner engagement and interaction in MOOCs.

Axis Three – E-Assessment and Evaluation

This dimension examines the tools and procedures used to assess student performance and maintain the integrity of examinations in MOOCs. It comprises four items addressing electronic assessment and evaluation. The results indicate that the mean scores ranged from 3.760 to 3.860, while the standard deviations ranged from 1.101 to 1.144. These findings suggest that respondents' ratings across the four indicators were relatively similar. However, although the mean scores provide a descriptive indication of faculty members' perceptions, determining whether all indicators are adequately implemented requires clearly defined interpretation criteria. The results for this dimension are presented in Table 6 and Figure 7.

Table 6. Results of the Analysis of Indicators for the Student Assessment axis

Rank	Item No. in Questionnaire	Indicators	Mean	Standard Deviation
4	1	Appropriateness of assessment tools (tests, assignments) for measuring specified learning outcomes	3.6800	1.14455
3	2	Clarity of evaluation criteria and grading policy for students and teaching assistants	3.7200	1.06145
2	3	Availability of mechanisms to ensure the integrity of tests and assignments (e.g., electronic monitoring, plagiarism detection tools)	3.7600	1.12842
1	4	Availability of detailed reports and statistics on performance to inform course development	3.7600	1.01160
Overall axis	—	E-Assessment and Evaluation	3.730	1.083

Table 6 presents the descriptive statistics for the four indicators of electronic assessment and evaluation in MOOC implementation. The highest mean scores were recorded for the availability of mechanisms to ensure the integrity of tests and assignments, such as electronic monitoring and plagiarism detection tools, and the availability of detailed performance reports and statistics to inform course development. Both indicators

obtained a mean score of 3.76, with standard deviations of 1.12842 and 1.01160, respectively. The clarity of evaluation criteria and grading policies for students and teaching assistants received a mean score of 3.72 (SD = 1.06145). Meanwhile, the appropriateness of assessment tools, including tests and assignments, for measuring specified learning outcomes recorded the lowest mean score ($M = 3.68$, $SD = 1.14455$). The overall mean for this dimension was 3.730, with a standard deviation of 1.083. These findings suggest that respondents rated the mechanisms for maintaining assessment integrity and using performance data relatively favorably, whereas the alignment of assessment tools with specified learning outcomes may warrant further attention (Al-Dabbas & Jabbar, 2022). Nevertheless, whether these indicators can be considered adequately implemented should be determined using clearly defined interpretation criteria.

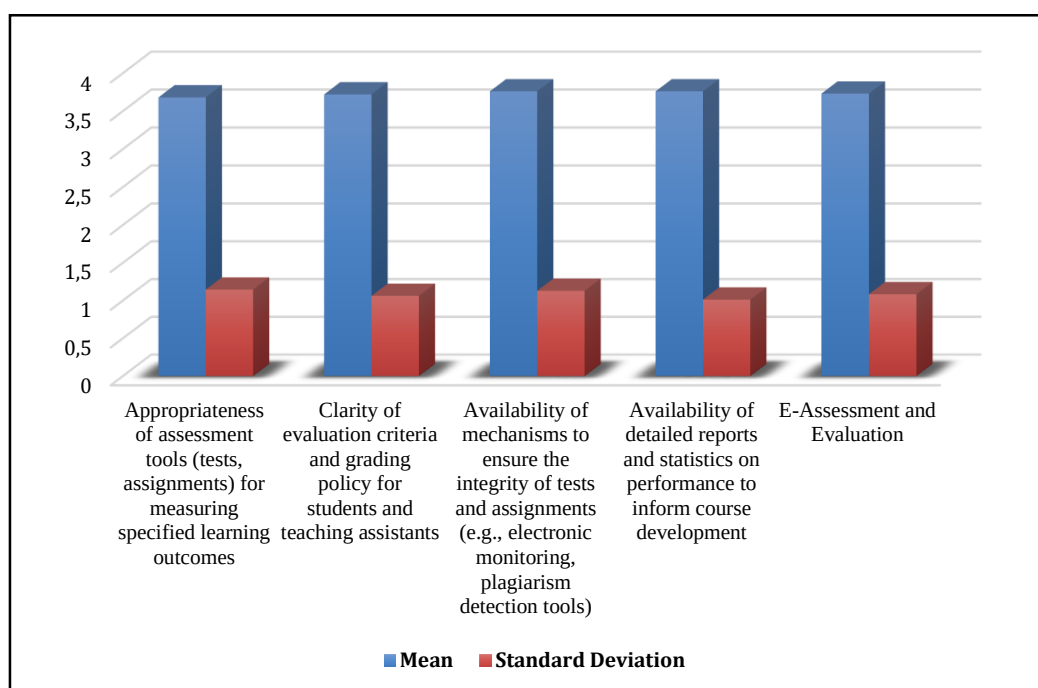


Figure 7. Mean and Standard Deviation of E-Assessment and Evaluation Indicators.

Figure 7 shows that assessment integrity mechanisms and performance reporting received the highest mean scores ($M = 3.76$), followed by the clarity of grading policies ($M = 3.72$). The appropriateness of assessment tools for measuring learning outcomes received the lowest score ($M = 3.68$). Standard deviations ranged from 1.01 to 1.14, indicating some variation in responses. Overall, the findings suggest that aligning assessment tools with intended learning outcomes requires further attention.

Axis Four – Infrastructure and Technical/Administrative Support

This dimension examines the supporting factors that facilitate the effective implementation and management of MOOCs, with particular attention to the resources and support available to instructors. It comprises four items addressing infrastructure, technical support, and administrative support. The results indicate that the mean scores ranged from 3.360 to 3.680, while the standard deviations ranged from 1.186 to 1.262. These findings

suggest that respondents' ratings varied across the four indicators. However, determining whether all indicators are adequately implemented requires clearly defined interpretation criteria. The results for this dimension are presented in Table 7 and Figure 8.

Table 7. Descriptive Statistics of Infrastructure and Technical/Administrative Support Indicators

Rank	Item No. in Questionnaire	Indicators	Mean	Standard Deviation
2	1	Ease and effectiveness of using the MOOC platform by the instructor for managing content and students	3.4800	1.26227
4	2	Availability of sufficient technical support for faculty members to develop and manage the course	3.3600	1.18603
1	3	Extent to which the course meets accessibility requirements and inclusive design for students with special needs	3.6800	0.85245
3	4	Availability of appropriate training for faculty members on designing and implementing the course using the MOOC system	3.4400	1.08321
Overall axis	—	Infrastructure and Technical/Administrative Support	3.490	1.247

Table 7 indicates that accessibility and inclusive design were rated most favorably ($M = 3.68$, $SD = 0.85$), whereas technical support received the lowest rating ($M = 3.36$, $SD = 1.19$). Platform usability ($M = 3.48$, $SD = 1.26$) and faculty training ($M = 3.44$, $SD = 1.08$) also showed room for improvement. The overall mean was 3.490 ($SD = 1.247$), suggesting that institutional support for MOOC implementation could be enhanced, particularly through improved technical assistance and faculty development.

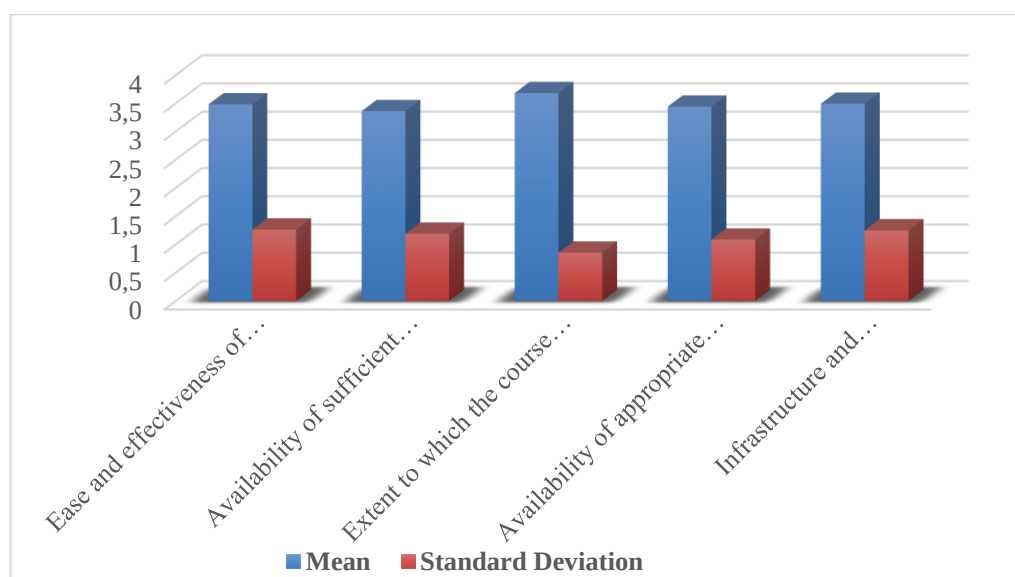


Figure 8. Mean and Standard Deviation of Infrastructure and Administrative Support Indicators.

Figure 8 shows that accessibility and inclusive course design received the highest mean score ($M = 3.68$, $SD = 0.85$), followed by platform usability ($M = 3.48$, $SD = 1.26$) and faculty training ($M = 3.44$, $SD = 1.08$). Technical support received the lowest mean

score ($M = 3.36$, $SD = 1.19$). Overall, the findings highlight the need to strengthen technical assistance and faculty training to support effective MOOC implementation.

CONCLUSION

The findings revealed limited faculty awareness of Massive Open Online Courses (MOOCs) in Iraqi higher education, with only 21% of respondents reporting familiarity with this learning model, while 79% reported no prior awareness. The overall implementation of MOOC quality standards was rated at a moderate level based on the study's interpretation of the descriptive statistics. Among the four dimensions examined, Academic Design and Content Quality obtained the highest mean score ($M = 3.746$), followed by Electronic Assessment and Evaluation ($M = 3.730$), Interaction and Educational Activities ($M = 3.630$), and Infrastructure and Technical/Administrative Support ($M = 3.490$). Within the academic design dimension, the diversity of instructional media received the highest item-level mean ($M = 4.000$), whereas the effectiveness of feedback mechanisms in the interaction dimension recorded the lowest mean among the indicators highlighted in the study ($M = 3.280$). In the infrastructure and support dimension, the availability of sufficient technical support ($M = 3.360$) and appropriate faculty training ($M = 3.440$) emerged as areas requiring further attention. These results indicate that, although respondents rated academic design and electronic assessment relatively favorably, important gaps remain in faculty awareness, learner feedback, technical assistance, and professional development. The findings therefore underscore the need for Iraqi higher education institutions to strengthen faculty digital competencies, provide sustained technical and pedagogical support, improve interaction and feedback mechanisms, and integrate evidence-based MOOC quality standards into institutional planning and higher education policy. The study also highlights the importance of adapting quality assurance frameworks, including Quality Matters and the Quality Reference Framework, to the institutional and educational context of Iraq. Given that the findings are based on questionnaire responses from 100 faculty members, they should be interpreted as perceptions of the participating respondents rather than as definitive evidence of MOOC implementation across all Iraqi universities. Future research should examine students' experiences and acceptance of MOOCs, compare institutional readiness across public and private universities, and investigate the effectiveness of interventions designed to improve MOOC quality and faculty digital teaching competencies.

Acknowledgments

The authors sincerely thank the faculty members of Iraqi universities for their participation in the questionnaire.

Author Contributions

Huda Abbas Kanber and Khalid Jamal Jassim jointly developed the study, prepared the manuscript, and approved the final version.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interest

The authors declare that they have no known financial or non-financial conflicts of interest that could have influenced the research, its findings, or the preparation of this manuscript.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to applicable ethical requirements and data protection considerations.

Declaration of Generative AI and AI-Assisted Technologies

The authors should confirm whether generative AI or AI-assisted technologies were used in preparing this manuscript. If such technologies were used, the authors should disclose the name of the tool and its purpose. The authors remain responsible for the accuracy, integrity, and content of the published article.

Ethical Approval and Informed Consent

This study involved 100 university faculty members in Iraq who participated in a questionnaire survey. The authors should confirm whether ethical approval was obtained and whether informed consent was secured from the participants before data collection. If ethical approval was obtained, the name of the approving committee and the approval number should be provided, where applicable.

REFERENCES

- Abdullah, C. O., & Abdulla, R. M. (2021). Evaluation of e-learning in higher education during COVID-19 pandemic: A case study in University of Sulaimani. In *Proceedings of the 2021 12th International Conference on E-Education, E-Business, E-Management, and E-Learning* (pp. 68–74). Association for Computing Machinery. <https://doi.org/10.1145/3450148.3450176>
- Abdulazeez, D., Salah, R., & Alves, G. (2020). A framework for enhancing higher education in the Kurdistan Region of Iraq through a dedicated digital education MOOC. *Journal of Duhok University*, 23(1), 81–93. <https://doi.org/10.26682/sjuod.2020.23.1.9>
- Adham, R., & Lundqvist, K. (2015). MOOCs as a method of distance education in the Arab world: A review paper. *The European Journal of Open, Distance and E-Learning*, 18(1), 123–138. <https://doi.org/10.1515/eurodl-2015-0009>
- Al-Assaf, S. (1989). *Introduction to research in behavioral sciences*. Al-Aikat Printing and Publishing Company. <https://archive.org/details/01486-pdf/page/188/mode/2up>
- Al-Dabbas, H. M., & Jabbar, A. Y. (2022). The reality of e-learning and its impact on education in Iraq. *NTU Journal for Administrative and Human Sciences*, 2(3). <https://doi.org/10.56286/ntujahs.v2i3.256>
- Al-Dusaimani, M. S. A. (2023). Massive open online courses (MOOCs) and their role in improving university learning. *International Journal of E-Learning*, 2, 11–45. https://ijel.journals.ekb.eg/article_329274.html
- Al-Azawei, A., Parslow, P., & Lundqvist, K. (2016). Barriers and opportunities of e-learning implementation in Iraq: A case of public universities. *The International Review of Research in Open and Distributed Learning*, 17(5), 126–146. <https://doi.org/10.19173/irrodl.v17i5.2501>
- AL-Tabtabai, A. A. A., & Asadi, M. (2022). E-learning and its impact on the quality of higher education in Iraq: A survey study to faculty members in Baghdad and AlMustansiriya universities. *Al-Adab Journal*, 1(142), 543–582. <https://doi.org/10.31973/aj.v1i142.2711>
- Ali, Q., & Shiratuddin, N. (2018). Proposing a blended MOOC framework for Iraqi higher education: Current status, needs, challenges, and opportunities. *Journal of Advances in Education and Philosophy*, 2, 54–64. <https://www.researchgate.net/publication/339435415>
- Allam, S.-D. (2000). *Educational and psychological measurement and evaluation: Its foundations, applications, and contemporary guidelines*. Dar al-Fikr al-Arabi. <https://archive.org/details/AAlexandrina-017438/page/n233/mode/2up>
- Al Musawii, A. (2020). Comparative cash vision among massive open online courses (MOOCs) model and the blended learning model in the Arab Open University. *Comprehensive Multidisciplinary Electronic*

- Journal*. <http://irep.iium.edu.my/id/eprint/80167>
- Al-Obeiki, H. S. I. (2022). Massive open online courses (MOOCs) and requirements for their implementation in smart learning environments in the Arab world: The Rwaq platform as a model. *International Journal of E-Learning*, 1, 247–267. https://journals.ekb.eg/article_217073.html
- Al-Rahmi, W., Aldraiweesh, A., Yahaya, N., Kamin, Y., & Zeki, A. (2019). Massive open online courses (MOOCs): Data on higher education. *Data in Brief*, 118–125. <https://doi.org/10.1016/j.dib.2018.11.139>
- Al-Zubaidi, A., Al-Kinani, I., & Bakr, M. (1981). *Psychological tests and measures*. University of Mosul, College of Education.
- Ameen, N., Willis, R., Abdullah, M. N., & Shah, M. (2019). Towards the successful integration of e-learning systems in higher education in Iraq: A student perspective. *British Journal of Educational Technology*, 50(3), 1434–1446. <https://doi.org/10.1111/bjet.12651>
- Blum-Smith, S., Yurkofsky, M. M., & Brennan, K. (2021). Stepping back and stepping in: Facilitating learner-centered experiences in MOOCs. *Computers & Education*, 160, Article 104042. <https://doi.org/10.1016/j.compedu.2020.104042>
- Chiheb, A., & Fennour, N. (2022). E-learning: Concept, characteristics, types, and challenges. In *Distance e-learning in the context of the coronavirus pandemic* [Conference paper]. <https://www.researchgate.net/publication/359393330>
- Cooper, S., & Sahami, M. (2013). Reflections on Stanford's MOOCs. *Communications of the ACM*. <https://doi.org/10.1145/2408776.2408787>
- Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). SAGE Publications.
- Dabbagh, N. (2016). Massive open online courses. In *Learning technologies and globalization*. Springer. https://doi.org/10.1007/978-3-319-22963-8_2
- Daniel, J. (2012). Making sense of MOOCs: Musings in a maze of myth, paradox and possibility. *Journal of Interactive Media in Education*. <https://jime.open.ac.uk/articles/2012-18>
- Edisherashvili, N., Saks, K., Pedaste, M., & Leijen, Ä. (2022). Supporting self-regulated learning in distance learning contexts at higher education level: Systematic literature review. *Frontiers in Psychology*, 12, Article 792422. <https://doi.org/10.3389/fpsyg.2021.792422>
- Gaebel, M. (2013). *MOOCs: Massive open online courses*. European University Association. <https://www.eua.eu/downloads/publications/moocs%20-%20massive%20open%20online%20courses.pdf>
- Huang, H., Jew, L., & Qi, D. (2023). Take a MOOC and then drop: A systematic review of MOOC engagement pattern and dropout factor. *Heliyon*, 9(4), Article e15220. <https://doi.org/10.1016/j.heliyon.2023.e15220>
- Irwanto, I., Wahyudiati, D., Saputro, A., & Lukman, I. (2023). Massive open online courses (MOOCs) in higher education: A bibliometric analysis (2012–2022). *International Journal of Information and Education Technology*, 13(2). <https://www.ijiet.org/vol13/IJiet-V13N2-1799-IJiet-6328.pdf>
- Keleş, M. K., & Özel, S. A. (2016). A review of distance learning and learning management systems. In *Proceedings of the International Conference on Education in Mathematics, Science & Technology*. <https://doi.org/10.5772/65222>
- Liyanagunawardena, T. R., Adams, A. A., & Williams, S. A. (2013). MOOCs: A systematic study of the published literature 2008–2012. *The International Review of Research in Open and Distributed Learning*, 14(3), 202–227. <https://doi.org/10.19173/irrodl.v14i3.1455>
- Ma, L., & Lee, C. S. (2020). Drivers and barriers to MOOC adoption: Perspectives from adopters and non-adopters. *Online Information Review*, 44(3), 671–684. <https://doi.org/10.1108/OIR-06-2019-0203>
- Mahajan, R., Gupta, P., & Singh, T. (2019). Massive open online courses: Concept and implications. *Indian Pediatrics*, 489–495. <https://doi.org/10.1007/s13312-019-1575-6>
- Margaryan, A., Bianco, M., & Littlejohn, A. (2015). Instructional quality of massive open online courses (MOOCs). *Computers & Education*, 80, 77–83. <https://doi.org/10.1016/j.compedu.2014.08.005>
- Ministry of Higher Education and Scientific Research, Iraq. (2020a, August 18). *UNESCO appreciates Iraqi higher education's strategy on adopting blended education*. <https://www.mohe.gov.iq/en/post/unesco-appreciates-iraqi-higher-educations-strategy-adopting-blended-education>
- Ministry of Higher Education and Scientific Research, Iraq. (2020b, June 26). *UNESCO representative to Iraq praises the e-learning procedures and MOHESR's response to the COVID-19 crisis*. <https://www.mohe.gov.iq/en/post/unesco-representative-iraqi-praises-e-learning-procedures-mohesr-response-covid-19-crisis>
- Mohammed, R. (2019). The importance of implementing e-learning in higher education in Iraq. *Lark*, 5.

- <https://doi.org/10.31185/lark.Vol4.Iss31.221>
- Moore, M. G. (2023). From correspondence education to online distance education. In O. Zawacki-Richter & I. Jung (Eds.), *Handbook of open, distance and digital education*. Springer. https://doi.org/10.1007/978-981-19-0351-9_2-1
- Moore, R. L., & Blackmon, S. J. (2022). From the learner's perspective: A systematic review of MOOC learner experiences (2008–2021). *Computers & Education*, 190, Article 104596. <https://doi.org/10.1016/j.compedu.2022.104596>
- Numan, H., Elareshi, M., & Atanasova, D. (2022). Iraqi university students' emergency remote learning experiences during COVID-19. *International Journal of Interactive Mobile Technologies*, 16(18), 162–173. <https://doi.org/10.3991/ijim.v16i18.31127>
- Ogunyemi, A. A., Quaicoe, J. S., & Bauters, M. (2022). Indicators for enhancing learners' engagement in massive open online courses: A systematic review. *Computers and Education Open*, 3, Article 100088. <https://doi.org/10.1016/j.caeo.2022.100088>
- Papadakis, S. (2023). MOOCs 2012–2022: An overview. *Advances in Mobile Learning Educational Research*. <https://www.syncsci.com/journal/AMLER/article/view/AMLER.2023.01.017>
- Qandilji, A. (1999). *Scientific research and the use of information sources*. Dar Al-Yazourdi Scientific Publishing and Distribution. https://archive.org/details/albahth_alilmy/page/95/mode/2up
- Rizvi, S., Rienties, B., Rogaten, J., & Kizilcec, R. F. (2024). Are MOOC learning designs culturally inclusive (enough)? *Journal of Computer Assisted Learning*, 40(6), 2496–2512. <https://doi.org/10.1111/jcal.12883>
- Ruipérez-Valiente, J. A., Halawa, S., Slama, R., & Reich, J. (2020). Using multi-platform learning analytics to compare regional and global MOOC learning in the Arab world. *Computers & Education*, 146, Article 103776. <https://doi.org/10.1016/j.compedu.2019.103776>
- Sallam, M. H. (2017). A review of MOOCs in the Arab world. *Creative Education*, 8(4), 564–573. <https://doi.org/10.4236/ce.2017.84044>
- Scherer, R., Siddiq, F., Howard, S. K., & Tondeur, J. (2023). Gender divides in teachers' readiness for online teaching and learning in higher education: Do women and men consider themselves equally prepared? *Computers & Education*, 199, Article 104774. <https://doi.org/10.1016/j.compedu.2023.104774>
- Shah, D. (2021, December 28). *A decade of MOOCs: A review of stats and trends for large-scale online courses in 2021*. Class Central. <https://www.classcentral.com/report/moocs-stats-and-trends-2021/>
- Stracke, C. M., & Trisolini, G. (2021). A systematic literature review on the quality of MOOCs. *Sustainability*, 13(11), Article 5817. <https://doi.org/10.3390/su13115817>
- Stracke, C., Downes, S., Conole, G., Burgos, D., & Nascimbeni, F. (2019). Are MOOCs open educational resources? A literature review on history, definitions and typologies of OER and MOOCs. *Open Praxis*, 11(4), 331–341. <https://doi.org/10.5944/openpraxis.11.4.1010>
- Tabbi, M. (2020). E-learning: A contemporary mechanism towards activating the educational process. *Social Empowerment Journal*, 4, 75–85. <https://asjp.cerist.dz/en/article/137770>
- Tseng, T. H., Lin, S., Wang, Y.-S., & Liu, H.-X. (2022). Investigating teachers' adoption of MOOCs: The perspective of UTAUT2. *Interactive Learning Environments*, 30(4), 635–650. <https://doi.org/10.1080/10494820.2019.1674888>
- Ucha, C. R. (2023). Role of course relevance and course content quality in MOOCs acceptance and use. *Computers and Education Open*, 5, Article 100147. <https://doi.org/10.1016/j.caeo.2023.100147>
- Park, S. Y. (2009). An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning. *Educational Technology & Society*, 12(3), 150–162. <https://www.jstor.org/stable/jeductechsoci.12.3.150>
- Wang, W.-T., & Wang, C.-C. (2009). An empirical study of instructor adoption of web-based learning systems. *Computers & Education*, 53(3), 761–774. <https://doi.org/10.1016/j.compedu.2009.02.021>
- Yaseen, I., & Demir, Ç. (2021). MOOC (massive open online courses) as an advanced technique to study the English language. *European Journal of English Language Teaching*, 4. <https://oapub.org/edu/index.php/ejel/article/view/3689>
- Yusof, A., Atan, N. A., Harun, J., & Doulatabadi, M. (2017). Understanding learners' persistence and engagement in massive open online courses: A critical review for Universiti Teknologi Malaysia. *Man in India*, 97, 147–157. <https://www.semanticscholar.org/paper/Understanding-learners%27-persistence-and-engagement-Yusof-Atan/c0b3d349646ff0bbee6e87a048e9b6b66423bd3a>
- Zgheib, G., Al Daia, R., & Serhan, M. (2023). A contextual approach for exploring faculty readiness to teach online. *Heliyon*, 9(10), Article e20491. <https://doi.org/10.1016/j.heliyon.2023.e20491>