

Transformation and Innovation in Learning al-Ḥifẓu wa Khaṭṭi al-Qur'an at Islamic Boarding Schools

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Abstract. This study analyzes the transformation and innovation of learning al-ḥifẓu wa khaṭṭi Al-Qur'an through digital integration at Al-Aqobah and Sakal Calligraphy Islamic boarding schools in Jombang, using a mixed-method approach to reveal how technology enhances learning quality and students' readiness to face global challenges. The findings show that, first, the administrators of both pesantren hold a positive, inclusive, and transformative paradigm for applying digital technology in Qur'anic memorization and calligraphy-based learning. Second, the pesantren implement digital transformation by adopting and integrating technology across various aspects of learning, with stages adjusted to each pesantren's takhassus (specialization). Al-Aqobah focuses on strengthening al-ḥifẓ Al-Qur'an supported by research and language competencies, while the Calligraphy Pesantren emphasizes the development of khaṭṭi Al-Qur'an and zukhrufah (ornamental design) through digital media. This digital transformation has also encouraged the emergence of various learning innovations in Qur'anic memorization and calligraphy instruction. A descriptive survey showed that 77.60% of respondents expressed positive perceptions regarding the implementation of digital transformation and learning innovation, while 22.40% considered its implementation less optimal due to limitations in technological infrastructure and digital competencies. In addition, 85% of respondents perceived that digital-based learning contributed positively to improvements in students' academic and non-academic achievements, indicating a positive trend in learning quality rather than statistical significance. These findings suggest that digital integration can support learning innovation while preserving the educational values and traditions of pesantren.

Keywords: Digital Transformation, Learning Innovation, Learning Quality.

Introduction

Digital transformation has significantly reshaped educational practices, requiring educational institutions, including pesantren, to integrate digital technology in ways that enhance learning quality while preparing students for future challenges.¹ Although digital transformation in education has been widely discussed in previous studies, most research focuses on general classroom learning, online learning platforms, or digital literacy in schools and universities. Studies specifically examining the digital transformation of pesantren-based learning, particularly in *Al-ḥifẓ* al-Qur'an and *Khaṭṭ* al-Qur'an, remain limited. Existing research rarely explores how digital technology is integrated into the distinctive pedagogical traditions of Islamic boarding schools while maintaining their religious values and learning culture. Therefore, this study seeks to fill this gap by examining the transformation and innovation of Qur'anic memorization and calligraphy learning in two pesantren with different educational specializations.

¹ The term "digital era" is often used to describe this situation. The condition of the digital era is characterized by the dominance of the internet in almost every field, from economics to art, sports, government, social life, and education, among other fields. Azhar Kholifah, "Strategi Pendidikan Pesantren Menjawab Tantangan Sosial Di Era Digital," *Jurnal Basicedu* 6, no. 3 (May 1, 2022): 4967, <https://doi.org/10.31004/BASICEDU.V6I3.2811>.

As the oldest Islamic educational institution in Indonesia, pesantren are expected to respond adaptively to digital transformation while preserving their distinctive religious traditions.² Many pesantren have gradually integrated digital technology into learning activities to improve educational quality without abandoning their traditional values. However, the extent of this transformation varies according to each pesantren's educational vision and institutional priorities.³

Rather than examining virtual pesantren, this study focuses on how two conventional pesantren integrate digital technology into the teaching of *Al-ḥifẓ* al-Qur'an and *Khaṭṭ* al-Qur'an while maintaining their pedagogical traditions and religious identity. Although digital technology has increasingly been adopted for administration and da'wah, its integration into classroom learning remains uneven due to differences in institutional readiness, teacher competence, and technological infrastructure. Therefore, this study investigates how digital transformation can improve learning quality while preserving the principle of *al-muḥāfaẓah 'alā al-qadīm al-ṣāliḥ wa al-akbaddhu bi al-jadīd al-aṣlah*.⁴

Al-Aqobah Islamic Boarding School is a pesantren specializing in *al-ḥifẓ* al-Qur'an, where Qur'anic memorization is integrated with research, Arabic and English language development, and digital learning support. The pesantren has gradually adopted digital technology to enhance memorization, learning management, and access to educational resources. In contrast, Sakal Calligraphy Islamic Boarding School specializes in *khaṭṭ* al-Qur'an through the *Manhaj Hamidy* approach. Besides preserving the tradition of Qur'anic calligraphy, the pesantren has incorporated digital media, graphic design applications, and online learning platforms to strengthen students' artistic and professional competencies. These distinctive characteristics make both pesantren relevant research sites for examining digital transformation in two different fields of Qur'anic education.⁵

Based on the information above, the researcher is interested in studying further the perspectives of the managers of the two Islamic boarding schools on digital transformation in their Islamic boarding schools. Furthermore, how are the implementation and its implications for the quality of learning in each of the Islamic boarding schools. This study employs the Mindzunnur Paradigm, Kurt Lewin's Change Theory, the SAMR Model, and Constructivist Learning Theory to analyze digital transformation and learning innovation in pesantren.

This study employed a mixed-methods approach using an exploratory sequential design proposed by Creswell. The qualitative phase was conducted first to obtain an in-depth understanding of the process of digital transformation and learning innovation at Al-Aqobah Islamic Boarding School and Sakal Calligraphy Islamic Boarding School. Data in this phase were collected through participant observation, in-depth interviews, and documentation studies.⁶ The findings from the qualitative phase were then used to inform the quantitative phase. Quantitative data were collected through a structured questionnaire administered to students to examine their perceptions of digital transformation and learning innovation, as well as academic achievement indicators. The quantitative data were analyzed using descriptive statistics in the form of percentages and mean scores, while the

² Haidar Putra. Daulay, *Dinamika Pendidikan Islam Di Asia Tenggara* (Jakarta: Rineka Cipta, 2009), 38.

³ Moh Asror et al., "Educational Innovation of Islamic Boarding Schools in Indonesia and Malaysia in Facing the 21st Century Challenges," *Jurnal Tarbiyatuna* 14, no. 1 (June 30, 2023): 27–50, <https://doi.org/10.31603/TARBIYATUNA.V14I1.8802>.

⁴ Moch Kalam Mollah, "Rekonstruksi Dan Reposisi Pendidikan Islam Dalam Merespon Tantangan Dunia Pendidikan Di Indonesia," *NUR EL-ISLAM: Jurnal Pendidikan Dan Sosial Keagamaan* 3, no. 2 (2016): 27, <https://ejurnal.iainasribungo.ac.id/index.php/nurelislam/article/view/65>.

⁵ "Sakal Jombang," accessed August 31, 2026, <https://sakalkaligrafi.blogspot.com/>.

⁶ Encep Supriatna, "Transformasi Pembelajaran Sejarah Berbasis Religi Dan Budaya Untuk Menumbuhkan Karakter Siswa," *Atikan* 2, no. 1 (2012): 23, <https://doi.org/10.2121/Atikan-Journal.V2I1.123>.

qualitative and quantitative findings were integrated to provide a comprehensive understanding of the implementation and outcomes of digital transformation in learning at both pesantren.

Discussion

Islamic Boarding School Managers' Perspectives on Digital Transformation

The progress of an Islamic Educational Institution cannot be separated from the paradigm of its management.⁷ Managers who have a transformative paradigm and an inclusive perspective will always be open to change. A good perspective will lead to good changes. Conversely, a negative perspective will lead to bad changes. However, this perspective of Islamic boarding school managers can also be adopted by the Islamic boarding school community, such as the board of asatidz, administrators, and students at the Islamic boarding school in order to further accelerate the progress of the Islamic boarding school, including in terms of digital transformation.

Westerners stated that digital transformation is a matter of using technology to transform or change analog or traditional processes into digital ones that are more efficient and effective, meaning that this digital transformation stimulates many innovations that make companies more efficient and effective.⁸ Danuri also stated that digital transformation is also a change in the way things are handled using information technology to gain efficiency and effectiveness.⁹

However, these changes must be made by the Islamic boarding school itself. The Qur'an has hinted that Allah SWT will change the fate of a society if they have tried hard to change their own fate. Allah SWT says in Surah al-Ra'd [13]: 11, which reads:

...إِنَّ اللَّهَ لَا يُغَيِّرُ مَا بِقَوْمٍ حَتَّى يُغَيِّرُوا مَا بِأَنْفُسِهِمْ...

Indeed, Allah will not change the condition of a people until they change the condition of themselves. (QS. al-Ra'd [13]: 11)

According to Al-Biqai, this verse implies that Allah will not change the condition of a people, whether for better or for worse, until they change what is within themselves. This change encompasses a process of self-transformation toward what is good and the abandonment of what is bad, all within the moral and spiritual domain. Thus, the destiny of a people greatly depends on the internal transformation they undertake.¹⁰

Efendi is of the opinion that this verse can be interpreted to mean that the condition of a backward or developing people can be changed by Allah SWT, but these people are obliged to try to

⁷ Bashori Bashori, "Kepemimpinan Transformasional Kyai Pada Lembaga Pendidikan Islam," *Al-Tanzim: Jurnal Manajemen Pendidikan Islam* 3, no. 2 (October 29, 2019): 73–84, <https://doi.org/10.33650/AL-TANZIM.V3I2.535>; Mahfudh, "Konstruksi Kepemimpinan Transformatif Di Lembaga Pendidikan Islam," *Indonesian Journal of Humanities and Social Sciences* 3, no. 2 (October 20, 2022): 131–50, <https://doi.org/10.33367/IJHASS.V3I2.3005>.

⁸ George Westerman, Didier Bonnet, and Andrew McAfee, *Leading Digital: Turning Technology into Business Transformation*, Harvard Business Review Press (Boston: Harvard Business Review Press, 2014), 292, https://books.google.com/books/about/Leading_Digital.html?hl=id&id=Fh9eBAAAQBAJ.

⁹ Muhamad Danuri, "Perkembangan Dan Transformasi Teknologi Digital," *Jurnal Ilmiah Infokam* 15, no. 2 (September 30, 2019): 120, <https://amikjtc.com/jurnal/index.php/jurnal/article/view/178>.

¹⁰ Ibrāhīm ibn 'Umar Al-Biqā'i, *Naẓm Al-Durar Fī Tanāsūb Al-Āyāt Wa Al-Suwar Volume 3* (Kairo: Dar al-Kutub al-Islamy, 1984), 292.

change it through various means, including changes for progress.¹¹ In another verse, Allah SWT says in surah al-Anfal [8]: 53 which reads:

ذَٰلِكَ بِأَنَّ اللَّهَ لَمْ يَكُ مُغَيِّرًا نِّعْمَةً أَنْعَمَهَا عَلَىٰ قَوْمٍ حَتَّىٰ يُغَيِّرُوا مَا بِأَنْفُسِهِمْ وَأَنَّ اللَّهَ سَمِيعٌ عَلِيمٌ

This is because Allah will not change a blessing that He has bestowed on a people until they change what is in themselves. Indeed, Allah is All-Hearing, All-Knowing. (QS. al-Anfal [8]: 53)

This second verse can be understood as humans are told to strive, be pious and grateful to Allah Swt, so that the blessings that have been given to them are not revoked. So, the second context is a change from progress to decline. And this can happen because of the actions of humans themselves. Quraish Shihab explains that social change cannot be achieved by an individual alone. Although it may begin with one person who initiates and spreads new ideas, real transformation occurs only when those ideas resonate within society. Thus, change starts from an individual but culminates in the community. Accordingly, divine change must be preceded by human effort; without internal transformation within society, true social change is impossible. Even if political systems or leaders change, the condition of society will remain the same unless its inner values and attitudes evolve first.¹²

The findings indicate that the managers of both pesantren adopt a transformative perspective toward digital technology. Rather than prohibiting the use of digital devices, they emphasize their educational value (*maṣlahah*) by regulating their use through institutional policies, time management, learning objectives, and continuous evaluation. They also encourage technology-based learning activities so that mobile phones and laptops function as educational tools rather than merely communication devices. According to the participants, this approach provides three main benefits: broader access to learning resources, stronger critical thinking, and greater creativity among teachers and students. These findings are consistent with Mujamil Qomar's transformative paradigm, which emphasizes positive institutional change through constructive mindsets, innovation, and organizational commitment.¹³

These findings also imply that successful digital transformation requires visionary leadership and continuous capacity building for teachers.¹⁴ Consistent with Mujamil Qomar's transformative paradigm, institutional leaders should promote positive organizational change by strengthening teachers' competencies, creativity, and commitment, enabling them to integrate digital technology into learning while preserving the educational values of pesantren.¹⁵

Researchers see how the two leaders of the Islamic boarding schools above try to continue to encourage their teachers and students to not only have critical thinking, but also encourage them to always develop their talents and abilities in anything, including by increasing digital literacy on the internet. Through digital transformation, various learning innovations have emerged. In addition, various works of creativity from teachers and students have also emerged, including various achievements achieved on a regional, national, and international scale.

¹¹ Nur Effendi, *Manajemen Perubahan Di Pondok Pesantren:Konstruksi Teoritik Dan Praktik Pengelolaan Perubahan Sebagai Upaya Pewarisan Tradisi Dan Menatap Tantangan Masa Depan* / Nur Effendi (Yogyakarta: Kalimedia, 2016), 85, <https://dpk.kepriprov.go.id/opac/detail/r13yk>.

¹² M. Quraish Shihab, *Tafsir Al-Misbah : Pesan, Kesan Dan Keserasian Al-Qur'an Volume 14* (Jakarta: Lentera Hati, 2002), 475.

¹³ Mujamil Qomar, *Manajemen Pendidikan Islam Mindbunnur* (Malang: Madani, 2022), 27, <https://bintangpusnas.perpusnas.go.id/konten/BK51550/manajemen-pendidikan-islam-mindhunnur>.

¹⁴ Qomar, 70.

¹⁵ Mujamil Qomar, *Pendidikan Islam Transformatif* (Malang: Madani, 2019), 59, <https://bintangpusnas.perpusnas.go.id/konten/BK19079/pendidikan-islam-transformatif>.

In this transformative Paradigm, Mujamil Qomar revealed that the transformative approach is shown through the concept of "*Mindzunnur*". He stated that the transformation process is a process changing negative actions into positive, destructive into constructive, so that they become positive-constructive. So that all educational institutions including Islamic boarding schools must also be designed to carry out transformations towards positive-constructive, creative-productive, and dynamic-progressive.¹⁶

The researcher sees that the paradigm of the management of the Islamic boarding school above, according to the researcher, has a transformative paradigm. However, it is not yet systematic, but is still reactive. This is proven, that the managers tend to be more inclined that the implementation to meet the needs as well as to follow the development of the times alone. Therefore, the researcher sees the need for a systematic transformative paradigm (PaTaS).

The proposed Systematic Transformative Paradigm (PaTaS) conceptualizes digital transformation through the linguistic structure of *taṣrif*, integrating the management functions of Planning, Organizing, Actuating, and Controlling (POAC) into a systematic framework for pesantren management. As illustrated in Figure 1, the stages of *taṣrif* symbolically represent the organizational process of planning, implementing, and evaluating digital transformation while preserving the educational values and traditions of pesantren.¹⁷

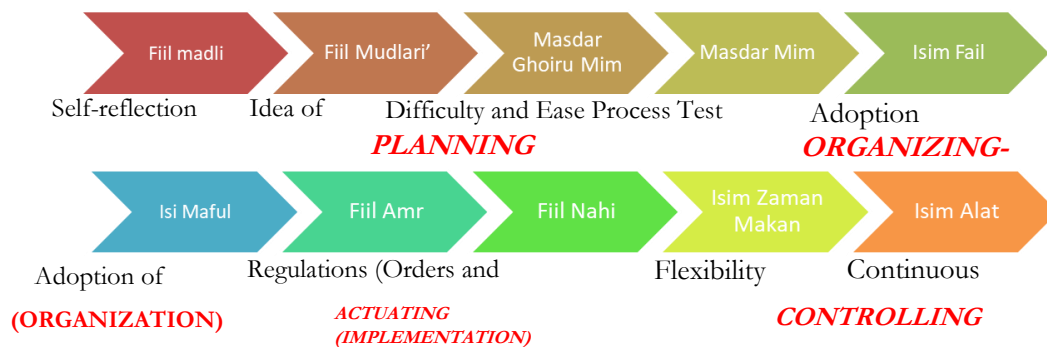


Figure 1. Stages of the Systematic Transformative Paradigm (PaTaS)

The findings also align with Kurt Lewin's three-stage model of organizational change. The *unfreezing* stage is reflected in the leaders' awareness of the need for digital transformation and their willingness to move beyond conventional learning practices. The *changing* stage is demonstrated by the adoption of digital learning platforms, teacher training, and the integration of technology into educational activities. Finally, the *refreezing* stage is evident in the institutionalization of digital practices through organizational policies and routines, indicating that digital transformation has become an integral part of the educational culture in both pesantren.¹⁸

Implementation of Digital Transformation and Learning Innovation in Islamic Boarding Schools

The implementation of digital-based learning transformation and innovation at the Al-Aqobah and Kaligrafi Sakal Islamic boarding schools is doing well. Both Islamic boarding schools implement

¹⁶ Qomar, 186.

¹⁷ Muhammad Fauzi Ramadhani and Fauzianor, "Tantangan Pesantren Dalam Menghadapi Modernitas," *Jurnal Ilmu Sosial Dan Humaniora* 1, no. 2 (June 9, 2025): 246–252, <https://doi.org/10.63822/0ECJT48>.

¹⁸ Fathor Rachman and Mohammad Hosnan, "Modernisasi Pendidikan Pesantren Di Indonesia: Inovasi, Tantangan, Dan Peluang Menuju Lembaga Pendidikan Islam Berdaya Saing Global," *Jurnal Pemikiran Dan Ilmu Keislaman* 8, no. 1 (March 30, 2025): 21–41, <https://journal.ua.ac.id/index.php/jpik/article/view/1002>.

it in several aspects, including education, financing, public services, and products. In the context of learning, both Islamic boarding schools have implemented various innovative learning approaches.

In practice, Al-Aqobah Islamic Boarding School has integrated digital technology into learning through paperless learning, online platforms (e.g., Google Meet and Zoom), digital examinations, livestreamed lectures, and creative applications such as Canva and CapCut to strengthen students' research, presentation, and digital literacy skills. Similarly, Sakal Kaligrafi has incorporated digital platforms into Qur'anic calligraphy instruction through online classes, YouTube-based demonstrations, and digital learning resources that support both face-to-face and distance learning.

Learning innovations also encourage the development of 21st century skills such as collaboration, communication, creativity, and problem solving.¹⁹ Various innovations were also carried out by the two Islamic boarding schools. At the Al-Aqobah Islamic Boarding School, various innovations have been carried out, including: Bilingual book study, comparison of the Amtsilati and Yahtadi methods in learning the Qur'an and Reading the Book, Multiple Intelligence-based Learning, One Day Five Verses, One Hadith, LMS (Learning Management System) using PINTRO, while the Sakal Calligraphy Islamic Boarding School adopt Manhaj Hamidy, online classes, Tahsin Kitabah classes, Zukhrufah and Munamnamat classes, Sakal Store and Sakal Design.

Table 1. Digital Utilization Implementation Questionnaire Table

No	Description	STB	TB	KB	B	SB
1	Utilization of Mobile Phones, Laptops and Digital Technology in Islamic Boarding Schools for Learning	0.7%	3.3%	17.1%	56%	22.9%
2	Implementation of digital or online-based learning in Islamic boarding schools	1.5%	2.2%	14.5%	57.5%	24.4%
3	Digital infrastructure provision can improve learning outcomes	0.4%	2.9%	12.4%	59.6%	24.7%
4	On average, teachers and students have good skills in utilizing digital-based learning applications in every lesson.	1.1%	4.7%	20.4%	52.7%	21.1%
5	Respondents feel enthusiastic when learning using digital	1.1%	1.8%	18.2%	45.8%	33.1%
6	Respondents' intensity in using cellphones or laptops to search for information, reference materials, create PPTs and so on	0.7%	0.7%	17.8%	46.2%	34.5%
7	On average, respondents are able to utilize digital technology to foster ideas, creativity and innovation in learning and working.	1.5%	0.7%	12%	59.3%	26.5%
8	Intensity of Respondents who use digital-based learning media, learning videos in	6.5%	4.7%	31.6%	33.8%	23.3%

¹⁹ Bernie Trilling and Charles Fadel, *21st Century Skills : P21 Framework Definitions Explained: White Paper, Choice Reviews Online* (Hoboken: John Wiley & Sons, 2009), 45, https://books.google.com/books/about/21st_Century_Skills.html?hl=id&id=VUrAvc8OB1YC.

	the form of creative content using Canva, Capcut and the like					
9	Respondents' intensity in utilizing social media as a means of exchanging information, sharing ideas and work by creating creative content.	3.3%	2.9%	20.7%	42.2%	30.9%
10	On average, students often discuss or share ideas, work and innovations at Islamic boarding schools.	1.5%	1.8%	15.3%	52.7%	28.7%
Average Amount		1.83%	2.57%	18 %	50.58%	27.01%
Average		22.40		77.60%		

Table 1 shows that respondents generally perceived the implementation of digital transformation positively, with an overall positive response rate of 77.60%. However, 22.40% of respondents indicated that the implementation remains less than optimal, particularly due to limitations in technological infrastructure and the varying levels of teachers' and students' digital competence.

Researchers also analyzed it using the theory of technology integration and learning in Islamic boarding schools using the SAMR Model (Substitution, Augmentation, Modification, Redefinition). This model was developed by Dr. Ruben Puentedura. A model that measures the level of technology integration in learning.²⁰ The SAMR model can be used to analyze the extent to which digital transformation in Islamic boarding schools only replaces old methods with new technology, or truly changes and redefines learning to be more meaningful and of higher quality.

Table 2. SAMR Stage and Evidence from the Study

SAMR Stage	Evidence from the Study
Substitution	Paperless learning, e-books, PDF resources, KhatBoard, WhatsApp and email submissions.
Augmentation	Google Meet, Zoom, Quizizz, multimedia presentations, online feedback.
Modification	Collaborative online discussions and project-based learning through digital platforms.
Redefinition	Student–teacher collaboration in creating digital learning videos and educational content shared through YouTube and social media.

As summarized in Table 2, both pesantren have implemented digital technology across all four levels of the SAMR model. While the initial stages are reflected in the replacement and enhancement of conventional learning practices through digital tools, the higher stages demonstrate more transformative changes, particularly collaborative learning and the production of digital educational

²⁰ Siti Sahronih et al., "Integrasi Teknologi Augmented Reality Berbasis Model SAMR (Substitution, Augmentation, Modification, Redefinition) Dalam Pembelajaran IPA Sekolah Dasar," *Prima Magistra: Jurnal Ilmiah Kependidikan* 4, no. 4 (October 27, 2023): 623, <https://doi.org/10.37478/JPM.V4I4.3230>.

content. These findings suggest that digital transformation in both pesantren extends beyond technology adoption toward pedagogical innovation that supports 21st-century competencies.²¹

Implications of Digital Transformation for Improving the Quality of Learning

The findings indicate that digital transformation has expanded access to learning resources, encouraged independent learning, and contributed to students' academic and non-academic achievements. The digital infrastructure provided by Al-Aqobah and Sakal Kaligrafi Islamic Boarding Schools enables teachers and students to access broader learning resources beyond formal classroom activities, fostering greater learning autonomy and improving the accessibility of education. As a result, students are able to explore diverse learning materials independently, both within and outside the pesantren environment. Combined with continuous guidance from teachers and *ustadz*, these digital learning innovations have contributed to students' academic and non-academic achievements, as reflected in their increasing success at regional, national, and international competitions.

Al-Aqobah Islamic Boarding School for the past three years, the achievements of its students have experienced significant improvements. Based on the following diagram:

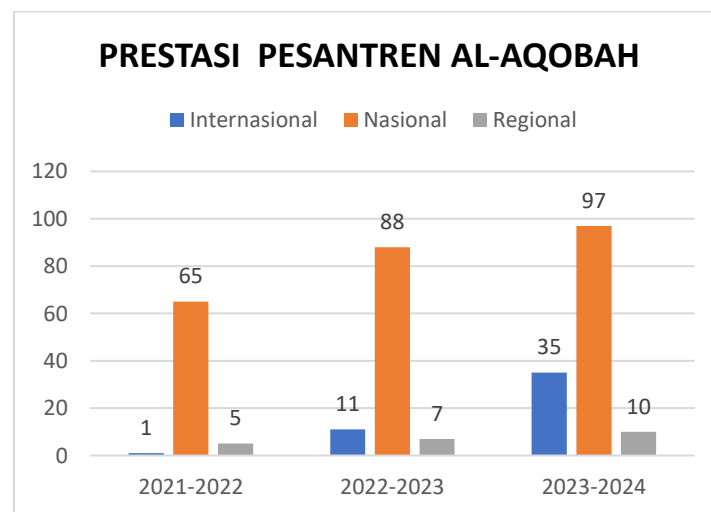


Figure 2. Al-Aqobah Islamic Boarding School Achievement Diagram

Figure 2 demonstrates a consistent increase in students' achievements over the last three academic years, particularly at the national and international levels, indicating the growing competitiveness of Al-Aqobah students.²²

²¹ Nur Fatmawati, "Urgensi Literasi Digital Dalam Meningkatkan Keterampilan Abad 21 Di Sekolah Dasar: Kajian Literatur Dan Strategi Implementasi," *Social, Humanities, and Educational Studies (SHES): Conference Series* 8, no. 3 (July 31, 2025): 1483–90, <https://doi.org/10.20961/SHES.V8I3.107405>.

²² Nila, "Interview with Ustadzah at AIS, Jombang May 29, 2024," n.d.

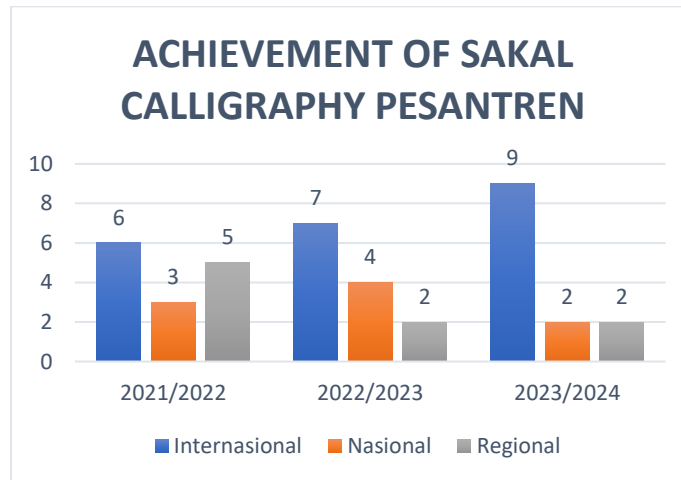


Figure 3. Graph of Achievements of Sakal Calligraphy Islamic Boarding School

Similarly, Figure 3 indicates that Sakal Kaligrafi consistently maintained high achievement at regional, national, and international levels during the last three academic years, with international awards dominating student achievements.

Researchers also conducted a survey related to the improvement of students' achievements in both academic and non-academic fields after conducting a digital-based learning process. The results are as follows:

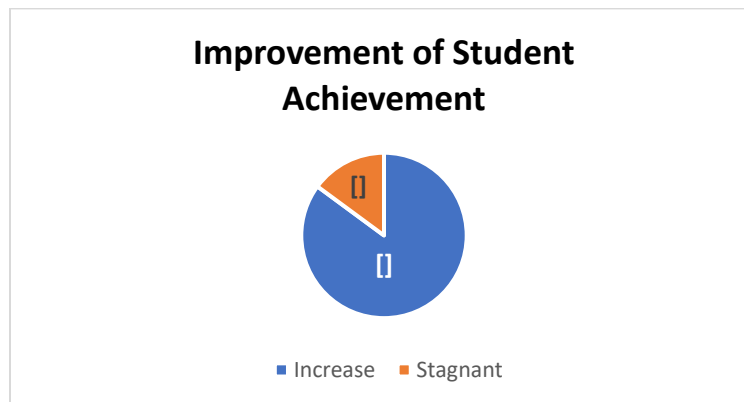


Figure 4. Graph of Increase in Islamic Boarding School Achievement

Figure 4 indicates that most respondents (85%) perceived a positive trend in students' academic and non-academic achievement following the implementation of digital-based learning, although a small proportion (15%) did not perceive substantial improvement.

The findings indicate that the improvement in students' achievements is closely related to the supportive digital learning environment developed in both pesantren. Digital technology expands opportunities for interaction, enabling students to access diverse learning resources, collaborate with peers, and receive continuous guidance from teachers and *ustadz*.²³ These findings support Vygotsky's constructivist perspective, which emphasizes that knowledge is constructed through social interaction

²³ L. S. Vygotsky et al., *Mind in Society: Development of Higher Psychological Processes* |, Harvard University Press (Boston: Harvard University Press, 1978), 84, <https://www.jstor.org/stable/j.ctvj9vz4>.

and guided participation within the Zone of Proximal Development (ZPD).²⁴ In this context, digital platforms function not merely as technological tools but as learning environments that facilitate discussion, feedback, collaboration, and independent exploration beyond formal classroom activities.²⁵ Consequently, digital transformation encourages students to become more active learners while enabling teachers to provide more effective scaffolding throughout the learning process. This interaction contributes to more meaningful learning experiences and helps explain the positive trend in students' academic and non-academic achievements observed in both Islamic boarding schools.²⁶

Proposed Pillars of Digital Transformation

In this study, the author tries to propose several pillars in digital transformation which are very important to know and apply in Islamic Boarding Schools, namely digital literacy, digital mindset, digital leadership, digital learning, and digital dakwah. Digital literacy refers to students' ability to access, evaluate, and utilize digital information responsibly.²⁷ In the context of pesantren, digital literacy enables students to explore religious and general knowledge through credible digital resources while maintaining ethical principles in the use of technology.²⁸ Digital mindset reflects openness to technological innovation and continuous learning. This mindset encourages teachers and students to adapt to technological change while using digital tools to improve learning effectiveness and problem-solving abilities.²⁹

Digital leadership emphasizes the role of pesantren leaders in driving digital transformation through strategic policies, institutional vision, and capacity building.³⁰ In this study, the leadership of the kiai plays a central role in creating a supportive environment for sustainable digital innovation.³¹ Digital learning integrates technology into teaching and learning activities through online platforms, blended learning, and digital resources. In both pesantren, digital learning has expanded learning flexibility while supporting innovation in Qur'anic memorization and calligraphy instruction.³² Digital da'wah refers to the dissemination of Islamic teachings through digital media. Beyond expanding the

²⁴ L. S. Vygotsky et al., 85; Ersya Khoirunnisa¹ et al., "Analisis Penerapan Zone of Proximal Development (ZPD) Dalam Pembelajaran," *Jurnal Pengembangan Dan Evaluasi Pendidikan* 2, no. 3 (December 31, 2025): 114–19, <https://doi.org/10.61692/JPEP.V2I3.439>.

²⁵ Rachman and Hosnan, "Modernisasi Pendidikan Pesantren Di Indonesia: Inovasi, Tantangan, Dan Peluang Menuju Lembaga Pendidikan Islam Berdaya Saing Global."

²⁶ Devintya Putriana et al., "Revolusi Digital Dalam Pendidikan Islam Meningkatkan Kualitas Pembelajaran Melalui Integrasi Teknologi," *Reflection: Islamic Education Journal* 1, no. 4 (November 29, 2024): 200–210, <https://doi.org/10.61132/REFLECTION.V1I4.263>.

²⁷ Mukhlisin Mukhlisin et al., "Urgensi Literasi Digital Bagi Santri Milenial Di Pondok Pesantren Rahmatutthoyibah Al Ifflahah Gunung Kaler Tangerang," *Jurnal Pengabdian Kepada Masyarakat (JPKM) - Aphelion* 1, no. 2 (February 26, 2021): 212, <https://doi.org/10.32493/JPKA.V1I2.9672>.

²⁸ Hary Soedarto Harjono, "Literasi Digital: Prospek Dan Implikasinya Dalam Pembelajaran Bahasa," *Pena: Jurnal Pendidikan Bahasa Dan Sastra* 8, no. 1 (2018): 3, <https://www.online-journal.unja.ac.id/pena/article/view/6706>.

²⁹ Maula Fiqriani et al., "Pendekatan Pembelajaran Pendidikan Islam Untuk Generasi Z: Studi Literatur Tentang Inovasi Dan Tantangan Terkini," *Jurnal Penelitian Ilmu Pendidikan Indonesia* 4, no. 2 (2025): 372–81, <https://jpion.org/index.php/jpi372> Situswebjurnal:<https://jpion.org/index.php/jpi>.

³⁰ Evans EW Tulungen, David PE Saerang, and Joubert B Maramis, "Transformasi Digital : Peran Kepemimpinan Digital," *Jurnal EMBA: Jurnal Riset Ekonomi, Manajemen, Bisnis Dan Akuntansi* 10, no. 2 (June 20, 2022): 1116–1123, <https://doi.org/10.35794/EMBA.V10I2.41399>.

³¹ Kholifah, "Strategi Pendidikan Pesantren Menjawab Tantangan Sosial Di Era Digital," 4973.

³² Bambang Sucipto and Cecep Kustandi, *Media Pembelajaran Manual Dan Digital* (Bogor: Ghalia Indonesia, 2011), 79, <https://www.scribd.com/document/447417961/MEDIA-PEMBELAJARAN-ringkasa>; Endah Yuni Pramesti, "Penggunaan Digital System (DLS) Sebagai Pembelajaran Berbasis Tehnologi Di SMP Negeri 5 Surabaya" (Skripsi, Universitas Airlangga, 2018), <http://lib.unair.ac.id>.

reach of religious messages, it also provides students with opportunities to develop communication skills and contribute positively to digital society.³³

And if a concept map is created, the description of the five pillars above will be as follows:

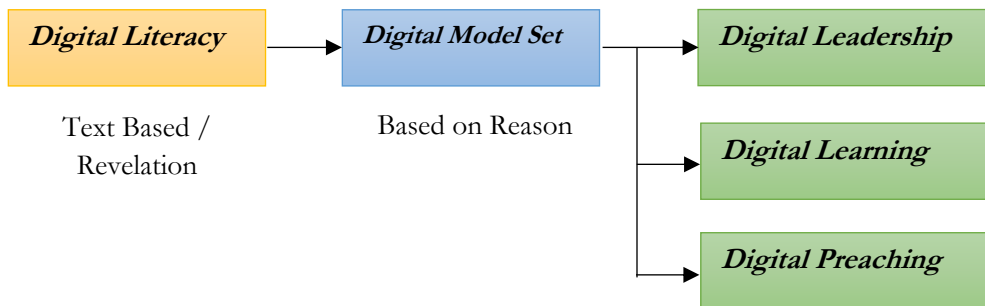


Figure 5. Pillars of Digital Transformation

Figure 5 summarizes the relationship among the five pillars of digital transformation. Digital Literacy and Digital Mindset function as the foundational dimensions that support the development of Digital Leadership, Digital Learning, and Digital Da'wah in pesantren.

The author also tries to connect the five pillars above with the concept of the obligatory characteristics of the Prophet, namely *ṣiddiq*, *amānah*, *faṭānah*, and *tabligh* as follows:

Table 3. The Meaning of the Pillars of Digital Transformation in the Obligatory Attributes of the Prophet

Five Pillars	The Characteristics of the Prophet	Meaning
<i>Digital Literacy</i>	<i>Ṣiddiq</i>	The ability of students to find the right sources
<i>Digital Mindset</i>	<i>Faṭānah</i>	The ability of students to think well to solve problems
<i>Digital Leadership</i>	<i>Trust</i>	The ability of students to carry out their duties very well
<i>Digital Learning</i>	<i>Tabligh</i>	Ustad's ability to deliver material well
<i>Digital Preaching</i>	<i>Tabligh</i>	The ability of students to preach in society

Table 3 links the proposed pillars of digital transformation with the Prophet's exemplary characteristics, emphasizing that digital transformation in pesantren should be guided by ethical and Islamic values. This helps maintain the integrity and values of Islam in various aspects of modern life, including in the rapidly evolving digital world.

The findings of this study suggest that the successful digital transformation implemented at Al-Aqobah, Mambaul Hikam, and Sakal Kaligrafi Islamic boarding schools can be conceptualized through the APIK model (Adaptive, Progressive, Innovative, and Collaborative). This model represents the institutional characteristics that enable pesantren to respond effectively to digital change while maintaining their religious identity and educational traditions.

³³ Reza Mardiana, "Daya Tarik Media Digital Sebagai Media Dakwah Untuk Generasi Milenial," *KOMUNIDA: Media Komunikasi Dan Dakwah* 10, no. 02 (December 25, 2020): 148–58, <https://doi.org/10.35905/KOMUNIDA.V10I02.1373>.

Within this framework, adaptive refers to the ability of pesantren to respond to technological and social change; progressive reflects their commitment to preparing students for future challenges; innovative emphasizes the continuous development of learning methods and institutional management; and collaborative highlights partnerships with educational institutions, government, industry, and wider communities. Together, these four dimensions provide a practical framework for understanding how pesantren can sustain digital transformation while preserving their core Islamic values.

Conclusion

The transformation and innovation of digital-based learning implemented at Al-Aqobah Islamic Boarding School and Sakal Kaligrafi demonstrate that the integration of digital technology into pesantren education can enrich learning processes and broaden students' access to educational resources. This study demonstrates that digital transformation can strengthen learning innovation in pesantren by expanding access to learning resources, supporting student-centered learning, and improving academic and non-academic outcomes while preserving the religious values and educational traditions of pesantren.

Despite these positive outcomes, digital transformation remains constrained by technological infrastructure, unequal digital competence among teachers, and limited access to digital facilities. Therefore, continuous teacher training, institutional support, and responsible digital governance are essential for sustaining digital transformation in pesantren. Future research should examine the long-term impact of digital transformation on learning outcomes, compare different pesantren models, and evaluate the effectiveness of the proposed PaTaS and APIK frameworks across broader educational contexts.

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