Design of *Madrasah* Readiness Assessment in International Competitions: A Grounded Theory

Enung Nugraha
Universitas Islam Negeri Sultan Maulana Hasanuddin Banten
enung.nugraha@uinbanten.ac.id

ABSTRACT

The purpose of the study is to design a *madrasah* readiness assessment model for participation in online international competitions and to propose a model for measuring readiness in international competitions. The methods used are a qualitative approach grounded in design thinking and measurement using the Analytic Network Process scale, with *madrasah* digital facilities and parental support as the primary focus. The findings show that *madrasahs* still have limited access to digital facilities but are striving to provide teacher training and to actively communicate with parents to maximize support for participation in international competitions. Design six social evolution with problem recognition, data collection of funding and infrastructure needs, development of training solutions and human resource capacity building, dissemination of information and collaboration, implementation of technology support and routine training, to the expansion of partnerships and continuous support. The ANP readiness assessment, on a scale of 1-9, provides an overview of the diverse levels of readiness among *madrasahs* in international competitions. The implications of this study confirm the importance of digital technology and collaboration with parents as the foundation for success in international competitions. Further research is suggested to explore models of systemic policy implementation and broader teacher capacity development, and to examine their implementation across various *madrasahs* in different regions.

Keywords: *Educational assessment; Readiness; International competition; Madrasah.*

INTRODUCTION

In recent decades, *madrasahs* in Indonesia have seen rapid growth, with the number of educational institutions focused on Islamic education increasing. Data from the Ministry of Religious Affairs indicates that in September 2024, there will be 87,397 *madrasah* in Indonesia, comprising 83,351 private *madrasah* and 4,046 state *madrasah* (Ministry of Religion, 2024; BPS, 2024). This figure includes the *Madrasah Ibtidaiyah* (MI), *Madrasah Tsanawiyah* (MTs), and *Madrasah Aliyah* (MA) levels.

The factor of increasing the number of *madrasahs* in Indonesia is greatly influenced by strong recognition and regulation from the government, modernization of the competitiveness-oriented curriculum, and active support of Islamic communities and organizations (Syar'i et al., 2020; Rizal & Bahar, 2024; Dasopang & Rambe, 2023; Thoyib et al., 2024). The favourable implication is that the government grants *madrasahs* equal status with public schools through policies and regulations, thereby increasing public trust.

The rapid growth in the number of *madrasahs* in Indonesia has not been accompanied by a significant increase in national and international achievements

(Alawiyah, 2014; Kosim et al., 2023; Umar & Munadi, 2024; Qomariyah & Azizah, 2025). This indicates a gap between structural development and substantial improvements in the quality of *madrasah* education, particularly in learning quality, teacher competence, and students' ability to compete globally.

Many *madrasahs still lag behind public schools in competition, even as the number of madrasahs* continues to grow (Ramdhani, 2024; Juwita & Rifa'i, 2024). This is due to various obstacles, including limited facilities, inadequate teacher training and coaching, low English proficiency, and student coaching that is not optimal for research and competition preparation (Lachebo, Thuo, Demissie, et al., 2024). Weak stakeholder support —namely, school administrators, the government, and parents —prevents students' extrinsic motivation from being optimally realized, leading to lower participation (Lachebo, Thuo, Labiso, et al., 2024).

The main problems faced by *madrasahs* in Indonesia in the context of international competitions include limited facilities and infrastructure, low student motivation, and educators who are not fully prepared. Limited facilities, such as classrooms, laboratories, and information technology facilities, hinder the learning process and students' preparation for prestigious competitions (Susanti et al., 2021; Haleem et al., 2022). In addition, students' motivation is often affected by inadequate support and stimulation in the *madrasah* environment, limiting their active participation in international competitions (Setia et al., 2025; Susanti et al., 2021). Educators' readiness is also a crucial factor; the lack of teacher training and professional development makes coaching and guidance efforts for students less than optimal (Adamson & Darling-Hammond, 2015; Ozcan, 2021).

International competitions are not only held face-to-face; they have also been held online. The competition is held online and, in addition to recognition from the organizers and the government, offers flexible time, no transportation costs, easy access, and lower costs (Culduz, 2024; Najjar et al., 2025; Haleem et al., 2022). This will create an excellent opportunity for all students to participate, regardless of their limitations.

International competitions that can be participated in online by students in the field of science and mathematics include the International Mathematical Olympiad (IMO), International Physics Olympiad (IPhO), International Biology Olympiad (IBO), International Chemistry Olympiad (IChO), and International Olympiad in Informatics (IOI), International Science and Engineering Fair (ISEF), Kangaroo Math Competition (KMC), World Robot Olympiad (WRO) Online Edition, International English Language Olympiad (IELO), to Google Science Fair through a series of difficult questions in a limited time, attended by teams from more than 100 countries. These competitions are supported by digital technology, enabling them to

be held online.

To ensure *madrasahs* are ready to participate in international competitions, it is essential to assess the readiness of educational institutions. Educational readiness assessment, as an educational evaluation, is a process of collecting and analysing information to determine the extent to which institutions, educators, and students are ready to implement a specific learning process or educational program (Gibbs, 2006; Srinivasan, 2020; Aiona, 2005). This assessment aims to identify strengths and weaknesses to plan improvements and ensure the success of educational programs, thereby enabling international achievement.

The two main factors that support the assessment of practical educational readiness evaluation for international competition are digital learning facilities and parental support (Zhang, 2017; Ydesen, 2023). Digital means, such as internet access and technological devices, facilitate effective learning and preparation for competitions, while parental support, including motivation and mentoring in the use of technology, is essential to encourage student independence and success (Basuki et al., 2025; Maqsood et al., 2024). Research shows that good digital literacy and parental involvement in children's education can increase student learning independence and achievement.

Previous research by Qomariyah and Azizah (2025) aimed to develop globally competitive students through innovation at MTsN 3 Pamekasan, using a case study method, showing an increase in international academic achievement and digital literacy despite obstacles posed by facilities and educators. Setia et al. (2025) used Structural Equation Modelling (SEM) to test the influence of peers and families on the competitive motivation of international students, finding a significant influence. Lachebo, Thuo, Demissie, et al. (2024) conducted a mixed-methods study examining teachers' involvement in international science competitions in Ethiopian secondary schools, which was low due to limited knowledge and support. Lachebo, Thuo, Labiso, et al. (2024) examine students' readiness to participate in international competitions, noting significant barriers to research and English language skills, and emphasize the need for support for schools, teachers, and parents in Ethiopia.

However, there has been no research specifically designed to develop an online international competition readiness assessment model, supported by digital means and the active involvement of parents, and accompanied by the submission of an online model for assessing international competition readiness, especially in private *madrasahs* in Serang City, Indonesia. Therefore, this study uses grounded theory methods and design thinking approaches to fill the gap by developing an educational evaluation framework that can help *madrasahs* improve students' readiness to participate in international competitions effectively and sustainably.

METHODS

This research primarily employs a Grounded Theory approach within a qualitative research framework. This methodology is selected to explore and understand the meaning of social phenomena—specifically the readiness of madrasahs to participate in international competitions—by developing or generating abstract, analytical theories directly and inductively from systematically collected data, as defined by Creswell (2013). Qualitative research, in general, focuses on in-depth human interactions within natural contexts Creswell (2013).

Subject of Research

The subjects of this research were the principals of three different levels of madrasahs in Serang City: MI Ats Tsauroh, MTs Darul Irfan, and MA Darul Arqam Muhammadiyah. The sample was selected purposively based on practical considerations of affordability and effectiveness in data collection (Eric, 2016). The data source includes primary data obtained through direct interviews with these principals and secondary data gathered from related literature.

Instruments

The primary research instrument utilized for gathering qualitative primary data was an in-depth interview guide. This guide was specifically designed to obtain comprehensive information regarding the madrasahs' readiness, strategies, and challenges related to participating in international competitions.

Additionally, to measure specific quantitative variables—namely digital asset readiness and parental support—the study adopted a rating scale based on the Analytic Hierarchy Process (AHP), often used in conjunction with the Analytic Network Process (ANP). This assessment utilizes a Saaty scale of 1-9 (Saaty and Vargas, 2014) to measure the level of importance or readiness of one element compared to others in a pairwise comparison, providing a structured approach to educational evaluation.

Data Collection and Analysis

Data collection relied on in-depth interviews conducted with the purposively selected madrasah principals. The collected data were then subjected to a multi-stage analysis process: (1) Qualitative Descriptive Analysis: The initial analysis focused on providing detailed, systematic descriptions of the research findings. This stage involved grouping, comparing, and interpreting the themes that emerged directly from the interview data, emphasizing an in-depth understanding without relying on numerical statistics (Creswell, 2013). (2) Model-Based Analysis (Design Thinking and Social Evolution): The qualitative findings were further analyzed using two distinct conceptual frameworks to develop strategies and solutions: (a) Design Thinking Method: This is an iterative, problem-solving approach focusing on user needs (in this case, the madrasahs and their context). It involves stages such as

understanding the user, challenging assumptions, and creating innovative solutions (Pressman, 2019). (b) Six Social Evolution Models (Moreira et al., 2020): This framework guided the exploration of solutions and strategies aligned with the madrasah context, proceeding through six structured stages: empathy, exploration, elaboration, exposure, execution, and expansion. (3) Quantitative Analysis (AHP/ANP): The data collected on digital asset readiness and parental support were analyzed using the AHP/ANP framework, specifically utilizing the 1-9 scale to quantitatively assess the comparative importance or readiness level of these elements. This provides a structured metric for the readiness assessment, integrating quantitative judgment into the overall qualitative study.

This combined analytical approach allows for the inductive generation of theory (Grounded Theory) while providing practical, structured solutions and readiness metrics (Design Thinking and AHP/ANP).

Figure 1. Six Social Evolution Model
Source: (Moreira et al., 2020)

RESULTS AND DISCUSSION

Madrasah Digital Facilities

The importance of developing digital facilities as a support for learning in the modern era is a research finding. Although still limited, *madrasah*s strive to provide internet access, computers, and digital learning materials. In addition, teacher and student training in the use of digital learning technology is considered very important to ensure adequate, efficient preparation for international competitions, thereby supporting improvements in the quality of education and student achievement.

> "*We strive to provide digital facilities such as internet access, computer devices, and online learning materials that are still limited. I agree that training for teachers and students in using digital learning technology in preparation for the competition can be effective* (FA, 2025)."

The *madrasah*'s commitment to maximizing the use of digital technology for learning and preparation for international competitions. By providing internet access, computers, and digital learning materials, *madrasah*s strive to continuously improve teachers' and students' skills through regular training. This is important so that all parties are ready to face the competition effectively and support the improvement of the *madrasah*'s quality and achievements in the digital era.

> "*I am committed to providing digital facilities such as internet access, computer devices, and regular training on the use of learning technology so that students and teachers are ready to participate in international online competitions optimally* (SU, 2025)."

Madrasah actively provides digital facilities to support learning and preparation for international competitions. Facilities such as internet access, technology devices, and training in digital learning media are routinely provided to teachers and students so they are optimally prepared to participate in competitions. This effort reflects the *madrasah*'s commitment to utilizing technology as a strategic tool to improve the quality of education and student achievement in the digital era.

> "*Madrasah provides digital facilities such as internet access, technology devices, and training on the use of digital learning media so that students and teachers can optimally prepare themselves for the competition* (TM, 2025)."

The development of digital facilities in *madrasah*s is significant as a key support for learning in the modern era. Although there are still limitations that *madrasah*s have, with the motivation of this competition, we will try to complement them, as per the opinion of Purwantoro et al. (2021), *madrasah*s are required to continue to strive to provide adequate internet access, computer devices, and digital learning materials to achieve better competitiveness. Training for teachers and students in using digital learning technology is also considered crucial, enabling adequate, efficient preparation for international competitions. It has a positive impact on the quality of education and student achievement (Ichsan & Susanti, 2025; Lachebo, Thuo, Labiso, et al., 2024)

The *madrasah*'s commitment to maximizing the use of digital technology is also reflected in efforts to provide digital facilities, in line with the study by Dang et al. (2024), which said that with a stable internet network, the latest technological devices, and digital learning materials that are tailored to the needs of the curriculum and achievement targets, it is easier to achieve. Regular training for teachers and students is also an important part, as it equips them with the competence to apply digital technology effectively, thereby supporting their readiness to participate in international online competitions (Adamson & Darling-Hammond, 2015; Rahmawati et al., 2025). This step is crucial to maintaining *madrasah*s' competitiveness and improving student achievement in the digital era.

The findings align with those of Azizah et al. (2024), who state that *madrasah*s

actively implement digitization programs and educational administration to support a more interactive, flexible, and transparent teaching and learning process. The adoption of platforms such as Learning Management Systems and e-learning, and the digitization of administration, aligns with the research by Kasman et al. (2024) on improved digital facilities, and the effectiveness of educational services in *madrasah*s will further strengthen. Despite challenges such as limited infrastructure and human resource readiness, strategic measures such as training, innovation, and partnerships continue to be developed to address them (Sari et al., 2024; Icha et al., 2025).

The assessment of the readiness of digital facilities is highly relevant and crucial for preparing for international competitions, as digital capabilities are the primary competency for competing in the current global era. Study May et al. (2023) emphasized that the digital readiness evaluation helps measure students' competence in using digital technologies essential to online learning and modern academic interactions, thereby preparing them to face the challenges of educational globalization and international competition. Moreover, Okoye et al. (2023) highlight the importance of digital literacy in strengthening students' ability to become creative and critical digital citizens on the international stage. Thus, the role of digital technology in learning in *madrasah*s is an important foundation for measuring educational outcomes in international competitions.

Parental Supporting

Parental support plays a critical role in students' educational success in *madrasah*s, according to research. Parents not only provide the motivation and facilities needed but also actively accompany the child's learning process, thereby creating a strong synergy between the *madrasah* and the family. Regular communication between the *madrasah* and parents is key to maximizing this support and optimally supporting students' academic development and character.

> "*I think parental support is crucial for student success. Our parents are actively involved in motivating children, providing the necessary facilities, and offering assistance during the learning process. We also routinely communicate with parents so that the synergy between madrasah and families can be maintained properly* (FA, 2025)."

Parental support is a vital factor in student learning success in *madrasah*. Parents not only provide the necessary motivation and facilities but also actively accompany the learning process at home, thereby fostering strong support between the family environment and the *madrasah*. Intensive and regular communication between the *madrasah* and parents is the key to maintaining strong synergy, supporting optimal student achievement and development.

> "*Parental support is vital, ranging from motivation, home-based learning assistance, to providing financing and sponsorship of international competitions.*

> *Intensive communication between madrasah and parents is also carried out so that synergy in supporting student achievement is maintained* (SU, 2025)."

Parental support is essential for the success of education and student development in a *madrasah*. Parents play an active role, from motivation and assistance with learning at home to providing the necessary support facilities. In addition, intensive and collaborative communication between *madrasah*s and parents is a key factor in maintaining synergy and ensuring the quality of learning and student achievement. The role of parents as the primary partners in education is the foundation for supporting students' optimal participation in international competitions.

> "*Parental support is crucial, starting from providing motivation, learning facilities, to mentoring and building English language capacity as a bridge to international competition. A strong relationship between the madrasah and parents is also the key to students' success in international competitions* (TM, 2025)."

Parental support has proven to be a key factor in students' educational success in *madrasah*s. The findings show that parental involvement is not limited to providing motivation and learning facilities; Shebani et al. (2025) argue that active assistance during the learning process at home and the willingness to finance competitions will make it easier to achieve international achievements. This aligns with research by de Brabander and Martens (2014), who found that parental involvement has a significant positive correlation with children's academic achievement across educational levels because it encourages greater motivation and independent learning habits.

In addition, regular and intensive communication between the *madrasah* and parents plays a significant role in fostering positive synergy for academic development and student character. These results are in line with research by Siregar and Siregar (2024), which confirms that quality parent-parent communication increases children's academic participation while strengthening the emotional connection between the home and school environment. Thus, communication and collaboration between *madrasah*s and parents are not only a form of administrative coordination but also a medium for strengthening the values of character education.

Furthermore, parental support for student capacity development, including financing, learning and mentoring, and English-language capacity building for international competitions, is an important aspect in preparing students for global challenges. These results are consistent with research by Lachebo, Thuo, Demissie, et al. (2024), which found that active partnerships between schools and parents lead to a more adaptive and globally oriented learning environment, thereby strengthening students' readiness to participate in international competitions.

Based on the findings and discussion above, it is necessary to develop a design thinking framework to guide efforts to improve *madrasah*s' and parents' efforts to increase student participation in international online competitions. The approach uses the following six social evolution models:

Table 1. Application of the Six Social Evolution Model Stages for Addressing Madrasah Resource and Support Challenges

Empathy	Exploration	Elaboration	Exposed	Execution	Expansion
Limited *Madrasah* Digital Facilities	Lack of funding support	Funding needs	Exposure of data on the need for funds	Fundraising	Partnerships and donations
	The infrastructure is inadequate.	Strengthening infrastructure	Program publications	Revitalization of facilities	Development expansion
	Stable internet availability	Internet access	Comparison between regions	Network upgrades	Expanding internet coverage
	Human resource competence	HR Training	Dissemination of best practices	Intensive training	Competency development
Weak Parental Support	Access digital devices at home	Inventory of needs	Problem solving	Standard digital devices	The existence of standard digital means
	Internet access at home	Strengthening internet access	Access data reinforcement	Affordable internet payments	The existence of a stable internet network
	Parental involvement	Training program and competition information	Communication with students and teachers	Preparation of training and competition schedules	Training and competition participation
	Parents' English and digital literacy	Language and digital literacy training	Development of training and competition information	Regular training	Collaboration with training institutions and competitions
	Financing training and competitions	Analysis of funding needs	Self-Reliance	Availability of funds and sponsorships	Fees and sponsorships

The main problem with the *madrasah*'s readiness to compete in the global era is its limited digital infrastructure, particularly uneven internet access. Research by Kasman et al. (2024) highlights that *madrasah*s are still lagging behind the global trend of digital education due to unequal access, a lack of teacher training, and resistance to change. Systemic policies, teacher capacity development, and curriculum design responsive to technological developments must support digital transformation in *madrasah*s.

The importance of digital infrastructure is also reinforced by the study by Yakin et al. (2025), which reveals technical constraints and limited digital access, especially in rural *madrasah*s. The main problems are the uneven distribution of digital devices and slow internet connections, as well as the high operational costs

of technology-based programs (Ichsan & Susanti, 2025). Strategic efforts such as device subsidies, joint internet procurement, and teacher technical training are solutions to ensure the impact of digitalization is felt inclusively across the entire *madrasah* community.

In addition, parental support has proven to be very important for learning success and the formation of students' character in *madrasah*s. Literature studies published in Alfiyanto et al. (2024) emphasized that parents' involvement in Islamic education not only builds children's motivation and character but also significantly impacts students' academic and moral qualities. Activities involving parents, such as seminars, training, and religious activities, can strengthen the synergy between the *madrasah* and families.

No less important, parental digital literacy is also a strategic factor in supporting student achievement. Research results by Hassan et al. (2022) found that family digital literacy strengthened the influence of parenting on children's academic orientation. Digital literacy, when owned by both students and parents, serves as a moderator, increasing learning independence, self-regulated learning, and student motivation to excel. Thus, increasing digital literacy in the home environment is an important step toward maximizing the positive impact of digital education innovations in *madrasah*s.

Based on the six social evolution models discussed above, it is necessary to assess online readiness for international competitions using the Analytic Network Process scale, focusing on the importance of readiness supported by digital means and parental support.

Table 2. Readiness Assessment Criteria and Sub-Criteria

Criterion	Sub-Criteria	Readiness Assessment	Scale
Madrasah Digital Facilities	Availability of digital devices	Availability of computers/laptops/tablets/and digital gadgets	1-9
	Internet connection	Stability, speed, and network access	1-9
	Student access to digital devices	Proportion of students who have direct access to digital devices	1-9
	Digital learning platform training	Usage rate of Learning Management System (Google Classroom, Zoom Meet, Google Form)	1-9
	Teacher competence in training and competition	Teacher and student skills in English and online digital competition training	1-9
Parent Support	Access digital devices at home	The availability of gadgets/computers/tablets/and laptops supports the competition	1-9
	Internet access at home	Quality and consistency of the internet connection	1-9
	Parental involvement	Intensity of parental mentoring and communication	1-9
	Parents' English and digital literacy	Parents' basic English skills using digital means of training and competition	1-9
	Financing training and competitions	Willingness to prepare costs or sponsorship for online training and competitions	1-9

Table 2 presents the criteria and sub-criteria for assessing the readiness of

*madrasah*s and parental support in facing the digitalization of education and international competition, with assessments on a 1–9 scale. The ANP uses a scale of 1–9 to measure the level of readiness between the two elements being compared. A value of 1 indicates both elements are equally ready, 3 indicates one of the elements is slightly more prepared, 5 means one of the elements is clearly more prepared, 7 indicates one of the elements is much more prepared, and 9 indicates a very extreme readiness compared to the other. Meanwhile, the numbers 2, 4, 6, and 8 serve as compromise values when the assessor is in doubt between the two closest levels of readiness, so that the entire assessment process can take place more objectively and structured.

The criteria for *madrasah* digital facilities assess device availability, internet connection quality, student access to technology, the use of digital learning platforms, and teacher competence in online training and competitions. Parental support is assessed based on device readiness at home, internet access, intensity of parental involvement, English and digital literacy, and readiness to finance online training and competitions (Qu, 2024). This multifaceted assessment approach aligns with international standards, which hold that technological readiness and family synergy are the main prerequisites for the effectiveness of education in the global era (Sholihuddin et al., 2024).

Table 3. Rating Category Scale

Average Score Range	Rating Categories	Interpretation
1.0 – 3.0	Not Ready	*Madrasah*s and parents lack digital infrastructure and adequate support.
3.1 – 5.0	Less Prepared	There are several facilities and support, but they are not optimal.
5.1 – 7.0	Quite Ready	The infrastructure and support are pretty good, but they are not consistent across all aspects of competing.
7.1 – 9.0	Highly Prepared	*Madrasah* and parents fully support the digital competition

Table 3 shows that the categories of *madrasah* digital readiness assessment and parental support are divided into four levels based on average scores: unprepared, underprepared, moderately prepared, and very prepared. This score provides an interpretation of the real state of readiness of facilities and support, ranging from the unavailability of infrastructure to full readiness to support digital competition. Thus, this Table facilitates mapping the condition of *madrasah*s and parents and serves as the basis for determining the interventions or reinforcements needed so that *madrasah*s can compete in the digital era and international competition.

Based on the criteria, sub-criteria and assessment scale based on the adaptation of T. L. Saaty & Vargas, (2006), it is very possible to be applied to assess the level of readiness of *madrasah* in participating in international competitions

online, so that this assessment model can be used as an instrument for evaluating internal or independent education and determine the extent of the level of readiness obtained based on the categories that have been set above.

CONCLUSION

Designed a model for assessing the readiness of *madrasah*s to participate in online-based international competitions, which emphasised two key factors, namely the availability of digital means and active parental support. The design of six social evolution to overcome the limitations of digital facilities and parental support in *madrasah*s for international competition. Starting from problem identification (Empathy), data collection of funding and infrastructure needs (Exploration), development of training solutions and human resource capacity building (Elaboration), dissemination of information and collaboration (Exposure), implementation of technology support and routine training (Execution), to expansion of partnerships and ongoing support (Expansion). The research's implications highlight the need for comprehensive digital transformation, continuous teacher training, and improvements in students' and parents' digital literacy, so that *madrasah*s can provide a learning environment that is adaptable to global developments. The contribution of the research lies in the development of ready-to-use evaluation instruments based on the Analytic Network Process (ANP) that can serve as internal and external references to assess the readiness of Islamic educational institutions to face the challenges of the era of international digital competition. For further research, it is recommended to expand the assessment model for *madrasah*s in the region, examine innovative policy implementation strategies, and strengthen digital partnership networks to create *madrasah*s that are truly superior and globally competitive in a sustainable manner.

REFERENCES

Adamson, F., & Darling-Hammond, L. (2015). Policy Pathways for Twenty-First Century Skills. In P. Griffi & E. Care (Eds.), *Assessment and Teaching of 21st Century Skills*. Springer International Publishing AG. https://doi.org/10.1007/978-94-017-9395-7_15

Aiona, S. (2005). Assessing School Readiness. *Educational Perspectives*, *38*(1), 47–50. http://search.proquest.com/docview/742872274?accountid=14902

Alawiyah, F. (2014). *Madrasah* Education in Indonesia. *Aspiration: Journal of Social Issues*, *5*(1), 51–57. https://doi.org/https://doi.org/10.46807/aspirasi.v5i1.449

Alfiyanto, A., Ikhwan, M., Mahdi, M., Gumilang, R. M., & Wahyudi, M. A. (2024). Parental Involvement in Islamic Education: A Literature Review and Its Implications for Students. *ISLAMIC PEDAGOGY: Journal of Islamic Education*, *2*(2), 24–33. https://doi.org/10.52029/ipjie.v2i2.249

Azizah, A. N., Mustafida, F., & Sulistiani, I. R. (2024). Implementation of the Digital *Madrasah* to Support Learning Activities in MIN 1 Malang City. *JPMI: Journal of Madrasah Ibtidaiyah Education*, *6*(1), p. 35. https://jim.unisma.ac.id/index.php/JPMI/article/view/23887

Basuki, I. A., Suyitno, I., & Ahsani, M. (2025). Entry-Level Assessment to Assess Readiness and Predict Study Success of Prospective College Students. *GHANCARAN: Indonesian Journal of Language and Literature Education*, *6*, 658–680. https://doi.org/10.19105/ghancaran.vi.21753

BPS. (2024). *Education Statistics* (Vol. 13). https://doi.org/10.22146/mgi.34838

Creswell, J. W. (2013). *Qualitative Inquiry and Research Design: Choosing among Five Approaches* (3rd ed.). Sage Publications.

Creswell, J. W., & Creswell, J. D. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (Fifth). Sage Publications.

Culduz, M. (2024). Benefits and Challenges of E-Learning, Online Education, and Distance Learning. In *Incorporating the Human Element in Online Teaching and Learning* (1st ed., Issue March, pp. 1–27). IGI Global. https://doi.org/10.4018/979-8-3693-4131-5.ch001

Dang, T. D., Phan, T. T., Vu, T. N. Q., La, T. D., & Pham, V. K. (2024). Digital competence of lecturers and its impact on student learning value in higher education. *Heliyon*, *10*(17), e37318. https://doi.org/10.1016/j.heliyon.2024.e37318

Dasopang, E. P., & Rambe, S. (2023). Modernization of Indonesian Islamic Education: Critical Analysis of Madrasa Curriculum Development. *Edumaspul: Journal of Education*, *7*(1), 398–409. https://ummaspul.e-journal.id/maspuljr/article/view/5054%0Ahttps://ummaspul.e-journal.id/maspuljr/article/download/5054/2482

de Brabander, C. J., & Martens, R. L. (2014). Towards a unified theory of task-specific motivation. *Educational Research Review*, *11*, 27–44. https://doi.org/https://doi.org/10.1016/j.edurev.2013.11.001

Ethan, I. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, *5*(1), 1–4. https://doi.org/10.11648/j.ajtas.20160501.11

FA. (2025). *Interview with the Head of Madrasah*. MI Ats Tsauroh.

Gibbs, G. (2006). How assessment frames student learning. In *Innovative Assessment in Higher Education*. Routledge Taylor & Francis Group. https://doi.org/10.4324/9780203969670

Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, *3*(February), 275–285. https://doi.org/10.1016/j.susoc.2022.05.004

Hassan, M., Malik, A. S., Sang, G., Rizwan, M., Mushtaque, I., & Naveed, S. (2022). Examine the effect of parenting style on the academic achievement orientation of secondary school students, with digital literacy as a moderating factor. *Frontiers in Psychology*, *13*(December), 1–12. https://doi.org/10.3389/fpsyg.2022.1063682

Icha, S., Amelia, M., & Mufid, A. I. (2025). The Utilization of Digital Information Technology in the Development of *Madrasah* and Islamic Boarding School Education. *Journal of Islamic Education Management (Edium), 3*(1), 3047–3244. https://doi.org/0.35905/edium.v

Ichsan, I., & Susanti, Y. (2025). Digitalization of Education Management: Challenges and Opportunities in the Hybrid Learning Era. *Journal of Pedagogy*, *2*(4), 36–43. https://doi.org/10.62872/66y2j952

Juwita & Rifa'i, M. (2024). *Madrasah* Modernization: The Key Role Of Communication In Building A Positive Image. *International Conference on Education, Society and Humanity*, *02*(02), 535–543.

Kasman, R. A., Suhada, H., Umurohmi, U., & Amer, M. A. B. (2024). Facing The Digital Era: A Comprehensive Transformation Of *Madrasah* Through Technology. *Indonesian Journal of Education*, *4*(2), 337–350. https://injoe.org/index.php/INJOE/article/view/130

Ministry of Religion. (2024). *Data on Islamic Education Institutions*. https://emis.kemenag.go.id/

Kosim, M., Muqoddam, F., Mubarok, F., & Laila, N. Q. (2023). The dynamics of Islamic education policies in Indonesia. *Cogent Education*, *10*(1), 2172930. https://doi.org/10.1080/2331186X.2023.2172930

Lachebo, G. C., Thuo, M. W., Demissie, E. B., & Labiso, T. O. (2024). Teachers' engagement in students' science competitions: Views from secondary schools in Southern Ethiopia. *Social Sciences and Humanities Open*, *10*(September), 101145. https://doi.org/10.1016/j.ssaho.2024.101145

Lachebo, G. C., Thuo, M. W., Labiso, T. O., & Demissie, E. B. (2024). Students' readiness to participate in science project competitions: Views from secondary schools in southern Ethiopia. *Social Sciences and Humanities Open*, *10*(March), 101033. https://doi.org/10.1016/j.ssaho.2024.101033

Maqsood, M., Othman, A., Ilyas, M., Sabir, R. M., Urooj, I., Zahra, T., Abdullah, O. M., & Butt, H. H. (2024). Assessment and evaluation in education 5.0. *Preconceptions of Policies, Strategies, and Challenges in Education 5.0*, *July*, 235–248. https://doi.org/10.4018/979-8-3693-3041-8.ch013

May, L., Feng, X., & Cavallaro, F. (2023). Evaluate and identify the competencies of the future workforce for the implementation of digital technologies in higher education. *Journal of Innovation and Knowledge*, *8*(4), 100445. https://doi.org/10.1016/j.jik.2023.100445

Moreira, J., Palma, G., & Tschimmel, K. (2020). Design Thinking para a Inovação Social, Desenvolvimento do modelo Social Evolution 6. In *Research and the Teaching in Design and Music* (2nd ed., pp. 169–176). Proglobal, Kda.

Najjar, N., Rouphael, M., Bitar, T., & Hleihel, W. (2025). The rise and drop of online learning: adaptability and prospects. *Frontiers in Education*, *10*(February), 1–14. https://doi.org/10.3389/feduc.2025.1522905

Okoye, K., Hussein, H., Arrona-Palacios, A., Quintero, H. N., Ortega, L. O. P., Sánchez, A. L., Ortiz, E. A., Escamilla, J., & Hosseini, S. (2023). Impact of digital technologies upon teaching and learning in higher education in Latin America:

an outlook on the reach, barriers, and bottlenecks. In *Education and Information Technologies* (Vol. 28, Issue 2). Springer US. https://doi.org/10.1007/s10639-022-11214-1

Ozcan, M. (2021). Factors Affecting Students' Academic Achievement According to Teachers' Opinions. *Education Reform Journal*, *6*(1), 1–18. https://doi.org/10.22596/erj2021.06.01.1.18

Pressman, A. (2019). *Design Thinking: A Guide to Creative Problem Solving for Everyone*. Routledge Taylor & Francis Group.

Purwantoro, A., Asari, S., & Maruf, N. (2021). The Effectiveness of E-Learning *Madrasah* in English Teaching and Learning. *BIRCI-Journal*, *4*(3), 5234–5244. https://doi.org/10.33258/birci.v4i3.2314

Qomariyah, N., & Azizah, S. (2025). International-based Social Education Transformation in Support of Continuing Education. *ENTITA: Journal of Social Sciences and Social Sciences Education*. https://doi.org/10.19105/ejpis.v1i.19220

Qu, Z. (2024). Digital Readiness and Digital Competencies Influence on Information Management System: Organizational Support as Moderator. *Information Professional*, *33*(4), 1–11. https://doi.org/10.3145/epi.2024.ene.0408

Rahmawati, S., Prestridge, S., Abdullah, A. G., & Widiaty, I. (2025). Unpacking the digital competence challenge in vocational education: A case from Indonesia. *Social Sciences and Humanities Open*, *12*(January), 101803. https://doi.org/10.1016/j.ssaho.2025.101803

Ramdhani, M. R. (2024). Strategy to Improve The Quality of *Madrasah* as An Effort to Form A Superior *Madrasah* (Analysis of Problems & Conditions of Existing *Madrasah* in Indonesia). *The Role of Prophetic Leadership and Strategic Management in the Transformation of Educational Institutions in the Islamic World*, *2*(September), 127–150. https://doi.org/https://doi.org/10.24853/pi.2.0.2024.127-150

Rizal, M., & Bahar, H. (2024). Examining Government Preference for Enhancing Islamic Education Through Regulatory Review. *AL-ISHLAH: Journal of Education*, *16*(3), 4024–4035. https://doi.org/10.35445/alishlah.v16i3.5197

Saaty, T. L., & Vargas, L. G. (2006). *Decision Making with The ANP* (Vol. 15, Issue 4). Springer.

Saaty, T., & Vargas, L. (2014). Decision Making with the Analytic Network Process (Economic, Political, Social, and Technological Applications with Benefits, Opportunities, Costs, and Risks). In *International Series in Operations Research & Management Science, Thomas* (Second, Vol. 195, pp. 1–370). Springer. https://doi.org/10.1007/978-1-4614-7279-7

Sari, J. P., Setio, J., Satria, R., Oviyanti, F., & Maryamah, M. (2024). The Challenges of *Madrasah* in the Digital Era: The Transformation of Islamic Religious Education in the Context of Technology. *Journal of Mudarrisuna: Media Studies of Islamic Religious Education*, *14*(2), 211–222. https://doi.org/10.22373/jm.v14i2.23489

Setia, P. B., Kurniawan, A., Wulansari, R. E., Indrawan, E., & Kassymov, G. K. (2025).

Analysis of factors influencing students' participation in national and international competitions. *Journal of Vocational Technology Education*, *8*(1), 30–47. https://doi.org/https://doi.org/10.24036/jptk.v8i1.42623

Shebani, Z., Aldhafri, S., & Alsaidi, F. (2025). The effect of parental involvement on academic passion: the mediating role of student motivation in learning English online. *International Journal of Adolescence and Youth*, *30*(1). https://doi.org/10.1080/02673843.2025.2467109

Sholihuddin, M., Sukarman, & Handoko, S. (2024). The Application of Digital *Madrasah* Suspect Stakes on MTS. Krm. Marzuki Cepogo. *Scholars: Journal of Education and Teaching*, *2*(12), 629–635.

Siregar, L. A., & Siregar, S. (2024). Assessing Teacher Competency and Preparedness for Integrating Digital Media in 21st-Century Education: An Exploratory Review. *AL-ISHLAH: Journal of Education*, *16*(4), 5794–5804. https://doi.org/10.35445/alishlah.v16i4.5619

Srinivasan, P. (2020). *Evaluation in Education* (Issue June 2016). Laxmi Book Publication.

SU. (2025). *Interview with the Head of Madrasah*. MTs Darul Irfan.

Susanti, S., Lian, B., & Mulyadi. (2021). The Influence of School Facilities and Motivation on the Students' Learning Outcomes. *Proceedings of the International Conference on Education Universitas PGRI Palembang (INCoEPP, 2021), 565*(23), 816–819. https://doi.org/10.2991/assehr.k.210716.160

Syar'i, A., Akrim, A., & Hamdanah. (2020). The Development of Madrasa Education in Indonesia. *Argentine Journal of Psychological Clinic*, *29*(4), 513–523. https://doi.org/10.24205/03276716.2020.858

Thoyib, M., Djohan, M. W., & Rahmawati, R. (2024). Research-Based Educational Innovation In The Development of Excellent *Madrasah*. *Southeast Asian Journal of Islamic Education Management*, *5*(1), 1–16. https://doi.org/10.21154/sajiem.v5i1.283

CE. (2025). *Interview of the Head of Madrasah* (p. 1). MAN 2 Serang City.

Umar, A., & Munadi, M. (2024). Transformation of *Madrasah* Management: Strategy to Increase Public Trust in State Elementary *Madrasah* 1 Grobogan. *Education Quarterly Reviews*, *7*(4), 228–243. https://doi.org/10.31014/aior.1993.07.04.539

Yakin, A., Musthofa, M. D., Kurniyawan, H., Baharun, H., & Hefniy. (2025). The Digital Divide: How *Madrasah* Uses Technology to Improve Brand Image. *Activism: Indonesian Journal of Educational, Political and Social Sciences*, *2*(1), 189–200. https://doi.org/10.62383/aktivisme.v2i1.760

Ydesen, C. (2023). *Educational assessment – trends in research, policy and practice* (R. J. Tierney, F. Rizvi, & K. B. T.-I. E. of E. (Fourth E. Ercikan (eds.); pp. 103–107). Elsevier. https://doi.org/https://doi.org/10.1016/B978-0-12-818630-5.09033-3

Zhang, J. (2017). Research on the assessment of student learning outcomes. *Council for Higher Education Accreditation*, 1–20.