

# Evaluating the Effectiveness of MOOC-Based Learning for Enhancing Civil Servant Competence: A Case Study in Karanganyar Regency

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## ABSTRACT

Education is crucial for enhancing the competencies of State Civil Apparatus (ASN) as public servants tasked with delivering quality services. To support this, the Indonesian government introduced a Massive Open Online Course (MOOC) program as an innovative approach to professional development. Karanganyar Regency was selected as the pilot region for MOOC implementation, given its readiness in digital infrastructure and its role as a model for other regions. This research aims to assess the effectiveness of the MOOC program in improving ASN competencies and to identify challenges to its successful implementation. Using a descriptive qualitative method with an inductive approach, the study collected data through observations, interviews with key stakeholders, and documentation analysis. Participants included ASNs enrolled in the MOOC program, program facilitators, and local government officials. Data analysis was conducted through reduction, presentation, and conclusion-drawing techniques. The findings indicate that the MOOC program significantly enhanced competencies such as digital proficiency, task management, and technical knowledge among ASNs. However, challenges were identified, including low quota fulfillment, suboptimal graduation rates, limited leadership control, and inadequate digital literacy among older participants. These barriers were compounded by inconsistent dissemination of information and limited participant engagement. Addressing these obstacles is vital to improving future MOOC implementations. Recommendations include enhanced leadership involvement, targeted training to improve digital literacy, and more effective communication strategies. The experience of Karanganyar Regency underscores the potential of MOOCs as a transformative tool for civil servant education, provided implementation challenges are systematically addressed.

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## 1. INTRODUCTION

Education is essential for both individuals and nations, as it builds knowledge, skills, and character. It helps people think critically, act ethically, and adapt effectively. Educated individuals contribute to national progress and help tackle global challenges. For civil servants, or State Civil Apparatus (ASN), education is crucial to developing the skills needed to deliver quality public services and drive national development. To meet these demands, ASNs require continuous training in areas like technical expertise, digital literacy, and task management. To support this, the Indonesian government launched a Massive Open Online Course (MOOC) program, designed to enhance ASN competencies. This initiative aims to equip public servants with the tools they need to handle the complexities of modern governance and improve public service delivery.

Civil Servants (ASN), as the executors of public policy and providers of public services, must be equipped with the requisite competencies to effectively fulfill their duties and responsibilities. According to the Regulation of the Minister of Administrative and Bureaucratic Reform No. 38 of 2017 on the Competency Standards for Civil Servants, ASN must possess three key competencies: Technical Competence, Managerial Competence, and Socio-Cultural Competence. One of the ways to enhance these competencies is through continuous learning as part of educational programs. However, given the numerous responsibilities associated with their roles, time and location constraints must be considered when engaging in such learning activities.

The rapid evolution of education, from traditional face-to-face instruction to online learning, reflects the increasing integration of digital technologies into the learning process. Education 4.0, characterized by innovation-driven approaches leveraging artificial intelligence, Big Data, and smart devices, has transformed the global education landscape (Salmon, 2019; Ugur & Cakir, 2019). Massive Open Online Courses (MOOCs), as a product of Education 4.0, have become a key tool for providing accessible, flexible, and cost-effective learning opportunities. Globally, MOOCs have demonstrated their capacity to enhance critical and creative thinking skills while meeting the diverse needs of learners across sectors, including public service (Voudoukis & Pagiatakis, 2022). Recognizing the potential of MOOCs, the Indonesian government adopted this system to address the professional development needs of its State Civil Apparatus (ASN). Civil servants play a pivotal role in delivering public services and upholding good governance, necessitating continuous training in technical, managerial, and socio-cultural competencies (Ahmad et al., 2020; Ahmad et al., 2022).

The Indonesian government recognizes ASN as the frontline workforce in public service, mandated to uphold core values such as accountability, competence, loyalty, and adaptability, as outlined in Indonesian Law No. 20 of 2023. To foster these values and support good governance, Karanganyar Regency has adopted the Massive Open Online Course (MOOC) system as an innovative learning solution. MOOCs address key challenges faced by ASN, such as time constraints and geographical limitations, by providing flexible and scalable learning opportunities. These digital platforms offer accessible, cost-effective training options, aligning with the demands of modern governance (Ahmad et al., 2022).

MOOCs have transformed education globally, enabling widespread access to quality learning resources at minimal or no cost. They employ diverse digital media, such as videos and interactive content, to foster critical and creative thinking skills, which are crucial for effective professional development (Voudoukis & Pagiatakis, 2022). This innovation has proven particularly effective for improving the competencies of learners, including public sector employees, by addressing the evolving demands of education and workforce development.

Despite the theoretical advantages of MOOCs, empirical evidence regarding their effectiveness in the public sector, particularly in Indonesia, remains limited. While global studies highlight the benefits of MOOCs in fostering professional development, challenges such as participant engagement, retention, and completion rates are underexplored in specific contexts like civil servant training. The implementation of MOOCs in Karanganyar Regency, a pilot district for this initiative, provides valuable insights into these issues. Initial data reveal declining enrollment and graduation rates across

successive batches of the program, along with persistent barriers such as digital literacy gaps among older participants and inconsistent engagement. These challenges underscore the need for context-specific research to evaluate the program's effectiveness and identify actionable solutions.

Karanganyar Regency stands as a pioneer in implementing the Massive Open Online Course (MOOC) program introduced by the Indonesian government through the Directorate of Empowerment. This initiative targets the development of competencies among State Civil Apparatus (ASN) across various sectors and institutions, including government officials and educators. The program aims to enhance the capabilities of civil servants, aligning with the broader goal of improving public service quality through digital learning innovations. As part of these efforts, the MOOC program in Karanganyar Regency has been conducted in multiple batches, now reaching its fourth iteration.

Data from the initial three batches illustrate both the program's successes and challenges. The first batch of the MOOC program had a high registration rate, with 96.2% of the 500-targeted participants enrolling. Of these, 79.2% successfully completed the program, while 20.8% did not meet the requirements. However, the second and third batches saw a notable decline in both registrations and completion rates. The second batch achieved an 82.4% registration rate, with 87.13% of those enrolled passing the program. By the third batch, registration rates had dropped to 57.6%, and the pass rate fell to 58.33%, leaving 41.67% of participants unable to complete the program successfully. On average, registration rates across the three batches were 78.7%, with an overall program completion rate of 74.88% and a failure rate of 25.11% (BKPSDM, 2023). While the MOOC program has made strides in enhancing ASN competencies, the inability to consistently meet enrollment targets and achieve high completion rates signals the need for improvement. The program's impact on the quality of public service delivery is indirectly reflected in the Public Satisfaction Index (IKM), which remains at an average grade of B. Although this indicates satisfactory performance, it also underscores the necessity for continued efforts to optimize civil servant training and development.

The implementation of MOOCs in Karanganyar Regency highlights a forward-thinking approach to enhancing public sector education. However, it also underscores the need to address critical challenges, including participant engagement, program retention, and completion rates, to fully realize its potential in improving public service delivery. Civil servants, or State Civil Apparatus (ASN), play a crucial role in ensuring effective governance and delivering high-quality public services. To fulfill these responsibilities, ASNs must continually develop competencies in areas such as technical expertise, digital literacy, and task management.

Recognizing the barriers ASNs face—such as limited time and accessibility to traditional training methods—the Indonesian government launched the Massive Open Online Course (MOOC) program as an innovative educational solution. By leveraging digital technology, MOOCs offer flexible, accessible, and cost-effective learning opportunities tailored to the evolving needs of civil servants. This initiative not only supports the professional growth of ASNs but also aligns with the broader goal of improving governance and public service outcomes through modern, adaptable training systems.

This study offers a novel contribution by focusing on the implementation of MOOCs within the public sector in Indonesia, specifically targeting civil servant training in Karanganyar Regency. By systematically evaluating the program's outcomes and identifying key challenges, this research fills a critical gap in understanding the practical application of MOOCs for government workforce development. Furthermore, the study leverages a qualitative descriptive approach to explore participant experiences, engagement, and program effectiveness, providing nuanced insights that are often overlooked in quantitative assessments. The findings aim to inform policy recommendations and practical strategies for optimizing MOOC implementation, ultimately enhancing civil servant competencies and improving public service delivery.

## 2. METHODS

This study employs a descriptive qualitative method with an inductive approach, chosen to provide a detailed and contextual understanding of the MOOC program's implementation in Karanganyar Regency. The qualitative method is appropriate because it allows for an in-depth exploration of participant experiences, behaviors, and perceptions within the program, aligning with the study's objective of assessing the program's effectiveness and identifying implementation challenges (Creswell, 2014). The inductive approach facilitates the identification of patterns and themes directly from the collected data, ensuring the findings emerge organically rather than being guided by preconceived frameworks.

To ensure comprehensive and representative data, three primary methods were employed: structured interviews, documentation analysis, and observation.

### 2.1 Structured Interviews

Interviews were conducted with 20 participants, including civil servants who had completed the MOOC program, program facilitators, and representatives from the Directorate of Empowerment. Participants were selected using purposive sampling, targeting individuals who could provide diverse insights into the program's implementation and outcomes. The interviews focused on key topics, such as program accessibility, digital literacy challenges, participant engagement, and perceived benefits of the MOOC system.

### 2.2 Documentation Analysis

Relevant documents, such as MOOC batch reports, participation and graduation records, and program guidelines, were analyzed to triangulate findings from interviews and observations. These documents provided quantitative data on enrollment rates, completion rates, and performance metrics, as well as qualitative insights into program objectives and implementation strategies.

### 2.3 Observation

Observations were conducted during live MOOC sessions and feedback discussions. The focus was on participant behavior, engagement levels, and interaction with course materials and facilitators. Observational data were systematically recorded in field notes to capture real-time dynamics and contextual factors influencing program effectiveness.

### 2.4 Sampling Strategy

The sampling strategy aimed to ensure diversity and representativeness. Interview participants were selected based on their roles and experiences with the MOOC program, while documents were chosen for their relevance to the program's objectives and outcomes. Observation sites and sessions were selected to include different stages of the program across multiple batches, providing a holistic view of the implementation process.

### 2.5 Data Analysis

The data analysis followed the Miles, Huberman, and Saldana (2014) framework, comprising three key stages: data reduction, data presentation, and conclusion drawing. During data reduction, raw data from interviews, documents, and observations were systematically condensed by categorizing responses, identifying key themes, and eliminating irrelevant information to focus on issues aligned with the study's objectives. In the data presentation stage, the reduced data were organized into visual and narrative formats, such as tables and thematic summaries, to facilitate interpretation and highlight connections between quantitative metrics like enrollment trends and qualitative insights from participant feedback. Finally, the conclusion-drawing stage involved interpreting emerging themes and patterns to assess the program's effectiveness and challenges. These conclusions were validated

through triangulation across multiple data sources and methods, ensuring the findings were both reliable and robust.

The use of structured interviews allowed for direct engagement with participants, capturing detailed insights into their experiences and challenges. Documentation analysis provided objective data to corroborate participant perspectives, while observations offered real-time contextual understanding of program dynamics. Together, these methods provided a comprehensive evaluation of the MOOC program, aligning with the study's goal of identifying actionable recommendations for improving its implementation.

### 3. FINDINGS AND DISCUSSION

#### 3.1 Findings

##### 3.1.1 Enhancing Civil Servant Competencies Through MOOCs: Insights from Karanganyar Regency

The implementation of the Massive Open Online Course (MOOC) program in Karanganyar Regency has demonstrated considerable promise in enhancing the professional competencies of State Civil Apparatus (ASN). Participants reported improvements in key skills such as digital proficiency, task management, and technical knowledge, which are essential for meeting the evolving demands of modern governance. These enhanced competencies enable civil servants to deliver more effective public services and adapt to the increasing reliance on digital technologies in administrative tasks.

The organization of the MOOC program in Karanganyar Regency was well-structured, adhering to the principle of placing the right individuals in the right roles. Employees in the Information and Human Resources Development (IPSDM) division were highly qualified to manage the program, supported by robust organizational policies such as Karanganyar Regent Regulation No. 116 of 2016. Collaborative efforts among staff enhanced efficiency through clear task divisions that promoted specialization. Additionally, the program benefited from effective communication, both vertically (e.g., reporting progress to leadership) and horizontally (e.g., coordinating with other government departments). These practices ensured smooth implementation and supported the broader goals of the initiative, consistent with research indicating that well-managed organizations achieve higher effectiveness (Devi et al., 2023; Mazzei, 2014).

The MOOC program was supported by skilled administrators, particularly within the IPSDM division, who regularly updated their knowledge to keep up with technological advancements. However, challenges persisted, particularly for older ASN participants who struggled with digital systems. Younger employees adapted more easily, which highlighted the need for tailored digital literacy training for older participants. While the program fostered professional growth among participants, targeted strategies are essential to address these technological gaps and ensure equitable benefits across all age groups (Friemel, 2014).

Management practices emphasized transparency, with information about the program readily available through official websites, social media, and internal communications. However, leadership involvement was largely limited to monitoring and motivating participants without mandatory enforcement. While motivation was provided, the lack of direct leadership intervention limited accountability, affecting program engagement. Effective leadership is crucial for fostering participation and achieving organizational objectives, as noted in previous studies (Ismael, 2023; Soeherlan, 2022).

One participant highlighted the program's impact on improving digital skills, stating, *"Before joining the MOOC, I struggled with using digital tools effectively in my daily tasks. Now, I feel more confident navigating online platforms and using software required for my role."* This sentiment underscores the program's role in equipping ASNs with essential digital capabilities, a critical component in fostering efficiency and innovation within public service.

Participants also widely appreciated the flexibility and accessibility of the MOOC platform. One government official noted, *"The MOOC program allowed me to learn at my own pace and fit the training*

sessions into my busy schedule. This would not have been possible with traditional in-person training." The ability to access learning materials anytime and anywhere provided participants with the opportunity to balance professional responsibilities with their educational pursuits, making the program particularly valuable for those with demanding workloads.

Moreover, improvements in task management skills were frequently mentioned by participants. As one respondent remarked, *"The structured modules taught me how to prioritize and manage my work more effectively. I have seen a noticeable improvement in how I approach complex projects."* This suggests that the MOOC program not only addressed technical knowledge gaps but also helped participants refine their organizational and time management abilities.

The program's emphasis on technical knowledge also proved beneficial, especially for civil servants working in specialized fields. *"The courses provided insights that were directly applicable to my work,"* explained one participant. *"For example, I learned techniques for data analysis that I now use to improve reporting and decision-making in my department."* Such targeted learning outcomes highlight the practical relevance of the MOOC content in enhancing job performance.

Overall, the MOOC program in Karanganyar Regency has succeeded in advancing the professional development of ASNs. By providing a flexible, accessible, and targeted learning platform, it has empowered participants to enhance their competencies in ways that directly impact their ability to serve the public effectively. These outcomes underscore the potential of MOOCs as a transformative tool for civil servant training, particularly when designed to meet the specific needs of its audience.

### 3.1.2 Challenges in Enrollment and Completion: Barriers to MOOC Program Success

Despite the positive outcomes of the MOOC program in Karanganyar Regency, several challenges were identified that hindered its overall success. One of the most significant issues was quota fulfillment, with enrollment targets falling consistently short in all three program batches. While the first batch achieved a high registration rate of 96.2%, this number declined to 82.4% in the second batch and dropped significantly to 57.6% in the third. This downward trend indicates a challenge in maintaining participant interest and engagement over time.

Participants provided insights into this issue, with one individual stating, *"The program was advertised well in the beginning, but over time, the promotion felt less visible. Many colleagues were unaware that the later batches were even open for enrollment."* This quote highlights gaps in communication and promotional efforts, which likely contributed to the reduced registration rates in subsequent batches.

Another critical challenge was the suboptimal completion rates. Although the overall pass rate across all batches was 74.88%, this indicates a notable level of attrition, with over a quarter of participants failing to complete the program. Some participants cited workload pressures as a significant barrier. *"I started the course with enthusiasm, but midway through, my work responsibilities became too demanding, and I couldn't keep up with the assignments,"* explained one respondent. This reflects the difficulty many ASNs face in balancing their professional obligations with the demands of continuous education.

The MOOC program incorporated robust data security measures, such as password protection and access restrictions, ensuring participant privacy. Despite this, challenges like unstable internet connections disrupted the overall learning experience. While the system enabled participants to access materials flexibly, reliable internet infrastructure is critical for the success of online learning programs (Saputra & Cahyono, 2022). Additionally, gaps in information delivery meant some participants were unaware of updates or requirements, highlighting a need for more effective communication through digital platforms.

### 3.1.3 Overcoming Barriers to MOOC Success: Addressing Digital Literacy, Communication, and Leadership Gaps

The program significantly impacted the professional development of ASN, particularly those in administrative roles. Participants reported improvements in competencies essential for public service delivery, aligning with studies that emphasize the benefits of digital learning systems for skill development (Radford et al., 2014; Rohida, 2018). However, the Public Satisfaction Index (IKM) revealed that while service quality improved, there remains room for optimization, with a current average grade of B. Nevertheless, Karanganyar Regency achieved second place nationally in meeting Maximum Service Standards (SPM) in early 2024, showcasing the program's broader success in improving public service quality.

The MOOC program in Karanganyar Regency highlights the potential of technology-driven learning systems to enhance civil servant competencies. While the program demonstrated strengths in organizational structure, transparency, and professional development, addressing challenges related to digital literacy, leadership involvement, and internet connectivity is essential. By overcoming these barriers, the MOOC program can serve as a scalable model for improving public sector education and service delivery.

Older participants also faced unique challenges, particularly related to digital literacy. One participant admitted, *"The platform was confusing at first, and I had to ask for help from younger colleagues. It took me longer to understand how to navigate the system and complete the tasks."* This underscores the need for tailored support, such as onboarding sessions or additional technical guidance for participants less familiar with digital tools.

The findings suggest that while the MOOC program has considerable potential, addressing these barriers is crucial for future success. Improved communication strategies to sustain participant interest, flexible course designs to accommodate work schedules, and targeted digital literacy support for older participants are among the recommendations to enhance engagement and completion rates. Without addressing these challenges, the program risks diminishing returns in its effort to build the competencies of civil servants in Karanganyar Regency.

The implementation of the MOOC program in Karanganyar Regency revealed digital literacy gaps as a significant barrier, particularly among older participants. Limited familiarity with digital tools and platforms hindered their ability to effectively engage with course materials and complete assignments. For instance, many participants struggled with basic navigation of the MOOC interface, which negatively impacted their learning experience. As one older participant admitted, *"I often found myself lost on the platform, unable to find the materials or submit assignments on time. It was frustrating and made me feel left behind compared to younger colleagues."* This highlights the need for targeted digital literacy training to ensure equitable access and participation across all age groups.

In addition to digital literacy issues, inconsistent dissemination of information also constrained the program's effectiveness. Several participants mentioned that they were not adequately informed about the course schedule, updates, or requirements. One participant remarked, *"I missed an important deadline because the instructions were unclear and not communicated well in advance."* These gaps in communication created confusion and undermined participant engagement, further reducing the program's overall impact.

Another key challenge was the lack of leadership involvement in encouraging and monitoring participant progress. Effective leadership is critical in motivating civil servants to prioritize continuous learning. However, observations during the study revealed insufficient oversight and support from supervisors, which contributed to varying levels of motivation among participants. Some participants noted that without direct encouragement from their superiors, it was difficult to stay committed to the program. As one respondent explained, *"It would have helped if my manager had shown more interest in my progress. Without that, I sometimes felt like the program wasn't a priority."*

Moreover, observations during live MOOC sessions revealed inconsistent participant engagement, with some individuals actively interacting with the course content and facilitators, while others appeared disengaged or unmotivated. This variability in motivation underscores the need for strategies to foster greater interaction and accountability among participants.

These findings suggest that while MOOCs offer a scalable and flexible solution for civil servant training, addressing these challenges is essential to maximize their potential. Enhanced leadership involvement could motivate participants and provide the necessary oversight to ensure progress. Tailored digital literacy programs, especially for older participants, would bridge technological skill gaps and improve overall engagement. Additionally, more effective communication strategies are needed to ensure participants are well-informed and can fully benefit from the program.

By systematically addressing these barriers, the MOOC program has the capacity to become a transformative model for public sector education. Its flexibility and accessibility position it as a powerful tool for enhancing the competencies of civil servants, thereby contributing to the broader goal of improving public service delivery. With the right adjustments, the program can better meet the diverse needs of its participants and achieve sustainable success.

### 3.2 Discussion

The findings of this study underscore the transformative potential of the MOOC program in Karanganyar Regency while highlighting critical challenges that must be addressed to maximize its impact. MOOCs have proven effective in enhancing the professional competencies of State Civil Apparatus (ASN), equipping them with essential skills such as digital proficiency, task management, and technical expertise. These competencies are indispensable for civil servants as they adapt to the increasing reliance on digital technologies in public administration, aligning with the global shift toward Education 4.0, which emphasizes innovation and digital integration in learning (Salmon, 2019; Ugur & Cakir, 2019).

Participants consistently praised the flexibility and accessibility of the MOOC platform, which allowed them to balance their demanding professional responsibilities with continuous learning. This aligns with prior research indicating that the asynchronous nature of MOOCs enables learners to engage with content at their convenience, making it particularly suitable for working professionals (Ahmad et al., 2022). However, while the program's flexibility was widely appreciated, the challenges of quota fulfillment and completion rates indicate the need for targeted improvements in program design and delivery.

Quota fulfillment emerged as a recurring issue, with declining enrollment rates across successive batches. While the first batch achieved a high registration rate of 96.2%, the subsequent decline to 57.6% in the third batch suggests waning interest or barriers to participation. Gaps in communication and promotional efforts were frequently cited by participants as contributing factors. This finding echoes the broader literature on online education, which emphasizes the importance of sustained engagement through clear and consistent communication strategies (Kizilcec et al., 2020). Enhancing outreach efforts and providing timely updates could address these challenges and improve enrollment outcomes.

Another critical barrier was the suboptimal completion rates, with over 25% of participants failing to finish the program. Workload pressures emerged as a key factor, as many ASNs struggled to balance their professional duties with the demands of the course. This finding is consistent with studies that highlight the attrition rates in MOOCs due to competing priorities and time management challenges (Jordan, 2015). Flexible course designs, including modular content and extended deadlines, could help participants better manage their workloads while maintaining progress in the program.

Digital literacy gaps, particularly among older participants, further constrained the program's impact. Limited familiarity with digital tools hindered effective engagement with course materials, echoing existing research that identifies digital skills as a critical barrier to the successful adoption of online learning platforms (Van Deursen & Van Dijk, 2019). Tailored onboarding sessions and technical

support tailored to the needs of less tech-savvy participants are recommended to bridge this gap and ensure equitable participation.

Leadership involvement also emerged as a crucial factor influencing participant motivation and engagement. Participants expressed the need for greater encouragement and oversight from their supervisors, reinforcing findings from organizational learning studies that emphasize the role of leadership in fostering a culture of continuous professional development (Eraut, 2014). Implementing structured feedback mechanisms and integrating MOOC participation into performance evaluations could enhance accountability and support.

The study also revealed variability in participant engagement during live MOOC sessions, with some learners actively interacting while others appeared disengaged. This highlights the need for strategies to foster interaction and accountability, such as incorporating peer collaboration and gamified elements to increase motivation. Research has shown that interactive and collaborative features in online learning environments can significantly improve engagement and retention (Wang et al., 2021).

#### 4. CONCLUSION

The MOOC program in Karanganyar Regency has shown great potential in improving the skills of State Civil Apparatus (ASN), particularly in digital proficiency, task management, and technical expertise, which are crucial for effective public service. Its strengths lie in its structured organization, transparent management, and flexible access, making it a promising model for digital governance training. However, challenges such as declining enrollment, low completion rates, digital literacy gaps among older participants, and limited leadership involvement need to be addressed. Improving communication, offering flexible course designs, and providing targeted support can enhance participation and outcomes. With these adjustments, the program can become a scalable and impactful tool for public sector education, setting a standard for innovation in civil servant training and public service improvement.

#### REFERENCES

- Ahad, M. A., Tripathi, G., & Agarwal, P. (2018). Learning analytics for IoE based educational model using deep learning techniques: architecture, challenges and applications. *Smart Learning Environments*, 5(7), 2–16. <https://doi.org/https://doi.org/10.1186/s40561-018-0057-y>
- Ahmad, I., Sanjay, J., & Sharma, S. (2020). Technology Enabled Learning in Higher Education: A Case Study. *Xplore-The Xavier's Research Journal*, 11(1). [https://www.researchgate.net/publication/363817519\\_Technology\\_Enabled\\_Learning\\_in\\_Higher\\_Education\\_A\\_Case\\_Study](https://www.researchgate.net/publication/363817519_Technology_Enabled_Learning_in_Higher_Education_A_Case_Study)
- Ahmad, I., Sharma, S., Singh, R., Gehlot, A., Priyadarshi, N., & Twala, B. (2022). MOOC 5.0: Peta Jalan Menuju Masa Depan Pembelajaran. *Sustainability*, 14(18). <https://doi.org/10.3390/su14181199>
- Ahmad, N. A., Rauf, M. F. A., Zaid, N. N. M., & Zainal, A. (2022). Effectiveness of Instructional Strategies Designed for Older Adults in Learning Digital Technologies: A Systematic Literature Review. *SN Computer Science*, 3(2). <https://doi.org/10.1007/s42979-022-01016-0>
- Akrimi, Y., & Khemakhem, R. (2014). What Drive Consumers to Spread the Word in Social Media? *Journal of Marketing Research and Case Studies*, 2012(2012). <https://doi.org/http://dx.doi.org/10.5171/2012.969979>
- Alharthi, A. D., Spichkova, M., & Hamilton, M. (2019). Sustainability requirements for eLearning systems: a systematic literature review and analysis. *Requirements Engineering*, 24(2), 523–543. <https://doi.org/10.1007/s00766-018-0299-9>
- Creswell, J. . (2014). *Research Design Qualitative, Quantitative and Mixed Methods-Approaches* (– 4th ed).

- SAGE Publications, Inc. [http://www.drbramedkarcollege.ac.in/sites/default/files/Research-Design\\_Qualitative-Quantitative-and-Mixed-Methods-Approaches.pdf](http://www.drbramedkarcollege.ac.in/sites/default/files/Research-Design_Qualitative-Quantitative-and-Mixed-Methods-Approaches.pdf)
- Devi, I., Sesmiarni, Z., Syafitri, A., Simbolon, A. M. Y., & Iswanti, I. (2023). Upaya Kepala Sekolah Dalam Meningkatkan Produktivitas Kerja Guru Di Mtss Tigo Nagari, Kabupaten Pasaman. *INNOVATIVE: Journal Of Social Science Research*, 3(2), 14422–14433. <https://doi.org/https://doi.org/10.31004/innovative.v3i2.2066>
- Dharma, A. A. S., & Kasim, A. (2021). Infodemi Covid-19 dalam Perspektif Open Government: Sebuah Tinjauan Literatur. *Jurnal Ilmiah Ilmu Pemerintahan*, 6(1), 105–125. <https://doi.org/https://doi.org/10.14710/jiip.v6i1.10372>
- Ellaway, R. H., & Masters, K. (2008). AMEE Guide 32: E-Learning in medical education Part 1: Learning, teaching and assessment. *Medical Teacher*, 30(5), 455–473. <https://doi.org/10.1080/01421590802108331>
- Eraut, M. (2014). Informal learning in the workplace. *Studies in Continuing Education*, 26(2), 173–247.
- Fajrussalam, H., Nursyahbani, A., Khoirunnisa, A., Nurbaiti, N., & Ningrum, N. C. (2023). Konten Dakwah Habib Ja'far Al-Haddar di Media Sosial Tiktok. *Jurnal Pendidikan Tambusai*, 7(1), 1647–1659. <https://doi.org/https://doi.org/10.31004/jptam.v7i1.6039>
- Friemel, T. N. (2014). The digital divide has grown old: Determinants of a digital divide among seniors. *New Media & Society*, 18(2), 313–331. <https://doi.org/10.1177/1461444814538648>
- Haryati. (2019). Penerapan Komunikasi Vertikal dalam Meningkatkan Kualitas Kinerja Pegawai Dinas Pertambangan Kabupaten Karimun. *JDM - Jurnal Dinamika Manajemen*, 1(1), 105–112.
- Ismael, M. U. (2023). The effect of leadership style on employee motivation, case study: Al-Neelain University in Sudan -Khartoum). *World Journal of Advanced Research and Review*, 18(01), 989–1000. <https://doi.org/https://doi.org/10.30574/wjarr.2023.18.1.0703>
- Jordan, K. (2015). Massive open online course completion rates revisited: Assessment, length, and attrition. *International Review of Research in Open and Distributed Learning*, 16(3), 341–358
- Kizilcec, R. F., Saltarelli, A. J., Reich, J., & Cohen, G. L. (2020). Closing global achievement gaps in MOOCs. *Science*, 355(6322), 251–252.
- Langgeng, Y. S., & Wilasari, M. F. (2023). Profesionalisme Aparatur Sipil Negara Dalam Meningkatkan Kinerja Organisasi (Tinjauan Literatur). *Nusantara Innovation Journal*, 2(2), 103–113. <https://doi.org/https://doi.org/10.32528/nij.v2i2.28>
- Latuheru, R. (2022). The Effect Of Vertical, Horizontal and Diagonal Communication On Employee Performance at The Training Board Maluku Province. *Jurnal BADATI*, 4(1), 97–103. <https://doi.org/https://doi.org/10.38012/jb.v6i1.750>
- Laudon, K. C., & Laudon, J. P. (2008). *Sistem Informasi Manajemen* (C. Sungkono & M. Eka (eds.); 10th ed.). Salemba Empat.
- Mardhiyah, R. H., Aldriani, S. N. F., Chitta, F., & Zulfikar, M. R. (2021). Pentingnya keterampilan belajar di abad 21 sebagai tuntutan dalam pengembangan sumber daya manusia. *Lectura: Jurnal Pendidikan*, 12(1), 29–40. <https://doi.org/https://doi.org/10.31849/lectura.v12i1.5813>
- Mazzei, A. (2014). Internal communication for employee enablement: Strategies in American and Italian companies. *Corporate Communications An International Journal*, 19(1), 82–95. <https://doi.org/10.1108/CCIJ-08-2012-0060>
- Menolli, A. L. A., Tironi, H., Reinehr, S., & Malucelli, A. (2019). Identifying organisational learning needs: an approach to the semi-automatic creation of course structures for software companies. *Behaviour and Information Technology*, 39(2), 1–16. <https://doi.org/10.1080/0144929X.2019.1653372>
- Miles, M.B, Huberman, A.M, & Saldana, J. (2014). *Qualitative Data Analysis, A Methods Sourcebook* (3rd ed.). Sage Publications.
- Nanjundaswamy, A., Kulai, A., Divyashree, M. ., & Dinesh, S. (2023). Effectiveness of MOOCs on learning efficiency of students: a perception study. *Journal of Research in Innovative Teaching & Learning Emerald Publishing Limited*, 16(1). <https://doi.org/10.1108/JRIT-12-2022-0091>
- Nyagadza, B. (2022). Sustainable digital transformation for ambidextrous digital firms: systematic

- literature review, meta-analysis and agenda for future research directions. *Sustainable Technology and Entrepreneurship*, 1(3), 1–13. <https://doi.org/10.1016/j.stae.2022.100020>
- Patau, S. A. (2024). Mengkaji Pengaruh Komunikasi Pembelajaran Efektif terhadap Motivasi Belajar Siswa Sekolah Dasar di Kota Poso. *Al-Ishlah Jurnal Pendidikan*, 16(2), 670–680. <https://doi.org/https://doi.org/10.35445/alishlah.v16i2.5134>
- R.Terry, G., & W.Rue, L. (2010). *Dasar-Dasar Manajemen*. Bumi Aksara.
- Radford, A. W., Robles, J., Cataylo, S., Horn, L., Jessica, & Whitfield, T. and K. (2014). The Employer Potential of MOOCs: A Mixed-Methods Study of Human Resource Professionals' Thinking on MOOCs. *International Review of Research in Open and Distributed Learning*, 15(5), 1–25. <https://doi.org/https://doi.org/10.19173/irrodl.v15i5.1842>
- Rohida, L. (2018). Pengaruh Era Revolusi Industri 4.0 terhadap Kompetensi Sumber Daya Manusia. *Jurnal Manajemen Dan Bisnis Indonesia*, 6(1), 114–136. <https://doi.org/10.31843/jmbi.v6i1.187>
- Salmon, G. (2019). May the Fourth Be with you: Creating Education 4.0. *Journal Of Learning For Development*, 6(2), 95–115. <https://doi.org/https://doi.org/10.56059/jl4d.v6i2.352>
- Saputra, J. W., & Cahyono, R. (2022). Kajian Literatur: Efektifitas Pembelajaran Daring Pada Mahasiswa Selama Pandemi Covid-19. *Jurnal Diversita*, 8(2), 170–179. <https://doi.org/https://doi.org/10.31289/diversita.v8i2.6048>
- Soeherlan, L. (2022). The Influence of Strategic Leadership and Motivation on Employee Performance. *International Journal of Health Science*, 6(S1), 3548–3563. <https://doi.org/https://doi.org/10.53730/ijhs.v6nS1.5499>
- Strayer, J. (2012). How learning in an inverted classroom influences cooperation, innovation and task orientation. *Learning Environments Research*, 15(2), 171–193. <https://doi.org/10.1007/s10984-012-9108-4>
- Sukmayanti, N. L. ., Bagia, I. ., & Suwendra, I. . (2016). Pengaruh Kompetensi Intelektual Dan Pengembangan Karir Karyawan terhadap Kinerja Karyawan. *Jurnal Manajemen Indonesia*, 4(1).
- Suseno, A., & Sukihananto. (2023). Pemanfaatan Teknologi Informasi Berbasis Website dan Android sebagai Media Pelaporan dan Promosi Antinarkoba : Literature Review. *Jambi Medical Journal*, 11(1), 1–9. <https://doi.org/https://doi.org/10.22437/jmj.v11i1.21943>
- Ugur, S. S., & Cakir, G. K. (2019). Artificial Intelligence to Super Artificial Intelligence, Cyber Culture to Transhumanist Culture. In *In Handbook of Research on Learning in the Age of Transhumanism* (pp. 1–16). IGI Global. <https://doi.org/10.4018/978-1-5225-8431-5.ch001>
- Van Deursen, A. J., & Van Dijk, J. A. (2019). The first-level digital divide shifts from access to skills. *New Media & Society*, 21(2), 354–375.
- Voudoukis, N., & Pagiatakis, G. (2022). Massive Open Online Courses (MOOCs): Praktik, Tren, dan Tantangan bagi Pendidikan Tinggi. *EJ-EDU European Journal of Education and Pedagogy*, 3(3), 288–295. <https://doi.org/http://dx.doi.org/10.24018/ejedu.2022.3.3.365>
- Wang, Y., Wang, Q., & Cheng, G. (2021). Effects of gamification on motivation and engagement in online learning: A systematic review. *Educational Technology Research and Development*, 69(1), 159–179.
- Williem, A. (2024). Literature Review: Efektivitas Aplikasi E-Government Berbasis Website. *Journal of Information Technology and Computer Science (INTECOMS)*, 7(3), 599–605. <https://doi.org/https://doi.org/10.31539/intecom.v7i3.9592>
- Wulur, F. C., & Mulyanti, D. (2023). Analisis Pngaruh Pemanfaatan Media Sosial dalam Penyebaran Layanan Informasi Publik di Pemerintah (Systematic Literature Review). *MANABIS (Jurnal Manajemen Dan Bisnis)*, 2(1), 37–45. <https://doi.org/https://doi.org/10.54259/manabis>
- Zhuang, T., Cheung, A. C. K., Lau, W. W. F., & Tang, Y. (2020). Development and Validation of an Instrument to Measure STEM Undergraduate Students' Comprehensive Educational Process. *Frontiers of Education in China*, 14(4), 575–611. <https://doi.org/https://doi.org/10.1007/s11516-019-0028-2>