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Research Article

Assessing MOOC Courses and its Impact on Sustainable Development among Higher Education Teachers

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In order to improve teachers' performance on technological advancement in higher education institutions, this research aims to better understand the MOOC Courses and their impact on sustainable development among higher education teachers. Through the use of an online questionnaire with two scales and identification questions, this study adopted a quantitative methodology. 145 respondents were chosen at random from the workforce and management of these institutions to make up the sample. The results gathered via the questionnaire were examined with statistical tools like descriptive statistics and SEM Model. Teachers from both private and government sector colleges are taken into consideration as a sample for this study. According to the findings, 76 of them are male and 89 are female; also, the majority of the respondents range in age from 20-30, who happen to total 59, which clearly shows that the teachers are in the early stages of their careers. Adapting MOOC Courses is facilitated by the habit of self-development and an inner drive to learn something new. However, inner drive alone cannot have an impact. The teachers' skill gap prevents the inner urge to adopt MOOC Courses and results in their inability to learn through a new medium. It is vital to advocate for the involvement of teachers who will lead the change process in the implementation processes in order to boost the productivity of institutions.

Keywords
MOOC courses, effective communication, higher education, modern education system, sustainable development

INTRODUCTION

Importance of the Study

Massive Open Online Courses have emerged as a significant innovation in higher education, offering a range of benefits to students, educators, and institutions. One of their primary advantages is accessibility; they eradicate financial and geographical barriers by providing learners worldwide with free or low-cost access to high-quality courses from prestigious universities. MOOCs are a critical capability in the swiftly evolving job market of the present day, as they enable individuals to upskill or reskill at their own pace, thereby facilitating lifelong learning. Furthermore, they promote personalized learning, which enables students to enroll in courses that are specifically tailored to their career goals and interests. MOOCs offer institutions the opportunity to showcase their expertise, experiment with digital pedagogy, and engage a more diverse audience. Furthermore, they foster networking and collaboration among a global community of learners. In general, MOOCs are transforming higher education by improving the responsiveness, inclusivity, and flexibility of the learning experience to the changing needs of a diverse student body. Massive Open Online Courses have emerged as a significant innovation in higher education, offering a range of benefits to students, educators, and institutions. One of their primary advantages is accessibility; they eradicate financial and geographical barriers by providing learners worldwide with free or low-cost access to high-quality courses from prestigious

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universities. MOOCs are a critical capability in the swiftly evolving job market of the present day, as they enable individuals to upskill or reskill at their own pace, thereby facilitating lifelong learning. Furthermore, they promote personalized learning, which enables students to enroll in courses that are specifically tailored to their career goals and interests. MOOCs offer institutions the opportunity to showcase their expertise, experiment with digital pedagogy, and engage a more diverse audience. Furthermore, they foster networking and collaboration among a global community of learners. In general, MOOCs are transforming higher education by improving the responsiveness, inclusivity, and flexibility of the learning experience to the changing needs of a diverse student body.

Recent Trends/Development in MOOC Courses

Recent research on MOOC courses has identified numerous noteworthy trends and areas of emphasis. Learning analytics is a substantial discipline that utilizes big data to enhance and monitor the learning experiences of students. This includes the analysis of student behavior, the prediction of attrition rates, and the provision of personalized learning pathways. The research has shown that learning analytics can improve educational outcomes and reduce attrition rates by offering insights into student engagement and progress.

However, the importance of ethical considerations in the context of data privacy and the necessity of explicit guidelines is increasing in this field.

An additional area of research is the examination of MOOC design and pedagogy. The impact of course structure, content delivery, and interactive elements on learner satisfaction and retention has been the subject of research. Additionally, there is a growing interest in understanding the effectiveness of MOOC-based credentials and their importance in the job market.

Why MOOC's Courses are the Future

MOOC courses are currently the subject of extensive research and are of great significance, as they have the potential to democratize education and provide flexible, accessible learning opportunities on a global scale. They offer learners the chance to acquire skills from prestigious institutions without being constrained by financial or geographic limitations. The comprehension of learner behavior through analytics, the enhancement of course design, and the mitigation of high attrition rates have been the primary focus of more recent research. Additionally, the significance of MOOCs in lifelong learning and their influence on workforce development are critical research areas. The educational value of MOOCs is optimized to ensure that they satisfy the diverse needs of learners, and their sustainability and efficacy are evaluated as technology advances.

Problem Statement

One of the numerous challenges that MOOC courses face is the difficulty of maintaining course quality and relevance, as well as high attrition rates and limited engagement. In these self-paced environments, a substantial number of learners encounter challenges with self-discipline and motivation, which leads to low completion rates. Additionally, the process of accommodating learners from a diverse range of backgrounds and with varying learning requirements can be exacerbated by the one-size-fits-all approach. So this study focuses on the impact of MOOC courses in higher education.

Research Objectives and Questions

Research objectives

1. To investigate the impact of MOOC courses on teachers' performance for sustainable development in the higher education sector.
2. To examine the relationship between digital competency factors and professional development.

Research questions

1. Which online courses specifically tackle the digital competencies of higher education teachers?
2. Do current online courses adequately prepare higher education teachers for a wide range of digital competencies?

Novelty of this Study

This study focuses on the impact of MOOC courses on higher education. This research suggests that

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adaptive learning technologies, which customize content for individual learners, are recommended by researchers as a means of addressing these concerns. Enhanced interactive components, such as peer feedback and discussion forums, can also promote engagement. Furthermore, the incorporation of credentialing options, such as micro-certificates or cumulative credits, can serve to enhance the value and motivate completion.

Research Methodology

The study focused on the employees of both private and government colleges. A total of 145 employees were interviewed. Percentage analysis and SEM model analysis were carried out using SPSS and AMOS. The sampling technique adopted for this study is proportionately stratified random sampling technique.

REVIEW OF LITERATURE

Challenges in MOOC

Sinha (2024) according to the research of Mr. Sinha, learning as a significant milestone is essential for the establishment of a progressive and informed society. In order to secure livelihood opportunities, continuous learning is the sole method of acquiring pertinent skills and enhancing one's knowledge. Individuals are zealously and assiduously pursuing a global form of learning to ensure a sustainable and advanced civilization in the industrial and digital environment of the 21st century, as they are dedicated to "earning while learning." In this context, diverse online courses, including MOOCs and OERs (Open Educational Resources), provide individuals with a multitude of opportunities by introducing them to a global form of learning.

Impact of MOOC in Higher Education

Yadav (2024) a consequence of digital learning has been the transformation of the educational landscape, which provides new opportunities for personalized and adaptable learning experiences. These findings are underscored by this investigation. This document delves into the historical evolution, contemporary trends, and future prospects of digital learning. It examines the opportunities and challenges associated with digital learning, including equity, accessibility, and quality assurance. The paper evaluates the efficacy of digital teaching techniques and their influence on students' performance through the analysis of empirical studies and case studies. In summary, the potential of digital learning to considerably alter the educational landscape is emphasized, while also highlighting the necessity of ongoing research and legislative initiatives to fully realize its potential and overcome its limitations.

Sharma & Nathani (2023) this study investigates the influence of MOOCs on higher education in Gwalior and the adjacent regions, as evidenced by this research. The primary goal of this study is to investigate the critical components of the teaching and learning processes that are implemented in Gwalior and the surrounding regions by utilizing open-source courses (MOOCs) in higher education. Descriptive and analytical methodologies were implemented in this investigation. In order to accumulate the required data, quantitative surveys were conducted. The research cohort was composed of all students and academics in Gwalior and the surrounding regions. The findings of the analyses suggest that MOOCs have a significant direct impact on higher education by enhancing educational outcomes.

Policy Strategies in MOOCs in Higher Education

Singh & Kakkar (2023) the paper evaluates and analyzes the numerous elements of this policy initiative. It examines the launch's objectives, function, and accomplishments. It also investigates the degree of preparedness of students and institutions to execute this policy. It assesses the current success rate of students and evaluates the potential of Massive Open Online Courses (MOOCs) as a substitute or supplement to the traditional educational system in India. The study is based on a descriptive research methodology that examines data and information from secondary sources, such as the All India Survey of Higher Education (AISHE) (2019–20), UGC notifications, National Education Policy (NEP), 2020, Ministry of Human Resource Development (MHRD),

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Government of India (GOI), and a few supplementary websites. Inferences are derived from prior research. Despite the considerable increase in student enrolment and the exceedingly low certification rates, the results suggest that the delivery of MOOCs is more effective in synchronous mode. Inclusivity is a substantial challenge that yields significant advantages when implemented in MOOCs and programs.

Rai et al., (2023) the purpose of this paper is to conduct a thorough analysis of MOOCs that promote intercultural competence (IC) and language acquisition. Particularly, the survey is intended to identify the keywords that are most relevant to MOOCs with IC components, the languages that are taught, the countries that offer the courses, and the soft skills that are integrated. In the sphere of language acquisition, the results indicate that a limited number of languages and countries offering MOOCs are the most prevalent. The investigation promotes the use of MOOCs to teach a diverse array of languages and cultures, thereby enabling a more global audience to access a more diverse body of knowledge. MOOCs that teach language are designed to develop five distinct categories of soft skills: language learning skills, communication skills, business and entrepreneurship skills, career development skills, and cultural development skills. This suggests that these MOOCs typically include intercultural competence and its associated soft skills.

Theoretical Framework

- **MOOCs and educational accessibility:** MOOCs give unfettered access to excellent learning resources, democratizing the educational process. The promotion of lifelong learning, which is essential to sustainable development, depends on this accessibility. Teachers in higher education can improve the quality of education they provide by regularly updating their pedagogical knowledge and skills through MOOCs.
- **Professional development of educators:** It takes ongoing professional development (CPD) for educators to stay creative and successful. MOOCs provide a wide selection of courses that can assist educators in learning new techniques, incorporating technology into the classroom, and staying current with research in their areas. SDG 4, which aims to ensure inclusive, equitable, high-quality education and to promote opportunities for lifelong learning for everyone, is aligned with this continual learning process.
- **Pedagogical innovation and sustainability:** Using MOOCs in the classroom has the potential to produce important pedagogical breakthroughs. MOOCs frequently make use of multimedia and interactive content, which can encourage teachers to implement similar strategies in their own classrooms. This change has the potential to improve learning outcomes and student engagement while advancing more long-lasting and efficient teaching strategies.
- **Collaborative learning and knowledge sharing:** MOOCs enable educators to collaborate globally and share information. Teachers can interact with colleagues around the globe, share best practices, and work together to address problems in education. This collaborative learning environment fosters a global community of educators dedicated to raising teaching standards and accomplishing sustainable development objectives.
- **Impact on curriculum development**: Curriculum development may be impacted by MOOCs' exposure to creative content and a range of viewpoints. Teachers in higher education can incorporate new subjects about sustainable development into their curricula, such as environmental science, social justice, and global citizenship. By this integration, it is ensured that students possess the knowledge and skills required to address complex global concerns.
- **Scalability and resource efficiency**: Due to the scalability of MOOCs, many people can benefit from a single course without requiring a substantial amount of extra funding. Since less physical infrastructure and printed materials are required, this scalability is both environmentally friendly and economically advantageous. MOOC integration can result in financial savings and a lesser environmental impact for institutes of higher learning.

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Sustainable development of MOOC

- **Access and inclusivity:** Many studies emphasize the potential of MOOCs to democratize education by providing access to high-quality courses globally. MOOCs have been praised for breaking down traditional barriers to education, enabling learners from diverse backgrounds to access content from top institutions.
- **Learner characteristics and engagement:** Research often explores the characteristics of MOOC participants, including their motivations, demographics, and learning behaviors. Studies have shown that MOOC learners vary widely, with participants ranging from traditional students to working professionals seeking continuing education. Engagement levels, completion rates, and factors influencing dropout rates have also been investigated.
- **Pedagogical design and effectiveness:** Evaluating the effectiveness of MOOCs in terms of learning outcomes is a common theme. Researchers have investigated various pedagogical strategies, such as the use of multimedia, interactive assessments, and peer-to-peer learning. Studies often compare MOOCs with traditional classroom settings to understand the efficacy of online education.
- **Challenges and barriers:** The literature highlights challenges associated with MOOC adoption, including issues related to scalability, quality assurance, and the lack of formal accreditation. Dropout rates, the digital divide, and concerns about the credibility of online credentials are also discussed as potential barriers to widespread adoption.
- **Institutional perspectives:** Some studies focus on the perspective of educational institutions, examining their motivations for offering MOOCs, the challenges faced in implementation, and the impact on their overall educational strategies. Institutional adoption is often influenced by factors such as branding, global outreach, and experimentation with new instructional models.
- **Technological infrastructure and design:** Research has explored the role of technology in MOOC adoption, including platform design, analytics, and the integration of MOOCs with existing learning management systems. Technical considerations, such as platform features and user interface design, can impact the overall user experience and learning outcomes.
- **Professional development and lifelong learning:** MOOCs are often seen as a means of professional development and lifelong learning. Studies investigate the role of MOOCs in upskilling and reskilling the workforce, as well as the motivations of individuals seeking career advancement through online courses.
- **Cultural and global perspectives:** Cultural factors influence the adoption and impact of MOOCs in different regions. Research has explored how cultural contexts shape learner preferences and how MOOCs can be adapted to cater to diverse educational needs globally.

Inclusion of new designs to improve teaching and learning:

- **Rethinking the current syllabus:** This is an excellent opportunity to reevaluate the curriculum and adapt it to blended learning. Students and faculty may find learning more straightforward with the help of an extensive and thorough syllabus. The inclusion of a syllabus quiz before going on to the next topic might also help with understanding.
- **Organising the content:** Time can be saved by topically organizing content in an organized way. Chapters, for instance, can be organized into topical divisions and kept in Google Drive folders accessible via shared links. Instructors and students can access resources like PDFs and eBooks more easily with these PowerPoint presentations. Learning can also be reinforced by including test series at the conclusion of each chapter.
- **Orienting the learner:** The portion that needs orientation, with detailed explanations of subjects, can aid students in understanding the material

better, especially considering the restricted in-person interaction.

- **Moving beyond power point:** Clarity can be increased by adding audio descriptions to PowerPoint presentations. Learning can also be reinforced by including test series at the conclusion of each chapter.
- **Rethinking grading strategies:** Critical thinking abilities and involvement in class can be used to evaluate both faculty and students. Giving comments can help both teachers and students alike, improving the learning process.

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Learning Outcomes through MOOC on Sustainable Development

Teachers can expand their knowledge and expertise in a variety of areas, including sustainable development, with the help of MOOCs (Massive Open Online Courses). For educators participating in MOOCs on sustainable development, the following list the essential learning objectives:

- **Enhanced knowledge of sustainable development concepts:** Teachers gain a thorough awareness of the economic, social, and environmental aspects of sustainable development principles. MOOCs on sustainable development frequently address fundamental concepts, including the UN Sustainable Development Goals (SDGs), climate change, resource management, social justice, and economic sustainability. After completing these courses, faculty professionals are more qualified to comprehend and instruct these difficult subjects.
- **Integration of sustainable practices in teaching:** Teachers are trained to integrate the ideals of sustainable development into their lesson plans and instructional strategies. MOOCs frequently include case studies and real-world examples of how different fields may incorporate sustainable development. By using these ideas, educators can create course materials that emphasize sustainability concerns pertinent to their areas of expertise and encourage interdisciplinary learning.
- **Development of critical thinking and problem-solving skills:** Teachers sharpen their analytical and problem-solving skills in relation to sustainability issues. Through conversations, tasks, and projects that call for a critical examination of current environmental challenges, MOOCs promote active learning. Teachers acquire the ability to evaluate these problems critically and look for creative solutions, which they can then teach to their students.
- **Familiarity with global and local sustainability initiatives:** Teachers gain an understanding of national and international programs and laws that support sustainable development. Modules covering diverse national policies, international agreements, and local initiatives are frequently

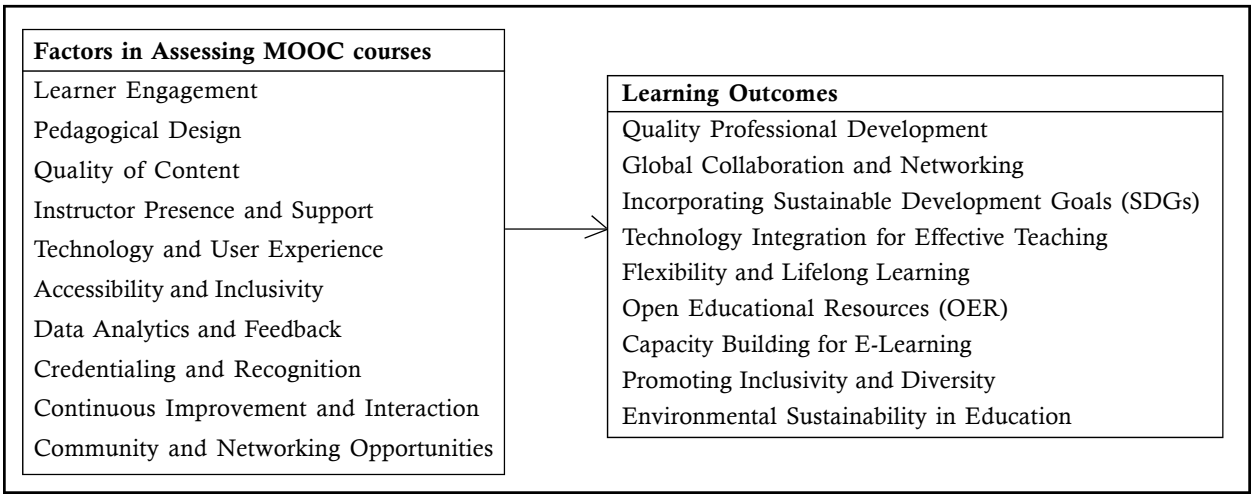


Figure 1: Conceptual Framework on MOOC and its implications

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included in MOOCs. By comprehending these frameworks, educators may help students think globally and act locally by placing sustainability initiatives within various geopolitical contexts.

- **Improved digital literacy and pedagogical skills:** Teachers become more digitally literate and use cutting-edge teaching techniques in blended and online classroom contexts. Participating in MOOCs exposes educators to a range of digital resources and pedagogical approaches that can improve in-person and online learning. This experience is especially pertinent to the use of technology in the classroom while teaching about sustainable development.
- **Enhanced capacity for research and interdisciplinary collaboration:** Academics Get knowledge about collaborating on sustainability-related projects and carrying out multidisciplinary research. MOOCs frequently feature cooperative projects and activities with a research focus that encourage interdisciplinary thinking. By incorporating these cooperative methods into their research, faculty members can create relationships with other academic disciplines.
- **Increased awareness and advocacy for sustainability:** Teachers become fervent advocates for sustainable development and are driven to advance sustainability in their schools and local communities. Faculty can become sustainability champions by being exposed to sustainability concerns and solutions through MOOCs. They can start or take part in committees, policies, and initiatives related to sustainability both inside and outside of their institutions.
- **Practical application of sustainability projects:** Teachers gain the knowledge and abilities necessary to plan and carry out sustainability programs. Designing sustainability projects is a necessity for project-based learning components seen in many MOOCs. Teachers can use these insights to launch related projects at their schools, encouraging a practical approach to teaching sustainability.
- **Improved student engagement and learning outcomes:** Instructors use innovative techniques to raise student interest and achieve learning objectives in environmental education. Teachers can increase the effectiveness and engagement of sustainability education for students by implementing creative and interactive teaching strategies that they have learned from MOOCs with their students. Students may learn and remember sustainability topics more effectively as a result of this.

Analysis and Interpretation

The demographic profile of the respondents shows that 76 of them are male and 89 are female. The majority of the respondents are aged 20-30, totalling 59, which clearly indicates that teachers are in the early stages of their careers (Table 1).

For several aspects of implications on faculty performance in the entire sample, correlation

Table 2: H2a: There is a significant relationship between 'Psychological factors and Sustainable Development through MOOC

Factors	Implications	Sig.
Motivation	0.588	.000
Self-efficacy	0.045	.186
Perceived Relevance	0.431	.000
Locus of Control	0.502	.000
Attitudes Toward Technology	0.804	.012
Emotional Engagement	0.653	.005

Source: Compiled by the Author

Table 1: Number and Percentage of Respondents Based on Demographic Variables

Type of classification	Category	No. of respondents	Percentage
Gender	Male	56	38.62
	Female	89	61.37
Age group	20-30	59	40.68
	31-40	40	27.58
	Above 40	46	31.72
Organization	Private	76	52.41
	Public	69	47.58
Experience	Below 6 months	21	14.48
	6 months – 1 year	42	28.96
	1-2 years	52	35.86
	Above 2 years	30	20.68

Source: Compiled by Author

coefficients were determined. The results show a considerable positive relationship between factors and sustainable development and employee productivity in general, as well as with considerable factors like Motivation, Perceived Relevance, Locus of Control, Attitudes Toward Technology, and Emotional Engagement (Table 2). Thus, the alternative hypothesis (H2a) might be accepted and the null hypothesis rejected because the level of significance between the variables is 0.000, which is less than the significance threshold of 0.01. Although self-efficacy has a negligible link.

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SEM

The Professional Development comprises six items that were measured on a 5-point agree scale. The initial model exhibits the relationship: As changes are introduced, MOOC providers increasingly provide certification programmes to demonstrate learners' knowledge and skills to future employers.

Model Fit Indices:

Chi.sq = 13.766, p = 0.056, CMIN/df = 1.967
GFI = 0.988, NFI = 0.963, AGFI = 0.962, CFI = 0.981
RMR = 0.013, RMSEA = 0.052

For the construct Professional Development, the Chi-square test statistic (CMIN) value is 13.766 and the associated probability is 0.056, which indicates that the chi-square is significant (P > 0.05). This suggests that the hypothesized model is a good fit when the alternative goodness-of-fit measure CMIN/df is 1.967. It indicates that the measurement model fitted the data well since the value is found to be between 2 and 5. The other goodness-of-fit measures, namely GFI (0.988), NFI (0.963), and CFI (0.981), are found to be above 0.95. The RMR (0.013) and RMSEA (0.052) are well inside the admissible limits of less than 0.08.

CONCLUSION

As changes are introduced, MOOC providers increasingly offer certification programmes to demonstrate learners' knowledge and skills to future employers. A series of courses and exams are frequently required for certification programmes in order to prove subject-matter expertise. Certifications can be a helpful addition to a CV, demonstrating a commitment to continual learning and professional development, even if they do not carry the same weight as formal degrees. The psychological factors are associated with the enrolment of MOOC courses among the faculty of various institutions to cope with technological advancements and to increase their potential in enrolling themselves in these courses. It enhances professional development, thereby harnessing environmental sustainability among faculty members of higher education institutions.

FURTHER SCOPE OF RESEARCH

The issue of higher education accessibility is brought up a lot. Higher education enrollment is predicted to increase 314 percent from 99.4 million in 2000 to 414.2 million by 2030. If we add five years to these forecasts, the number of faculty and students seeking higher education by 2035 is expected to approach 520 million. Transformations in developing

Table 3: Regression Co-efficient – Professional Development

			Estimate				
			Unstandardized	Standardized	S.E	C.R.	P
PD1	→	F1	1.000	.526			
PD2	→	F2	1.891	.619	.263	7.183	***
PD3	→	F3	1.482	.561	.211	7.025	***
PD4	→	F4	1.424	.532	.209	6.816	***
PD5	→	F5	1.391	.514	.197	7.064	***
PD6	→	F6	2.083	.687	.250	8.343	***

*** Significant at 1 %; * Significant at 5 %
Source: Compiled by the Author

and emerging countries are driving global growth, which is expected to intensify in the next decades. The lack of qualified instructors and superior course materials in developing and growing nations presents obstacles to the anticipated rise in higher education. The issue is complicated by national agendas, financial constraints, competence limitations, and the digital divide, making it challenging to gauge its scope. To achieve the best results, colleges should continue to offer both traditional and distance education while also promoting the development of high-quality MOOCs. Increasing the number of university campuses, enhancing virtual education, and reducing obstacles to education are merely some of the solutions to this enormous problem. MOOCs can help address socioeconomic concerns in higher education in developing nations, including increasing access and reducing prices for disadvantaged children and adults. A thorough investigation is required to determine the potential of MOOCs for expanding education.

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