

Techonology-Based Human Resource Management as a Strategy for Improving the Competence of Public High School Teachers in Jambi City

Ashira Naila Susanti¹, Ananda Clarissa², Callista Putri Andani³, Devi Riani⁴, Muthia Salsabila⁵

Universitas Muhammadiyah Jambi, Indonesia

**Corresponding e-mail: andanicallista@gmail.com*

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This study aims to analyze the implementation of technology-based human resource management (HRM) as a strategy to improve the competence of public high school teachers in Jambi City using a qualitative approach through in-depth interviews with principals, teachers, and HR management staff. The results show that the integration of technology, such as the use of Management Information Systems (MIS) and Learning Management Systems (LMS), has facilitated data management, online training, and digital collaboration among teachers, thereby supporting administrative efficiency, objective recruitment, and flexible competency development. However, main challenges faced include limited technological infrastructure, low digital literacy among some teachers, and lack of basic technological training for senior teachers. Institutional support, availability of facilities, and participative policies are key success factors, while disparities in technology access remain significant obstacles. The study recommends optimizing digital infrastructure, continuous training, and strengthening policies on technology-based HR development to ensure sustainable and relevant improvements in teacher competence aligned with educational needs in the digital era.

1. Introduction

Education is fundamentally a conscious and systematic effort to develop all potentials or a process aimed toward better and dignified orientations. Educating the nation, advancing the development of character, mind, and body, as well as improving the quality of human resources, are the goals of education. To achieve educational goals and realize societal welfare free from ignorance and poverty, Indonesian society must complete 12 years of mandatory education (UU Nomor 20, 2023).

Quality education underpins the advancement of a country like Indonesia, and teachers play a key role in the educational process, thus it is important to enhance teacher capacity. In Jambi, challenges to improve teacher skills and adapt to future technological developments exist. Teacher competence greatly influences the quality of learning and educational achievement.

Education is a conscious and systematic effort to develop all human potential leading toward a better quality of life and is the foundation for national progress. Teachers hold a central role in education, not only as knowledge transmitters but also as character and skills builders for students. Therefore, improving teacher competence is key to quality education.

In the digital era, educational challenges grow more complex. Teachers are required to adapt to technological developments and apply innovation to learning. Efforts to improve teacher competence in Jambi include addressing resource, time, and conventional training facility constraints. Technology-based human resource management (HRM) offers an innovative solution to overcome these barriers by providing flexible and easily accessible

training and competency development platforms.

Technology encompasses all tools and means that support human life comfort and sustainability. Early human use of technology involves transforming natural resources into simple tools. Prehistoric discoveries such as controlling fire increased food availability; the invention of the wheel facilitated travel and environmental control. Recent technological advances like the printing press, telephone, and Internet reduce physical communication barriers and allow global interaction.

Developing teacher and staff competence involves methods aimed at improving professional performance and strengthening teaching capacity. Strategies include technology-based training, online courses, experiential learning, and constructive feedback. Such approaches enable educational staff to continuously update skills, adapt to changing educational needs, and significantly contribute to educational quality. (Aida Raihani Subandi et al., 2024)

Jambi, as a developing region, has undertaken efforts to enhance education quality through teacher competency development. Challenges include limited resources, time, and conventional training facilities, hindering adequate teacher training participation. Hence, technology-based human resource management is crucial as an innovative solution enabling flexible and accessible competency development.

According to experts Bintoro and Daryanto, HR management is the science or method of efficiently and effectively organizing relationships and roles of human resources (workforce) to maximize usage and achieve goals..

Indonesian Law No. 20 of 2003 states education is a conscious and planned effort to create learning atmospheres and processes so learners actively develop their potential to possess spirituality, self-control, personality, intelligence, noble character, and skills. Education is a fundamental aspect of national development. Quality education depends on various factors, including the quality of human resources engaged in teaching, especially teachers. Teachers act as key drivers in education, not just transferring knowledge but shaping student character and skills. Thus, HR management of teachers is an important aspect to improve classroom learning quality. (Munip et al., 2024)

HR management plays a crucial role in educational advancement because education evolves with time. Therefore, human resources must be well-managed to ensure good managerial processes involving planning, organizing, leadership delegation, controlling to evaluating systems for quality education improvement (Manajemen Pendidikan et al., 2023)

Technology-based HR management focuses not only on administrative efficiency but also enhancing teaching quality through online training, digital collaboration, and data-based performance evaluations. Digital transformation in educational HR management is an urgent need so teachers can continuously develop and optimally contribute to achieving national educational goals.

Competence is defined as a set of skills, knowledge, and attitudes directly related to work performance (Sunyoto, 2015). Individuals competent in their fields tend to perform well. Competence assessment is important for determining proficiency and effectiveness levels. Setting required competence levels forms the basis for recruitment, strategic planning, performance evaluation, and human resource development.

Competence reflects collective effort to tackle challenges and achieve objectives. It relates closely to ability, where competent individuals have capacities required to excel. Sutrisno (2010: 202) traces the term "competency" etymologically emphasizing behavioral skills or excellence demonstrated by leaders or staff members. Competence combines abilities, knowledge, and behaviors necessary for particular or exceptional tasks. (Chamdan Purnama et al., 2025)

2. Methodology

This research uses a qualitative approach to deeply understand how technology-based human resource management is implemented as a strategy for improving teacher competence

in public high schools in Jambi City. Qualitative methods are chosen for exploring perceptions, experiences, and motivations of teachers and educational stakeholders, which quantitative methods may not fully capture. Data are collected through in-depth interviews with school principals, teachers, and HR management staff from several public high schools in Jambi. Interviews are designed to uncover subjective experiences regarding technology use in HR management, changes perceived, and effectiveness and challenges in teacher competence improvement.

Informants are purposively selected to represent diverse schools and teacher backgrounds in Jambi City. Ethical research principles, including informed consent and confidentiality, are strictly followed.

Findings will be presented narratively, integrating direct participant quotes to illustrate results, enabling readers to understand teacher experiences and practical implications of technology-based HR management in Jambi's public high schools. The study aims to provide applicable strategic recommendations for schools and education policymakers to optimize technology use for sustainable teacher competency development..

3. Results and Discussion

Findings from interviews with teachers in Jambi regarding "Technology-Based Human Resource Management as a Strategy for Improving Teacher Competence" are summarised as:

- 1) Teachers utilize information technology in teaching processes such as Google Classroom, Quiziz, and Geogebra, with frequency adjusted to lesson needs.
- 2) Technology aids teacher data management, including attendance, evaluation, and performance. Google Classroom simplifies attendance and exam management even for large student numbers.
- 3) Teachers actively access online learning platforms (LMS) for competency development, finding ease in creating tests, randomizing answers, and setting exam timings.
- 4) Schools provide technology-based training via applications and in-house sessions with experts.
- 5) The main benefits of online training and tech use include time efficiency and easy information access.
- 6) Technology effectiveness is measured by student benefits and teacher ease in performing professional duties.
- 7) Technology-supported recruitment and selection are seen as more objective and transparent.
- 8) Teacher HR development is conducted through internal training facilitated by schools, involving all school members.
- 9) Key enablers include adequate tools, institutional support, and teacher- student synergy. Major obstacle is limited technological facilities.
- 10) Technology accelerates real-time teacher performance evaluations.
- 11) Schools have specific policies supporting technology-based HR development, facilitating training processes.

4. Discussion

The results of this study indicate that the utilization of technology in human resource management (HRM) and education in Jambi City has been fairly optimal, especially in supporting the enhancement of teacher competence. This finding aligns with literature stating that the integration of technology in education can improve administrative efficiency, accelerate evaluation processes, and expand access to learning resources and online training.

The rapid development of technological systems in recent years has brought

significant changes in various fields, including education. Every year, new innovations emerge not only improving efficiency but also transforming how humans work and learn. The digital era introduced cutting-edge technologies such as Artificial Intelligence (AI), Internet of Things (IoT), and widespread adoption of digital applications, particularly after the pandemic..

In the educational context, a major transformation has been observed since early 2020 when teaching and assessment activities shifted to online platforms. The use of hardware and software, as well as digital platforms supporting distance learning and online evaluations, has become an inseparable part of modern education systems.

Between 2020 and 2025, there has been an extraordinary acceleration in technology application in the educational sector. Teaching and learning processes moved to online platforms like Learning Management Systems (LMS) such as Google Classroom, Moodle, and similar applications. Students and educators can access learning materials anytime and anywhere. Exams have shifted from paper-based to digital platforms, increasing efficiency, flexibility, and accuracy of assessments, while reducing paper consumption.

Platforms such as Google Classroom and Quiziz not only facilitate learning and evaluation processes but also support more effective teacher data management. This matches the concept of technology-based HRM, which emphasizes the critical role of digitizing administrative processes and competency development as part of strategies to improve education quality.

Technology-based training facilitated by schools, either online or in-house, provides significant benefits to teachers, particularly in terms of time efficiency and ease of accessing information. Nonetheless, the effectiveness of training strongly depends on the availability of technology infrastructure and institutional support. Supporting factors like adequate tools, school support, and teacher collaboration are key to successful technology-based competency development.

Conversely, the lack of technological facilities remains a primary obstacle, as revealed through interviews. This finding strengthens prior research indicating that disparities in technology access can obstruct the implementation of technology-based HRM in educational environments.

From a policy perspective, school support and facilitation are crucial factors for the success of technology-based HR development programs. The involvement of the entire school community in planning and conducting training reflects a participatory approach consistent with modern HR management principles.

In practice, the implementation of technology-based HRM in public high schools in Jambi involves integrating Management Information Systems (MIS) and Learning Management Systems (LMS) to optimize teacher management. This includes utilizing MIS for structured management of teacher performance data, attendance, and learning evaluations, alongside LMS for online training and teaching materials development. However, implementation faces significant challenges such as limited infrastructure and low digital skills among teachers.

Challenges faced by public high school teachers in Jambi in improving competence include:

- a) Inadequate computer labs and Wi-Fi networks in some schools, limiting digital learning and training support.
- b) Inflexible training schedules that conflict with core teaching responsibilities.
- c) Varied digital skills, with some teachers still lacking confidence or basic technological abilities.

- d) Insufficient foundational technology training, especially for senior teachers.
- e) Training content that sometimes does not align with actual teacher needs in the field.
- f) Lack of ongoing and sustainable policies or programs for teacher competency development in some schools.

Technology-based HRM solutions identified are :

- a) Use of Management Information Systems (MIS) to facilitate digital and real-time management of teacher data, attendance, performance evaluations, and administration.
- b) Recruitment, assessment, and promotion processes conducted objectively and transparently via digital systems.
- c) Learning Management System (LMS) platforms such as Google Classroom and Moodle providing flexible online training accessible anytime and anywhere.
- d) Self-directed learning without disturbing teaching schedules.
- e) Technology-based training improves pedagogical and digital skills..
- f) Encouraging teacher familiarity with digital learning applications, online test creation, virtual classroom management, and digital collaboration
- g) Facilitating collaboration among teachers within and across schools to share teaching strategies and learning resources.
- h) Immediate feedback provision enabling prompt improvements.
- i) Integrated data allows schools and local government to design more effective HR development policies and reward innovative teachers.

The application of technology has a positive impact on improving teacher competence through :

- 1. Efficient data management: MIS offers organized and transparent teacher data, speeding performance evaluation and decision-making processes.
 - 2. Flexible training access: LMS removes time and space barriers, allowing teachers to develop competencies independently through online materials.
 - 3. Enhanced professionalism: Technology supports collaboration among teachers in sharing teaching strategies and monitoring student progress in real-time, fostering 21st-century skill development.
- 1. Technology-Based Continuous Training Plan
 - a. Consistently improve teachers' pedagogical, professional, and technological competencies.
 - b. Ensure teachers can keep up with the latest developments in educational technology.
 - c. Utilize Learning Management System (LMS) platforms such as Google Classroom, Moodle, or Edmodo
 - d. Training materials include the creation of digital teaching media, use of interactive learning applications (Quiziz, Kahoot, Geogebra), and basic digital literacy.
 - e. Teachers who participate in the training receive digital certificates as proof of ongoing professional development.
 - f. Each training session concludes with evaluation and reflection to measure effectiveness and identify future training needs.
 - g. Trainings are scheduled regularly
 - h. Monitoring is carried out by the school HR development team through the SIM (Information Management System) application
 - 2. Development of Professional Learning Communities
 - a. Build a culture of collaboration and mutual knowledge sharing among teachers
 - b. Serve as a forum for discussion, problem-solving, and learning innovation
 - c. Use WhatsApp groups, Telegram, or school LMS forums to share materials, experiences, and learning solutions.

- d. Teachers observe each other's lessons, provide feedback, and discuss improvements in teaching strategies.
 - e. Schools facilitate dedicated times for community learning meetings
 - f. Provide rewards to teachers who actively contribute to the community.
3. Provision of Adequate Technology Infrastructure
- a. Ensure equal and fair access to technology for all teachers and students
 - b. Support the smooth implementation of technology-based training, learning, and management
 - c. Conduct surveys on ICT device needs (laptops, computers, projectors, internet access) in each school
 - d. Procure computers/laptops for teacher rooms and laboratories
 - e. Provide projectors and audiovisual equipment in every classroom
 - f. Ensure each school has stable and fast internet access
 - g. Provide Wi-Fi in strategic areas within the school
 - h. Establish a school ICT technician team for equipment maintenance and troubleshooting
 - i. Involve the school committee and parents in supporting infrastructure procurement.

The integration of technology in educational HR management has the potential to improve teacher efficiency and competence if supported by adequate infrastructure, comprehensive training, and sustained policy commitment.

Overall, the research results confirm that technology-based HR management strategies can improve teacher competence in public high schools in Jambi City, provided they are supported by sufficient infrastructure, clear policies, and collaboration among all stakeholders within the school environment.

Based on interviews and studies at public high schools (SMA Negeri) in Jambi City, the use of technology in human resource management has proven to have a positive impact on enhancing teacher competence. Teachers actively utilize various digital platforms such as Google Classroom, Quiziz, and Geogebra for teaching, as well as Learning Management Systems (LMS) for online training. This technology not only facilitates real-time management of teacher data, attendance, and performance evaluation but also expands flexible and efficient training access, enabling teachers to independently develop their pedagogical and professional competencies..

However, challenges remain, particularly regarding limited technological facilities in some schools, disparities in digital skills among teachers, and training materials that are sometimes less relevant to actual field needs. Furthermore, not all schools have ongoing technology-based HR development policies, resulting in uneven implementation of training and competency development programs. These obstacles call for infrastructural support, comprehensive training, and clear policies from both schools and local governments.

In summary, technology-based HR management strategies have great potential to improve the competence of public high school teachers in Jambi City. The success of these strategies heavily depends on the availability of technological infrastructure, institutional support, and collaboration among teachers and the entire school community. With continuous training, the development of professional learning communities, and adequate facilities, the integration of technology in HR management can become an effective solution to the educational challenges in the digital era.

5. Conclusion

Technology-based Human Resource Management (HRM) is a highly relevant strategic

effort to address the challenges of education in the digital era, particularly in improving the competence of public high school teachers in Jambi City. Teachers, as the vanguard of education, are required to continuously develop their pedagogical, professional, social, and personal competencies to deliver quality learning. However, in practice, teachers still face various obstacles such as limited technological facilities, disparities in digital skills, and uneven, sometimes irrelevant, access to training that doesn't meet their needs in the field.

The application of technology in school HRM has shown clear positive impacts. The use of platforms such as Management Information Systems (MIS) and Learning Management Systems (LMS) facilitates the management of teacher data, attendance, performance evaluation, and the flexible execution of online training. Teachers can access training materials anytime and anywhere, allowing competency development to be self-directed without disrupting their primary duties. Furthermore, technology also accelerates performance evaluation processes and provides real-time feedback, which is highly beneficial for teachers in refining and improving the quality of their teaching.

Nevertheless, several challenges still need to be overcome for this strategy to operate optimally. Limited infrastructure, such as computer labs and internet networks in some schools, remains a major obstacle. Additionally, not all teachers possess adequate digital literacy, especially senior teachers who are still less confident in utilizing technology. Training content that is sometimes irrelevant to actual field needs and the lack of sustainable HR development policies also present unique challenges.

Therefore, strong support is required from local governments, schools, and all educational stakeholders to provide adequate technological infrastructure, develop relevant and sustainable training programs, and foster a culture of collaboration and innovation within the school environment. The active involvement of all school members—from teachers, principals, to administrative staff—is crucial in planning and implementing technology-based competency development programs. Moreover, providing awards and incentives for innovative teachers can also boost motivation and enthusiasm for learning.

Overall, technology-based HRM has proven effective in improving the competence of public high school teachers in Jambi City, provided it is supported by adequate infrastructure, relevant training, and clear policies. Digital transformation in education is not merely an option but an urgent necessity to ensure teachers continue to develop and contribute optimally to achieving national educational goals. With synergy among the government, schools, and teachers, it is hoped that the quality of education in Jambi City can continuously improve and meet the demands of the times.

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