Jupiter: Jurnal Pendidikan Terapan
Homepage: https://journal.diginus.id/jupiter/index
Email: jurnalpendidikanterapan@gmail.com

p-ISSN : 2985-3214; e-ISSN : 2964-3171
Jupiter, Vol. 4, No. 4, September 2026
Page 417-431

Digital Technology and the Reconstruction of Social Interaction in a Madrasah: A Qualitative Study in East Jawa

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ARTICLE INFO

Article history:
Submitted: August 06, 2026
Final Revised: August 13, 2026
Accepted: September 06, 2026
Published: September 28, 2026

Keywords:
Sociology of Islamic Education; Social Interaction; Digital Technology; Madrasah; Transformation of Education.

ABSTRACT

Background: The increasing integration of digital technology into madrasah education has transformed learning practices as well as communication, authority, participation, and interpersonal relations. However, limited attention has been given to how these changes reconstruct social interaction and the internalization of Islamic values in madrasah settings. **Purpose**: This study analyzes how digital technology reconstructs social interaction and its implications for communication, participation, interpersonal closeness, educational authority, and religious value internalization in a madrasah. **Methods**: A descriptive qualitative approach was used in a single madrasah in East Java that has integrated digital technology into learning and communication. Data were collected through semi-structured interviews with 15 informants (one head, six teachers, and eight students). Thematic analysis was conducted through coding, categorization, theme development, and interpretation using NVivo 14. **Results**: Digital technology expands communication spaces, accelerates information flow, enhances collaboration, and enables flexible participation. It also produces hybrid interaction patterns combining online and face-to-face engagement. The role of teachers shifts from primary information sources to epistemic and moral authorities. However, challenges include reduced face-to-face interaction, weakened social control, digital literacy gaps, and changing communication ethics. **Conclusion and Implications**: Digital technology reconstructs social interaction by reshaping communication, participation, relationships, and authority. Madrasas need ethical, inclusive, and Islamic value-based digital governance. Findings are context-specific. **Originality**: This study conceptualizes digital technology as a driver of hybrid social relations and transformed educational authority in madrasas.

Doi: https://doi.org/10.61255/jupiter.v4i4.1794

INTRODUCTION

Digital transformation has changed the educational ecosystem globally, not only through the use of learning devices and platforms but also through transformations in communication patterns, knowledge distribution, participation, and social relations among educational actors. Technology enables learning processes to take place beyond spatial and temporal boundaries, expands access to knowledge resources, and provides more flexible spaces for collaboration. Alam & Mohanty (2023) explain that digital technology can improve accessibility, personalization, interactivity, and learning efficiency, although its success remains influenced by users' capabilities and the pedagogical designs applied. Balalle (2024) systematic review of 33 articles also showed that student engagement in technology-based education is closely related to patterns of interaction, motivation, teacher support, and the characteristics of the learning environment. Meanwhile, Han (2025), through a study of 15 studies involving 1,428 participants, found that blended learning generally had a positive impact on engagement and learning outcomes. These findings confirm that the digitalization of education should not be understood solely as a technological transformation, but also as a social process that reconstructs the ways individuals communicate, participate, access knowledge, negotiate roles, and build relationships within educational environments.

In the context of Islamic education, these changes have become increasingly complex because madrasas not only perform academic functions but also serve as institutions for value socialization, character formation, and the internalization of Islamic teachings. The use of digital learning platforms, conversation applications, social media, and

madrasah information systems has expanded communication among teachers, students, leaders, and parents. However, digitalization can also transform structures of authority, communication ethics, mechanisms of social control, and patterns of exemplary behavior that previously developed primarily through direct interaction. Dalimunthe et al., (2023) emphasized that information technology and virtual spaces provide opportunities for the dissemination of Islamic knowledge while simultaneously creating challenges for value education, social supervision, and the formation of student behavior. In the Indonesian context, Al Husna & Hidayati (2025) found that digital transformation in madrasas requires adaptive leadership, institutional strategies, competent human resources, a culture of innovation, and supervision of technology use. This condition demonstrates that the digital transformation of madrasas cannot be understood merely as the modernization of learning facilities. Instead, it needs to be examined as a form of social change that affects interpersonal relationships, educational authority, institutional interaction, and the processes through which Islamic values are transmitted and internalized.

Theoretically, this study is grounded in the sociology of education, which views education as a social process involving interaction, socialization, negotiation of norms, distribution of roles and authority, and the formation of social identity. From this perspective, educational relationships are not merely channels for transmitting knowledge but also social spaces in which meanings, values, expectations, authority, and behavioral norms are continuously constructed and negotiated. In a digital environment, interaction does not disappear; rather, its form, intensity, space, and mediation change from relationships predominantly based on physical encounters toward interactions mediated by devices, platforms, algorithms, and rules of online communication. Consequently, the reconstruction of social interaction can be understood not simply as a shift from offline to online communication, but as a transformation in how educational actors establish presence, negotiate authority, maintain interpersonal closeness, exercise social control, and reproduce institutional and religious values.

Within this sociological perspective, the concepts of social presence and transactional distance provide more specific analytical dimensions for understanding how digitally mediated interactions affect educational relationships. Social presence refers to an individual's ability to present himself or herself as a real, responsive, socially available, and trustworthy person within digital communication. In the context of madrasas, this concept is particularly relevant for examining whether teachers and students are still able to maintain interpersonal closeness, responsiveness, recognition, emotional connection, and meaningful participation when interactions are mediated by technology. Transactional distance, in contrast, refers to the psychological and communicative gaps that may emerge when teachers and students are physically separated and when communication increasingly depends on mediated interaction. Therefore, the two concepts are conceptually connected: digital technology may expand opportunities for communication and participation, but increased communication does not automatically guarantee stronger social relationships. The quality of digitally mediated relationships depends on whether social presence can be maintained and whether transactional distance can be reduced through sufficient dialogue, responsiveness, feedback, recognition, and relational engagement. K. Han (2021), through a study of 827 students, found that teacher–student and student–student interactions increase learning engagement through social presence and autonomous motivation. Miao et al. (2022) also show that the social presence of teachers has a positive effect on student involvement in online learning. Thus, digital technology can expand interaction, but the quality of social relationships continues to depend on dialogue, responsiveness, a sense of connectedness, and mutual recognition among educational actors. In this study, these concepts are therefore not positioned merely as interpretive concepts but as interconnected analytical lenses for examining changes in communication, participation, interpersonal closeness, teacher authority, and the internalization of values in digitally mediated madrasah interactions.

A number of previous studies have discussed the digitalization of education from various perspectives, but an important scientific gap remains. Timotheou et al. (2023) focused on the benefits and general application of digital technology in education, while Vaszkun & Szakács (2024) examined the influence of digital competence, self-organizing ability, and learning independence on the acceptance of digital learning. Malik (2023) and Indra et al. (2023) focus more on engagement and learning outcomes in technology-based education. In the context of Islamic education, Dalimunthe et al. (2023) discuss the challenges of information technology broadly in Islamic education, while Sholeh et al. (2022) focus on the study of madrasah heads' leadership in digital transformation. These studies have provided an important foundation for understanding technology acceptance, digital leadership, learning engagement, and moral challenges. However, technology is still predominantly positioned as a learning medium, facility, or instrument. Consequently, the theoretical gap is not merely that studies specifically addressing social interaction in madrasas remain limited, but that existing discussions have not sufficiently explained digital technology as a social force that simultaneously reorganizes different dimensions of educational relationships. In particular, the relationship among expanded digital communication, changes in participation, interpersonal closeness, teacher authority, social control, and the internalization of religious values has not been sufficiently integrated into a single

sociological explanation. Studies that specifically analyze how technology reconstructs communication, participation, interpersonal closeness, teacher authority, social control, and the internalization of religious values in the daily life of madrasas are therefore still limited.

This gap is important to examine because the expansion of digital communication is not always accompanied by an improvement in the quality of social relationships. Increased access to communication channels may increase the frequency and flexibility of interaction while simultaneously changing its relational depth, forms of supervision, authority, and ethical boundaries. Rizk & Hillier (2022) found that technology can strengthen engagement by providing broader access, support, and spaces for participation, but these benefits are strongly influenced by digital capital and individuals' ability to use technology. On the other hand, technical problems, unequal access, weak digital competence, and reduced direct interaction can lead to isolation and decrease the quality of teacher–student and student-to-student relationships. Research by Chan et al. (2024) involving 1,095 high school students in Hong Kong showed that online learning problems are associated with disruption of social interaction and decreased psychosocial well-being, particularly among students from lower socioeconomic groups. Gutiérrez Ángel et al. (2022) also showed that digital competence affects the acceptance of digital learning, but direct contact with teachers and peers remains important for fulfilling interpersonal needs. These findings illustrate a theoretical tension between technological expansion and relational quality: technology may increase opportunities for interaction while simultaneously increasing relational distance if digital communication is not accompanied by adequate social presence, dialogue, and interpersonal recognition. In the context of madrasas, these problems have broader implications because the weakening of social closeness can also affect processes of exemplary behavior, moral habituation, behavioral supervision, and the cultivation of Islamic values.

Based on these problems and gaps, this study aims to analyze the process of reconstructing social interaction through the use of digital technology and its implications for communication, participation, interpersonal closeness, and the internalization of religious values in madrasas. The study was carried out through a descriptive qualitative approach in one of the madrasas in East Java that has utilized digital technology in learning and institutional communication. More specifically, the study seeks to understand digital transformation not simply in terms of the presence or effectiveness of technological devices, but through changes in the social relationships that emerge when communication, participation, authority, supervision, and value transmission increasingly operate through a combination of direct and digitally mediated interactions.

Accordingly, this study addresses the following research questions: (1) How does the use of digital technology reconstruct patterns of social interaction, particularly communication, participation, and interpersonal closeness, in the studied madrasah? (2) How does digitally mediated interaction transform teacher authority, social control, and relationships among educational actors in the studied madrasah? and (3) What are the implications of these reconstructed patterns of interaction for the internalization of Islamic values in the studied madrasah?

Theoretically, this research is expected to expand the study of the sociology of Islamic education by positioning digital technology as a social force that can transform patterns of relationships, the distribution of authority, communication norms, mechanisms of social control, and processes of religious identity formation. By connecting the sociological perspective of education with social presence and transactional distance, the study examines how technological mediation simultaneously creates opportunities for greater communication and participation while potentially altering relational closeness, educational authority, and processes of value internalization. The contribution of this study lies in its integrated analysis of technological dimensions, social relations, and the internalization of Islamic values within the empirical context of a single madrasah, rather than solely measuring technological effectiveness or learning outcomes. Given its contextual and single-site qualitative design, this contribution is intended to provide an in-depth understanding of the social dynamics of digital transformation within the studied madrasah rather than to claim broad generalization across all madrasas. Practically, the research findings are expected to provide a basis for madrasah leaders and teachers in developing digital interaction practices and governance that are participatory, humanistic, inclusive, ethical, and firmly grounded in Islamic values.

METHOD

Types of Research

This study used a descriptive qualitative approach to understand the reconstruction of social interaction through the use of digital technology in a madrasah. This approach was chosen because the study focused on participants' experiences and meanings regarding changes in communication, participation, interpersonal closeness, educational authority, social control, and the internalization of religious values. The research was conducted in one madrasah in Kediri, East Java, Indonesia, that had integrated digital technology into learning and institutional communication through conversation groups, digital learning platforms, online assignments, collaborative documents, conferencing

applications, and social media. As a single-site study, the findings were intended to provide a contextual understanding rather than statistical generalization to all madrasas. A qualitative approach allows social phenomena to be understood contextually based on the perspectives of the actors directly involved (Stutterheim & Ratcliffe, 2021).

Participants and Sampling Strategy

The participants consisted of the madrasah head, teachers, and students. They were selected using purposive sampling based on direct involvement in learning or digital communication, at least one academic year of experience in the madrasah, sufficient understanding of changes in social interaction, and willingness to participate. The study involved 15 participants: one madrasah head (KM-01), six teachers (G-01–G-06), and eight students (S-01–S-08). These groups represented institutional, pedagogical, and student perspectives. The adequacy of the 15 participants was determined by the depth, relevance, and recurrence of information across the three participant groups. During the later interviews, the major categories of communication, participation, interpersonal relationships, authority, social control, digital literacy, and value internalization had become increasingly recurrent, while contrasting accounts were still retained for analysis. The three groups were chosen to obtain a comprehensive institutional, pedagogical, and student experience perspective (Abbas, 2020).

Research Instruments and Trustworthiness

The researcher served as the main research instrument, supported by a semi-structured interview guide, an audio-recording device, and field notes. The interview guide was developed based on the research objectives and covered changes in communication, participation in digital learning, interpersonal closeness, teacher authority and social control, digital literacy and communication ethics, and the internalization of Islamic values. The questions explored, among other aspects, how digital technology changed teacher–student communication, participation, interpersonal relationships, supervision, and the practice of Islamic values. The guide was substantively reviewed to ensure relevance, clarity of language, and suitability for the context of Islamic education.

Statistical validity and reliability were not applied because the study did not use numerical questionnaires. Credibility was strengthened through source triangulation by comparing accounts from the madrasah head, teachers, and students. Member checking was conducted through clarification and confirmation of important meanings during and after the interviews. Dependability and confirmability were supported through repeated transcript examination, documentation of coding and interpretive decisions, examination of conflicting accounts, and maintenance of an audit trail. Transferability was supported by describing the study context, participant groups, and forms of digital interaction used in the madrasah (Nyirenda et al., 2020).

Data Collection Procedure

The research began with problem identification, literature review, determination of the research focus, preparation of the interview guide, institutional permission, and purposive recruitment of participants. Individual semi-structured interviews were conducted between February 14 and March 11, 2025, in a private and convenient setting within the madrasah. Each interview lasted approximately 35–60 minutes, depending on the participant's role and the depth of information provided.

The interviews explored the use of digital technology, changes in communication and participation, interpersonal relationships, educational authority, social and ethical control, digital literacy, and the internalization of religious values. Before the interviews, participants were informed about the research objectives, confidentiality, voluntary participation, and their right to withdraw. With participants' consent, interviews were audio-recorded, supplemented with field notes, transcribed verbatim, cross-checked, and anonymized using participant codes. Semi-structured interviews allow researchers to maintain focus while delving into the informant's experiences in depth (Ahlin, 2019).

Data Analysis Techniques

Data were analyzed using an iterative thematic-descriptive analysis. The process began with repeated reading and familiarization with the transcripts, followed by coding, categorization, theme development, theme review, and interpretation. Coding followed a hybrid approach in which the research objectives and theoretical concepts guided the initial analytical focus, while additional patterns were allowed to emerge from participants' accounts.

The researcher conducted the coding and interpretation. Similar codes were grouped into categories and compared across the madrasah head, teacher, and student groups using a thematic matrix. Six main themes were identified: (1) expansion of communication spaces, (2) increased learning participation, (3) changes in interpersonal closeness, (4) shifts in social authority and control, (5) digital literacy gaps, and (6) transformation in the internalization of Islamic values. Different or conflicting accounts were retained as meaningful variations and were used to refine the final themes. The themes were repeatedly checked against the original transcripts before final interpretation. The process

follows the stages of data familiarization, coding, theme development, theme review, and reflective interpretation (Naeem et al., 2023).

NVivo 14 was used to organize transcripts, codes, categories, and themes, while all coding and interpretive decisions remained the responsibility of the researcher. Researcher reflexivity was maintained through analytical notes, documentation of coding decisions, repeated comparison with the original transcripts, and examination of data that differed from emerging interpretations.

RESULTS

Characteristics of Research Informants

This study involved 15 informants selected through purposive sampling, consisting of one madrasah head, six teachers, and eight students from one madrasah in Kediri, East Java. Informants were selected based on their direct involvement in digital learning or communication, a minimum of one academic year of experience in the madrasah, understanding of changes in social interaction, and willingness to participate. The composition represented three perspectives: institutional policy and management, pedagogical practice, and student experience.

Table 1. Characteristics of Research Informants

Informant Group	Quantity	Informant Code	Characteristics of Engagement
Head of madrasah	1	KM-01	Policy, supervision, and management of digital communication
Teachers	6	G-01–G-06	Digital-based learning, communication, and student mentoring
Students	8	S-01–S-08	Digital learning, discussion, assignments, and communication
Total	15	—	Institutional, pedagogical, and student experiential perspectives

The madrasah head provided information related to digital communication policy, supervision, and institutional management. Teachers described the use of technology in learning and changes in interaction with students, while students explained their experiences of digital learning, communication, participation, and technology-related challenges.

The thematic analysis assisted by NVivo 14 produced **six main themes**: (1) expansion and acceleration of communication spaces, (2) increased learning participation and collaboration, (3) changes in interpersonal closeness, (4) shifts in educational authority and social control, (5) digital literacy gaps and technology access, and (6) transformation in the internalization of Islamic values and digital ethics. The themes were developed from recurring codes and categories across the three informant groups and were subsequently compared to identify similarities, differences, and contrasting experiences.

Summary of Key Findings

Table 2. Summary of Key Findings

Main Theme	Empirical Findings	Positive Pattern	Challenges Identified
Expansion of communication spaces	Communication occurs through face-to-face interaction and digital platforms	Information becomes faster and more accessible	Boundaries of communication time become less clear
Learning participation and collaboration	Students participate through class groups, learning platforms, online assignments, and collaborative documents	Participation becomes more flexible and inclusive	Digital responses do not always indicate substantive understanding
Interpersonal closeness	Teacher–student relationships develop through a combination of digital and face-to-face interaction	Students find it easier to initiate questions and communication	Emotional cues and closeness are more difficult to identify digitally
Educational authority and social control	Teacher authority and supervision extend into digital spaces	Teachers act as guides, information filters, and ethical references	Supervision is limited in students' private digital spaces

Main Theme	Empirical Findings	Positive Pattern	Challenges Identified
Digital literacy and technology access	Technological skills, device ownership, and network access vary among participants	Peer assistance and collaborative adaptation emerge	Differences in devices, networks, and technical competence affect participation
Internalization of Islamic values and digital ethics	Religious values are communicated through digital content, messages, and online interaction	Religious and moral messages reach students beyond classroom settings	Digital messages may be superficial and communication ethics may weaken

To demonstrate the cross-group pattern of the findings, Table 3 summarizes how each theme appeared across the madrasah head, teachers, and students.

Table 3. Theme × Informant Group Matrix

Theme	Madrasah Head	Teachers	Students
Communication spaces	Emphasized speed and institutional information flow	Emphasized continuity of communication beyond class hours	Emphasized accessibility but also message overload
Participation	Viewed technology as supporting learning communication	Distinguished active responses from substantive engagement	Reported greater confidence and flexibility in participation
Interpersonal closeness	Concerned with maintaining institutional interaction	Emphasized the importance of direct expressions and personal attention	Reported easier initial contact but different emotional experiences online
Authority and social control	Emphasized difficulty of supervising private digital spaces	Reported a shift toward guidance, verification, and ethical direction	Felt stronger supervision in formal groups than in private peer spaces
Digital literacy and access	Observed unequal levels of technological adaptation	Reported differences in technological competence	Reported device sharing, network limitations, and peer assistance
Islamic values and digital ethics	Emphasized supervision and responsible digital behavior	Integrated religious values and communication ethics into digital interaction	Experienced religious reminders and learned digital forms of honesty and politeness

Expansion and Acceleration of Communication Spaces

Digital technology changed communication in the madrasah from a pattern that relied primarily on face-to-face meetings to a hybrid pattern combining direct and digital interaction. Information about learning activities, schedule changes, assignments, religious activities, and madrasah policies was communicated through conversation groups and digital platforms. This made information distribution faster and extended communication beyond classroom hours. The madrasah head emphasized the acceleration of institutional communication:

> "*In the past, information had to wait for a meeting or be submitted from the homeroom teacher one by one. Now it is enough through the official group, a few minutes later the teacher and students already know. In terms of speed, it is much more effective*." (KM-01, interview, February 14, 2025)

Teachers similarly described the continuation of academic communication outside formal classroom time:

> "*If there is material that has not been completed in class, I send a brief explanation or reading material in the group. Children can also ask questions after they get home. So the communication doesn't stop immediately when the class hours are over*." (G-02, interview, February 18, 2025)

From the students' perspective, increased accessibility was accompanied by different experiences. Some students considered teachers easier to contact, while others experienced hesitation or information overload:

> "*If we don't understand, we can ask questions through groups or private messages. It's easier than having to wait for tomorrow, but sometimes I still hesitate for fear of interrupting the teacher's break*." (S-03, interview, March 4, 2025)

> "*Information is faster, but messages in groups are sometimes too much. If you don't open your phone often, there are announcements that are piled up and missed*." (S-06, interview, March 7, 2025)

These accounts show a dual pattern. Digital technology expanded the speed and accessibility of communication, while simultaneously making the temporal boundaries between academic and personal communication less distinct.

Increased Learning Participation and Collaboration

Digital technology also expanded the forms through which students participated in learning. Participation occurred not only through oral discussion in the classroom but also through written messages, online assignments, digital presentations, and collaborative documents. Teachers observed that some students who were less active in direct classroom interaction became more expressive through written digital communication.

> "*There are children who are just silent when asked directly, but when given the space to answer through the group, the answer is quite long. They may need time to form an opinion and be more comfortable writing*." (G-01, interview, February 17, 2025)

Students similarly described digital platforms as providing flexibility in group work and participation:

> "*If it's a group task, we can divide the work through the group. One person searches for materials, one makes presentations, and another examines. You don't always have to meet after school*." (S-02, interview, March 3, 2025)

> "*I am more daring to answer through writing because I can think first. If you go directly to class, sometimes you are afraid of making mistakes and being laughed at by friends*." (S-07, interview, March 10, 2025)

However, a contrasting pattern emerged from teachers' accounts. Digital activity did not always indicate substantive engagement:

> "*Sometimes everyone looks active because they send 'ready' or a thumbs up. But when asked again, it turned out that he had not read the material. So digital activities are not necessarily the same as learning engagement*." (G-03, interview, February 20, 2025)

Thus, students generally emphasized increased flexibility and confidence, whereas teachers distinguished between visible digital participation and engagement that demonstrated substantive understanding.

Changes in Interpersonal Closeness

Digital communication facilitated access between teachers and students but did not fully reproduce the interpersonal qualities of face-to-face interaction. Teachers emphasized limitations in identifying expressions, intonation, emotional states, and students' need for personal attention.

> "*Through messages we only read writing. We don't always know that the child is sad, confused, or in need of attention. If you meet in person, the expression on his face can be seen*." (G-06, interview, February 28, 2025)

Students reported similar differences between receiving a digital response and engaging in direct dialogue:

> "*Through chat, it's fast, but it feels different. When the teacher explained directly, we could see if he was serious, joking, or reprimanding well*." (S-01, interview, March 3, 2025)

Nevertheless, the data also revealed a contrasting pattern. For some students, digital communication provided an easier initial channel for discussing issues that were difficult to express face-to-face:

> "*For personal matters, I am more comfortable sending a message to the homeroom teacher first. After that, they are usually asked to meet. Messages are the first way for me to dare to speak*." (S-08, interview, March 11, 2025)

The findings therefore do not indicate a simple decline in interpersonal closeness. Instead, the teacher–student relationship developed into a hybrid relationship, in which digital communication facilitated accessibility and initial contact while face-to-face interaction continued to provide stronger emotional and interpersonal cues.

Shifts in Educational Authority and Social Control

Digital technology also changed how teachers exercised educational authority and supervision. Students could obtain knowledge from search engines, social media, and learning platforms, meaning that teachers were no longer the only

source of information. Teachers described their roles increasingly in terms of guidance, information verification, and ethical direction.

> "*Children sometimes find information faster than teachers. Our job is not just to explain the content of the lesson, but to help them ensure that the source is true and accountable*." (G-01, interview, February 17, 2025)

> "*Now teachers can't just say 'follow the book'. Students bring a lot of information from the internet. We must be ready to dialogue and explain which ones are in accordance with the lessons and values of the madrasah*." (G-04, interview, February 24, 2025)

At the same time, the madrasah head identified limitations in digital supervision:

> "*At school, student behavior can still be observed directly. In the digital space, we don't always know what they're seeing, sharing, or commenting on. Therefore, supervision is not enough with prohibitions; students also need to build their awareness*." (KM-01, interview, February 14, 2025)

Students confirmed a distinction between formal and private digital spaces:

> "*In the class group, we are more careful because there are teachers. But in a group of friends, the language is sometimes more free and not always controlled*." (S-04, interview, March 5, 2025)

The findings indicate that teacher authority did not disappear but changed in its basis. Teachers remained influential through guidance, verification, exemplarity, and ethical direction, while their direct supervisory reach became more limited in students' private digital spaces.

Digital Literacy Gaps and Technology Access

Digital literacy emerged as a distinct dimension of the reconstruction of social interaction because differences in technological competence and access affected how teachers and students participated in digital activities. The madrasah head observed differences in teachers' adaptation to technology:

> "*Not all teachers have the same speed of adaptation. Some can immediately try new applications, but there are also those who need assistance several times*." (KM-01, interview, February 14, 2025)

Teachers themselves also described differences in technological competence:

> "*I can use the basic application, but if it has too many features, sometimes I need help from younger teachers. We usually study together, so we don't walk alone*." (G-05, interview, February 26, 2025)

Among students, variation was not limited to competence but also involved access to devices and internet connectivity:

> "*I use my cell phone with my brother. If the tasks are concurrent, I have to wait. Sometimes it's not because I don't want to do it, but the device is actually being used*." (S-02, interview, March 3, 2025)

> "*At home, the signal is not always stable. To send videos or open large material, you usually have to find a place with a better network*." (S-07, interview, March 10, 2025)

At the same time, these differences generated peer-support practices:

> "*If there are friends who don't understand how to upload assignments, we usually help them through chat or show them directly at school. So we learned the technology together*." (S-05, interview, March 6, 2025)

Digital literacy and access therefore shaped the intensity and form of participation. The data show both unequal technological experiences and adaptive practices of assistance among teachers and students.

Transformation of the Internalization of Islamic Values and Digital Ethics

Digital technology expanded the spaces in which Islamic values were communicated. Religious messages, worship reminders, moral materials, documentation of Islamic activities, and advice regarding digital behavior were distributed through class groups, short videos, digital posters, and other messages.

> "*Religious values are not only conveyed during lessons. In the class group we also remind ourselves to pray, speaking manners, honesty in assignments, and caution in sharing information*." (G-03, interview, February 20, 2025)

Teachers also connected Islamic values to patterns of digital communication:

> "*When students use the internet, we emphasize that adab still applies. Even though they didn't meet in person, their writing still reflected their attitude and responsibility*." (G-06, interview, February 28, 2025)

Students identified concrete examples of this extension of values into digital activities:

> "*The teacher once explained that copying assignments from the internet without citing the source is dishonest. From there, we began to understand that honesty also applies in digital tasks*." (S-08, interview, March 11, 2025)

However, the data also contained contrasting assessments concerning the depth of digital value internalization:

> "*The religious message in the group is good, but if it is only continued without talking about it anymore, sometimes it is quickly forgotten. Students still need to see direct examples from teachers*." (G-02, interview, February 18, 2025)

> "*If you only read the poster, you usually forget it for a while. It is more felt when the teacher explains with examples that are close to our lives*." (S-01, interview, March 3, 2025)

Changes in communication ethics were also reported, particularly in the use of abbreviations, messages without greetings, communication outside appropriate times, and forwarding information without verification.

> "*At first, there were students who sent assignments only with photos without greetings or explanations. After being reminded, they begin to understand that sending a message to the teacher also has manners*." (G-04, interview, February 24, 2025)

These findings show that the internalization of Islamic values expanded into digital interaction through the application of honesty, responsibility, politeness, respect, and self-control. At the same time, participants distinguished between the dissemination of religious messages and deeper value internalization through dialogue, habituation, and direct example.

Variations in Findings Across Informant Groups

Cross-group comparison revealed that the three informant groups did not interpret digital transformation in exactly the same way. The madrasah head emphasized communication efficiency, institutional supervision, policy, and human-resource readiness. Teachers focused more strongly on pedagogical benefits, participation, communication workload, authority, and ethical formation. Students emphasized flexibility, accessibility, device and network limitations, and differences between digital and face-to-face interaction. One contrast concerned communication outside school hours. Teachers interpreted easier digital communication partly as an extension of their service time:

> "*Communication is indeed easier, but teachers also feel that they must always be ready to answer. Sometimes the order comes in at night or on holidays*." (G-05, interview, February 26, 2025)

Students generally perceived the same accessibility as beneficial, although they also recognized teachers' personal boundaries:

> "*For us, it's good because we can ask questions at any time, but actually we also need to know the right time. Not all messages have to be answered immediately that night*." (S-06, interview, March 7, 2025)

A second variation concerned participation. Students tended to view digital responses as opportunities for involvement, whereas teachers differentiated between visible activity, administrative responses, and responses that demonstrated substantive understanding. Similarly, digital communication was experienced by some participants as reducing emotional cues, while for other students it provided an initial channel for establishing communication with teachers. These variations indicate that the six themes were not experienced uniformly. Their meaning depended on the participant's institutional position, responsibilities, access to technology, and form of involvement in digital interaction.

Synthesis of Research Findings

Overall, the findings demonstrate that digital technology reconstructed social interaction in the studied madrasah through six interconnected dimensions. First, communication became faster, broader, and less dependent on classroom encounters. Second, student participation became more flexible and provided additional opportunities for students who were less active in direct interaction. Third, teacher–student relationships developed into hybrid relationships combining digital communication with face-to-face interaction. Fourth, teacher authority and social control shifted as teachers increasingly acted as guides, information verifiers, and ethical references while experiencing more limited

supervision in private digital spaces. Fifth, differences in digital literacy, devices, and network access shaped participants' ability to engage in digitally mediated interaction and simultaneously generated forms of peer assistance. Sixth, the internalization of Islamic values expanded into digital spaces through practices of honesty, politeness, responsibility, respect, and ethical communication.

The six dimensions were interrelated rather than independent. Greater access to communication expanded participation, but differences in digital literacy influenced who could participate effectively. Digital interaction increased accessibility between teachers and students but did not always produce greater emotional closeness. Open access to information changed the basis of teacher authority, while limited visibility into private digital spaces altered forms of social control. Similarly, the dissemination of Islamic messages became wider, but participants distinguished between receiving digital religious content and experiencing deeper internalization through direct interaction and exemplarity.

The overall pattern therefore shows that digital technology did not replace conventional social interaction. Instead, it produced a hybrid form of social interaction characterized by expanded communication, flexible participation, changing interpersonal relationships and authority, unequal digital capacity, and the extension of Islamic values into digital practices.

DISCUSSION

The findings show that the use of digital technology in the studied madrasah does not merely change the medium of learning delivery but reconstructs social interaction through six interrelated dimensions: the expansion of communication spaces, increased flexibility of participation, changes in interpersonal closeness, shifts in educational authority and social control, digital literacy gaps, and the expansion of Islamic value internalization into digital spaces. These findings indicate that digital transformation operates as a social and cultural process because technology influences when, where, and through which norms educational interactions occur. This interpretation expands on the views of Kumar & Gautam (2023), who emphasize the contribution of technology to accessibility, flexibility, interactivity, and educational efficiency, by showing that these changes are also accompanied by shifts in relationships, roles, and social boundaries within the madrasah.

One of the most visible changes is the formation of hybrid communication patterns. Academic information, religious activities, madrasah policies, assignments, and learning consultations are no longer confined to classroom meetings but continue through conversation groups and digital platforms. From the perspective of the sociology of education, digital spaces therefore function as additional arenas of socialization that coexist with the physical space of the madrasah. However, greater accessibility also creates less distinct boundaries between academic and personal time. Teachers experience expectations for continued responsiveness, while students encounter information density and the possibility of missing messages. Thus, increased communication access does not automatically mean improved communication quality. The findings indicate that the social organization of digital communication, including boundaries of time, channels, and interaction norms, becomes increasingly important as communication moves across physical and digital spaces.

The increased flexibility of student participation supports the findings of (Alghasab et al., 2019), which show that digitally mediated learning can support collaborative interaction when accompanied by appropriate teacher involvement. Students who were less verbally active in face-to-face settings gained opportunities to express themselves through written messages, online assignments, and collaborative documents. Similar patterns are found by Rizk & Hillier (2022), who demonstrate that digital technology can expand opportunities for participation and interaction among learners. While their study focused on students with disabilities, the present findings indicate that greater participation opportunities may also be relevant for madrasah students who experience hesitation or lack confidence in direct classroom interaction.

At the same time, the findings distinguish between digital presence, administrative participation, and substantive academic engagement. Sending a brief response, attendance confirmation, or symbol of approval demonstrates presence on a digital platform but does not necessarily indicate understanding or reflection. This distinction is consistent with Caulfield (2023), who emphasizes that the effectiveness of blended learning depends not only on the presence of technology but also on learning design, teacher support, and relationships among learning components. In this study, therefore, increased opportunities to participate represent only one dimension of digital interaction; the depth of students' cognitive and relational engagement remains an important distinction.

The findings on interpersonal closeness further demonstrate the dual character of digitally mediated interaction. Digital communication makes teachers more accessible and, for some students, provides an initial channel for communicating issues that are difficult to express directly. However, text-based interaction does not fully communicate expressions, intonation, empathy, or emotional states. These findings can be understood through social presence and

transactional distance. Hamid & Awhinawhi (2025) show that supportive language-mediated collaboration and digital communication can strengthen motivation and engagement in virtual learning environments. Miao et al. (2022) similarly show that teacher–student and student–student interactions influence social presence and learning engagement. The present study suggests that, in the madrasah context examined here, social presence involves more than communication frequency or response speed; it also involves humane language, personal attention, recognition of students' conditions, exemplarity, and continuity between digital and face-to-face interaction.

The results therefore do not support a deterministic assumption that increased use of technology necessarily weakens social interaction. For some students, digital communication becomes an entry point for initiating contact with teachers before continuing the interaction face-to-face. This pattern is related to the way technology is used in the studied madrasah as a complement and extension of physical interaction rather than its complete replacement Folabit et al. (2025), similarly demonstrate through their review that technology integration can support educational experiences and belonging while also producing inequalities and digital stress. The present findings reinforce the importance of context: the consequences of digital technology for interpersonal relationships depend on how digital and direct interactions are combined, as well as on teacher responsiveness and available social support.

Another significant finding concerns the reconstruction of teacher authority. Students' access to search engines, social media, and multiple sources of knowledge means that teachers no longer function as the sole information center. Nevertheless, their authority does not disappear. Instead, the findings indicate a shift from authority based predominantly on information ownership toward authority based on selecting sources, contextualizing information, verifying its credibility, guiding reasoning, and directing ethical technology use. In the context of Islamic education, this role also involves moral exemplarity and the interpretation of information in relation to institutional and religious values. The transformation can therefore be interpreted as a contextual shift from informational authority toward epistemic and moral authority.

The findings expand on Siregar & Pramudita (2025), who place madrasah leadership, human-resource development, innovation culture, and institutional strategy within the process of digital transformation. In the present study, leadership-related transformation is also visible at the micro level of teacher–student interaction. Teachers exercise forms of digital guidance when helping students evaluate sources, respond to conflicting information, maintain communication ethics, and understand the consequences of online behavior. The findings therefore suggest a more dialogical form of educational authority without eliminating the teacher's normative and moral role.

The transformation of authority is closely connected to changes in social control. Direct interaction enables teachers to observe behavior, expression, and responses more immediately, whereas private digital spaces remain less visible to institutional supervision. The findings indicate that external supervision becomes more limited when interaction moves beyond formal digital groups. In the context of Islamic education, this shifts part of the emphasis from direct external control toward students' awareness, responsibility, self-control, and recognition that values such as honesty, politeness, trust, respect, and prudence remain relevant even when teachers are not physically present.

Digital literacy and technology access constitute another distinct dimension of this reconstruction. Differences in devices, network stability, technological experience, and skills affect how quickly and extensively students and teachers can participate in digitally mediated activities. The findings are consistent with Scheel et al. (2022), who demonstrate that digital competence, self-organization, and independent learning abilities influence the acceptance of digital learning. The present findings add a contextual dimension by showing that unequal participation is not always attributable to individual motivation; it may also reflect differences in access, connectivity, and technical capability.

At the same time, digital inequality generates practices of peer assistance. Students with greater technical competence help peers manage digital assignments, while more technologically adaptive teachers support colleagues in using digital platforms. These findings correspond with Lybeck et al. (2024), who explain the relationship between digital skills, participation, and digital capital. In the studied madrasah, however, digital competence also operates relationally: technological capability can become a resource for cooperation and peer solidarity. This does not eliminate inequalities of access, but it demonstrates how social relationships can mediate some of their effects.

The internalization of Islamic values also changes in medium and form. Messages concerning worship, morality, honesty, responsibility, and politeness extend from formal learning and face-to-face habituation into group conversations, digital content, and online interaction. Honesty becomes connected with avoiding plagiarism and identifying sources; respect is expressed through appropriate language, greetings, and recognition of communication boundaries; and responsibility extends to the management of assignments, privacy, and information. These findings are consistent with Hasanah (2024), who identifies both opportunities and challenges associated with Islamic education in increasingly digital social environments. Within the studied madrasah, this process shows how Islamic values begin to acquire practical expressions in digital communication.

However, the findings also indicate that wider circulation of religious messages does not necessarily mean deeper internalization. Posters, videos, quotations, and reminders may expand exposure to religious values, but participants reported that these messages become more meaningful when accompanied by dialogue, habituation, contextual explanation, and direct examples from teachers. This finding relates to Abdullah et al. (2024), who found that incomplete internet-based Islamic learning may contribute to confusion and religious emptiness among Muslim youth. In the present study, students remain connected to teachers and the institutional life of the madrasah, allowing digital religious information to be clarified and related to everyday practices. Digital technology therefore expands the channels through which values are communicated, while direct pedagogical relationships remain important for their interpretation and internalization.

Taken together, these findings address a gap in previous research. Parveen & Ramzan (2024) discuss the benefits and challenges of digital technology in education, Scheel et al. (2022) emphasize digital learning acceptance and user competence, while Balalle (2024) and Karuru et al. (2024) focus on engagement and technology-based learning design. In Islamic education, Dalimunthe et al. (2023) discuss technological challenges more broadly, Abdullah et al. (2024) examine internet-based religious learning, and Khofi (2025) focuses on madrasah leadership in digital transformation. The present study does not claim to replace these perspectives; rather, it brings communication, participation, interpersonal closeness, authority and social control, digital literacy, and Islamic value internalization into one contextual analysis of everyday interaction in a single madrasah.

From these six empirical themes, this study proposes the contextual concept of hybrid relational reconstruction. The term refers to the pattern observed in the studied madrasah in which physical and digital relationships coexist and complement one another while simultaneously altering participation, authority, interpersonal boundaries, and interaction norms. Rather than treating this concept as a universally applicable model, it should be understood as an analytical proposition derived from the experiences of 15 participants in one institutional setting. Its contribution lies in directing attention away from a simple online–offline dichotomy toward the ways physical and digital relationships are combined in everyday madrasah life.

A second analytical proposition concerns the transformation of teacher authority from predominantly informational authority toward epistemic and moral authority. Open access to information reduces teachers' exclusivity as information providers but increases the significance of their roles in verification, interpretation, contextualization, and ethical guidance. In the context examined here, this transformation also connects digital leadership with everyday teacher–student relations. This interpretation remains context-dependent and requires examination in other madrasah settings before broader claims can be made.

Based on the relationship among the six themes, the study also proposes a contextual framework for humanist digital interaction based on Islamic values. The framework consists of four interrelated elements: inclusive digital access, responsive social presence, substantive academic participation, and digital ethics based on Islamic values. These elements are not introduced independently of the empirical findings. Inclusive digital access is derived primarily from the digital literacy and technology-access theme; responsive social presence synthesizes findings on communication and interpersonal closeness; substantive academic participation emerges from differences between digital presence and meaningful engagement; and Islamic digital ethics integrates findings on teacher authority, social control, and the internalization of Islamic values. In this framework, unequal access constrains participation; participation without cognitive depth remains largely administrative; digital presence without relational responsiveness may increase interpersonal distance; and technology use without ethical orientation may weaken the social and moral functions of the madrasah. Accordingly, the framework should be regarded as a proposed, context-specific conceptual synthesis rather than a validated model.

Practically, the findings suggest that digital transformation in madrasas needs to consider the quality of social relationships alongside technological efficiency. Digital communication requires attention to appropriate channels, communication times, privacy, and interaction ethics. Teacher competence also involves not only technical ability but the capacity to design meaningful participation, provide responsive feedback, verify information, maintain social presence, and connect digital practices with Islamic values. Face-to-face interaction remains particularly relevant for counseling, exemplarity, habituation, and the development of emotional relationships. The practical implication is therefore not to replace direct interaction with technology, but to manage the relationship between digital and physical interaction more deliberately.

The interpretation of these findings should be considered in light of the study's scope. The research was conducted in one madrasah with 15 informants, and the findings are therefore influenced by its institutional culture, leadership, technological facilities, and local social context. The data were primarily derived from interviews and represent participants' experiences and perceptions, while actual digital interactions were not systematically observed. Perspectives from parents, educational staff, supervisors, and technology managers were also not included.

Consequently, the proposed concepts of hybrid relational reconstruction and humanist digital interaction should be treated as context-specific analytical propositions rather than broadly validated theoretical models.

Further research can examine these propositions through multisite studies involving public and private madrasas, different educational levels, and urban and rural contexts. Interviews may also be combined with observations, documentation, digital communication content, and platform-use data. Longitudinal designs would help examine whether changes in interpersonal closeness, teacher authority, communication ethics, and the internalization of Islamic values persist over time. The proposed contextual framework may subsequently be refined or tested through quantitative or mixed-method approaches involving social presence, digital literacy, communication quality, student engagement, interpersonal closeness, digital ethics, and the internalization of religious values.

CONCLUSION

This study concludes that digital technology has reconstructed social interaction in the studied madrasah from predominantly face-to-face relationships toward hybrid patterns that combine direct and digitally mediated interaction. This reconstruction is reflected in broader and faster communication, more flexible participation, changes in interpersonal closeness, shifts in teacher authority and social control, unequal digital access and literacy, and the expansion of Islamic value internalization into digital spaces. Digital interaction increases accessibility and participation, but it does not automatically produce deeper interpersonal closeness or meaningful engagement. At the same time, teachers' authority increasingly shifts from primarily providing information toward epistemic and moral roles involving information verification, interpretation, guidance, and ethical direction.

Conceptually, the study proposes hybrid relational reconstruction as a contextual interpretation of how physical and digital relationships coexist and reshape interaction within the studied madrasah. It also proposes a contextual framework for humanist digital interaction based on Islamic values, consisting of inclusive digital access, responsive social presence, substantive participation, and Islamic digital ethics. These propositions should be understood as analytical insights derived from a single-site qualitative study rather than as broadly validated theoretical models.

Practically, the findings indicate that madrasah digital transformation should balance technological efficiency with the quality of social relationships, meaningful participation, ethical communication, and the internalization of Islamic values. Digital technology is therefore most beneficial when it complements rather than replaces direct interaction, particularly in areas requiring personal guidance, moral exemplarity, emotional closeness, and character formation.

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ACKNOWLEDGEMENT

The author express their sincere appreciation to the head of the madrasah, teachers, and students who voluntarily participated in this study and provided valuable information during the data collection process. The authors also acknowledge the institutional and academic support received throughout the preparation and completion of this research.

AUTHOR CONTRIBUTION STATEMENT

Hasan Basri was solely responsible for the conceptualization, research design, literature review, data collection, data analysis, interpretation of findings, and preparation, review, and editing of the manuscript. The author approved the final version of the manuscript and accepts full responsibility for the accuracy, integrity, and originality of the study.

AI DISCLOSURE STATEMENT

Generative artificial intelligence tools were used solely to support language editing, sentence refinement, and structural organization of the manuscript. These tools were not used to generate, fabricate, or modify research data, interview transcripts, analytical findings, or scholarly conclusions. All AI-assisted content was critically reviewed, verified, and revised by the author, who retains full responsibility for the originality, accuracy, validity, and integrity of the published work.

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