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Students and lecturers' perspectives on MOOCs as an educational innovation for sustainable learning

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ABSTRACT

The integration of Massive Open Online Courses (MOOCs) into higher education in Indonesia continues to face significant challenges, particularly regarding their effectiveness in supporting sustainable learning. Most prior studies have predominantly focused on technical aspects such as platform usage and user participation rates. At the same time, limited attention has been given to the impact of MOOCs on long-term skill development, learner autonomy, and their formal integration into academic curricula. This study offers a novel contribution by deeply exploring the perspectives of both students and lecturers on MOOCs as an educational innovation for sustainable learning in higher education. Employing a mixed-methods approach, the research utilized the MOOC Integration Perception Scale (MIPS) for quantitative data and the MOOC Sustainability Interview Protocol (MSIP) for qualitative inquiry. A total of 120 students and 20 lecturers from diverse Indonesian universities participated as respondents. Quantitative data were analyzed using descriptive statistics and independent samples t-tests, while qualitative data were examined through thematic analysis. Findings reveal that both students and lecturers highly value the flexibility and accessibility of MOOCs, especially in overcoming geographic and temporal barriers. However, concerns remain about the lack of direct interaction and the limited provision of personalized feedback, which hinders the pedagogical depth of these platforms. This study recommends the development of blended learning models and improvements in digital infrastructure, especially in underdeveloped regions, as strategic efforts to enhance MOOC integration in higher education. Future research should adopt longitudinal approaches to assess the long-term effects of MOOCs on learning outcomes, skill development, and learner autonomy.

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INTRODUCTION

The rapid advancement of digital technologies over the past decade has profoundly transformed educational systems worldwide, notably through the emergence of Massive Open Online Courses (MOOCs), which offer unprecedented access to learning opportunities beyond geographical limitations. Observations by the author suggest that MOOCs are no longer merely

utilized as emergency alternatives during crises such as the COVID-19 pandemic; rather, they are increasingly considered integral components of long-term learning strategies in higher education institutions. MOOCs provide temporal and spatial flexibility, enabling learners to access thousands of modules from prestigious universities either for free or at low cost. However, in practice, the integration of MOOCs into formal education remains suboptimal, particularly in fostering sustainable learning outcomes. While many institutions have begun to adopt MOOCs, there remains a lack of clarity regarding how these courses contribute to the long-term development of student competencies or address the demands of 21st-century skills, including critical thinking, collaboration, and complex problem-solving. This study, therefore, aims to critically examine students' and lecturers' perceptions of MOOC integration in higher education and to explore how these platforms can be strategically leveraged to support sustainable learning and the development of future-relevant skills.

Online Courses (MOOCs) and their actual implementation in supporting sustainable learning. While MOOCs are envisioned as tools to bridge educational access gaps and enhance learning quality, several persistent challenges continue to hinder the realization of these goals. According to UNESCO data, over 60% of MOOC participants in developing countries do not complete their courses, and fewer than 10% report applying the knowledge gained to real-life or professional contexts (Senevirathne et al., 2022). This shortfall is further exacerbated by the fact that most MOOCs remain predominantly informative in nature, lacking the integration of active and reflective learning approaches necessary for sustainable learning outcomes (Zhou et al., 2025). Additionally, many MOOCs are not contextually adapted to the specific needs and learning characteristics of students in higher education, calling into question their alignment with national curricula and local educational priorities (García-Peñalvo et al., 2018). Another critical concern is the absence of standardized assessment systems to evaluate the long-term educational impact of MOOCs, particularly in fostering the internalization of sustainability values, interdisciplinary collaboration, and the development of lifelong learning dispositions. These gaps underscore the urgent need for a more strategic and pedagogically grounded approach to MOOC integration within higher education systems.

The novelty of this study lies in its conceptual departure from prior research that predominantly emphasizes the technical dimensions of MOOCs, such as user interface design or platform engagement, toward positioning MOOCs as integral components of sustainable learning systems in higher education. Unlike previous studies, such as Li et al., (2024), which primarily focused on user experiences and platform usability, this research aims to critically examine the role of MOOCs in fostering long-term educational transformation. Similarly, works by Aparicio et al., (2019) and Hughes (2025) assessed MOOCs through the lenses of gamification and learning retention rates, while Wei & Taecharungroj (2022) concentrated on business models and patterns of technological adoption. Hendriks et al., (2024) explored students' motivations for enrolling in MOOCs but did not address their broader impact on sustainable learning outcomes. Even comprehensive global reviews by Berde et al., (2024) and Ruipérez-Valiente et al., (2022), despite mapping the evolution of MOOCs, fell short of investigating how these platforms can be systematically integrated into higher education to cultivate sustainable competencies. This study, therefore, fills a critical gap in the literature by exploring both student and lecturer perspectives on MOOC integration as a strategic mechanism for promoting sustainable learning within the higher education landscape.

Departing from the predominantly technical, institutional, and motivational approaches adopted in previous studies (Rivera et al., 2025; Harnadi et al., 2024; Gao, 2024), this research offers a holistic perspective that integrates user perceptions with an analysis of curriculum policy implementation and the long-term potential for capacity development in learning. By bridging individual experiences with systemic educational frameworks, the study contributes significantly to the existing body of literature. It introduces a conceptual model for the integration of MOOCs into higher education curricula grounded in the principles of sustainable learning. Furthermore, it provides strategic, context-specific, and actionable recommendations for higher education institutions navigating the challenges and opportunities of digital transformation. This dual

emphasis on pedagogical relevance and institutional alignment positions the study as a timely and impactful contribution to advancing educational innovation in a rapidly evolving global landscape.

Building on the aforementioned discussion, this study aims to critically explore and analyze students' and lecturers' perceptions of the integration of Massive Open Online Courses (MOOCs) into higher education, with particular emphasis on their role in supporting sustainable learning and the development of long-term skills. The objective is not only to generate empirical findings, but also to contribute theoretically by proposing an adaptive framework for MOOC implementation that responds to the evolving challenges of future education. The outcomes of this study are expected to serve as a foundation for institutional policymaking in developing hybrid learning models grounded in the principles of sustainable education and aligned with the competencies required in the 21st century.

METHOD

Type of Research

The approach in this study uses a mixed method, combining quantitative and qualitative methods. The quantitative aspect focuses on measuring students' and lecturers' perceptions through structured questionnaires. The qualitative component involves in-depth interviews in exploring lecturers' and students' perspectives comprehensively. Identifying the challenges and opportunities of MOOCs and their role in supporting continuous learning in higher education is the aim of this study.

Research Subjects

This study focused on two groups of participants with direct experience in the use and integration of Massive Open Online Courses (MOOCs) within the context of higher education. The first group consisted of 120 undergraduate students from Nurul Jadid University who had participated in MOOC-based learning for at least one academic semester. The second group comprised 20 faculty members who had integrated MOOCs into their teaching practices for a minimum of one semester.

Participants were selected purposively using a purposive sampling technique, based on their active involvement and the relevance of their experience to the research objectives. This sampling strategy was chosen to ensure the collection of rich and contextually grounded data, allowing for an in-depth exploration of perceptions, effectiveness, as well as the challenges and opportunities associated with MOOC implementation in higher education.

Research Procedure

The research procedure began with the collection of quantitative data through questionnaires distributed to students and lecturers at Nurul Jadid University. After quantitative data were collected, in-depth interviews were conducted with selected respondents based on questionnaire responses to gain deeper insight into perceptions and experiences of MOOCs.

The research procedure follows the following steps, 1) Developing a questionnaire and interview guide; 2) Distributing the questionnaire to selected respondents; 3) Analyzing the questionnaire results to select interview participants; 4) Conducting in-depth interviews with students and lecturers of Nurul Jadid University; 5) Analyzing interview data and triangulating with the questionnaire results; 6) Writing a research report based on the findings.

Instruments and Data Collection

The primary data collection instruments employed in this study consisted of a structured questionnaire titled MOOC Integration Perception Scale (MIPS) and a semi-structured interview guide referred to as the MOOC Sustainability Interview Protocol (MSIP). The MIPS was developed to assess both students' and lecturers' perceptions of the effectiveness of MOOCs in supporting sustainable learning. It focused on key indicators such as flexibility, accessibility, self-paced learning, lack of direct interaction, and limited feedback mechanisms. Complementing the quantitative tool, the MSIP was used to gain deeper insights into participants' experiences and

opinions regarding MOOCs. The interviews explored themes including the sustainability of learning, the long-term benefits of MOOCs, and the pedagogical and institutional challenges lecturers face when integrating MOOCs into formal higher education settings.

Table 1. The Key Aspects of the Instrument

No.	Instrument	Type	Measured Indicators	Usage
1	Questionnaire	Structured Survey	Accessibility, Flexibility, Learning Outcomes, Challenges	Distributed to students and lecturers
2	Interview Guide	Semi-Structured	Sustainability of learning, Long-term benefits of MOOCs	Used for in-depth interviews

For data analysis, both quantitative and qualitative approaches were utilized. Quantitative data collected through the MIPS were analyzed using descriptive statistics, with independent sample t-tests conducted to compare perceptions between students and lecturers. This analysis aimed to identify prevailing trends and potential differences in attitudes toward MOOC effectiveness. Meanwhile, qualitative data obtained from the MSIP interviews were examined using thematic analysis. Interview transcripts were systematically coded according to recurring themes such as flexibility in learning, access to digital resources, the self-paced nature of MOOCs, limitations in direct interaction, and constraints in receiving timely and personalized feedback.

Instrument Validity and Reliability

To ensure the appropriateness and robustness of the research instruments used to measure students' and lecturers' perceptions of MOOC integration in sustainable learning, a comprehensive validity and reliability assessment was conducted. Content validity was established through expert judgment involving two specialists in the fields of instructional technology and MOOC research. These experts were invited to evaluate the relevance and alignment of each questionnaire item with the targeted indicators. Their feedback and recommendations were systematically incorporated to refine the wording and clarity of selected items, thereby enhancing the instrument's precision and construct alignment.

Table 2. Summary of Content Validity Assessment

No.	Area of Expertise	Feedback on Instrument Items	Information
1	Instructional Technology and e-Learning	The items in the MIPS scale are aligned with the indicators of sustainable learning and MOOC practices.	Valid
2	MOOC Research and Digital Curriculum	The instrument adequately covers key aspects such as flexibility, interaction, and digital accessibility.	Valid, with minor editorial revisions recommended for 2 items

Subsequently, a reliability test was conducted to evaluate the internal consistency of the questionnaire using Cronbach's Alpha coefficient. The results revealed that all dimensions of the MOOC Integration Perception Scale (MIPS) achieved $\alpha > 0.7$, indicating that the instrument items were consistently reliable. The overall Cronbach's Alpha score reached 0.882, which is categorized as highly reliable and demonstrates strong internal coherence across all measured constructs.

Table 3. Reliability Test of the MOOC Integration Perception Scale (MIPS)

No.	Theme	Item	Cronbach's Alpha	Information
1	Flexibility in learning	7	.821	Reliable
2	Accessibility to resources	6	.792	Reliable
3	Self-paced learning	7	.809	Reliable
4	Lack of direct interaction	6	.745	Quite Reliable
5	Limited opportunities for feedback	9	.857	Very Reliable
Total		**35**	**.882**	

Decision-Making Criteria

To ensure the trustworthiness of the qualitative interview data, validation procedures were carried out using triangulation and member checking techniques. Triangulation was employed to compare and cross-verify data obtained from interviews with the quantitative findings and relevant secondary sources, thereby enhancing the credibility of the interpretations. Member checking was conducted by soliciting feedback from participants on the accuracy of the researcher's interpretations, ensuring that the analyzed data authentically represented their perspectives and experiences.

For quantitative data analysis, decision-making will be based on the results of the t-test. Significant differences in student and lecturer perceptions will be considered if the p-value is less than 0.05. In qualitative analysis, decisions are made by the main themes that emerge from the data, considering the frequency and consistency of findings across respondents.

RESULTS AND DISCUSSION

Results

The research results are presented in both quantitative and qualitative forms to align with the mixed-methods approach of the study. The findings are displayed using descriptive statistics, tables, and graphical representations to provide clear insights into the data collected from the questionnaires and interviews.

Data collected through surveys and interviews revealed that both groups acknowledged the flexibility and accessibility that MOOCs provide, particularly in overcoming geographical barriers. However, a marked difference in perception emerged between the two groups. Students generally rated MOOCs better in terms of accessibility and flexibility, while lecturers expressed concerns about the lack of interaction and personalized feedback. To investigate whether the differences in perceptions between students and lecturers were statistically significant, an independent samples t-test was conducted.

Table 4. Independent t-Test Results: Students' and Lecturers' Perceptions of MOOCs

No.	Variabel	N	Mean	Std. Dev	t-value	p-value
1	Students' Perceptions	120	4.23	0.56	2.45	0.015*
2	Lecturers' Perceptions	20	3.85	0.65		

*Significant at $p < 0.05$

As shown in Table 4, the t-value of 2.45 with a p-value of 0.015 indicates a significant difference in perception between students and lecturers ($p < 0.05$). Students had higher mean scores ($M = 4.23$) than lecturers ($M = 3.85$), indicating that students were more satisfied with the flexibility and accessibility provided by MOOCs. The significant differences in students' and lecturers' perceptions indicate that although both groups acknowledge the advantages of MOOCs in terms of flexibility and accessibility, students tend to view these aspects more positively. Relevant to previous research, which found that students could access learning from anywhere according to their abilities (Zakaria et al., 2024). On the other hand, lecturers were critical of the lack of interaction and the inability to provide feedback, which are essential components of effective and personalized learning.

These findings highlight the potential of MOOCs to democratize education by expanding access. However, they also underscore the importance of addressing pedagogical challenges, such as increasing interaction and feedback mechanisms. Providing integrated MOOCs with traditional or hybrid learning can increase the effectiveness of learning in higher education environments. Qualitative data processing was obtained through in-depth interviews with selected students and lecturers. Thematic analysis revealed the following main themes:

Research Question 1: How do Students Perceive the Role of MOOCs in Supporting their Learning?

Through thematic analysis of interviews, students highlighted the flexibility, accessibility, and self-directed learning provided by MOOCs as the main benefits. Most students (85%) stated that MOOCs enable them to manage their time effectively and independently, balancing academic responsibilities. Students stated that MOOCs have opened the door to high-quality education.

Table 5. Key Themes from Student Interviews

No.	Theme	Frequency (N = 20)	Example Quotes
1	Flexibility in Learning	17	"I can access courses anytime, anywhere."
2	Accessibility to Resources	15	"MOOCs provide access to material not available in my local university."
3	Self-paced Learning	12	"I can take my time to understand difficult topics, which helps my learning process."

Research Question 2: What are the Lecturers' Concerns Regarding MOOCs as a Sustainable Educational Tool?

Lecturers expressed concerns about the lack of interaction and personalized feedback in MOOCs. Although MOOCs are useful for delivering content, the absence of direct discussion and feedback poses challenges in assessing student understanding and engagement. Approximately 70% of lecturers interviewed emphasized that the passive nature of MOOCs limits critical thinking and student engagement.

Table 6. Key Themes from Lecturer Interviews

No.	Theme	Frequency (N = 10)	Example Quotes
1	Lack of Direct Interaction	7	"There's no way to gauge whether students are truly engaged with the material."
2	Limited Opportunities for Feedback	6	"Without feedback, it's difficult to know if students are mastering the material."
3	Passive Learning Environment	5	"MOOCs tend to make students passive learners; they don't engage in discussions."

The findings reveal a dichotomy in perception between students and lecturers. While students emphasized the convenience and autonomy that MOOCs offered, lecturers had concerns about the lack of active learning elements and interaction, which they said were important for student success. These differing perspectives highlight the need for improvements in the pedagogical design of MOOCs to address flexibility and engagement.

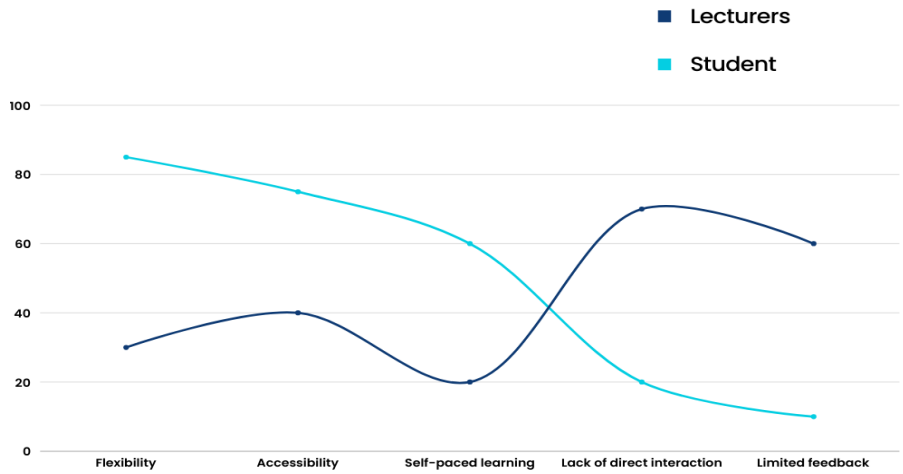

Figure 1. Comparison of Perceived Benefits of MOOCs between Students and Lecturers

Visually, the diagram above compares the differences in perceptions of students and lecturers. Students are more inclined towards the benefits of accessibility and flexibility, while lecturers' views are towards the challenges of interaction and engagement.

This qualitative analysis provides insights into the strengths and limitations of MOOCs from the perspectives of students and lecturers. MOOCs present significant opportunities to expand access to education, but require further pedagogical refinement to meet expectations.

Discussion

The discussion in this study focuses on several key findings about students' and lecturers' perceptions of MOOCs (Massive Open Online Courses), while answering the research questions and objectives. The discussion in this study aims to contextualize the results in existing literature and theory, and explore the potential contributions of the study, limitations, and implications for future research and practice.

The findings of this study indicate that both students and instructors hold favorable perceptions of Massive Open Online Courses (MOOCs), particularly in terms of accessibility and flexibility. The consistently high mean scores (above 4.0) in these categories reinforce the core strengths of MOOCs, as previously identified (Shah et al., 2023; Ivone et al., 2024; Putra et al., 2024). These studies emphasize that MOOCs provide unparalleled opportunities for learners to access educational content asynchronously, from virtually any location with internet connectivity. Such features are especially critical in geographically diverse nations like Indonesia, where significant disparities exist in access to quality education between urban centers and remote or underdeveloped regions.

In this context, MOOCs emerge not merely as a technological innovation but as a strategic mechanism for expanding equitable access to higher education. The alignment of these findings with global trends further underscores the transformative potential of MOOCs to support inclusive and sustainable learning ecosystems. As Iniesto & Rodrigo (2024) and Putra et al., (2024) have argued, MOOCs can serve as an essential supplement to traditional educational systems, particularly in areas where institutional resources and infrastructure remain limited or underdeveloped. Therefore, the strategic integration of MOOCs into national higher education policy may serve as a critical step toward building long-term learning capacity, promoting educational inclusion, and responding to the evolving demands of the Fourth Industrial Revolution and 21st-century skills development. This study contributes to the growing body of knowledge on MOOCs by reinforcing their relevance not only as flexible learning tools, but also as instruments for structural educational transformation.

However, a closer examination of the qualitative data reveals the complexity of the challenges to this potential. Students and lecturers complained about digital infrastructure issues, particularly internet access. This reflects the findings of Cabanlit & Domingo (2024), Huang & Quan (2025), and Connolly et al., (2025), who noted the “digital divide” as a persistent barrier to MOOC adoption. While MOOCs have inherent accessibility, local context, particularly digital infrastructure, significantly impacts their effectiveness. These findings suggest that MOOCs are addressing certain educational gaps, but that they must be implemented in conjunction with efforts to improve digital infrastructure to realize their full potential.

Another important finding was the lower scores for learning outcomes, especially from the lecturer's perspective. In line with Javed et al., (2023), who concluded that despite MOOCs’ wide accessibility and flexibility, students and lecturers expressed concerns about the lack of personalized interaction and feedback. Zhang’s study also highlighted the success of MOOCs in delivering content, but they also often fail to foster deep learning and engagement due to limited interaction between lecturers and students. In this study, lecturers expressed difficulty in maintaining the same level of engagement and support that they could offer in a traditional learning environment. Qualitative interviews further confirmed that participants perceived a lack of personal connection, which may hinder the overall effectiveness of MOOCs in achieving meaningful educational outcomes (Sebbaq & Faddouli, 2024).

The challenges of fostering engagement and interaction in MOOCs have been widely discussed in the literature, and previous research has shown. Celik & Cagiltay (2024), Lexman &

Baral (2024), and Smiling & Hollebrands (2025) argued that while MOOCs excel in content delivery, their pedagogy lacks the richness of a face-to-face learning environment, particularly in areas such as critical thinking and personalized support. The findings of this study are in line with Bali's findings and suggest the need for future MOOCs to incorporate more interactive elements, such as live discussions, virtual office hours, or AI-driven feedback systems to increase engagement. These enhancements would address the gap between content delivery and meaningful learning experiences, making MOOCs not only a tool for knowledge dissemination but also a platform for comprehensive learning.

Another important aspect of this discussion was the sustainability of MOOCs as a long-term learning solution. Students and lecturers identified self-paced learning as a key benefit, allowing students to revisit content as needed and engage with the material at their own pace. This aligns with the concept of lifelong learning, which Cagiltay et al., (2024) identified as an important benefit of MOOCs. However, challenges with maintaining motivation and self-discipline were recurring themes in the qualitative data. Watted & Barak (2024) indicated that high dropout rates were a significant problem with MOOCs, and this study supports these findings, with students citing a lack of external accountability as a reason for disengagement. To address this issue, future MOOC designs could incorporate gamification strategies or more structured learning paths that help maintain student motivation and foster a sense of community (Nanjundaswamy et al., 2021).

These findings also have significant implications for the education system. While most research on MOOCs has focused on global or Western contexts, this study provides unique insights into the opportunities and challenges of MOOCs in Indonesia (Iniesto & Rodrigo, 2024). The high rankings for accessibility and flexibility suggest that MOOCs could play a significant role in addressing educational disparities across the country (Zakaria et al., 2024). However, the findings also highlight the need to adapt MOOCs to local contexts (Li et al., 2024), and improving digital infrastructure and finding ways to integrate MOOCs with traditional classroom settings could enhance their effectiveness (Kamble et al., 2024). By contextualizing MOOCs within the specific educational needs and challenges of Indonesia, this study offers valuable insights that can inform future policy and practice.

This study is one of the few studies that includes both student and lecturer perspectives on MOOCs, providing a more comprehensive view of their potential and limitations. While most of the literature focuses solely on student experiences, this study highlights the important role of lecturers in shaping the success of MOOCs (Nanjundaswamy et al., 2021; Javed et al., 2023). The results suggest that lecturer engagement and support are important factors that influence MOOC learning outcomes. These findings add a new dimension to the discourse on MOOCs and suggest that future research should explore ways to better integrate instructors into the MOOC learning experience.

However, this study also has limitations. First, the sample size was limited to students and lecturers from a single university, which may limit the generalizability of the findings to other contexts. Second, while this study explored perceptions, it did not measure actual learning outcomes. Future research should address this gap by examining the impact of MOOCs on students' academic performance and educational achievement. Furthermore, while this study focused on the Indonesian context, further research could compare its findings with those from other developing countries to gain a broader understanding of the challenges and opportunities associated with MOOCs.

This study contributes to the growing body of research on MOOCs by providing specific insights into the higher education system in Indonesia. This study highlights the potential of MOOCs to increase accessibility and flexibility in education, while identifying key challenges related to digital infrastructure, engagement, and learning outcomes. The findings suggest that for MOOCs to reach their full potential, they must be adapted to local contexts, both in terms of infrastructure and pedagogical design. By offering a balanced view of the benefits and limitations of MOOCs, this study provides valuable implications for educators, policymakers, and researchers interested in the future of online education.

CONCLUSION

This study adequately addresses the research objectives by demonstrating that MOOCs have provided significant benefits in terms of accessibility and flexibility for students and lecturers. However, MOOCs also present challenges related to personalized interaction and feedback. The findings suggest that MOOCs can play a significant role in expanding access to education, particularly in areas with limited physical infrastructure. The lack of face-to-face interaction and inadequate feedback mechanisms limit their effectiveness in fostering deeper student engagement and understanding. These insights are consistent with previous research and highlight the need for better pedagogical strategies. From these findings, MOOCs should be equipped with more interactive and personalized elements to enhance students' learning experiences. For practical implications, educational institutions and policymakers should focus on integrating MOOCs with traditional learning approaches or developing hybrid models that combine online and face-to-face interactions. Additionally, improving technological infrastructure, particularly in underserved areas, is essential to maximizing the potential of MOOCs in higher education. Finally, future research should explore the long-term impact of MOOCs on student learning outcomes and investigate methods to enhance the interactivity and effectiveness of these platforms to support sustainable and comprehensive learning.

Based on these insights, several recommendations are proposed: First, higher education institutions should consider adopting blended learning models that integrate MOOCs with traditional classroom approaches. By doing so, institutions can leverage the strengths of both modalities (flexibility from MOOCs and interpersonal engagement from face-to-face learning) to improve educational outcomes. Second, the design of MOOCs should be enhanced to include more interactive and personalized learning components. This includes incorporating moderated discussion forums, adaptive feedback systems, and live tutorial sessions or mentoring components to better support student comprehension and motivation. Third, policymakers and educational stakeholders should prioritize improving technological infrastructure, especially in underserved areas. Ensuring equitable access to stable internet connections, digital devices, and technical support is essential to enable the effective implementation of MOOCs across diverse learning environments. Fourth, Future research is encouraged to employ longitudinal methodologies to rigorously assess the long-term impact of MOOCs on learning outcomes, skill acquisition, and learner autonomy. Further empirical investigations are also warranted to identify best practices in the design of interactive and personalized features that enhance the pedagogical effectiveness of MOOC platforms. By addressing these critical areas, MOOCs have the potential to transcend their current limitations and evolve into transformative instruments for inclusive, sustainable, and forward-looking higher education.

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