Indian Journal of Information Sources and Services
ISSN: 2231-6094 (P) Vol.15, No.2, 2025, pp.420-426

DOI: https://doi.org/10.51983/ijiss-2025.IJISS.15.2.51

Knowledge and Online Learning through Skill Growth among Higher Education Students

R. Manoj Kumar[1], Dr.J. Senthil Velmurugan[2] and Dr.M. Suryakumar[3*]

[1]Ph.D Research Scholar, Department of Management Studies, Periyar University, Salem, Tamil Nadu, India
[2]Professor, Department of Management Studies, Periyar University, Salem, Tamil Nadu, India
[3*]Assistant Professor, Department of Management Studies, Periyar University, Salem, Tamil Nadu, India
E-mail: [1]itsmanojkumarid@gmail.com, [2]jsenthilv@periyaruniversity.ac.in,
[3]suryakumarmprims@periyaruniversity.ac.in
ORCID: [1]https://orcid.org/0000-0001-5575-3964, [2]https://orcid.org/0000-0002-8282-7225,
[3]https://orcid.org/0000-0003-3872-3776
(Received 24 March 2025; Revised 26 April 2025; Accepted 21 May 2025; Available online 25 June 2025)

Abstract - **In order to improve college students' competency with technological innovation in various institutions, this research aims to analyse in in-depth understanding of online courses and their effects on skill development. 145 respondents from the colleges were chosen at random to make up the sample. Descriptive statistics and correlation analysis were used to examine the information gathered from the questionnaire. Thus, both government and private college students are included in this poll. The findings demonstrated that students has a tendency to learn online courses as they feel it's comfortable for them to learn.**

Keywords: **Online Courses, Higher Education, Internet Connection, Skill, Knowledge, Comfortable in Online Courses**

I. INTRODUCTION

A new era of interactive learning has begun by the introduction of MOOC's. Even while learning technology developments and widespread open enrollment are paving up new options for continuous learning in formal and informal related aspects, but adopting those resourceful and proper assessment is one such hurdle (Khasawneh & Ahmad, 2024). It is well recognized that there are variations in educational opportunities and resources worldwide, and that wealthy nations often have better access to education than less developed ones (Abendan et al., 2023). MOOCs have been promoted as a solution to this issue because they make online education reachable to everyone if there is internet connection (Albelbısı et al., 2023). The effect of online learning platforms on college students' skill development and career promotion is examined in this study. According to this survey, the small amount of completion rate and high abandonment rate of the platforms which makes it imperative to enroll in online courses from reputable platforms in order to compete in the corporate sector.

II. REVIEW OF LITERATURE

(Nguyen 2022) in their manuscript revealed the study MOOCs have also given lecturers and instructors new avenues to disseminate their knowledge to a global audience (Maria et al., 2021; Al-Rahmi et al., 2019). With MOOCs, instructors may create and provide courses to thousands of students, something that was not previously possible (Badiuzzaman et al., 2023). However, MOOCs face some obstacles. MOOCs face significant challenges, including a high dropout rate. Many students enrol but do not complete MOOCs (Bitakou et al., 2023). Another problem is a lack of personal interaction with professors and classmates. Students who require structured supervision and feedback may struggle with self-paced MOOCs (Busato et al., 2022).

(Foley 2019), discussed in their article about the MOOCs offer global accessibility, which is a key advantage (Cagiltay et al., 2023). This has democratised education, allowing students of all backgrounds to access high-quality content (AlGerafi et al., 2023). MOOCs are a low-cost alternative to traditional higher education, attracting students who cannot afford traditional degrees. MOOCs provide a plethora of advantages for learners (Gao, 2024; Castaño-Muñoz & Rodrigues, 2021). They let pupils learn according to their own timetable and pace. MOOCs offer a huge number of courses, from specialty to foundational academic areas (Dang et al., 2022). Finding classes that fit their interests and career goals is simple for students. MOOCs are offered by numerous prestigious universities on websites like Coursera, edX, and Udemy (Deng et al., 2019). As a result, universities have been able to attract new faculty members for their regular degree courses and increase brand recognition.

Strategies Related to Online Courses in Higher Education as Policy

(Misiejuk 2021), in their paper highlighted that MOOCs have also given lecturers and instructors new avenues to disseminate their knowledge to a global audience (Džiugaitė et al., 2024). With MOOCs, instructors may create and provide courses to thousands of students, something that was not previously possible (Gamage et al., 2020). However, MOOCs face some obstacles (Gameel & Wilkins, 2019). MOOCs face significant challenges, including a high dropout

rate. Many students enroll but do not complete MOOCs (Goglio & Bertolini, 2021). Another problem is a lack of personal interaction with professors and classmates. Students who require structured supervision and feedback may struggle with self-paced MOOCs (Hossain et al., 2022). The accessibility of policy MOOCs is one of their main benefits (Hudson et al., 2019). Anybody with an internet connection can access them, it doesn't matter when and where (Armstrong & Tanaka, 2025). This gives everyone everywhere access to top-notch policy education, particularly those living in underprivileged areas (Sharipov et al., 2024).

(Barthakur 2021) in their manuscript focuses on the public guidelines MOOCs have the power to alter Indonesia's system of higher learning (Kumar & Kumar, 2020). With one of the densely populated in Southeast Asia, Indonesia is also home to a booming IT sector, a large youth population, and an economy that is expanding quickly (Braun, 2023). Obstacles to higher education in Indonesia include poor facilities, low financing, and a shortage of trained teachers. MOOCs provide affordable and high-quality education to students worldwide, addressing these difficulties (Lambert, 2020). Universities should create a marketing plan to promote MOOCs to potential students (Lee et al., 2018). To reach a larger audience, consider employing digital marketing methods such as social media. Higher Education Institutions must engage themselves with business people to endorse Online Courses and give the students with useful skills and experience in the workplace (Vasquez & Sorensen, 2025). The prevailing review of literature Doesn't have the inclusive research which creates a perfect hurdle in promoting MOOCs (Löhr et al., 2024). To balance this the study research gap is understood by means of Focusing on the factors that significantly impact the skill growth development of Higher Education Students (Melesse et al., 2023).

III. AIM AND OBJECTIVE OF STUDY

Research Objectives

1. To look into how MOOCs affect students' ability to advance professionally in the business world.
2. To investigate the relationship between professional growth and digital capacity aspects

Theoretical Framework

The rise of online learning has been one of the most significant shifts in the global educational landscape in recent decades (Mukherjee et al., 2024). India's use of online courses has significantly increased due to a number of factors, including technological advancements, growing internet usage, the popularity of mobile learning, and government-led initiatives like SWAYAM and the Education Policies being introduced (Bordoloi et al., 2020). Understanding and evaluating the effects and effectiveness of online education in India requires a solid theoretical foundation. This framework has to incorporate pedagogical theories, technology adoption models, sociocultural perspectives, and policy-related components (Barbuti et al., 2022; Bukartaite & Hooper, 2023).

1. Constructivist Learning Theory

Constructivism holds that through introspection and experience, students actively generate their own knowledge and understanding of the universe. This idea, which has the backing of scholars like Jean Piaget and Lev Vygotsky, emphasizes the importance of communication, collaboration, and learner-centered approaches. Online education in India is heavily influenced by constructivism (Bloomberg, 2024; Cunningham, 2017). Online learning platforms often offer flexible, self-paced learning, which supports the constructivist concept of personal knowledge production. Platforms such as BYJU'S, Unacademy, and Coursera offer interactive resources such as forums, quizzes, and assessments from colleague to cultivate continuous learning. Furthermore, online learning environments that support students as they progress from what they can do on their own to what they can do with assistance such as community forums, AI-based recommendation systems, and virtual tutors.

2. Acceptance Model - Technology

Davis developed the Model to explain how individuals adopt and use a technology. This model acknowledges that two major important factors impacts consumers' attitudes toward technology and their intention to use it.In India, instructors and students can use TAM to understand why they are using online courses. For instance, if students think online platforms will enhance their learning outcomes which are helpful to use then they engage with them. Features like user interface design, language options (especially for regional languages), and mobile accessibility have a direct impact on PEOU and PU. The ability of the platform to provide career-oriented and skill-based content has a significant effect on how useful online education is seen, particularly in rural and semi-urban region, according to new research on Indian students.

3. The Digital Divide and Sociocultural Theory

Online education in India is also significantly impacted by the present innovations, or the break amongst those who have access to technology and those who do not have access to those techonology. This disparity stems from location, economy, technology, and gender. Sociocultural theory, particularly Vygotsky's, is highly relevant to the study of disparities in access to online courses because it highlights the significance of social interaction and culture in learning (Bertola et al., 2019). Students from marginalized communities in India sometimes face challenges because of limited access to gadgets, poor internet connectivity, and a lack of digital competence. In certain places, women's and girls' access to online education is further limited by gender conventions. These distinctions must be considered when evaluating the effectiveness and reach of online courses. Policies are essential to closing this gap and promoting fair

access. Examples include promoting digital literacy through public-private partnerships and providing subsidized devices or internet connectivity in distant schools.

4. The Connectives' idea

Connectivism is a learning theory for the people who highlights the role of networks and technology in the learning process, It suggests that learning is the act of navigating, growing, and pruning networks of knowledge that are found inside systems (Herbert et al., 2024). It argues that the ability to link specialized nodes or knowledge sources is how learning occurs. When it comes to MOOCs and platforms like NPTEL and SWAYAM, where students interact with teachers, other students, and digital content from various geographic places, connectivism is particularly pertinent in the Indian setting (Luo & Ye, 2021). These platforms allow students to access global knowledge resources and develop learning communities, which is consistent with the principles of connectivism.

5. Self-Determination Theory (SDT)

The demand for autonomy, competence, and relatedness is the foundation of motivation. In the context of online learning, it is explained that the outline and delivery of online courses affect students' motivation. Online courses are growing in popularity among Indian students, especially those pursuing higher education and professional development, due to the flexibility they offer (Hadi et al., 2025). Online platforms boost intrinsic motivation by allowing students to choose what, how, and when to learn. Students must, however, feel connected (via social interaction tools like forums and live sessions) and capable (through unambiguous feedback and attainable goals) in order to stay engaged. For platforms that do not provide these inspiring resources, dropout rates are high in number amidst a determined problem in the Indian online learning sector.

6. Innovation Diffusion Theory

The Diffusion of Innovations Theory clarifies in what way new technology and habits spread within a community. It categorizes learners into innovators, according to their propensity to embrace innovation (Jivet et al., 2020). This idea helps to explain the online course adoption curve in India. Urban, tech-savvy students were the first to embrace online learning. However, all through and subsequently in the ear of COVID-19 pandemic, online education swiftly expanded to a wider spectrum of audiences, including working professionals, students in faraway locations, and government organizations. Some of the factors influencing the diffusion are trialability, observability, simplicity, perceived benefits, and compatibility with present attitudes and behaviors. For instance, since the government recognized SWAYAM as being comparable to traditional classroom learning, its legitimacy and appeal have increased.

7. Governance and Policy Frameworks

The Indian government has a big impact on online education, thus policy analysis needs to be part of the theoretical framework as well. The Education Policy encourages greater use of tech and online education to improve way to quality of higher education (Hajjaji & M'barki, 2018). It also promotes mixed learning, the creation of digital material, and the application of AI and analytics in education. The UGC's acknowledgment of online degrees, the AICTE's support for virtual learning in technical education, and initiatives like Digital India and BharatNet are also influencing the landscape of online courses. The legitimacy and effectiveness of online learning are impacted by these rules and facilitators.

MOOCs and their Learning Outcomes among Students

Many Online Courses have appeared as a disruptive force in the global education landscape because they offer easily accessible, scalable, and blended learning opportunities. Online Courses have become a valuable tool for students' academic and professional development, especially in developing countries like India. Platforms like Coursera, edX, SWAYAM, NPTEL, and Udacity, which provide courses developed by esteemed universities and corporations, are helping students acquire skills that enhance employability and career readiness. This essay explores MOOC learning objectives in the context of professional development (Ma & Lee, 2019). It looks at the benefits that students receive, the abilities they learn, the challenges they face, and the broader implications for both higher education and the labor market.

1. Understanding MOOCs in the Context of Professional Development

Online courses that are accessible to a large number of people, either for free or at a very low cost, and are often provided through structured modules, interactive technologies, and tests (Mısır & Işık-Güler, 2022). The purpose of Online Courses is to gain professional development and to help students acquire skills such as data analytics, programming, leadership, project management, digital marketing, and soft skills which are relevant to the present scenario in the industry (Karakolis et al., 2022).

MOOCs serve as a bridge between conventional academic education and the dynamic needs of the workforce, which is critical in the modern job market where communication, problem-solving, and technological competence are critical.

2. Key Learning Outcomes of MOOCs

MOOCs offer a range of learning goals. These fit within the broad categories listed below:

a) Mental Outcomes

- Students gain technical expertise and domain-specific information through MOOCs. For example:
- By enrolling in a machine learning course, students can master algorithms and use predictive modelling.

- Enrolling in a corporate communication MOOC enhances presentation skills, email writing, and professional etiquette.
- Cognitive outcomes are usually measured through assessments, quizzes, and project submissions as part of the MOOC framework.

b) Skills-Based Outcomes

MOOCs place a strong emphasis on experiential learning, especially in professional development courses. The outcomes include:

- Proficiency in programming languages (R, Java, and Python)
- Using software like Excel, Tableau, or AutoCAD \Project management and agile methodologies
- Public speaking, time management, and teamwork
- Students commonly build digital portfolios through project-based learning to aid in their job applications.

c) Results in Behavior and Emotion

MOOCs affect students' behaviors and attitudes in the following ways:

- Increased motivation for self-directed learning
- Enhanced confidence in using digital technology
- Improved online collaboration and communication

These affective changes are crucial for workplaces that promote adaptability and lifelong learning.

d) Career-Related Results

One of the most important outcomes is an improvement in employability. Students usually say:

- Better job prospects
- The prerequisites for internships preparing for certification exams (such the Google Career Certificates and the AWS Cloud Practitioner) creating professional networks via forums or groups on LinkedIn

3. Evidence of Learning Outcomes: Case Studies and Research

The following studies and papers attest to MOOCs' efficacy for professional development:

4. *Online credentials significantly improve employment prospects, particularly for students from low-income families, according to the World Bank (2018)*

A 2015 study by Harvard and MIT found that students who complete professional MOOCs are more likely to get promoted or earn more money. According to websites like NPTEL and SWAYAM, MOOCs enhance classroom education and enable engineering students in India become more employable and perform better academically. For instance, engineering students from tier-2 colleges in Tamil Nadu reported increased recruitment opportunities after completing NPTEL courses on data structures and software engineering. MOOCs and Soft Skills Development Professional growth Along with technological skills, MOOCs usually highlight 21st-century competences such as the following:

- Making choices and demonstrating leadership
- Critical thinking and creativity
- Emotional intelligence and resilience

The popularity of courses like "Essential Soft Skills for the Workplace" on edX and "Learning How to Learn" on Coursera demonstrates that students recognize the value of soft skills for professional success. Discussion boards, group projects, and peer assessments also foster interpersonal communication and cultural awareness, two traits that are critical in globally integrated companies.

5. The Role of MOOCs in Filling the Skills Gap

One of the biggest problems that students worldwide deal with is the skills mismatch, or the disparity between academic credentials and industry demands.

MOOCs address this through:

Delivering up-to-date content that conforms to industry standards granting micro-credentials and badges that denote certain competencies allowing students to customize their education to meet their career goals. A commerce student who wants to work in finance, for instance, can sign up for MOOCs on business analytics, financial modelling, and Excel for accountants skills that aren't usually taught in conventional degree programs.

6. Accessibility and Equity Considerations

MOOCs democratize education, but the results vary. elements like

- Language-related barriers
- Knowledge of digital Internet connectivity

Background in terms of socioeconomic status have a major impact on how well learning outcomes work. For example, low levels of English proficiency or high-speed internet may lower course completion rates in rural India. Initiatives like SWAYAM provide material in regional languages in an effort to combat this, and many platforms are becoming more mobile-friendly. Additionally, in an effort to make MOOCs more accessible and inclusive, educational institutions are starting to include them into formal courses using blended models (Ochieng & Gyasi, 2021).

7. Integration with Career Pathways and Formal Education

When MOOCs are incorporated into academic programs and acknowledged by employers, their efficacy rises. Important advancements consist of:

- Credit transfer systems: SWAYAM/NPTEL credits are starting to be accepted by Indian colleges for graduation.
- Industry partnerships: To provide job-aligned courses, platforms such as Coursera and Udacity work with Google, IBM, or Meta.
- Career services: A lot of MOOCs now offer career portals, resume checks, and practice interviews. These connections strengthen the connection between learning and job advancement by enabling students to clearly see the return on their investment in MOOC time.

8. Difficulties in Assessing Learning Results Notwithstanding the Encouraging Patterns, Measuring MOOC Results Presents Certain Difficulties

- Low completion rates: MOOC completion rates are about 10% worldwide. This calls into question the design of the course and student motivation.
- Credential recognition: When compared to traditional degrees, some companies and educational institutions continue to doubt the worth of online certificates.
- Self-control requirements: Career advancement High levels of motivation are necessary for MOOCs, but without the right support, not all students may have them.
- Stronger employer participation, mentorship, integration with formal education, and improved instructional design are all necessary to meet these difficulties.

9.Views and Contentment of Students According to Surveys, the Majority of Students Appreciate MOOCs for

- Acquiring practical skills
- Increasing preparedness for the workforce
- Examining potential job paths

But many also mention the necessity of:

- More interaction with the instructor and feedback
- Improved compatibility with local labor markets
- Employers' acceptance of MOOC certificates

According to these findings, MOOCs are effective instruments for professional growth, but in order to fully realize their potential, pedagogy, support services, and stakeholder alignment must all be continuously improved.

10. Suggestions and Future Directions Several Actions can be Performed to Improve MOOCs' Usefulness for Students' Professional Development

- Blended Learning Models: Accountability and context are guaranteed when MOOCs are incorporated into traditional classroom instruction.
- Mentorship Programs: Assisting students with career planning and motivation, industry mentors are paired with them.
- Localization of Content: Relevance can be raised by include examples from nearby sectors and more localized language courses.
- Credential Portability: Recognition can be increased by implementing a national MOOC certification structure, such as India's Academic Bank of Credits (ABC).
- Integration of Soft Skills: Technical courses that incorporate communication and critical thinking modules offer a comprehensive educational experience.

Methodology Used

The current study was on the students of both private and Government colleges from the salem city, Tamil Nadu. A sum of 145 students' data were collected and analyzed using percentage analysis and SEM Model, also the study adopted Two Stage Sampling method as sampling technique for collecting the data from the respondents. Table I shows the respondents values.

Analysis

TABLE I RESPONDENTS BASED ON GENDER, AGE AND ORGANIZATION

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%

Source: Complied by Author

Focus Group Discussion

Having Focus Group Discussion with the students it was clear that the Student's willingness to learn online courses has the impact on skill gap and that prevents psychological needs from having a large impact on adoption of online courses.

SEM Model

Fig. 1 shows the structural model how several cognitive and psychological aspects impact the skill gap, which impacts online course attendance. These aspects include things like emotional involvement, motivation, self-efficacy, perceived relevance, locus of control, and attitude towards technology.

It explores the mediating role of the skill gap in professional growth through digital capacity enhancement.

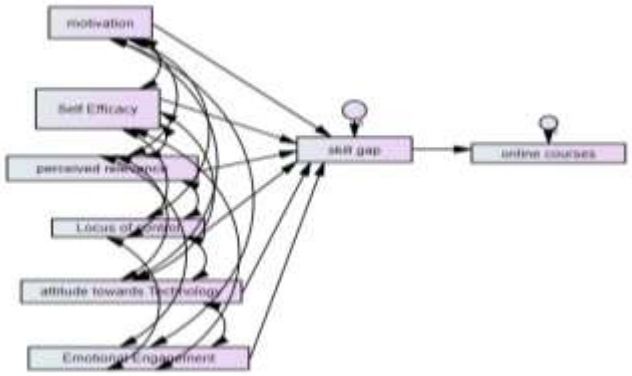

Fig. 1 $H2_a$: To investigate the relationship between professional growth and digital capacity aspects

Source: Complied by Author in AMOS

TABLE II FIT INDICES OF MODEL

Variable	Value	Suggested Value
CMIN	5.143	-
Df	3	_
P value	0.162	>0.05
CMIN/df	1.714	<5.00
GFI	0.995	>0.90
AGFI	0.967	>0.90
CFI	0.997	>0.90
NFI	0.993	>0.90
RMSEA	0.045	<0.08
RMR	0.049	<0.08

The table II indicates that based on the value it is clear that the goodness of fit indices is as per the suggested value and its suggest that the structural model is acceptable

IV. CONCLUSION

As advancements are made, more and more online course providers are providing certification programs to demonstrate students' skills and expertise to prospective employers. In order to prove subject-matter expertise, certification programs occasionally call for a series of classes and exams. Certificates got from the courses can be a helpful addition to their resume because they demonstrate a assurance to professional development and lifelong learning, even though they don't take all along the as official degrees. In order to increase their chances of enrolling in these courses and to keep up with technological advancements, students from various universities are now taking online courses. Professional and psychological variables are associated with these causes. It supports students' adoption of environmental sustainability in higher education institutions by enhancing professional development.

Research Implication

One issue that is frequently brought up is access to higher education. A lot of students enrolling in higher studies are forecasted to increase a lot in million by 2050, a 314 percent increase. If we extend these forecasts by five years, there should be about 520 million instructors and students who will be studying higher education by late 2030. Changes in developing and emerging countries are driving global growth, and over the next few decades, this trend is expected to accelerate. The deficiency in highly trained faculties and top-notch materials for the courses in emerging nations is impeding the expected increase in education sector. Due to the digital divide, talent shortages, funding constraints, and national agendas, it is challenging to determine the scope of the problem. To accomplish the finest outcomes, higher education institutions must carry on with offering conventional and online learning despite simultaneously encouraging the growth of online courses. Reducing educational hurdles, enhancing virtual learning, and growing university campuses are among key to this issue. Online courses can pacify the societal difficulties in norms of the colleges among the countries like growing access to the internet and reduction in price for people from poor backgrounds. Extensive research is needed in examining whether MOOCs have the capacity to expand educational opportunities.

So, the study can be extended to

1) Does Online Courses develop Skill Among Teachers: A Study among college teachers in Chennai City
2) Knowledge and Skill development Among college students in Madurai city: A Literature Review.'

REFERENCES

[1] Abendan, C. F., Kilag, O. K., Taping, M. L., Poloyapoy, G., Echavez, R., & Suba-an, H. M. (2023). Driving excellence in management education through IT innovation. *Excellencia: International Multi-disciplinary Journal of Education (2994-9521)*, *1*(4), 62-75.

[2] Albelbısı, N. A., Al-Adwan, A. S., & Habıbı, A. (2023). A qualitative analysis of the factors influencing the adoption of MOOC in higher education. *Turkish Online Journal of Distance Education*, *24*(2), 217-231.

[3] AlGerafi, M. A., Zhou, Y., Oubibi, M., & Wijaya, T. T. (2023). Unlocking the potential: A comprehensive evaluation of augmented reality and virtual reality in education. *Electronics*, *12*(18), 3953. https://doi.org/10.3390/electronics12183953

[4] Al-Rahmi, W., Aldraiweesh, A., Yahaya, N., Kamin, Y. B., & Zeki, A. M. (2019). Massive open online courses (MOOCs): Data on higher education. *Data in brief*, *22*, 118-125.

[5] Armstrong, D., & Tanaka, Y. (2025). Boosting Telemedicine Healthcare Assessment Using Internet of Things and Artificial Intelligence for Transforming Alzheimer's Detection. *Global Journal of Medical Terminology Research and Informatics*, *2*(1), 8-14.

[6] Badiuzzaman, M., Jiang, Z., Thakur, S., Rahman, S., & Rahman, M. M. (2023). Perspective chapter: MOOCs to bridge the multilevel digital divide. In *Massive Open Online Courses-Current Practice and Future Trends*. Intech Open.

[7] Barbuti, N., De Bari, M., Kameas, A., & Chiotis, T. (2022). New job role profiles to bridge the digital skills gap in the cultural heritage sectors: The BIBLIO project. *Umanistica Digitale*, (13), 97-115.

[8] Bertola, P., Mortati, M., & Taverna, A. (2019). Developing new models and educational approaches supporting digital entrepreneurship within cultural and creative industries (CCI). In *EDULEARN19 Proceedings* (pp. 5058-5067). IATED.

[9] Bitakou, E., Ntaliani, M., Demestichas, K., & Costopoulou, C. (2023). Assessing massive open online courses for developing

digital competences among higher education teachers. *Education Sciences*, *13*(9), 900. https://doi.org/10.3390/educsci13090900

[10] Bloomberg, L. D. (2024). Re-Aligning Higher Education and Employability: Stackable Skills are the New Currency as Online Education Paves the Way. *International Journal of Online Graduate Education*, *7*(1).

[11] Bordoloi, R., Das, P., & Das, K. (2020). Lifelong learning opportunities through MOOCs in India. *Asian Association of Open Universities Journal*, *15*(1), 83-95.

[12] Braun, G. (2023). *Towards bridging skill gaps for the future industrial workforce*. Chalmers Tekniska Hogskola (Sweden).

[13] Bukartaite, R., & Hooper, D. (2023). Automation, artificial intelligence and future skills needs: an Irish perspective. *European Journal of Training and Development*, *47*(10), 163-185.

[14] Busato, J., Miskioglu, E., Martin, K., & Guzzetti, D. (2022, August). Preparing prospective engineers for Artemis: Analyzing the efficacy of MOOCs in a specific area of expertise (WIP). In *2022 ASEE Annual Conference & Exposition*.

[15] Cagiltay, N. E., Toker, S., & Cagiltay, K. (2023). Exploring the influence of countries' economic conditions on massive open online course (MOOC) participation: A study of 3.5 million MITx learners. *International Review of Research in Open and Distributed Learning*, *24*(2), 1-17.

[16] Castaño-Muñoz, J., & Rodrigues, M. (2021). Open to moocs? Evidence of their impact on labour market outcomes. *Computers & Education*, *173*, 104289. https://doi.org/10.1016/j.compedu.2021.104289

[17] Cunningham, P. D. (2017). Bridging the distance: Using interactive communication tools to make online education more social. *Library Trends*, *65*(4), 589-613.

[18] Dang, A., Khanra, S., & Kagzi, M. (2022). Barriers towards the continued usage of massive open online courses: A case study in India. *The International Journal of Management Education*, *20*(1), 100562. https://doi.org/10.1016/j.ijme.2021.100562

[19] Deng, R., Benckendorff, P., & Gannaway, D. (2019). Progress and new directions for teaching and learning in MOOCs. *Computers & Education*, *129*, 48-60.

[20] Džiugaitė, N., Ardic, B., & Zaidman, A. (2024, April). What Are Massive Open Online Courses (MOOCs) Teaching About Software Testing? In *Proceedings of the 5th ACM/IEEE International Conference on Automation of Software Test (AST 2024)* (pp. 204-208).

[21] Gamage, D., Perera, I., & Fernando, S. (2020). MOOCs lack interactivity and collaborativeness: evaluating MOOC platforms. *Int. J. Eng. Pedagog.*, *10*(2), 94-111.

[22] Gameel, B. G., & Wilkins, K. G. (2019). When it comes to MOOCs, where you are from makes a difference. *Computers & Education*, *136*, 49-60.

[23] Gao, Q. (2024). Decision support systems for lifelong learning: Leveraging information systems to enhance learning quality in higher education. *J. Internet Serv. Inf. Secur*, *14*(4), 121-143.

[24] Goglio, V., & Bertolini, S. (2021). The contribution of MOOCs to upskilling the labor force. *Journal of Workplace Learning*, *33*(7), 561-574.

[25] Hadi, N. K., Hamad, S. H. A., Abbas, S. J., Ali, G. F., & Maadi, M. M. M. (2025). Enhancing Software Reusability in Higher Education Applications through Microservices Architecture. *Journal of Wireless Mobile Networks, Ubiquitous Computing, and Dependable Applications*, *16*(1), 390-409. https://doi.org/10.58346/JOWUA.2025.I1.024

[26] Hajjaji, S. E., & M'barki, M. A. (2018). The Higher Education Quality Concept: Comparative Analysis between the Universities of Morocco and Spain. *International Academic Journal of Innovative Research*, *5*(1), 1–8. https://doi.org/10.9756/IAJIR/V5I1/1810001

[27] Herbert, N., Herbert, D., & Gray, T. (2024, January). Navigating the IT skills gap: Cultivating job-ready graduates. In *Proceedings of the 26th Australasian Computing Education Conference* (pp. 68-76).

[28] Hossain, M. N., Hossain, M. Y., Bao, Y., Kumar, N., & Hoque, M. R. (2022). A proposed model to design MOOCs through the lens of addressing graduate skill gap. *Higher Education, Skills and Work-Based Learning*, *12*(5), 963-982.

[29] Hudson, L., Wolff, A., Gooch, D., Van Der Linden, J., Kortuem, G., Petre, M., ... & O'Connor-Gotra, S. (2019). Supporting urban change: Using a MOOC to facilitate attitudinal learning and participation in smart cities. *Computers & Education*, *129*, 37-47.

[30] Jivet, I., Scheffel, M., Schmitz, M., Robbers, S., Specht, M., & Drachsler, H. (2020). From students with love: An empirical study on learner goals, self-regulated learning and sense-making of learning analytics in higher education. *The Internet and Higher Education*, *47*, 100758. https://doi.org/10.1016/j.iheduc.2020.100758

[31] Karakolis, E., Kapsalis, P., Skalidakis, S., Kontzinos, C., Kokkinakos, P., Markaki, O., & Askounis, D. (2022). Bridging the gap between technological education and job market requirements through data analytics and decision support services. *Applied Sciences*, *12*(14), 7139. https://doi.org/10.3390/app12147139

[32] Khasawneh, S., & Ahmad, M. (2024). Beyond digital platforms: Gamified skill development in real-world scenarios and environmental variables. *International Journal of Data & Network Science*, *8*(1).

[33] Kumar, P., & Kumar, N. (2020). A study of learner's satisfaction from MOOCs through a mediation model. *Procedia Computer Science*, *173*, 354-363.

[34] Lambert, S. R. (2020). Do MOOCs contribute to student equity and social inclusion? A systematic review 2014–18. *Computers & Education*, *145*, 103693. https://doi.org/10.1016/j.compedu.2019.103693

[35] Lee, J., Hong, A., & Hwang, J. (2018). A review of massive open online courses: MOOC's approach to bridge the digital divide.

[36] Löhr, A., Broers, V., Tabuenca, B., Savelli, H., Zwimpfer, T., Folbert, M., & Brouns, F. (2024). Informing and inspiring worldwide action against marine litter-The impact of the Massive Open Online Course (MOOC) on Marine Litter. *Marine Pollution Bulletin*, *198*, 115811. https://doi.org/10.1016/j.marpolbul.2023.115811

[37] Luo, R., & Ye, Z. (2021). What makes a good-quality language MOOC? An empirical study of criteria to evaluate the quality of online language courses from learners' perspectives. *ReCALL*, *33*(2), 177-192.

[38] Ma, L., & Lee, C. S. (2019). Investigating the adoption of MOOC s: A technology–user–environment perspective. *Journal of Computer Assisted Learning*, *35*(1), 89-98.

[39] Maria, E. I., Abayomi, I., Olusegun, O. A., & Oluwafemi, R. A. (2021). Indigenous Knowledge Management in the Modern Day Library and Information Services. *Indian Journal of Information Sources and Services*, *11*(1), 28-35.

[40] Melesse, S., Haley, A., & Wärvik, G. B. (2023). Bridging the skills gap in TVET: a study on private-public development partnership in Ethiopia. *International Journal of Training Research*, *21(*3), 171-186.

[41] Mısır, H., & Işık-Güler, H. (2022). "Be a better version of you!": A corpus-driven critical discourse analysis of MOOC platforms' marketing communication. *Linguistics and Education*, *69*, 101021. https://doi.org/10.1016/j.linged.2022.101021

[42] Mukherjee, M., Le, N. T., Chow, Y. W., & Susilo, W. (2024). Strategic approaches to cybersecurity learning: A study of educational models and outcomes. *Information*, *15*(2), 117. https://doi.org/10.3390/info15020117

[43] Ochieng, V. O., & Gyasi, R. M. (2021). Open educational resources and social justice: Potentials and implications for research productivity in higher educational institutions. *E-Learning and Digital Media*, *18*(2), 105-124.

[44] Sharipov, S., Jumanazarov, U., & Nizomova, M. (2024). Digital Tools for Enhancing Plant-based Nutrition Education Integrating Environmental Sustainability. *Natural and Engineering Sciences*, *9*(3), 129-143. https://doi.org/10.28978/nesciences.1581572

[45] Vasquez, A., & Sorensen, I. (2025). The Effects of Education on Social Mobility: A Study of Intergenerational Mobility. *Progression Journal of Human Demography and Anthropology*, *2*(1), 21-26.