

Analysis of Training Needs in the Integration of Digital Technology in Learning for Java Language Teachers

Varary Mechwafanitiara Cantika^{1*}, Asep Herry Hernawan¹

¹Postgraduate of Curriculum Development, Universitas Pendidikan Indonesia, Indonesia

vararymc@upi.edu

ABSTRACT

Keywords:

Training Needs
Analysis;
Digital Technology in
Learning;
Javanese Language;
Teacher Competence.

Training can increase the competency of Javanese teachers regarding integrating digital technology into learning so that they no longer focus on traditional media such as textbooks. This research aims to identify prioritized training needs for Javanese language teachers in integrating digital technology into learning. Survey methods and quantitative approaches are the methods and approaches used in this research. The research population was Javanese language teachers at the Senior High School (SMA) level in East Java Province. The sample in this study consisted of 30 Javanese language teachers who were taken using an accidental sampling technique. A questionnaire is a data collection tool as well as a research instrument. The questionnaire was prepared using a Likert scale with 18 statement items. Research data were analyzed using descriptive statistics to show tendencies toward data centralization and measures of data diversity. The research results show that most teachers often participate in training activities but not training related to integrating digital technology into learning. According to the needs analysis survey, Javanese teachers need training in using online learning platforms, creating digital content, integrating digital tools in learning, and project-based learning with digital technology. This research has implications for being used as initial data for analyzing the need to develop a training curriculum for integrating digital technology in learning for Javanese language teachers.



Article History:

Received: 18-04-2024
Revised : 07-05-2024
Accepted: 10-06-2024
Online : 01-08-2024



This is an open access article under the **CC-BY-SA** license



<https://doi.org/10.31764/ijecca.v7i2.22903>

A. INTRODUCTION

The existence of technology in the world of education brings challenges and benefits. Technology raises problems that can reduce interaction and even closeness between teachers and students. If this situation continues to occur, students may experience a lack of holistic learning experiences in the learning activities carried out (Chauhan, 2017). Even though it has a negative impact, it cannot be denied that technology in education gives rise to more creative and innovative learning opportunities. If these opportunities are utilized optimally, they will improve students' learning experiences and encourage students' understanding and ability to think critically (Raja & Nagasubramani, 2018). Technological development has entered the Society 5.0 era and is starting to move away from the Industrial Revolution 4.0 era. This era of society encouraged the development and use of technology through various innovations born during the Industrial Revolution, which centered on technology. One example of the use of society-era technology in education can be seen in the emergence of artificial intelligence (Muhtadin et al., 2023).

Integrating digital technology in learning is a teaching strategy that involves integrating and using technology to improve and change student learning (McKnight et al., 2016). This integration also increases students' accessibility to information and learning opportunities more cooperatively (Alenezi et al., 2023). Through this integration, students will have the opportunity to receive high-quality learning and get better educational results (Hood, 2018). A study shows that the use of digital technology in education will be able to increase students' digital academic literacy, self-efficacy, accuracy, and efficiency in carrying out academic tasks, such as obtaining information, capturing information, taking notes, and collaborating with friends (Solas & Sutton, 2018). Even though several studies show that the integration of digital technology in learning can provide various positive benefits for students, in fact, in teaching and learning activities carried out in the classroom, it is still found that many teachers are not able to carry out integration because of the various limitations they have (Akram et al., 2022; Bereczki & Kárpáti, 2021; Rana & Rana, 2020).

This phenomenon has encouraged researchers' interest in finding ways to overcome this situation. Training is considered to be a way of developing a person's competencies. The existence of training provided for teachers in the realms of psychology, didactics, pedagogy, information, and communication technology can help develop the professional competencies that teachers need for the teaching they carry out (Eva, 2020). Referring to its relationship to the integration of technology in learning, the existence of training is considered to be able to improve teachers' skills, knowledge, and understanding of technology in learning and increase their abilities to face challenges and optimize teaching potential in the digital era (Nasution et al., 2023). Through this training, teachers will also get benefits such as personality development, pedagogical style, professionalism, and more focus on other competencies needed by an educator, including information, multicultural, and social (Tovkanets, 2022).

Javanese is one of the local content subjects in Indonesia, and it provides students with understanding and knowledge regarding the language and culture of the Javanese people. As one of the local content subjects closely related to regional culture, integrating digital technology in Javanese language subjects is often considered less relevant to incorporate. Integrating digital technology in Javanese language learning will help learning objectives be achieved more optimally (Hartanto & Triyono, 2021). For example, a study shows that the existence of a digital library, which is a form of information technology development in the form of a library, can bridge the need for teaching materials among Javanese language teachers. This digital library can provide straightforward, cheap, and paperless support for obtaining information (Pudjastawa & Cantika, 2020). Therefore, based on the findings of previous studies and the research phenomena described, this research aims to identify prioritized training needs for Javanese language teachers in integrating digital technology into learning. Identification was conducted by conducting a needs analysis survey for Javanese language teachers at the senior high school (SMA) level in East Java Province. A needs analysis assessed the urgency of training needs related to online learning platforms, digital content creation, integration of digital tools into learning, and project-based learning with digital technology.

B. METHODS

The approach used in this research is quantitative. The method chosen is the survey method with cross sectional design. Survey research is a procedure carried out on an entire population or a sample to describe the attitudes, unique characteristics, behaviors, or opinions of the population studied. A cross-sectional survey is a survey design that collects data at one time for a sample (Creswell, 2014). In order to obtain research data, it is first necessary to determine the population and research sample as well as the sampling technique used (Ali, 2014). The population of this study was Javanese language teachers at the Senior High School (SMA) level in East Java Province who were taken using accidental sampling. This sampling technique was chosen because researchers can collect data to help expand their understanding of the research topic. Apart from that, the influence of this sampling technique can help researchers obtain a more diverse sample so that the research results will not be limited to a specified list of respondents. The sample in this study consisted of 30 Javanese language teachers.

The questionnaire is a data collection tool used in this research. Questionnaires are also used as research instruments, and they are used using indicators from variables related to the research problem. The total number of statement items in this study was 18 statement items arranged on a Likert scale with details: strongly disagree (1), disagree (2), quite agree (3), agree (4), and strongly agree (5). The instrument was developed by synthesizing several previous studies (Creangă, 2021; Dooley et al., 2016; Heggart & Yoo, 2018; Khaimina et al., 2023; Khomyshak, 2022; Lin et al., 2017; Amin & Paiman, 2022; Orlova & Firsova, 2022; Sahirin et al., 2023; Seo, 2016; Yarychev & Mentsiev, 2020) and then tested for validity and reliability using SPSS 25. The results of the instrument's validity were 0.001 ($\alpha < 0,05$) and its reliability was 0,843 ($> r$ tabel = 0,367). Referring to the results of the validity and reliability tests, the instrument in this research is valid and reliable for use as a data collection tool. The data in this research were analyzed using descriptive statistics. *Descriptive statistics* is a statistical analysis method that describes data to be presented concisely and quickly understood and shows the tendency of data concentration and measures of data diversity (Lynch, 2013) as shown in Figure 1.

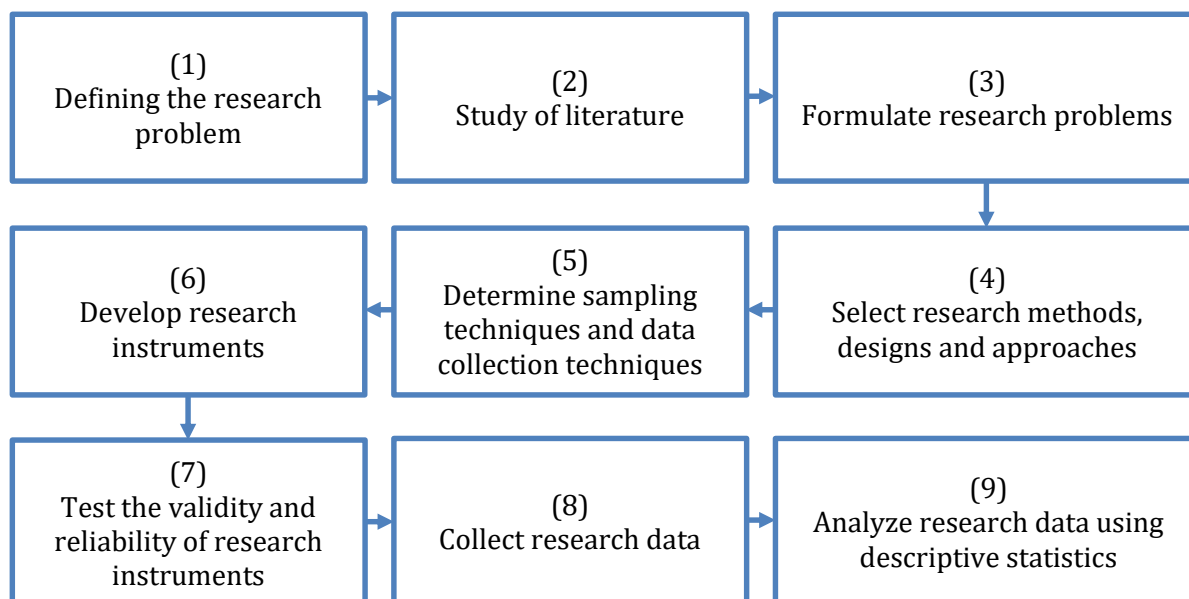


Figure 1. Research Stages

C. RESULT AND DISCUSSION

Participating in training is one of the activities teachers must continue to carry out to improve and fulfill the competencies needed in their teaching. Based on a survey conducted on 30 Javanese language teacher respondents at the high school level in East Java, it is known that the level of teacher participation in training is shown differently, as shown in Table 1.

Table 1. Teacher Participation in Training Activities

No.	Participation Information	Total	Percentage
1.	Always	8	26,7%
2.	Often	15	50%
3.	Sometimes	3	10%
4.	Never	4	13,3%
Total		30	100%

Based on the data displayed in Table 1, it can be seen that 50% of teachers often participate in training activities, while the remaining 26,7% (always), 10% (sometimes), and never (13,3%) participate in training activities. Referring to this data, it is also known that participation in training related to digital technology in learning Javanese is quite rare.

Table 2. Type of Training Undertaken

No.	Training Followed	Total	Percentage
1.	Training related to digital technology in learning Javanese	8	26,7%
2.	Training that is not related to digital technology in learning Javanese	18	60%
3.	Did not attend any training	4	13,3%
Total		30	100%

Referring to Table 2, it can be seen that only eight teachers (26,7%) have attended training related to digital technology in learning Javanese. In comparison, the remaining 18 teachers (60%) participated in training unrelated to digital technology, and four teachers (13,3%) did not attend any training. This shows that Javanese teachers' competence in integrating digital technology into learning still needs improvement and optimization. This condition is proven in Figure 2, which shows that some teachers need to gain competence in integrating digital technology into their learning.

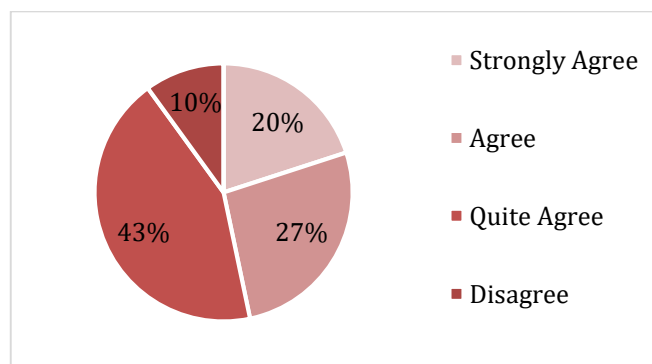


Figure 2. Ability to Integrate Digital Technology in Learning

Based on Figure 2, it can be seen that as many as six teachers (20%) strongly agree that they can integrate digital technology into learning. A total of 8 teachers (27%) said they agreed, 13 teachers (43%) said they quite agreed, and three teachers (10%) said they disagreed. Following these conditions, researchers conducted a training needs analysis on integrating digital technology in learning for Javanese language teachers. In summary, the results of the needs analysis survey on the four types of training are as follows.

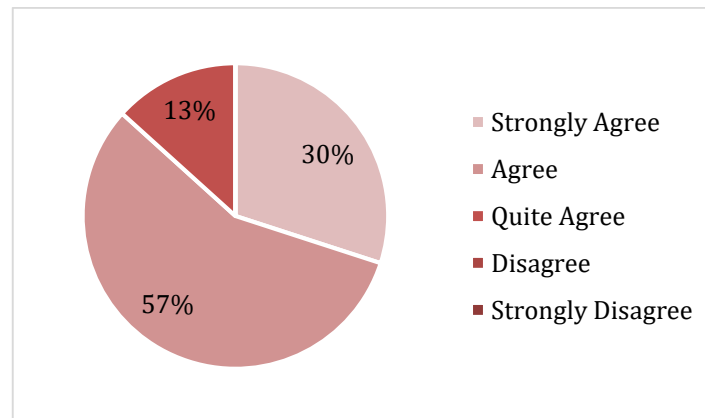


Figure 3. Use of Online Learning Platforms

Referring to the data shown in Figure 3, it can be seen that as many as nine teachers (30%) strongly agree that they need training related to the use of online learning platforms. Seventeen teachers (57%) agreed, and four (13%) agreed. These data show that most teachers agree that training in using online learning platforms is needed to learn Javanese.

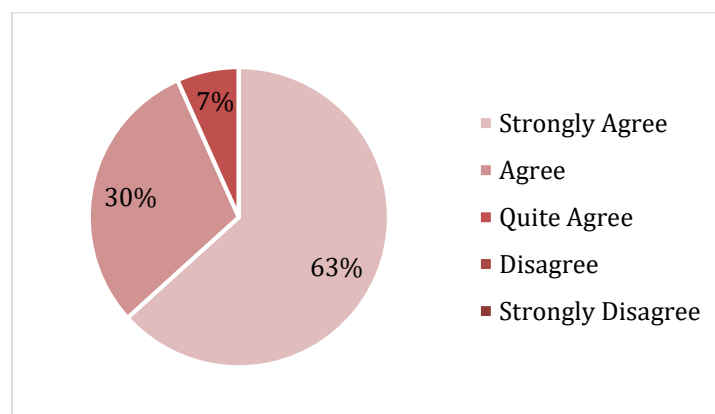


Figure 4. Digital Content Creation

Referring to the data shown in Figure 4, it can be seen that 19 teachers (63%) strongly agree that they need training related to digital content creation. Nine teachers (30%) said they agreed, and two teachers (7%) said they quite agreed. The data shows that most teachers agree that digital content creation training is needed in learning Javanese.

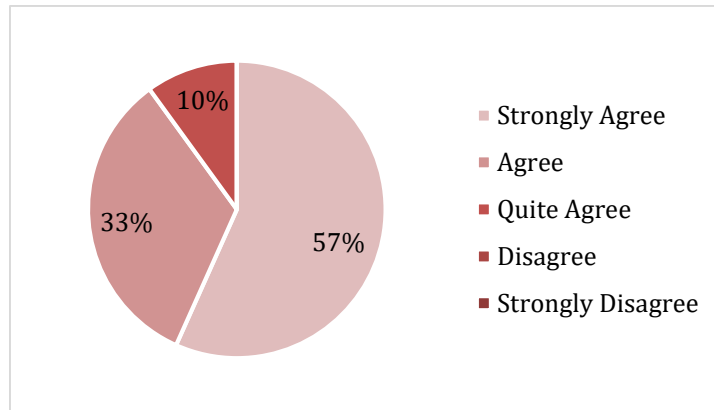


Figure 5. Integration of Digital Tools in Learning

Referring to the data shown in Figure 5, it can be seen that 17 teachers (57%) strongly agree that they need training related to integrating digital tools in learning. A total of 10 teachers (33%) said they agreed, and three teachers (10%) said they quite agreed. The data shows that most teachers agree that digital tool integration training is needed in learning Javanese.

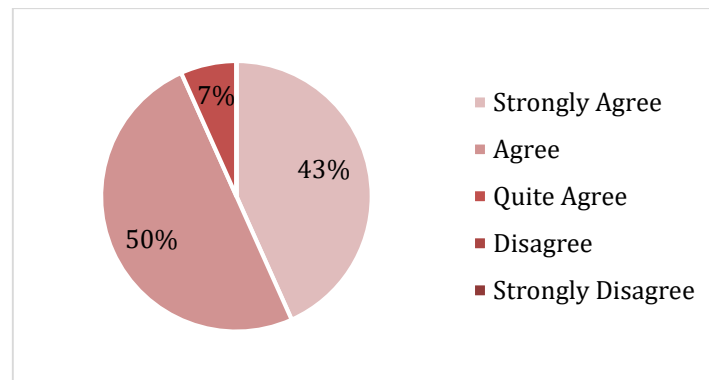


Figure 6. Project Based Learning with Digital Technology

Referring to the data shown in Figure 6, it can be seen that 13 teachers (43%) strongly agree that they need training related to project-based learning with digital technology. Fifteen teachers (50%) agreed, and two (7%) agreed. The data shows that most teachers agree that project-based learning training with digital technology is needed to learn Javanese. Furthermore, referring to the results obtained, the following is a summary of the training that is considered needed by Javanese language teachers, as shown in Table 3.

Table 3. Digital Technology Integration Training that Teachers Need

No.	Required Training	Relevant Competencies
1.	Use of Online Learning Platforms	<ul style="list-style-type: none"> ▪ use of LMS (learning management system) ▪ create and manage classes online ▪ give assignments and carry out assessments online ▪ communicate with students and parents online
2.	Digital Content Creation	<ul style="list-style-type: none"> ▪ utilization of learning media applications (Powtoon, Canva, Prezi, Piktochart, and Emaze) ▪ create interesting and interactive digital presentations and learning videos ▪ developing interactive digital teaching materials

No.	Required Training	Relevant Competencies
3.	Integration of Digital Tools in Learning	<ul style="list-style-type: none"> ▪ using social media for learning ▪ using digital tools (Kahoot! and Quizizz) to increase student participation ▪ use online educational applications to help students learn ▪ combining digital technology with traditional learning methods
4.	Project Based Learning with Digital Technology	<ul style="list-style-type: none"> ▪ designing digital technology-based learning projects ▪ guiding students to complete digital technology-based learning projects ▪ assess student learning outcomes on learning projects

The four types of training shown in Table 3 are the types of training teachers consider most needed to support their abilities regarding integrating digital technology in Javanese language learning. Javanese language learning is local content in the Merdeka Curriculum, and it introduces students to themselves and their regional culture. The implementation of local Javanese content material in the Merdeka Curriculum pays attention to the use of Javanese language, the use of modern Javanese literature, the use of classical literature (oral and written), the use of non-literary texts, and Javanese script. Seeing the complexity and embeddedness of Javanese culture in the materials and learning, innovation is needed to integrate digital technology into Javanese language learning. However, the competency of Javanese teachers regarding integrating digital technology into learning still requires improvement. This is because most Javanese teachers still focus on using textbooks and do not maximize the potential for integration or use of digital technology in the learning they carry out (Kurnia & Nugroho, 2017; Kurwidaria et al., 2019; Pudjastawa, 2022; Subrata, 2022).

Such conditions can be minimized and overcome by utilizing training to increase the competence of Javanese teachers regarding integrating digital technology into learning. Bearing in mind, training is one of the ways that can be used to improve teacher competence (Gümüş, 2022). Technology-related training can also increase teachers' knowledge, skills, and understanding of utilizing technology in learning. This can also improve teachers' abilities to face technological challenges and optimize their teaching potential in the digital era (Nasution et al., 2023). Training can be a way to train teachers to have good competencies according to their expertise. Training can also be a way of career development for teachers to improve the quality of their learning (Hafizi et al., 2022). The hope is that by attending training related to integrating digital technology into learning, Javanese language teachers will no longer focus on using textbooks and will maximize the potential for technological developments in education.

Not only for teachers the benefits obtained from teachers' participation in the training can also be felt by students (Sudarsana et al., 2019). The benefits that students can experience when teachers utilize technology are producing interactive learning activities and focusing students' attention holistically (McDermott & Gormley, 2016). Apart from that, students who learn using technology will also be more able to engage in critical discussions and problem-solving and be better able to communicate the ideas they have to achieve success (Trust, 2017). Technology in learning can also facilitate student learning and real-time student collaboration (Roy, 2019; Sun, 2023). Several studies reveal that teaching involving technological tools has generally proven to be more effective than traditional teaching methods, which in turn also transforms teacher-

centered learning into student-centered learning (Aziz, 2021; Johnson, 2020; Qurat-ul-Ain et al., 2019; Rajan et al., 2021; Zhang et al., 2021).

D. CONCLUSION AND SUGGESTIONS

This research concludes that many Javanese language teachers still need to integrate digital technology into learning and not only focus on textbooks or traditional learning media. Training is considered a way that can support and improve teacher competence in this regard. Surveys show that most teachers often participate in training activities but not training related to integrating digital technology into learning. The types of training teachers need refer to the needs analysis survey, including training in online learning platforms, creating digital content, integrating digital tools in learning, and project-based learning with digital technology. These four types of training are the types of training teachers consider most needed to support their abilities regarding integrating digital technology in learning Javanese. However, this research still has limitations. Therefore, further research should be carried out with a more comprehensive analysis of training needs that can show the level of competence of Javanese teachers in integrating digital technology into learning.

REFERENCES

- Akram, H., Abdelrady, A. H., Al-Adwan, A. S., & Ramzan, M. (2022). Teachers' Perceptions of Technology Integration in Teaching-Learning Practices: A Systematic Review. *Frontiers in Psychology, 13*, 1–9. <https://doi.org/10.3389/fpsyg.2022.920317>
- Alenezi, M., Wardat, S., & Akour, M. (2023). The Need of Integrating Digital Education in Higher Education: Challenges and Opportunities. *Sustainability, 15*(6), 4782. <https://doi.org/10.3390/su15064782>
- Aziz, A. (2021). Impacts of Information and Communication Technology on Developing Quality of Teaching. *Journal of Technology and Information, 13*(1), 92–102. <https://doi.org/10.5507/jtie.2021.010>
- Bereczki, E. O., & Kárpáti, A. (2021). Technology-enhanced creativity: A multiple case study of digital technology-integration expert teachers' beliefs and practices. *Thinking Skills and Creativity, 39*, 1–27. <https://doi.org/10.1016/j.tsc.2021.100791>
- Chauhan, S. (2017). A meta-analysis of the impact of technology on learning effectiveness of elementary students. *Computers & Education, 105*, 14–30. <https://doi.org/10.1016/j.compedu.2016.11.005>
- Creangă, I. (2021). Comparative Study between The Traditional Teaching Method and The Online Teaching Method. *Proceedings of SOCIOINT 2021- 8th International Conference on Education and Education of Social Sciences*, 330–333. International Organization Center of Academic Research. <https://doi.org/10.46529/socioint.202154>
- Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (4th ed.). Thousand Oaks, CA: Sage.
- Dooley, C. M., Lewis Ellison, T., Welch, M. M., Allen, M., & Bauer, D. (2016). Digital Participatory Pedagogy: Digital Participation as a Method for Technology Integration in Curriculum. *Journal of Digital Learning in Teacher Education, 32*(2), 52–62. <https://doi.org/10.1080/21532974.2016.1138912>
- Eva, S. A. S. (2020). Development of Competencies among High School Teachers: Main Directions. *Gafurov I, Valeeva R (Eds) VI International Forum on Teacher Education, Kazan Federal University*, 2397–2408. Rusia: ARPHA Proceedings 3. <https://doi.org/https://doi.org/10.3897/ap.2.e2397>
- Gümüş, A. (2022). *Twenty-First-Century Teacher Competencies and Trends in Teacher Training*. https://doi.org/10.1007/978-981-16-9640-4_11

- Hafizi, Iim Wasliman, Hanafiah, & Faiz Karim Fatkhullah. (2022). Management of Teacher Competency Development and Training in Improving Learning Quality. *Journal of Education Research and Evaluation*, 6(3), 520–528. <https://doi.org/10.23887/jere.v6i3.52673>
- Hartanto, D. D., & Triyono, S. (2021). Manajemen Pembelajaran Bahasa Jawa Menggunakan Moda Bsmart UNY. *Piwulang: Jurnal Pendidikan Bahasa Jawa*, 9(2), 122–136. <https://doi.org/10.15294/piwulang.v9i2.47841>
- Heggart, K., & Yoo, J. (2018). Getting the Most from Google Classroom: A Pedagogical Framework for Tertiary Educators. *Australian Journal of Teacher Education*, 43(3), 140–153. <https://doi.org/10.14221/ajte.2018v43n3.9>
- Hood, N. (2018). Re-imagining the nature of (student-focused) learning through digital technology. *Policy Futures in Education*, 16(3), 321–326. <https://doi.org/10.1177/1478210317742215>
- Johnson, M. L. (2020). Teaching and Tech: An Investigation of the Relationship and Use of Digital Technologies and the Overall Effectiveness of the Classroom Learning Environment. *Peabody Journal of Education*, 95(2), 183–192. <https://doi.org/10.1080/0161956X.2020.1745609>
- Khaimina, L. E., Demenkova, E. A., Zelenina, L. I., Demenkov, M. E., Khaimin, E. S., & Zashikhina, I. M. (2023). Project-based Learning: Formation of Students' Digital Competencies. *2023 3rd International Conference on Technology Enhanced Learning in Higher Education (TELE)*, 178–180. IEEE. <https://doi.org/10.1109/TELE58910.2023.10184375>
- Khomyshak, O. B. (2022). Using Digital Learning Technology in The Process of Linguomethodological Training of Future Foreign Language Teachers. *Information Technologies and Learning Tools*, 88(2), 38–55. <https://doi.org/10.33407/itlt.v88i2.4654>
- Kurnia, E. D., & Nugroho, Y. E. (2017). Pelatihan Pembuatan Media Pembelajaran Aksara Jawa Bagi Guru Bahasa Jawa SMA di Kabupaten Rembang. *Jurnal Pengabdian Pada Masyarakat*, 2(2), 101–112. <https://doi.org/10.30653/002.201722.22>
- Kurwidaria, F., Sumarwati, S., & Wardani, N. E. (2019). Model Pelatihan Penyusunan Perangkat Pembelajaran untuk Meningkatkan Kompetensi Guru Bahasa Jawa SMP di Kabupaten Karanganyar. *Jurnal VARIDIKA*, 31(1), 8–16. <https://doi.org/10.23917/varidika.v1i1.8899>
- Lin, M.-H., Chen, H.-C., & Liu, K.-S. (2017). A Study of the Effects of Digital Learning on Learning Motivation and Learning Outcome. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(7), 3553–3564. <https://doi.org/10.12973/eurasia.2017.00744a>
- McDermott, P., & Gormley, K. A. (2016). Teachers' Use of Technology in Elementary Reading Lessons. *Reading Psychology*, 37(1), 121–146. <https://doi.org/10.1080/02702711.2015.1009592>
- McKnight, K., O'Malley, K., Ruzic, R., Horsley, M. K., Franey, J. J., & Bassett, K. (2016). Teaching in a Digital Age: How Educators Use Technology to Improve Student Learning. *Journal of Research on Technology in Education*, 48(3), 194–211. <https://doi.org/10.1080/15391523.2016.1175856>
- Mohamed Amin, M., & Paiman, N. (2022). University English Language Teachers' Use of Digital Platforms for Online Teaching. *International Journal of Emerging Technologies in Learning (IJET)*, 17(20), 134–148. <https://doi.org/10.3991/ijet.v17i20.31421>
- Muhtadin, I., Susilahati, S., & Santoso, G. (2023). Transformation Work Discipline, Leadership Style, And Employees Performance Based On 21st Century. *Proceedings of the 1st Pedagogika International Conference on Educational Innovation, PICEI 2022, 15 September 2022, Gorontalo, Indonesia*. EAI. <https://doi.org/10.4108/eai.15-9-2022.2335931>
- Nasution, N. H. A., Dalimunte, N., Harahap, S. B., Dewi, R. S., & Karim, A. (2023). Increasing Teacher Competency Through Training and Person Job Fit. *Nidhomul Haq: Jurnal Manajemen Pendidikan Islam*, 8(2), 268–277. <https://doi.org/10.31538/ndh.v8i2.3997>
- Orlova, S. N., & Firsova, S. V. (2022). Digitalisation and challenges of the education system: project work in formation of foreign language communicative competence. *Vestnik Universiteta*, (4), 20–25. <https://doi.org/10.26425/1816-4277-2022-4-20-25>
- Pudjastawa, A. W. (2022). "How They Teach": Case Study Javanese Language Teaching in The Covid-19 Crisis. *Education and Human Development Journal*, 6(3), 82–92. <https://doi.org/10.33086/ehdj.v6i3.2222>

- Pudjastawa, A. W., & Cantika, V. M. (2020). Penerapan Google Drive Bersama sebagai Perpustakaan Digital. *Piwulang: Jurnal Pendidikan Bahasa Jawa*, 8(2), 89–95. <https://doi.org/10.15294/piwulang.v8i2.42114>
- Qurat-ul-Ain, Q.-A., Shahid, F., Aleem, M., Islam, M. A., Iqbal, M. A., & Yousaf, M. M. (2019). A Review of Technological Tools in Teaching and Learning Computer Science. *EURASIA Journal of Mathematics, Science and Technology Education*, 15(11), 1–17. <https://doi.org/10.29333/ejmste/109611>
- Raja, R., & Nagasubramani, P. C. (2018). Impact of modern technology in education. *Journal of Applied and Advanced Research*, 3(1), 33–35. <https://doi.org/https://dx.doi.org/10.21839/jaar.2018.v3S1.165>
- Rajan, S., Bindu, G. V., & Mukherjee, S. (2021). Adopting Evolving Technologies to Aid Cognitive Abilities in Classroom Learning-Teaching. In *Neuro-Systemic Applications in Learning* (pp. 483–506). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-72400-9_24
- Rana, K., & Rana, K. (2020). ICT Integration in Teaching and Learning Activities in Higher Education: A Case Study of Nepal's Teacher Education. *Malaysian Online Journal of Educational Technology*, 8(1), 36–47. <https://doi.org/10.17220/mojet.2020.01.003>
- Roy, A. (2019). Technology in Teaching and Learning. *International Journal for Innovation Education and Research*, 7(4), 414–422. <https://doi.org/10.31686/ijer.vol7.iss4.1433>
- Sahirin, R., Cian, L., Wang, Y., & Zou, G. (2023). Making Creative Videos as Learning Media. *Journal International Inspire Education Technology*, 2(1), 1–10. <https://doi.org/10.55849/jiiet.v2i1.239>
- Seo, K. K.-J. (2016). Empowering Learning Communities With Social Media. *American Journal of Distance Education*, 30(1), 1. <https://doi.org/10.1080/08923647.2016.1119608>
- Solas, E., & Sutton, F. (2018). Incorporating Digital Technology in the General Education Classroom. *Research in Social Sciences and Technology*, 3(1), 1–15. <https://doi.org/10.46303/ressat.03.01.1>
- Subrata, H. (2022). Implementation of 21st Century Learning Principles on Local Content of Javanese Elementary Schools in East Java. *RA Journal of Applied Research*, 08(12), 847–857. <https://doi.org/10.47191/rajar/v8i12.01>
- Sudarsana, I. K., Mulyaningsih, I., Kurniasih, N., Haimah, Wulandari, Y. O., Ramon, H., ... Abdullah, D. (2019). Integrating Technology and Media in Learning Process. *Journal of Physics: Conference Series*, 1363(1), 012060. <https://doi.org/10.1088/1742-6596/1363/1/012060>
- Sun, S. (2023). Teachers' Technological Skills in Influencing Students' Learning Motivation. *Applied & Educational Psychology*, 4(9), 80–88. <https://doi.org/10.23977/appep.2023.040913>
- Tovkanets, A. (2022). Competence aspects of a teacher training. *Visnyk of the Lviv University. Series Pedagogics*, (36), 179–186. <https://doi.org/10.30970/vpe.2022.36.11565>
- Trust, T. (2017). Preparing Future Teachers to Redefine Learning With Technology. *Journal of Digital Learning in Teacher Education*, 33(2), 44–45. <https://doi.org/10.1080/21532974.2017.1281654>
- Yarychev, N. U., & Mentsiev, A. U. (2020). Impact of digital education on traditional education. *Journal of Physics: Conference Series*, 1691(1), 012132. <https://doi.org/10.1088/1742-6596/1691/1/012132>
- Zhang, L., Basham, J. D., Carter, R. A., & Zhang, J. (2021). Exploring Factors associated with the implementation of student-centered instructional practices in U.S. classrooms. *Teaching and Teacher Education*, 99, 1–11. <https://doi.org/10.1016/j.tate.2020.103273>