

Design and Development of a MySQL-Based Group Elimination Information System as a Tournament Management Solution for Tapak Suci PIMDA 04 Jember

IFFAN GALLANT EL MUHAMMADY¹, DENI ARIFianto², YOSVICO RAFEL DESTRIO³, TIARA PRAMESTI DESTIANA WULANDARI³

¹Public Administration Study Program, Universitas Muhammadiyah Jember, Indonesia

²Informatics Study Program, Universitas Muhammadiyah Jember, Indonesia

³Students of Universitas Muhammadiyah Jember, Indonesia

Email: iffangallant@unmuhjember.ac.id

Received 16 March 2026 | Revised 31 March 2026 | Accepted 08 May 2026

ABSTRACT

The Tapak Suci PIMDA 04 Jember championship has been managed manually, causing inefficiencies in group elimination scheduling, score calculation, and data archiving. This community service program (PKMS) aimed to develop a MySQL-based web information system for championship group elimination management, train committee members in digital tournament management, and strengthen the institutional capacity of PIMDA 04 Jember. Implementation was carried out in five stages: system introduction, participant data entry, competition management training, competition report creation, and a full simulation (sarasehan). The system was successfully developed and operated independently by PIMDA 04 Jember's operator team. Results showed significant improvement in tournament management accuracy, operational efficiency, and information transparency accessible via smartphone. A local operator team of three members was formed, ready to operate the system in official championships. This program demonstrates that technology-based community service can effectively transform manual organizational practices into sustainable digital governance.

Keywords: information system, MySQL, Tapak Suci, tournament management, digitalization

1. INTRODUCTION

The Tapak Suci championship is a strategic agenda routinely organized by the Regional Board (PIMDA) IV of Tapak Suci Putera Muhammadiyah Jember as an instrument for cadre development, athlete competency enhancement, and strengthening the tradition of professional martial arts. Within the organizational context, the championship serves as a cadre-building platform that brings together values, discipline, and training culture within a measurable competition arena (PP Tapak Suci, 2019).

The group elimination system plays a crucial role in ensuring fair competition, time efficiency, and orderly event management from start to final determination of champions. Precise tournament management—encompassing participant registration, group assignment,

scheduling, result recording, and point and standings calculation—is a prerequisite for maintaining competition integrity **(Csató, 2021; Hewawasam & Lanel, 2024; Marsehan et al., 2026; Patil et al., 2025; Syahnaz et al., 2025)**.

However, initial observations and discussions with PIMDA 04 Jember leadership revealed that elimination management was still conducted manually. This manual approach is prone to technical issues such as data input errors, incorrect group assignments, inaccurate standings calculations, and slow schedule updates. The consequences include reduced operational efficiency, increased risk of miscommunication, and diminished event professionalism.

The digitalization of tournament management has become an urgent necessity. The need for big data has become increasingly important in contemporary governance and public policy. However, its utilization often becomes problematic when data management and processing still rely heavily on third-party providers. In such situations, institutions may collect or possess large amounts of data, yet they are unable to fully control, access, or strategically use that data for institutional purposes. As a result, the potential of big data to support evidence-based policymaking is significantly limited. This issue is consistent with the findings of El Muhammady who argue that the question of big data is not only about technological capacity, but also about ownership, control, and institutional sovereignty over data use **(Muhammady et al., 2023)**.

Information technology has demonstrated its capacity to improve data accuracy and information quality, accelerate managerial and operational processes, and strengthen information transparency for stakeholders **(Al-Hashimy & Yao, 2024; Al-Mamary et al., 2013; Khoiriyah & Priana, 2025; Li et al., 2012; Milovich et al., 2026; Nunes et al., 2017; Purwanti, 2025; Solana-González et al., 2021; Turban et al., 2018)**. This situation prompted the implementation of the Stimulus Community Partnership Program (PKMS) through the development of a MySQL-based web Group Elimination Information System for PIMDA 04 Jember.

This program aligns with the Community Service Strategic Plan (Renstra PkM) of Universitas Muhammadiyah Jember 2024–2029, particularly under the priority theme of 'Social Model Innovation and Science-Technology for Community Welfare Improvement,' and in the fields of smart organization development based on digital transformation and community sports service delivery.

2. METHODS

This program employed a service-learning methodology, which integrates academic learning with structured community engagement to produce mutually beneficial outcomes for both the academic team and the partner community **(Aláez et al., 2022; Marco-Gardoqui et al., 2020; Rodríguez-Zurita et al., 2025; Saeed & Ahmed, 2021)**. Within this framework, the implementation approach encompassed three main components: (1) information system development using the Systems Development Life Cycle (SDLC) method, (2) institutional capacity building, and (3) operational training. Each stage involved the partner as an active subject of the program. The SDLC method guided system development through sequential phases: (a) needs analysis, (b) system design including flowchart and database schema, (c) system implementation/coding, (d) testing, and (e) deployment and training. The program was carried out in five meeting stages during the period of December 2025 to February 2026.

2.1 Stage 1 – System Preparation and Introduction (December 16, 2025)

The service team conducted initial coordination with PIMDA 04 Jember administrators, covering: needs assessment interviews and system observation, mapping of technical and administrative constraints, introduction to the MySQL-based group elimination information system concept, and agreement on workflow and training schedule (figure 1).



Figure 1. Stage 1 Activity – System Introduction (December 16, 2025)

2.2 Stage 2 – Member Data Entry (January 3, 2026)

Participant data management training: administrators and operators were trained to input participant data into the system, including athlete names, competition categories, weight classes, and team/school affiliations. The system manages data in a structured manner, enabling automatic group generation (figure 2).



Figure 2. Stage 2 Activity – Participant Data Entry (January 3, 2026)

2.3 Stage 3 – Competition Management Training (January 17, 2026)

Operators were trained to use the core system features: automatic group elimination, round-robin/half-competition schedule generation, match score input, and real-time standings monitoring via dashboard. Sessions included hands-on practice using simulated data (figure 3).



Figure 3. Stage 3 Activity – Competition Management Training (January 17, 2026)

2.4 Stage 4 – Competition Activity Report Creation (January 24, 2026)

Training on digital data-based championship activity report preparation. Operators were trained to export match result data, compile structured reports, perform database backups, and systematically document activities for archival and evaluation purposes.

2.5 Stage 5 – Competition Simulation / Sarasehan (February 7, 2026)

The final stage consisted of a full championship simulation (hands-on training). All participants ran actual championship scenarios: simulated participant registration, automatic group assignment, real-time score input, standings dashboard monitoring, troubleshooting, and comprehensive evaluation by the service team together with the partner. Following the simulation, participants completed a structured evaluation questionnaire (Likert scale 1–5) covering four dimensions: (1) system ease of use, (2) training effectiveness, (3) system usefulness for tournament management, and (4) overall program satisfaction. Results of this evaluation are presented in Table 2 in the Results and Discussion section (figure 4).



Figure 4. Stage 5 Activity – Full Championship Simulation (February 7, 2026)

3. RESULTS AND DISCUSSION

3.1 MySQL-Based Group Elimination Information System

The developed information system is a web-based application supported by a MySQL database, designed specifically for Tapak Suci championship needs (figure 5-8). The system integrates the entire core workflow of tournament management, comprising: (1) participant data management, (2) automatic group assignment based on category and weight class, (3) round-robin/half-competition match fixture generator, (4) match score input and validation, (5) automatic point and standings calculation, (6) real-time dashboard, and (7) structured championship data archiving.

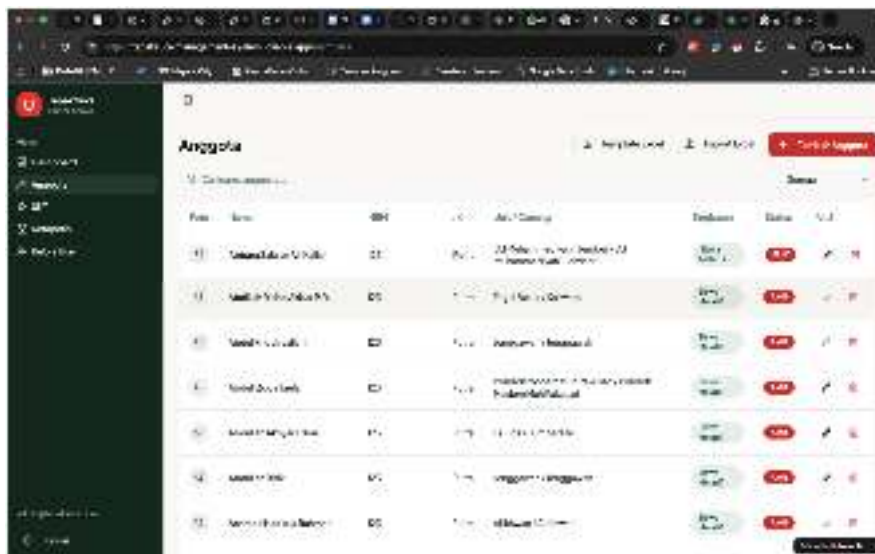


Figure 5. Participant Data Management Interface

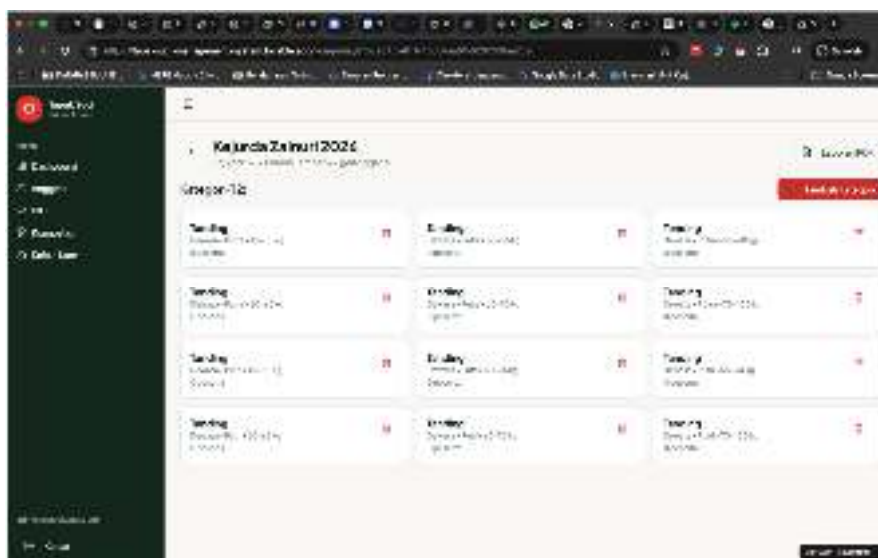


Figure 6. Automatic Group Assignment Feature

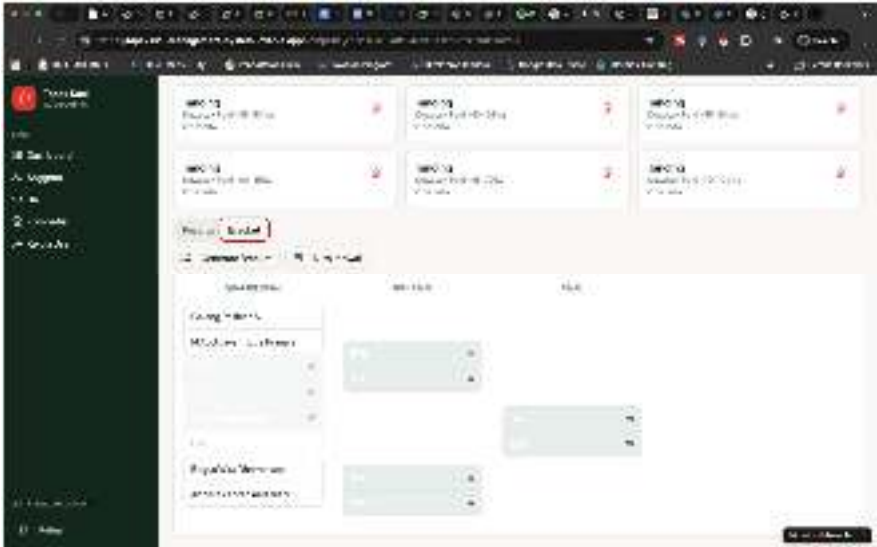


Figure 7. Match Fixture Generator and Schedule Display

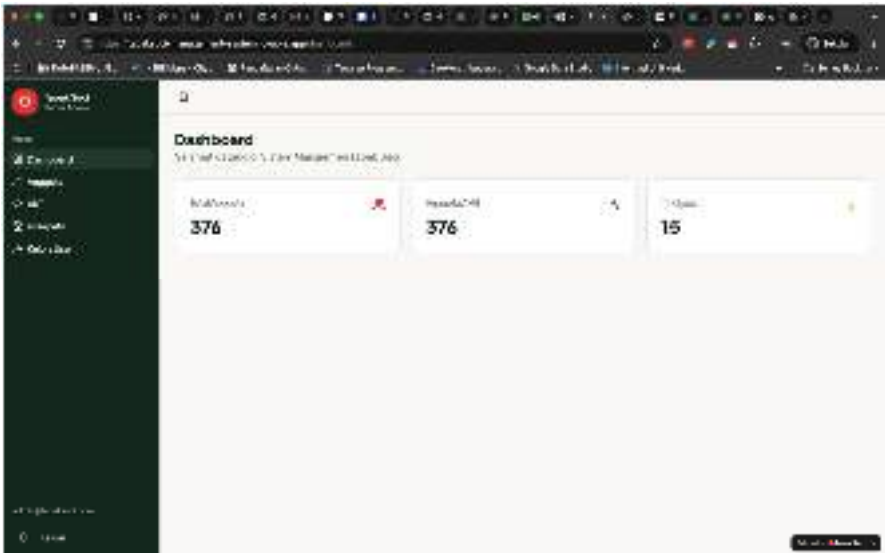


Figure 8. Real-Time Dashboard and Standings

The system also features smartphone-based public access, enabling participants and officials to check schedules, group assignments, and results without relying on bulletin boards or verbal announcements. This feature directly addresses the information miscommunication problems that had long been a major challenge for PIMDA 04 Jember (Liu, Z., & Cao, T., 2024; Malyeyeva, 2020).

3.2 Training Stage Outcomes

All program activities were successfully completed and produced significant achievements for PIMDA 04 Tapak Suci Jember. Table 1 summarizes the key outcomes of each implementation stage:

Table 1. Summary of Outcomes per Implementation Stage

Stage	Date	Outcomes
1	Dec 16, 2025	Technical requirements mapped; system design agreed; digitalization concept disseminated to PIMDA 04 administrators; training schedule established

Stage	Date	Outcomes
2	Jan 3, 2026	Operators able to input participant data in a structured manner; simulated data stored in MySQL database; automatic group generation understood
3	Jan 17, 2026	Operators able to use automatic group elimination features, create round-robin schedules, input scores, and monitor real-time standings
4	Jan 24, 2026	Operators able to compile digital data-based activity reports; database backup-restore SOP established; operational manual draft completed
5	Feb 7, 2026	Full championship simulation ran smoothly; operators independently managed the entire tournament workflow; local operator team (3 members) formed

3.3 Program Impact and Outputs

This community service program has delivered tangible impact for PIMDA 04 Jember across several dimensions. First, tournament management accuracy and efficiency improved significantly through system automation—processes that previously required several hours can now be completed within minutes. Second, administrators' technical capacity to independently manage the digital system was established, evidenced by the success of the full simulation without assistance from the service team. Third, tournament information transparency increased substantially, with participants able to access real-time information via mobile devices.

Sustainability was strengthened through the formation of a local PIMDA 04 operator team comprising at least three members with defined roles as administrator, operator, and verifier. A digital-based tournament management SOP was also formulated as a replicable work standard for subsequent championships. Program evaluation was conducted using a structured questionnaire (Likert scale 1–5) administered to all 12 participants following the Stage 5 simulation. Results are presented in Table 2 below.

Program outputs that have been completed or are in progress include: (1) a fully functional MySQL-based group elimination information system installed at PIMDA 04 Jember, (2) activity documentation video, (3) partner satisfaction survey, (4) scientific article, (5) system user manual, and (6) submission of Intellectual Property Rights (HKI/Copyright) to the Directorate General of Intellectual Property (DJKI). The developed system has strong replication potential for Tapak Suci PIMDA branches in other regions and other autonomous Muhammadiyah organizations

Table 2. Evaluation Questionnaire Results (n=12, Likert Scale 1–5)

No.	Evaluation Dimension	Mean Score	Category	%
1	System ease of use	4.58	Very Good	91.6%
2	Training effectiveness	4.67	Very Good	93.4%
3	System usefulness for tournament management	4.75	Very Good	95.0%
4	Overall program satisfaction	4.71	Very Good	94.2%

Scale: 1–2 = Poor; 3 = Fair; 4 = Good; 4.5–5 = Very Good

The evaluation results (Table 2) indicate that all four dimensions received very good scores, with mean values ranging from 4.58 to 4.75 out of 5. The highest score was recorded for system usefulness (4.75), reflecting participants' strong agreement that the system effectively addresses the tournament management challenges previously faced by PIMDA 04 Jember.

Training effectiveness also received a high score (4.67), confirming the appropriateness of the service-learning approach adopted in this program.

3.4 Comparison: Manual vs. Digital System

Prior to system implementation, the organizing committee required 3–5 hours to manually compile the group elimination schedule, with a relatively high error rate. Following implementation, the same process can be completed in under 15 minutes using the match fixture generator feature, while simultaneously minimizing human error through the system's integrated automatic validation (**Jogiyanto, 2017**). This is consistent with Liu, Z., & Cao, T. finding that digitalization of sports tournament management information systems consistently improves operational efficiency and data accuracy (**Liu, Z., & Cao, T., 2024; Malyeyeva, 2020**).

4. CONCLUSION

The Stimulus Community Partnership Program (PKMS) was successfully implemented across five stages during the period of December 2025 to February 2026. The MySQL-based Group Elimination Information System was successfully developed, tested, and independently operated by the PIMDA 04 Jember operator team. This program demonstrates that technology-based interventions accompanied by structured training and institutional capacity building effectively transform manual work practices into more efficient, accurate, transparent, and sustainable digital governance.

For program sustainability, the following recommendations are proposed: (1) PIMDA 04 Jember should promptly implement the system in the next official championship and document the results for evaluation; (2) the local operator team should periodically refresh their system knowledge; (3) the system can be replicated and adapted for Tapak Suci PIMDA in other regions as well as other Muhammadiyah autonomous organizations; and (4) the LPPM of Universitas Muhammadiyah Jember may consider this program as a model for technology-based community service under larger grant schemes.

ACKNOWLEDGMENT

The service team extends sincere gratitude to the Research and Community Service Institute (LPPM) of Universitas Muhammadiyah Jember for supporting the PKMS program, to the leadership and administrators of Tapak Suci PIMDA 04 Jember for their active collaboration and participation throughout program implementation, and to all students involved in the system development.

LIST OF REFERENCES

- Aláez, M., Díaz-Iso, A., Eizaguirre, A., & García-Feijoo, M. (2022). Bridging generation gaps through service-learning in higher education: A systematic review. *Frontiers in Education*, 7, 841482. <https://doi.org/10.3389/feduc.2022.841482>
- Al-Hashimy, H. N. H., & Yao, J. (2024). The moderator effect of financial data accuracy in electronic accounting information systems towards business efficiency. *Evolutionary*

- Studies in Imaginative Culture*, 8(S2), 78–95.
<https://doi.org/10.70082/esiculture.vi.1027>
- Al-Mamary, Y. H., Shamsuddin, A., & Aziati, N. (2013). The impact of management information systems adoption in managerial decision making: A review. *Management Information Systems*, 8(4), 10–17.
- Jogiyanto, H. M. (2017). *Sistem informasi manajemen*. Andi.
- Hewawasam, H. P. P. M., & Lanel, G. H. J. (2024). A novel method to tournament scheduling. *International Journal of Scientific and Research Publications*, 14(8), 95–103.
<https://doi.org/10.29322/IJSRP.14.08.2024.p15212>
- Khoiriyah, R., & Priana, A. J. (2025). Effectiveness of ERP-based accounting information system implementation in improving operational efficiency of manufacturing companies. *Dhana*, 2(2), 72–79. <https://doi.org/10.62872/bpyqtv32>
- Li, C., Peters, G. F., Richardson, V. J., & Watson, M. W. (2012). The consequences of information technology control weaknesses on management information systems: The case of Sarbanes–Oxley internal control reports. *MIS Quarterly*, 36(1), 179–203.
<https://doi.org/10.2307/41410413>
- Liu, Z., & Cao, T. (2024). Computer information technology in the digital system of sports scoreboard. In *Proceedings of the 2024 International Conference on Telecommunications and Power Electronics (TELEPE)* (pp. 83–87). IEEE.
- LPPM Universitas Muhammadiyah Jember. (2025). *Buku panduan hibah internal pengabdian kepada masyarakat 2025*. Universitas Muhammadiyah Jember.
- Malyeyeva, O. V., Glushko, I. V., Artiukh, R. V., & Plyasheshnik, A. M. (2020). Informational support of event manager in the project of organization of sports actions. *Bulletin of NTU "KhPI": Series Strategic Management, Portfolio, Program and Project Management*, (2), 9–14.
- Marco-Gardoqui, M., Eizaguirre, A., & García-Feijoo, M. (2020). The impact of service-learning methodology on business schools' students worldwide: A systematic literature review. *PLOS ONE*, 15(12), e0244389. <https://doi.org/10.1371/journal.pone.0244389>
- Marsehan, A., Aulia, R., & Aprilisa, S. (2026). Rancang bangun sistem pendaftaran dan bracket otomatis pada turnamen esport berbasis web. *INTECOMS: Journal of Information Technology and Computer Science*, 9(2), 238–247.
<https://doi.org/10.31539/w00e7m79>

- Milovich, M., Riemenschneider, C. K., & Krey, N. (2026). Central information technology transparency: A managerial perspective of a multi-faceted construct. *Decision Support Systems*, 204, 114647. <https://doi.org/10.1016/j.dss.2026.114647>
- Muhammady, I. G., Mardiyanta, A., Suryono, A., & Rizkika, H. L. (2023). Who owns big data? Examine the policies of rural government in Indonesia. In *Promoting adaptive system to the current turbulence within crisis environments*. Airlangga University Press.
- Nunes, V. T., Cappelli, C., & Ralha, C. G. (2017). Transparency in information systems. In C. Boscaroli, R. M. de Araujo, & R. S. P. Maciel (Eds.), *Grand research challenges in information systems in Brazil 2016–2026* (pp. 73–89). Sociedade Brasileira de Computação. <https://doi.org/10.5753/sbc.2884.0.7>
- Patil, A., Shringarpure, K. R., Patil, K., Kathe, S., Shetty, S., & Pillai, S. (2025). RoundGen: Sports event scheduler using genetic and round robin algorithm. In *2025 3rd International Conference on Intelligent Data Communication Technologies and Internet of Things (IDCIoT)* (pp. 964–971). IEEE. <https://doi.org/10.1109/IDCIoT64235.2025.10914869>
- Pimpinan Pusat Tapak Suci Putera Muhammadiyah. (2019). *Pedoman pembinaan dan kejuaraan Tapak Suci*. Pimpinan Pusat Tapak Suci Putera Muhammadiyah.
- Purwanti. (2025). Penggunaan teknologi dalam manajemen enterprise resource planning (ERP), sistem manajemen informasi serta otomatisasi perspektif Islam. *ALSYS: Jurnal Keislaman dan Ilmu Pendidikan*, 5(6), 2280–2290. <https://doi.org/10.58578/alsys.v5i6.7921>
- Rodríguez-Zurita, D., Jaya-Montalvo, M., Moreira-Arboleda, J., Raya-Diez, E., & Carrión-Mero, P. (2025). Sustainable development through service learning and community engagement in higher education: A systematic literature review. *International Journal of Sustainability in Higher Education*, 26(1), 158–201. <https://doi.org/10.1108/IJSHE-10-2023-0461>
- Saeed, M., & Ahmed, I. (2021). An analytical review on rethinking service-learning as critical transformative paradigm in higher education. *Journal of Humanities, Social and Management Sciences*, 2(2), 318–334. <https://doi.org/10.47264/idea.jhsms/2.2.23>
- Solana-González, P., Vanti, A. A., García Lorenzo, M. M., & Bello Pérez, R. E. (2021). Data mining to assess organizational transparency across technology processes: An approach from IT governance and knowledge management. *Sustainability*, 13(18), 10130. <https://doi.org/10.3390/su131810130>

- Syahnaz, E., Hastriyandi, H., Setiawan, G., & Wahyuni, S. (2025). Design and construction of a web-based football competition registration and management application in Sambas Regency. *Journal of Scientech Research and Development*, 7(1), 1104–1112. <https://doi.org/10.56670/jsrd.v7i1.1185>
- Turban, E., Pollard, C., & Wood, G. (2018). *Information technology for management: On-demand strategies for performance, growth and sustainability* (11th ed.). Wiley.
- Universitas Muhammadiyah Jember. (2024). *Rencana strategis pengabdian kepada masyarakat Universitas Muhammadiyah Jember 2024–2029*. Universitas Muhammadiyah Jember.