


School principals managerial leadership strategies in increasing students' digital literacy



Muhammad Afif Abdurrohman ^{a,1}, Dian Hidayati ^{a,2*} 

^a Universitas Ahmad Dahlan, Yogyakarta, Indonesia

¹ 2207046046@webmail.uad.ac.id; ² dian.hidayati@mp.uad.ac.id *

* corresponding author

ARTICLE INFO

Received January 28, 2024
Revised March 12, 2024
Accepted March 20, 2024

Keywords

Digital literacy
Managerial leadership
School principals
Educational strategies

ABSTRACT

Digital literacy is an essential skill that allows students to understand, use, and effectively participate in the digital world. Moreover, it enables them to explore, understand, and develop the skills necessary for using technology wisely and critically evaluating information. This research aims to ascertain the managerial leadership strategies employed by school principals to enhance students' digital literacy. Specifically, it focuses on such strategies in the context of school leadership. Research into school principal leadership strategies for enhancing students' digital literacy holds significance due to the pivotal role of leadership in optimizing school management, particularly in advancing students' digital literacy. Additionally, this research holds promise for contributing to the field of education and serving as a valuable reference for other school principals. Employing a qualitative approach, this research collected data through interviews and document analysis of school archives. The respondents interviewed included the principal and teachers of MBS Prambanan Elementary School. Data analysis followed the Miles and Huberman approach, encompassing data collection, reduction, presentation, and verification or conclusion drawing. The study identified managerial leadership strategies utilized by the principal of Muhammadiyah Boarding School Prambanan to enhance students' digital literacy. These strategies include (1) fostering collective collegial leadership, (2) provisioning facilities related to digital technology, (3) fostering learning innovations, (4) cultivating a culture of digital literacy and guidance for students, and (5) conducting evaluations.



This is an open access article under the [CC-BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.



1. Introduction

As the era progresses, the education sector must adapt to the characteristics of the technological era to effectively address the challenges of the times. The digitalization era is typified by rapid access to information, with digital literacy emerging as a crucial component [1]. It serves as a pivotal tool for education to sift through available information, thereby aligning with the objectives of national education [2]. However, digital literacy transcends mere technical skills, necessitating a profound understanding of how technology profoundly influences life [3]. Hence, leadership strategies employed by school principals to enhance digital literacy are paramount in cultivating intelligent, critical, and innovative students [4]. At the core of any educational institution's success lies the leadership role [5]. The quality of human resources hinges largely on the institution's caliber, which, in turn, is heavily influenced by effective school leadership. School leaders must possess a spectrum of competencies outlined in the Regulation of the Minister of National Education, encompassing personality traits,

managerial aptitude, entrepreneurial skills, supervisory capabilities, and social acumen [6]. Effective leadership entails the ability to influence behavior and adeptly manage operations, termed as managerial leadership. Managerial leadership denotes the capacity of school principals to navigate self-management and cultivate a conducive work environment, drawing upon their skill set [7].

Challenges associated with managerial leadership, such as motivational deficits among leaders, are widely debated within organizational contexts. School principals require managerial competencies to proficiently plan, execute, monitor, and evaluate educational programs. These competencies, entailing planning, organization, implementation, and supervision, underpin effective management within educational institutions. Books serve as gateways to knowledge and skill acquisition, underscoring their importance in an individual's intellectual development. However, the digital era facilitates seamless access to information, reshaping various facets of education. The rapid evolution of science and technology necessitates the integration of digital technology across educational domains. This shift underscores the criticality of digital literacy, which is pivotal for societal development and cultural enrichment. As technological advancements pervade everyday activities, proficiency in digital literacy becomes indispensable, shaping the trajectory of societal progress and cultural enrichment. Currently, digital literacy has become imperative in education, particularly in teaching and learning activities. Technological advancements progress rapidly, impacting both urban and rural areas, notably benefiting students who can access reference sources via digital media. Social media platforms provide various means of interaction, communication, and socialization, facilitated by engaging features [8].

Digital literacy encompasses the skills and knowledge necessary for utilizing communication tools, digital media, or networks to acquire, create, evaluate, and use information wisely, adhering to applicable laws in everyday communication and interaction activities [9]. Implementing and understanding digital literacy is crucial for fostering students' character values in this century [10]. However, the reality persists that students' digital literacy remains underdeveloped [11]. Numerous benefits stem from applying digital literacy in education, including enlivening teaching and learning activities, saving time and costs, nurturing a positive reading culture, enhancing the learning environment's interactivity, providing knowledge, and motivating independent information seeking [12]. A strategy entails practical steps or methods for implementing preconceived programs in alignment with the plan. Implementation of strategies typically involves three stages: planning, execution, and evaluation [13]. From the diverse definitions provided, managerial leadership and strategies for enhancing digital literacy can be understood as plans devised by school principals to enhance students' ability to utilize digital devices as learning resources, fostering knowledge acquisition, communication skills, online access proficiency, and digital learning quality enhancement. Addressing digital literacy-related challenges necessitates the formulation of strategies by school principals, tailored to the school's specific problems, obstacles, and advantages. This research was conducted at MBS Prambanan Elementary School, chosen due to its implementation of a boarding system, which presents numerous challenges in the digital era. Through observations, researchers noted the successful integration of digital literacy into the school's learning processes. The research aims to explore the managerial leadership strategies employed by school principals to enhance students' digital literacy, providing insights into the methods and steps taken by the principal of MBS Prambanan Elementary School. These findings can serve as a reference and aid school principals in other regions in devising strategies to enhance students' digital literacy.

2. Method

This research employed descriptive qualitative methodology. Data collection encompassed interviews and document analysis. Interviews were conducted with the principal and teachers of MBS Prambanan Elementary School, with researchers serving as instruments for data acquisition. Information was gathered from informants' submissions and documentation archives owned by the school. The interviews involved school principals and teachers as participants, lasting approximately 40 minutes each. Data analysis followed the Miles and Huberman approach, involving data collection, reduction, presentation, and verification or conclusion drawing. The data analysis procedure unfolded as follows: (1) Data Collection: Information was gathered through interviews with the school principal and documentation.

Upon completing data collection, all acquired data were compiled into a comprehensive dataset; (2) Data Reduction: Following data collection, the researchers synthesized and interpreted the interview results, extracting key insights; (3) Presentation of Data: The gathered data were presented in the form of a descriptive narrative, providing a comprehensive overview of the findings; (4) Verification or Conclusion: Final conclusions were drawn based on the analyzed data, elucidating the managerial leadership strategies implemented by school principals to enhance students' digital literacy.

3. Results and Discussion

Based on the conducted analysis, several leadership strategies have been identified, which are implemented by school principals to enhance the digital literacy of students at MBS Prambanan Elementary School. The strategies implemented by the school principal are designed to facilitate the integration of digital literacy into all learning activities, thereby enabling students to effectively utilize digital technology and adapt to ongoing developments. Fig. 1 illustrates the principal's managerial leadership strategy aimed at enhancing students' digital literacy.

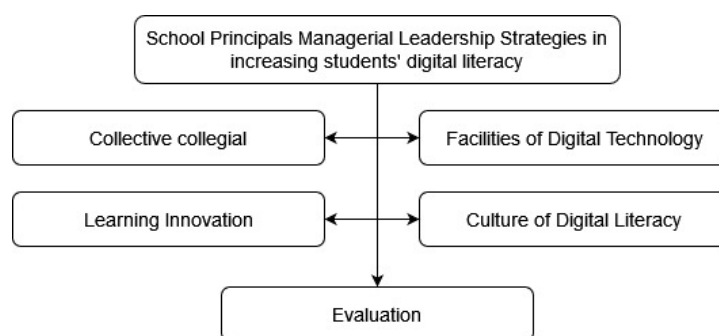


Fig. 1. School Principals' Managerial Leadership Strategies

3.1. Barriers to Students' Digital Literacy

In the implementation of digital literacy for students, school principals encounter several obstacles. For instance, some students still lack proficiency in using digital technology, thereby hindering optimal participation in digital literacy activities at MBS Prambanan Elementary School. Additional challenges include variations in teachers' abilities and ages. Furthermore, there are limitations concerning facilities related to digital technology, notably insufficient digital equipment to support digital literacy implementation due to the large student population. These obstacles, as articulated by the principal of MBS Prambanan Elementary School, are as follows:

"Obstacles are surely inevitable, sir. Some of those are, for example, inadequate facilities and there are students who, sorry, are a bit clueless when it comes to technology. As a result, we as the school sometimes have to provide more guidance to some students who are falling behind so they can keep up with their other friends. Other limitations such as ability and age, perhaps young teachers or fresh graduates and those who have been there for a long time are different, but it's not that significant because they are backed up with other teachers who are young and whose enthusiasm for learning is still possible. So teachers who don't know or cannot do anything will automatically adapt to the environment so that the learning process will run well. Moreover, with the KKG which happens to have 4 groups, the material or content will be worked on together and not alone. There are four teachers plus one al-Islam teacher at Elementary School of MBS, so it is not so difficult for teachers to teach" (School Principal Interview, 15 June 2023).

The principal's statement was corroborated by the following statement made by the teacher:

"Yes, sir. The obstacle lies in the lack of facilities. Thus, we as teachers are sometimes confused. Em... I don't want to implement a learning process (KBM) with technology yet. The implementation of digital technology has been around for a long time, only

because there are so many students that we are constrained by facilities" (Teacher Interview, 15 June 2023).

Based on the acquired interview results, it is evident that several obstacles persist regarding students' digital literacy at MBS Prambanan Elementary School. These obstacles include students' inadequate proficiency in keeping pace with evolving technology, thus impeding their effective implementation of digital literacy. Additionally, the school still lacks adequate facilities, thereby hindering the optimization of teaching and learning processes utilizing digital technology.

3.2. School Principal's Managerial Leadership Strategy in Increasing Students' Digital Literacy

Based on the conducted analysis, several managerial leadership strategies are utilized by school principals to enhance students' digital literacy, including (1) fostering collective collegial leadership; (2) providing facilities related to digital technology; (3) fostering learning innovations; (4) cultivating a culture of digital literacy and providing guidance to students; and (5) conducting evaluations. According to the interview results, the school principal highlighted the implementation of collective collegiality as a managerial leadership strategy to augment students' digital literacy. This approach involves engaging all stakeholders in discussions concerning school progress, particularly in advancing students' digital literacy. The strategy aims to enhance students' quality to ensure they remain competitive in terms of digital literacy compared to students from other schools. To facilitate this process, the school principal solicits suggestions and input from all stakeholders regarding the utilization of digital technology at MBS Prambanan Elementary School. These discussions take place during school meetings and Foundation meetings, as conveyed by the school principal.

"In managerial implementation at that time we used collective collegial interests, where the involvement of all existing stakeholders was to discuss school progress. As for related considerations, the decision is still in the hands of the school principal" (Principal Interview, 15 June 2023).

The principal's statement is substantiated by the teacher's statement, as follows:

"The principal always asks for input from teachers, parents, committees, and all parties in the school regarding school progress, especially regarding increasingly developing technology. Thus, the school always opens a forum for discussions to improve the quality of the school, but the decision remains with the principal" (Teacher Interview, 15 June 2023)

From the statements provided by the school principal and teacher, it can be inferred that the first strategy undertaken by the school principal pertains to enhancing students' digital literacy, specifically through fostering a collegial collective involving all stakeholders within the school. This collaborative process occurs during both school and Foundation meetings and aims to assess the school's progress. The subsequent strategy implemented by the school principal involves providing facilities related to digital technology. According to the analysis results, it is evident that the school principal ensures the provision of digital technology facilities such as computers and laptops. These technological resources are supplied by the school to support technological learning processes and are tailored to current advancements. Presently, the school's facilities are deemed adequate and effectively support activities associated with students' digital literacy, as articulated by the school principal.

"As of now the facilities and infrastructure are adequate, such as computers, laptops, and so on, and students have services to start learning to use computers. This supports the students' digital literacy process" (School Principal Interview, 15 June 2023).

The principal's statement was supported by the statement made by the teacher, as follows:

"For the facilities themselves, the school has equipped and provided adequate technological facilities or equipment, so both teachers and students can use computers, laptops, and so on" (Teacher Interview, 15 June 2023).

The subsequent managerial leadership strategy employed by school principals to enhance students' digital literacy involves creating learning innovations. These innovations entail utilizing technological learning media in the educational process, such as cell phones, YouTube, and websites containing supporting learning materials. This approach was articulated by the principal as follows:

"To implement this related to increasing digital literacy, the teachers directed the students to websites that supported learning and provided teaching materials for children in addition to YouTube" (School Principal Interview, June 15, 2023).

The same thing was also conveyed by a teacher who supported the statement from the principal above, namely as follows:

"The principal directed all teachers to innovate in learning. This innovation is asked to utilize technology as well so that students can get to know technology and not be left behind. Currently, in the learning process, there are those from websites, YouTube, mainly those that utilize digital technology" (Teacher Interview, 15 June 2023).

The subsequent strategy entails fostering a culture of digital literacy and providing guidance for students. This culture involves incorporating digital technology into the learning process, facilitating interactive communication through digital means, and fostering a supportive family environment conducive to positive interaction and communication processes. Additionally, the principal emphasized directing all teachers to integrate digital technology into every activity, as stated below:

"Building a reading habit or culture for every student always to use digital technology in learning activities, creating interactions in communicating with digital technology, creating an environment that supports families to meet their needs in efforts to build a digital literacy culture. Then related to educators or teachers, now the principal must direct all teachers without exception, both class teachers, subject teachers, and tahfidz teachers, to use digital, so the principal demands and gives directions to all teachers, must use digital via social media that can be used for certain materials or lessons" (School Principal Interview, 15 June 2023).

The principal's statement concerning digital literacy culture is corroborated by the teacher's statement, as follows:

"The principal also builds a culture of literacy at the Elementary School of MBS Prambanan. For example, by getting used to using technology in learning, then also using digital technology in the process of positive interaction and communication with all parties" (Teacher Interview, 15 June 2023).

The last strategy employed by school principals to enhance students' digital literacy involves evaluating aspects pertaining to the implementation of digital literacy in schools. The evaluation conducted by the school principal aims to ascertain both successful and unsuccessful elements of the implementation, as articulated by the principal below:

"We are also carrying out evaluations regarding the use of digital technology in this school. The purpose of this evaluation is to make the weaknesses and strengths of this school known so that in the future we can make improvements and continue to implement digital literacy. Students will become more familiar with digital so that students will not be stuttering with technology. Their challenges in the future will be much greater, even facing the era of technological development. We have to prepare at least the basics for them to get to know the digital world so that students in the future will be ready to accept changing times and technological developments so they won't stutter and be surprised so they will be better and survive in their time" (School Principal Interview, 15 June 2023).

The statement made by the school principal is supported by the statement provided by the teacher, as follows:

"At the end of every activity or during the meeting, the principal always asks what things have not yet been achieved, for example in technological facilities what is still lacking, what has not been implemented. That's called evaluation" (Teacher Interview, June 15, 2023).

Based on the results of interviews conducted with the principal and teachers of MBS Prambanan Elementary School, it is evident that several obstacles hinder the implementation of digital literacy for students at the school. These obstacles include students' inadequate proficiency in using digital technology, variations in teachers' abilities and ages, and a lack of digital equipment to support students' digital literacy. Moreover, to enhance students' digital literacy at the school, the school principal has implemented managerial leadership strategies. These strategies include fostering collective collegial leadership, providing facilities related to digital technology, fostering learning innovations, cultivating a culture of digital literacy and guidance for students, and conducting evaluations. These strategies serve as a reference for future improvement endeavors.

Based on interviews conducted with the principal and teachers of the Elementary School of MBS Prambanan, it is evident that obstacles exist in students' digital literacy. These obstacles include students' inability to use digital technology effectively, variations in teachers' abilities and ages, and insufficient digital equipment to support students' digital literacy implementation. To address these challenges, school principals employ managerial leadership strategies aimed at enhancing students' digital literacy. The managerial leadership strategies employed by school principals to enhance students' digital literacy include: (1) Utilizing collective collegial leadership; (2) Providing facilities related to digital technology; (3) Creating innovative learning approaches; (4) Cultivating a culture of digital literacy and providing guidance to students; (5) Conducting evaluations for future improvements. The principal initiates the first strategy by facilitating collective collegial discussions involving all stakeholders to monitor school progress, particularly regarding students' digital literacy, as it significantly impacts their success. Adopting a collective collegial approach fosters openness and has comprehensive implications for educational program success [14].

The principal's strategic objective is to enhance students' quality, ensuring they remain competitive in terms of digital literacy compared to other schools. The principal actively solicits suggestions and input from stakeholders regarding the integration of digital technology at the Elementary School of MBS Prambanan, which occurs during school and Foundation meetings. Involving stakeholders streamlines decision-making processes, recognizing stakeholders' integral role in school management [15]. In addition to convening collegial collectives, the principal evaluates and implements stakeholders' suggestions, such as providing digital technology-related facilities. These facilities, including computers and laptops, are accessible to all school members, supporting technology-related learning processes and adapting to evolving technological trends, thereby enhancing student engagement and comprehension [16]. Keeping pace with digital literacy trends is imperative [17], and the current adequacy of school facilities and infrastructure supports activities related to students' digital literacy [18], facilitating effective learning processes.

Additionally, the school principal initiates learning innovations, incorporating technological mediums into the learning process such as cell phones, YouTube, and websites containing supportive educational materials. Integrating YouTube into the learning process is crucial in the digital era [19]. The objective of employing such technology is to diversify learning materials, preventing student boredom and promoting comprehensive knowledge acquisition. Digital literacy facilitates access to information from various sources [10]. Utilizing YouTube as a learning platform combines entertainment with education, enhancing student engagement [20]–[22]. The subsequent strategy involves fostering a culture of digital literacy and providing guidance to students. This culture encompasses utilizing digital technology in the learning process, engaging in interactive communication through digital mediums, and establishing a supportive familial environment conducive to positive interaction and communication. Furthermore, all teachers are directed to incorporate digital technology into their activities. The final strategy undertaken by school principals to enhance students' digital literacy involves evaluating aspects related to the implementation of digital literacy within schools. Principals are tasked with guiding, supervising, evaluating, and reflecting on both teachers' and students' performance [23]. The evaluation conducted by principals aims to assess the success and areas

of improvement in the implementation process. Conducting evaluations enables informed decision-making both before and after program implementation (Munthe, 2015).

4. Conclusion

Based on our research findings, it can be concluded that the principal of the Elementary School of MBS Prambanan implements a managerial leadership strategy to enhance students' digital literacy. Among the strategies employed by the principal are endeavors to enhance student quality, ensuring they remain technologically proficient, facilitating an easier learning process, and importantly, keeping pace with technological advancements. Given the rapid pace of technological development, school principals must continuously innovate and devise strategies to facilitate ongoing improvement.

Acknowledgment

The author would like to thank the Universitas Ahmad Dahlan, Yogyakarta for the granted support.

Declarations

- Author contribution** : All authors contributed equally to the main contributor to this paper. All authors read and approved the final paper
- Funding statement** : None of the authors have received any funding or grants from any institution or funding body for the research
- Conflict of interest** : The authors declare no conflict of interest
- Additional information** : No additional information is available for this paper

References

- [1] S. C. A. Utulu and B. Mustapha, "Reconceptualizing the Indigenous Peoples in the Era of Digital Disruption," in *SDGs in Africa and the Middle East Region*, 2023, pp. 1–24. doi: [10.1007/978-3-030-91260-4_13-1](https://doi.org/10.1007/978-3-030-91260-4_13-1)
- [2] M. Akour and M. Alenezi, "Higher Education Future in the Era of Digital Transformation," *Educ. Sci.*, vol. 12, no. 11, p. 784, Nov. 2022, doi: [10.3390/educsci12110784](https://doi.org/10.3390/educsci12110784).
- [3] D. Anurogo, Hardin La Ramba, Nabila Diyana Putri, and Ulfah Mahardika Pramono Putri, "Digital Literacy 5.0 to Enhance Multicultural Education," *Multicult. Islam. Educ. Rev.*, vol. 1, no. 2, pp. 109–179, Dec. 2023, doi: [10.23917/mier.v1i2.3414](https://doi.org/10.23917/mier.v1i2.3414).
- [4] T. M. Kin and O. A. Kareem, "School leaders' Competencies that make a difference in the Era of Education 4.0: A Conceptual Framework," *Int. J. Acad. Res. Bus. Soc. Sci.*, vol. 9, no. 4, pp. 214–225, May 2019, doi: [10.6007/IJARBS/v9-i4/5836](https://doi.org/10.6007/IJARBS/v9-i4/5836).
- [5] M. Brown, R. McGreal, and M. Peters, "A Strategic Institutional Response to Micro-Credentials: Key Questions for Educational Leaders," *Journal of Interactive Media in Education*, no. 1. 24-May-2023, doi: [10.5334/jime.801](https://doi.org/10.5334/jime.801).
- [6] M. I. Dacholfany, E. Susanto, and A. Noviandi, "Leadership and management of education institutions in improving human resources in Indonesia," *Am. J. Econ. Bus. Manag.*, vol. 1, no. 3, pp. 38–55, Jul. 2018, doi: [10.31150/ajebm.Vol1.Iss3.30](https://doi.org/10.31150/ajebm.Vol1.Iss3.30).
- [7] R. T. Pangandoyon, S. P. Lupina, M. O. Mandin, and M. M. Bauyot, "A Multiple Case Study on the Resilient Leadership in Integrated Schools: School Heads' Perspective in Focus," *Asian J. Educ. Soc. Stud.*, vol. 50, no. 1, pp. 28–41, Jan. 2024, doi: [10.9734/ajess/2024/v50i11237](https://doi.org/10.9734/ajess/2024/v50i11237).
- [8] J. Szabolics, S. Malos, and D. C. Balaban, "Adolescents' Augmented Reality Filter Usage on Social Media, Developmental Process, and Well-Being," *Media Commun.*, vol. 11, no. 4, pp. 129–139, Oct. 2023, doi: [10.17645/mac.v11i4.7016](https://doi.org/10.17645/mac.v11i4.7016).
- [9] L. P. Supratman and A. Wahyudin, "Digital Media Literacy to Higher Students in Indonesia," *Int. J. English Lit. Soc. Sci.*, vol. 2, no. 5, pp. 51–58, 2017, doi: [10.24001/ijels.2.5.7](https://doi.org/10.24001/ijels.2.5.7).
- [10] V. I. Marín and L. Castañeda, "Developing Digital Literacy for Teaching and Learning," in *Handbook of Open, Distance and Digital Education*, Singapore: Springer Nature Singapore, 2023, pp. 1089–1108. doi: [10.1007/978-981-19-2080-6_64](https://doi.org/10.1007/978-981-19-2080-6_64)

-
- [11] A. W. Lazonder, A. Walraven, H. Gijlers, and N. Janssen, "Longitudinal assessment of digital literacy in children: Findings from a large Dutch single-school study," *Comput. Educ.*, vol. 143, p. 103681, Jan. 2020, doi: [10.1016/j.compedu.2019.103681](https://doi.org/10.1016/j.compedu.2019.103681).
- [12] C. Audrin and B. Audrin, "Key factors in digital literacy in learning and education: a systematic literature review using text mining," *Educ. Inf. Technol.*, vol. 27, no. 6, pp. 7395–7419, Jul. 2022, doi: [10.1007/s10639-021-10832-5](https://doi.org/10.1007/s10639-021-10832-5).
- [13] E. Bergsmann, M.-T. Schultes, P. Winter, B. Schober, and C. Spiel, "Evaluation of competence-based teaching in higher education: From theory to practice," *Eval. Program Plann.*, vol. 52, pp. 1–9, Oct. 2015, doi: [10.1016/j.evalprogplan.2015.03.001](https://doi.org/10.1016/j.evalprogplan.2015.03.001).
- [14] G. Mudhar, S. K. Ertesvåg, and E. Pakarinen, "Patterns of teachers' self-efficacy and attitudes toward inclusive education associated with teacher emotional support, collective teacher efficacy, and collegial collaboration," *European Journal of Special Needs Education*. pp. 1–17, 11-Jul-2023, doi: [10.1080/08856257.2023.2233297](https://doi.org/10.1080/08856257.2023.2233297).
- [15] A. Bandur, "Stakeholders' responses to school-based management in Indonesia," *Int. J. Educ. Manag.*, vol. 32, no. 6, pp. 1082–1098, Aug. 2018, doi: [10.1108/IJEM-08-2017-0191](https://doi.org/10.1108/IJEM-08-2017-0191).
- [16] K. Dzulqornain, S. Narimo, W. Wafroturrohman, S. Haryanto, and A. Muhibbin, "Implementation of iPad-based digital classroom services at al Azhar Islamic school 21 Solo Baru, Central Java, Indonesia," *J. Fundadikdas (Fundamental Pendidik. Dasar)*, vol. 6, no. 1, pp. 76–91, Mar. 2023, doi: [10.12928/fundadikdas.v6i1.8062](https://doi.org/10.12928/fundadikdas.v6i1.8062).
- [17] Z. Yangzi, K. S. L. Cheah, and M. S. N. Bin Shaharom, "Enhancing Self-Leadership in Online Fitness Education and Training: Exploring Strategies and Addressing Challenges Among Social Media Influencers in Henan Province, China," *SAGE Open*, vol. 13, no. 4, Oct. 2023, doi: [10.1177/21582440231219325](https://doi.org/10.1177/21582440231219325).
- [18] N. Zainal Abiddin, I. Ibrahim, and S. A. Abdul Aziz, "Advocating Digital Literacy: Community-Based Strategies and Approaches," *Acad. J. Interdiscip. Stud.*, vol. 11, no. 1, pp. 198–198, Jan. 2022, doi: [10.36941/ajis-2022-0018](https://doi.org/10.36941/ajis-2022-0018).
- [19] J. S. Quaicoe, A. A. Ogunyemi, and M. L. Bauters, "School-Based Digital Innovation Challenges and Way Forward Conversations about Digital Transformation in Education," *Educ. Sci.*, vol. 13, no. 4, p. 344, Mar. 2023, doi: [10.3390/educsci13040344](https://doi.org/10.3390/educsci13040344).
- [20] J. Boltiziar and D. Munkova, "Emergency remote teaching of listening comprehension using YouTube videos with captions," *Education and Information Technologies*. pp. 1–17, 25-Oct-2023, doi: [10.1007/s10639-023-12282-7](https://doi.org/10.1007/s10639-023-12282-7).
- [21] I. Chalkias, K. Tzafilkou, D. Karapiperis, and C. Tjortjis, "Learning Analytics on YouTube Educational Videos: Exploring Sentiment Analysis Methods and Topic Clustering," *Electronics*, vol. 12, no. 18, p. 3949, Sep. 2023, doi: [10.3390/electronics12183949](https://doi.org/10.3390/electronics12183949).
- [22] L. M. Harper, E. D. James, S. Joo, and Y. Kim, "System and content factors associated with college students' adoption of YouTube for learning purposes," *Electron. Libr.*, vol. 41, no. 5, pp. 641–661, Sep. 2023, doi: [10.1108/EL-04-2023-0083](https://doi.org/10.1108/EL-04-2023-0083).
- [23] B. Fresko and I. Levy-Feldman, "Principals' implementation of teacher evaluation and its relationship to intended purpose, perceived benefits, training and background variables," *Assess. Educ. Princ. Policy Pract.*, vol. 30, no. 1, pp. 18–32, Jan. 2023, doi: [10.1080/0969594X.2023.2166461](https://doi.org/10.1080/0969594X.2023.2166461).