

## DIGITAL LEADERSHIP IN MADRASAH

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**Abstract:** *Digital leadership characteristics are needed in developing digital madrasahs. With these characteristics, various obstacles are faced so that the digitalization transformation process can be carried out. This study was conducted to determine the principal's characteristics at MA Ma'arif Almuhtadi, Paciran, Lamongan, East Java. This madrasah has succeeded in winning the digital madrasah innovation award. The study was conducted with a qualitative approach. Data collection was carried out using interview, observation and documentation techniques. The data collected is explained and concluded descriptively. The results of this study indicate that the principal of MA Ma'arif Almuhtadi has digital leadership characteristics. He is capable to think to face change, creative, visionary, has motivation to learn and has deep insight so that he can make decisions in complex situations. Digitalization programs in madrasah management can be carried out despite facing various obstacles. The role of digital leadership is very important to realize digital madrasahs effectively and efficiently.*

*Keywords:* Digital Transformation; Madrasah; Leadership.

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### Introduction

Leaders have a very important role for the progress of an organization or institution. Likewise, leaders or principal in madrasahs. His role is so important to advance the quality of madrasah (Zahro et al., 2018, Wibawani et al., 2019). The madrasah head carries out the role of educator, manager, administrator, supervisor, leader, innovator, and at the same time motivator (Mulyasa in Imelda et al., 2024). To carry out its role, a leader needs to see the times (Silawati et al., 2023). The madrasah principal carries out his role in a visionary manner so that he can become a driver of change or improvement in his institution, (Wibawani et al., 2019). Principals need to have a strategy in improving the implementation of education (Hidayat & Patras, 2021). Including in the current digital era. Information and communication technology can be utilized for innovative education services (Fajri & Wiyani, 2019). Madrasah leadership that is able to respond to the challenges of digitalization is needed.

Currently, the development of information and communication technology and the process of digitalization are pervasive in various aspects of life. To encourage a digital-savvy society, the Ministry of Communication and Information of the Republic of Indonesia initiated a program to uphold the pillars of digital literacy. In line with this goal, the Ministry of Religious Affairs of the Republic of Indonesia developed a digital madrasa program. Various educational service activities can be carried out by utilizing digital technology.

Directly or indirectly, madrasahs are faced with challenges for learning that utilize digital technology (J. P. Sari et al., 2024). Madrasahs need to equip students with digital literacy skills, so that they can grow into a generation that is ready to take a positive role in the development of the times while being able to counteract the negative impacts of technology.

With the ease and speed of information dissemination, learners need to be equipped with the ability to access the right information from reliable sources. Thus, they are able to avoid harmful, misleading information, even radicalism and extremism, which can be harmful to themselves and others. An understanding of digital literacy is essential to counteract radicalism and extremism, which are spread on social media through the internet (Kenedi & Hartati, 2022).

Madrasah leaders need to understand that madrasah is a strategic space to equip generations to be able to uphold the four pillars of digital literacy. Namely, digital culture, digital ethics, and digital safety, digital skills, (Alfiani et al., 2024). The madrasah head as a leader can direct management to carry out the four pillars of digital literacy. Digitalization transformation is carried out with all academic resources. That way the leader directs the

development of madrasah towards digital madrasah. Digital madrasah is a madrasah that organizes education management using digital applications, organizes information and communication technology learning in the form of subjects, local content, or extracurricular activities, applies information and communication technology-based learning strategies, resources and media and applies digital applications in its assessment system (Smart madrasah). Digital madrasah is managed in accordance with the 8 National Education standards.

The concept of digital madrasah is a madrasah that organizes education management using digital applications. Digital devices, information and communication technology, are not the main goal, but rather a tool to support effectiveness and efficiency. Madrasahs strive to achieve the vision by conducting digital literacy, lifelong learning, complete learning and character-based education. The human aspect becomes an important source, policy maker, providing a human touch and as an operator of digital devices. The digital madrasah program is expected to realize the best education implementation and not lag behind with the development of information and communication technology.

The utilization of information and communication technology in the field of education, especially in terms of teaching has become a concern. In previous studies, the use of information and communication technology and digitalization activities in schools or madrasahs have become a concern. Learning with ICT using blended learning is an innovation and alternative that can be expected in order to achieve the success of the learning process (Permana et al., 2021, (Dahlan & Arini, 2022), (Izzati et al., 2021). However, to achieve good results, school management must strengthen its management system, especially in terms of ICT operations and resource skills (Royyan et al., 2023). Of course, all of this also faces various challenges that are not easily overcome by madrasahs. The implementation of information and communication technology in educational institutions requires readiness. This readiness includes aspects of human resources, infrastructure and financing that are not small. To realize this, an educational institution leader who has a broad view and is oriented towards the future is needed. Digital leadership in madrasah is needed to prepare a generation with good digital literacy.

Digital leadership is the ability of a leader to use digital assets to make decisions to improve the quality of education quickly and accurately (Soeratin & Fanani, 2023). The madrasah head represents a digital era Islamic education leader who is ideally able to communicate and collaborate with stakeholders according to the needs and demands of the times and is able to organize Islamic education that can produce quality graduates. Graduates who can think critically, creatively towards the use of renewable technology (Amin & Muttaqin, 2022).

Digital leadership is a leadership style that focuses on implementing digital transformation in an organization. This leadership model allows companies and organizations to digitize their work environment and work culture (Sağbaşı & Alp Erdoğan, 2022 in (Tulungen et al., 2022)). Pearl Zhu (Zhu, 2015) in Tulungen et al., (2022) mentions digital leadership criteria consisting of 5 characteristics: (1) Thinkers who are able to deal with market changes and competition, (2) Creative, have a creative and innovative mindset in formulating new ideas into reality, (3) Visionaries, namely digital leaders who have the ability to provide direction in digital transformation efforts (4) have curiosity that encourages them to continue learning (5) Profound Leader, namely the digital style has in-depth knowledge and understanding, can use their knowledge for interpretation, synthesis thinking to make decisions so that they are ready to face complex situations.

The application and utilization of information and communication technology in educational institutions requires a visionary policy strategy and is able to answer the challenges of the times (P. Sari & Murod, 2023). These challenges can be in terms of the procurement of the required infrastructure facilities, or in terms of the skills of its users. Limited funds for the provision of facilities and infrastructure are often an obstacle, as well as the skills of education personnel, educators and students in utilizing digital technology.

Teachers who have the skills to utilize information and communication technology well can create interesting and interactive audio-visual learning media. So, this can arouse students' learning motivation and improve the quality of learning and become more effective and efficient. With devices connected to the internet, students can access various learning resources and learning can be done anywhere and anytime. In addition, learning media designed in accordance with the learning needs of students can present a positive response from students to the learning process (Anshori, 2018). Information and communication technology is the application of knowledge and skills used to convey information or messages with specific purposes (Setiawan, 2018). In the 21st century, the delivery of learning messages using media and learning resources is dominated by electronic and digital-based media (Mulyono & Ampo, 2021).

To encourage the digitalization of madrasahs, the Ministry of Religious Affairs of East Java Province in collaboration with Infra digital Nusantara held a digital madrasah innovation program. Activities carried out include socialization through webinars, ongoing training and mentoring, madrasah digitalization surveys, digital madrasah campaigns, madrasah assessment visitations, and closed with a madrasah award summit. The 2021

Digital Madrasah Innovation Award for Surabaya and Bojonegoro Working Areas was held to coincide with the 76th Charity Day of the Ministry of Religious Affairs, on January 3, 2022 at Vasa Hotel, Surabaya. This event is a form of appreciation for leadership the continuation of the digital madrasah transformation program that has been carried out in 8 East Java cities / districts to award the best digital madrasah. In the event, Madrasah Aliyah Ma'arif Almuhtadi Sendangagung Paciran Lamongan won the Digital Madrasah Innovation Award in East Java in 3rd place. This achievement attracts the attention of researchers to find out how digital leadership is carried out by the madrasah head and how to deal with all its limitations.

## Method

This research employed a qualitative descriptive approach. Data collection involved semi-structured interviews with the principal of MA Ma'arif Almuhtadi as the primary informant. To enhance the depth and validity of the findings, the researchers also conducted supporting interviews with a teacher and a student, focusing on their experiences with digital leadership implementation in daily activities.

Each interview lasted between 45–60 minutes and was guided by an interview protocol developed based on the dimensions of digital leadership proposed by Pearl Zhu (2015). The protocol included open-ended questions to explore perceptions, experiences, and implementation challenges.

In addition to interviews, direct observations and documentation analysis (such as school reports, digital attendance records, and website content) were used to enrich the data. To ensure data validity, the study employed data triangulation (source, method, and time) and used member checking to confirm key interpretations with the participants.

## Findings and Discussion

### Findings

MA Ma'arif Almuhtadi was established in 1985 based on the madrasah charter from the Minister of Religion of the Republic of Indonesia Number: W.M.06.02./30/377/C.Ket/1985 issued on October 16, 1985 and the charter of the Ma'arif Education Institution for the East Java Region Number: B-4008018 issued on May 20, 1986. MA Ma'arif Almuhtadi has experienced several changes in accreditation status. Since 2016, MA Ma'arif Almuhtadi has achieved an A accredited status. MA Ma'arif Al Muhtadi has a vision of realizing high piety, superior achievement, commendable morals, and skilled innovation.

Meanwhile, its mission is (1) to implement Islamic religious learning and education effectively, so that every student is able to understand, appreciate and practice Islamic teachings properly and correctly and have noble morals, (2) to develop science and technology learning, in order to improve quality human resources and can foster a high competitive spirit, (3) to implement participatory, open and madrasah-based management by involving all madrasah members and the community. This vision and mission are the driving force behind the development of the institution. Madrasahs strive to face the development of the times and prepare students to become a generation that has information and communication technology skills. When the COVID-19 pandemic occurred, learning was carried out remotely by utilizing information and communication technology. Madrasahs strive to provide distance learning services. Entering the new normal era, learning based on information and communication technology was not abandoned. When learning was allowed to be held face-to-face, limited MA Ma'arif Al Muhtadi under the leadership of Nur Rohmat, Sos, M.A. tried to implement digital madrasah management. This begins with the implementation of student attendance with fingerprint recording "fingerspot" which evidence can be accessed by parents of students through the Back To School application. Likewise in the implementation of the learning curriculum. In the learning process, the heutagogy approach is also applied. Thus, students must develop their awareness and independence in learning.

This learning process is inseparable from student management. Student management activities include planning and implementing new student admissions, student coaching, and student graduation. Planning and implementing student admissions carried out at MA Ma'arif Almuhtadi also involves digital technology. So that prospective students can register online. Next, after being accepted to study in the madrasah environment, students receive coaching to develop their abilities. This coaching is carried out in accordance with the vision, mission and objectives of the madrasah. Student coaching includes student guidance and discipline, recording student learning progress, recording and reporting learning outcomes. This coaching process is also supported by the use of digital technology. The learning process is supported by e-learning and the provision of learning resources is facilitated by the existence of an e-library.

E-learning is a learning system that utilizes information and communication technology and the internet

network to facilitate the delivery of information, materials, interactions and evaluation of learning. With the use of this technology, learning is not constrained by distance and time. The learning process can be done anywhere and anytime, not necessarily in the school environment. With e-learning, learning can also be done in a blended learning manner, teachers can implement more varied learning strategies, combining online and offline learning. Varied learning and utilizing various learning resources prevent students from getting bored and encourage their motivation to enjoy learning. Meanwhile, e-library is a digital library. With the existence of e-library, students do not have to come directly to the school library and have difficulty finding the references they need. They can access e-library from anywhere and anytime.

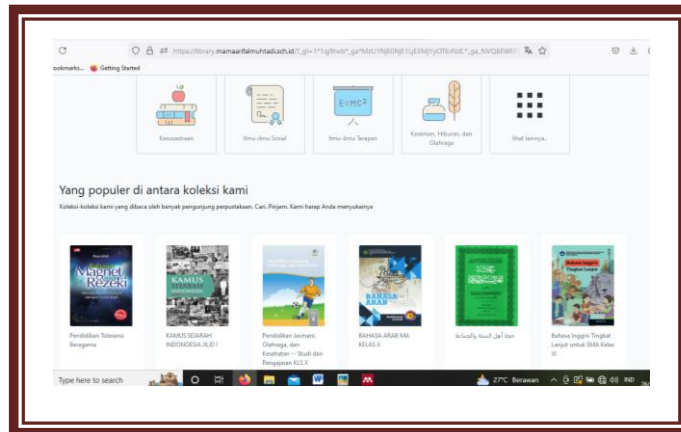


Figure 1. [screenshot of MA Ma'arif Al Muhtadi E-library] (source: <https://mamaarifalmuhtadi.sch.id/>, taken on 04/26/2025)

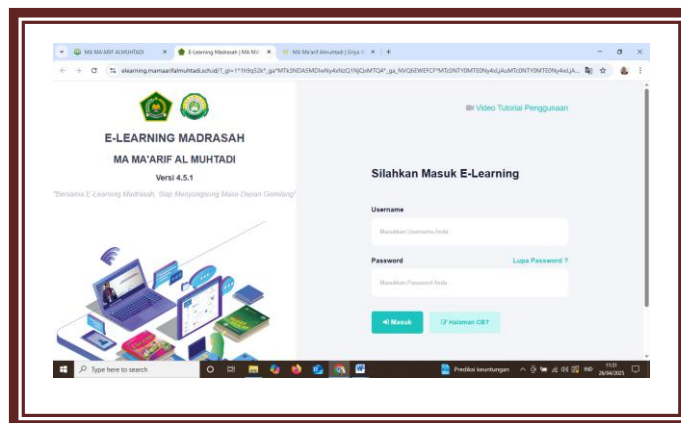


Figure 2. [screenshot of MA Ma'arif Al Muhtadi E-library] (source: <https://mamaarifalmuhtadi.sch.id/>, taken on 04/26/2025)

Next, the learning outcome report is submitted in the form of a digital report (Raport Digital Madrasah/RDM). RDM is a special portal developed by the Ministry of Religion of the Republic of Indonesia to support the realization of digital-based madrasahs.

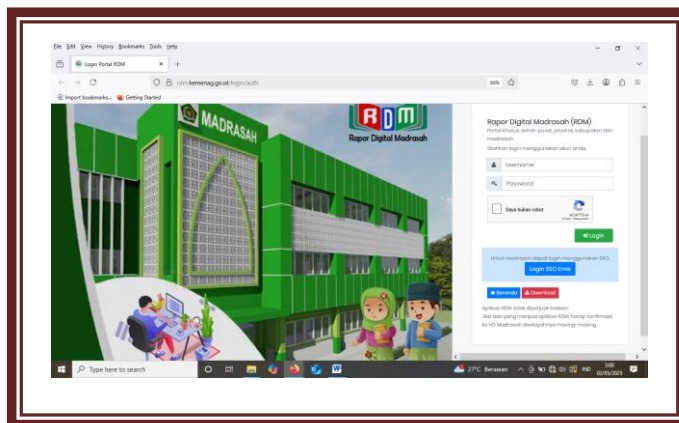


Figure 3. [screenshot to enter the RDM page  
(source: <https://mamaarifalmuhtadi.sch.id/>, taken on 04/26/2025)

MA Ma'arif Almuhtadi also developed a special broadcast media by creating a channel account on Youtube. This media can be accessed at <https://www.youtube.com/@mediamaladi4425/streams>. Many videos have been uploaded to this channel, including institutional profiles, coverage of curricular, extracurricular and co-curricular activities, videos of student art performances, educational podcasts, and alumni testimonials and so on. This channel also broadcasts live the activities of the Yayasan Almuhtadi.

All digitalization activities require good and sustainable management. In this case, the principal of the madrasah has a big role. So that, the planned program can continue to be implemented and developed step by step. In terms of managing MA Ma'arif Almuhtadi facilities and infrastructure, the principal of the madrasah directs to support curricular, co-curricular, and extracurricular activities. Availability of facilities and infrastructure is one of the important components that must be fulfilled in supporting good education management. Facilities and infrastructure management activities include planning of educational facilities and infrastructure, procurement, inventory, utilization, maintenance, disposal, and accountability. MA Ma'arif Almuhtadi makes plans for facilities and infrastructure through meetings of educators and education staff. Then, the procurement is carried out by prioritizing the provision of devices that are urgent for digitalization purposes. Meanwhile, maintenance and care are carried out together with the entire academic community. The digital transformation of madrasah is certainly not easy. MA Ma'arif Al Muhtadi experienced several obstacles including limited funds to meet the needs of tools or devices and the internet network accessed, limited students to buy data packages, students' learning devices are less supportive, electricity is sometimes unstable.

MA Ma'arif Almuhtadi is trying to overcome these limitations. Some of the solutions that have been implemented include: optimizing the available tools, each student brings a digital device to the madrasah, the madrasah helps students who do not yet have a digital learning device, installing an easily accessible internet/WIFI network in each class. MA Ma'arif Almuhtadi manages its human resources and encourages them to continue to improve their competence and professionalism. Human resource management includes recruitment, placement, development, and supervision. To improve digital literacy skills, the head of the madrasah leads the implementation of workshops to improve the digital skills of teachers and education personnel. For example, on Monday, October 16, 2023, Madrasah Aliyah Almuhtadi Sendangagung Paciran, Lamongan Regency, held professional development training for teachers. This training aims to improve the quality of teaching and the implementation of the Merdeka Curriculum with the teachers who work at the madrasah.

All human resources at MA Ma'arif Almuhtadi have duties, authorities and responsibilities according to their respective abilities. All are expected to work together. So that when there are obstacles or difficulties in implementing this digital transformation, all can work together to overcome them. The Madrasah also gives awards to those who excel. Financing management in this madrasah refers to the following principles: financing is carried out in accordance with the budget plan, directed and controlled in line with the activity plan, implementing transparent or open principles, efficiency and effectiveness according to instructions and technicalities, and trying to utilize domestic production. Finance management activities include planning, implementation, supervision, and accountability. Madrasah management at MA Ma'arif Almuhtadi is carried out using the e-RKAM service provided by the Ministry of Religion. E-RKAM is an Electronic-Based Madrasah Work Plan and Budget developed by the Ministry of Religion to support madrasah management activities. It also contains an application for Madrasah Self-Evaluation. In addition, finance management is also managed through e-budgeting services. Meanwhile, technical management activities of correspondence are carried out in accordance with their functions, namely, collecting,

recording, processing, duplicating, sending, and storing. Administrative management at MA Ma'arif Almuhtadi is carried out digitally and manually.

Correspondence data is managed digitally through e-archive services, a digitally managed student attendance system. Data on teaching staff, education and students are managed using the Education Management Information System (EMIS). This system is managed by the Ministry of Religion to manage education data including at the madrasah aliyah level. This system can be used as a source of information in the decision-making process, evaluating madrasah policies and making strategic madrasah planning. MA Ma'arif Almuhtadi manages information and communication to carry out public relations activities. Public relations management must also be carried out effectively through several stages, namely planning, organizing, directing, and supervising. Public relations activities are carried out to convey information and establish cooperation. This activity is carried out both directly and by utilizing digital communication media. Madrasah also developed a website <https://mamaarifalmuhtadi.sch.id/> to disseminate information officially in digital form about madrasah activities and facilities. Various activities in the madrasah can be found on this website.

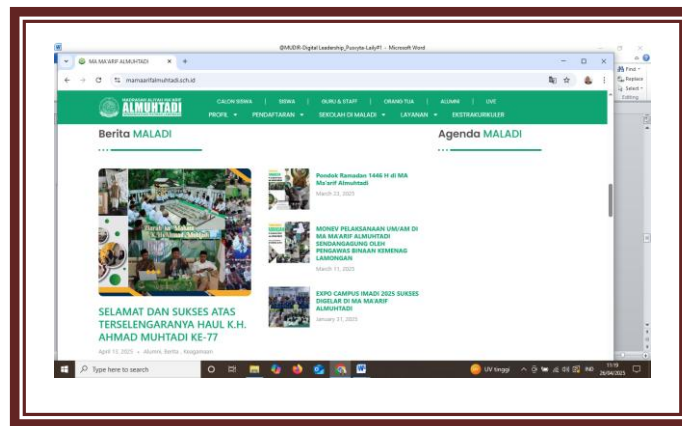


Figure 4. Screenshot of the official MA Ma'arif Almuhtadi website (source: <https://mamaarifalmuhtadi.sch.id/>, taken on 04/26/2025)

MA Ma'arif Al Muhtadi strives to prepare infrastructure and continue to develop human resource skills in the institution. The principal also becomes a motivator who also inspires educators and education staff to continue learning. The principal actively participates in the Training and Competency Improvement Workshop for the Principal of Madrasah. This shows that the principal has an interest in continuing to learn new things and improve his knowledge and skills. This enthusiasm for learning provides a good example to the human resources in the institution to participate enthusiastically in learning new things in the process of digitalizing the madrasah.

In implementing digital transformation and developing digital madrasahs, MA Al Muhtadi is supported by internal and external stakeholders. The atmosphere of digital transformation is more felt as a continuous learning process, not as a burden that is difficult or discriminatory for those who are less skilled in operating digital technology. Government support, in this case the Ministry of Religion which oversees madrasah, is also very important in realizing digital madrasah.

## Discussion

From the data obtained, it can be seen that the transformation of madrasahs to grow into digital madrasahs requires leaders who have digital leadership characteristics. The increasingly rapid development of technology and communication in people's lives is seen as an important challenge to face. Leaders do not give up trying to provide digital-based education services even though madrasahs have limited infrastructure resources and human resource skills.

This study found that the principal of MA Al-Muhtadi madrasah has the characteristics of digital leadership criteria as stated by Pearl Zhu. The five characteristics of digital leadership are leaders who are able to think to face market changes and competition, have a creative and innovative mindset in formulating new ideas into reality, have the ability to provide direction in digital transformation efforts, have a curiosity that drives them to continue learning, and have deep insight and understanding, so that they are able to make decisions in complex situations.

The ability to think to face market changes and is shown by MA Ma'arif Almuhtadi's efforts to carry out information and communication technology-based learning, creating digital programs since before the Covid-19

pandemic hit. Thus, madrasahs can implement distance learning, without direct face-to-face meetings. The program is increasingly well managed. These digital programs include website development, e-learning, e-library, digital madrasah report cards, e-budgeting. This shows that the leadership of the madrasah principal can face market changes and competition.

Creative characteristics or having a creative and innovative mindset in formulating new ideas into reality are also reflected in the realization of digital-based programs in the madrasah. Without creativity, leaders lose the opportunity to make changes, they can be trapped in limitations and various obstacles faced. Then the visionary characteristics, namely digital leaders who have the ability to provide direction in digital transformation efforts, are also possessed by the principal of MA Ma'arif Almuhtadi. He carries out the vision and mission of the madrasah and is able to direct resources to carry out digital transformation by training educators and education personnel to have the skills needed. Training is carried out by bringing in professionals who are experts in the field. Next, the head of the madrasah also has a curiosity that drives him to continue learning.

The Principal of MA Ma'arif Almuhtadi continues to learn, for example actively participating in competency strengthening workshops for Principals of Islamic Senior High Schools (MA) throughout Lamongan Regency organized by the Ministry of Religion of Lamongan Regency, East Java Province. Then, in-depth knowledge and understanding, so that they are able to make decisions in complex situations are demonstrated by the Principal of MA Ma'arif Almuhtadi with his ability to find a way out or solution to the problems experienced in developing digital madrasahs. Problems that are not resolved can hinder the journey of educational services. This characteristic is very much needed in the development of digital madrasahs. It does not only require the readiness of human resources, but also infrastructure resources with quite expensive costs. In addition, leaders also need support from madrasah stakeholders. To get this support, leaders must be able to make strategic decisions in complex situations.

More specifically related to digital technology, the strategic decision of the madrasah principal to prepare experts in the field of digital information and communication technology greatly influences the journey of managing digital madrasahs. The role of the technical operator of madrasah digitalization is an important key to supporting digital leadership in madrasahs. Every change is inseparable from the challenges of obstacles that can occur. With strong and agile leadership trying to overcome various obstacles, slowly but surely the change will continue. This is different from a leader who is overshadowed by various limitations that he has and then remains silent and does not make any efforts, a visionary leader has the courage to take steps even though they seem difficult to do and are full of challenges. A leader understands well every vision, mission and goal of the institution. Every difficulty and challenge can be used as motivation to determine the right strategy in managing the institution. Leaders can map the strengths and weaknesses of the resources that

A leader understands well every vision, mission and goal of the institution. Every difficulty and challenge can be used as motivation to determine the right strategy in managing the institution. The leader can map the strengths and weaknesses of the resources owned by the institution. The strategy made is an effort to take advantage of the advantages and encourage potential to overcome existing weaknesses. All institutional resources can contribute optimally to achieve common goals. In terms of madrasah digitalization, leaders must understand digital literacy. With their knowledge and motivation to continue learning and developing, leaders can map out various needs to make it happen.

Tabel 1. Principal's Digital Leadership Characteristics and Their Implementation at MA Ma'arif Almuhtadi

Leadership Characteristic	Manifestation in Practice
Thinker	Initiated digital attendance system using "Fingerspot" and integrated with Back to School app
Creative	Developed YouTube channel to promote school activities and online content
Visionary	Directed teachers toward e-learning and digital library use
Lifelong Learner	Actively participated in national workshops and led local training
Profound Leader	Able to solve infrastructure challenges, like WiFi installation and device sharing

Source: Field data collected at MA Ma'arif Almuhtadi, 2025

The Ministry of Religion of the Republic of Indonesia encourages and supports madrasahs to develop digitally. Various platforms are built to help madrasahs realize digitalization. However, a madrasah principal cannot do everything alone. He needs professional support staff both in technical matters related to digitalization. Next, the madrasah principal can organize educators and education staff to learn to improve digital literacy skills

and carry out digitalization activities by working together and being responsible. Madrasah managerial resources are an example in upholding the pillars of digital literacy. Thus, students also have digital skills, have ethics in using digital media, have good digital habits and culture and are able to maintain the security of their digital data. If the head of the madrasah does not have digital leadership characteristics, the process of digitizing the madrasah can experience more difficulties in facing the challenges of digitalization.

The principal of the madrasah holds the key to controlling the realization of a digital madrasah. No matter how complete the supporting infrastructure is, no matter how good the resources are for technical operations, without the support of the principal of the madrasah as top management, everything cannot run smoothly. Likewise, with various efforts from the government (through the Ministry of Religion) which have prepared various supports to realize digital madrasahs, it will be less than optimal in realizing digital madrasahs if it is not supported by a head of the madrasah who has digital leadership characteristics. The head of the madrasah needs the support of internal and external stakeholders of the institution. Likewise, these stakeholders need good leaders. So everything is interrelated with each other. The principal of the madrasah needs to realize that everything cannot be done alone, but good and sustainable cooperation is needed to realize a digital madrasah.

The characteristics of digital leadership are not just to be possessed, but more importantly to be carried out sustainably. These characteristics foster the skills and knowledge of the madrasah principal. These characteristics also do not appear instantly. Digital leadership grows based on extensive knowledge and adequate leader experience. It does not only focus on the growth of the institution that is visible from the outside, but also strengthens the professionalism and readiness of the resources within the institution. Like a tree that grows tall, if it does not have strong roots it will easily fall, so too an educational institution, if it does not have quality human resources and infrastructure, will easily falter with various obstacles and constraints that hit it.

Although the study primarily focused on the principal, the incorporation of teacher and student perspectives – although limited – helped contextualize the impact of digital leadership on daily operations. Future research may deepen this by including a broader range of stakeholders to enhance representativeness.

## Conclusion

Digital leadership in madrasahs is needed to prepare a generation that is ready to face the challenges of the digital world, creative and innovative. The principal of MA Almuhtadi madrasah has the characteristics of digital leadership. A leader who is able to think about facing market changes and competition, has a creative and innovative mindset, is able to provide direction for digital transformation, continues to learn and has in-depth knowledge and understanding, so that he is able to make decisions in complex situations. These characteristics support leaders in carrying out management functions and managing madrasah resources based on technology.

MA Almuhtadi organizes digitalization programs in terms of teaching, institutional management and information services for the community. In teaching, e-learning and e-libraries are developed, as well as the use of digital madrasah report cards to convey student learning outcomes. Management of financing and institutional data is also carried out digitally. In terms of information management, a website and *YouTube* channel are developed to convey various news about madrasah activities.

Madrasahs utilize platforms developed by the Ministry of Religion of the Republic of Indonesia. To realize a digital madrasah, the principal of the madrasah needs support from internal and external stakeholders of the institution. Likewise, government programs through the Ministry of Religion cannot be realized without strong determination from the leadership and implementation at the level of educational units. The implementation also requires support for technical operational facilities and infrastructure with adequate facilities and infrastructure and skills from the human resources who use them. All must be interrelated and support each other so that goals are achieved more effectively and efficiently.

Based on the findings, several practical recommendations are proposed. First, madrasah leaders should actively develop digital leadership skills through continuous professional development, peer collaboration, and mentorship programs. Embracing innovation and fostering a digital mindset among staff and students is essential. Second, educational policymakers, especially within the Ministry of Religious Affairs, should design structured capacity-building programs focused on digital leadership. This includes providing technical assistance, infrastructure support, and digital literacy modules tailored for school management. Third, madrasahs can establish digital innovation teams involving teachers and students to collaboratively drive transformation. This participatory model not only improves implementation but also builds ownership and resilience in adapting to technological change.

Finally, successful cases like MA Ma'arif Almuhtadi should be documented and shared as models or benchmarks to inspire and guide other educational institutions across Indonesia.

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