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TEACHER–STUDENT RELATIONSHIPS IN THE DIGITAL LEARNING ENVIRONMENT: PEDAGOGICAL CHALLENGES AND DEVELOPMENT PROSPECTS

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Abstract
The digital transformation of education has fundamentally changed the nature of teacher–student relationships. Online platforms, virtual classrooms, and digital communication tools have created new opportunities for interaction, collaboration, and personalized learning. However, these developments have also introduced challenges related to social presence, mutual trust, emotional engagement, and communication effectiveness. This study examines the transformation of teacher–student relationships in digital learning environments and identifies the main factors influencing their quality. The research is based on a conceptual analysis of international scientific literature. The findings highlight five essential dimensions of effective digital pedagogical relationships: pedagogical interaction, social presence, emotional support, digital communication competence, and collaborative learning. The study concludes that successful digital education requires not only technological infrastructure but also human-centered pedagogical approaches that strengthen mutual understanding, academic motivation, and student engagement.

Keywords: Digital learning environment, teacher–student relationships, online education, pedagogical interaction, social presence, digital communication, student engagement, higher education.

Introduction

The rapid development of information and communication technologies has significantly transformed contemporary educational systems. Digital learning platforms, online communication tools, virtual classrooms, and artificial intelligence have changed traditional approaches to teaching and learning. In this context, teacher–student relationships have become an important factor determining the effectiveness of digital education.

Traditionally, pedagogical relationships were established through direct communication, classroom interaction, and personal contact. However, digital learning environments have shifted a considerable part of educational communication to virtual spaces. Although these environments provide flexibility and accessibility, they may reduce spontaneous communication and limit certain forms of emotional interaction.

Teacher–student relationships are not limited to the transmission of knowledge. They also involve mutual respect, trust, academic guidance, emotional support, and cooperation. Positive relationships contribute to student motivation, engagement, and educational achievement.

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Camas Garrido et al. (2021), in a systematic review of 111 scientific publications, demonstrated that social networking technologies have transformed educational communication while preserving the importance of interpersonal relationships.

More recent research by Wang et al. (2025) demonstrated that regular teacher–student interaction in online education can improve students' academic performance and certain personality characteristics.

Therefore, investigating the transformation of pedagogical relationships in digital environments is essential for developing effective educational strategies.

The aim of this study is to identify the main characteristics of teacher–student relationships in digital learning environments and propose pedagogical approaches to improving their effectiveness.

2. METHODOLOGY

The study employs a qualitative conceptual research approach based on the analysis and synthesis of international scientific literature concerning digital education, online communication, social presence, and pedagogical interaction.

The methodological framework includes comparative analysis, theoretical generalization, and conceptual synthesis. Particular attention is given to research examining the relationship between teacher accessibility, communication quality, emotional support, and student engagement.

The study focuses on five analytical dimensions: pedagogical interaction, social presence, emotional support, digital competence, and collaborative learning.

Since the research is literature-based, it does not claim original experimental or survey findings. The proposed conclusions represent a theoretical synthesis of existing research.

3. RESULTS AND DISCUSSION

3.1. Transformation of pedagogical relationships

Digital technologies have changed the structure and dynamics of teacher–student communication. Learning management systems, video conferencing platforms, and educational social networks allow teachers and students to communicate beyond traditional classroom boundaries.

However, technological accessibility alone does not guarantee effective pedagogical interaction. The quality of communication depends on teachers' accessibility, instructional organization, timely feedback, and willingness to provide individual support.

Moore's (1993) transactional distance theory explains that psychological distance in distance education can be reduced through meaningful dialogue, flexible instructional structures, and learner autonomy.

Consequently, teachers should organize regular online consultations, encourage student participation, and provide opportunities for open academic discussion.

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3.2. Social presence and emotional support

Social presence is one of the most important factors influencing relationships in digital learning environments. It refers to the extent to which participants feel that they are communicating with real and accessible individuals rather than interacting only with technological systems.

Garrison et al. (2000) identified social presence, teaching presence, and cognitive presence as three essential elements of meaningful online learning.

In practical terms, social presence can be strengthened through interactive discussions, personalized messages, collaborative assignments, and regular video communication.

Emotional support is equally important. Students who receive encouragement, constructive feedback, and respectful communication are more likely to develop trust and maintain academic motivation.

A 2025 study by Han (2025), involving 381 university students, found that teacher–student rapport and teacher immediacy were significant predictors of student engagement and well-being in technology-enhanced learning environments.

3.3. Digital competence and collaborative learning

Effective digital communication requires both teachers and students to possess appropriate digital competencies. Teachers need not only technical knowledge but also the ability to organize online discussions, provide constructive feedback, manage digital learning activities, and maintain professional communication.

Collaborative learning also plays a significant role in strengthening pedagogical relationships. Group projects, online discussions, peer assessment, and joint research activities encourage students to participate actively and develop a sense of educational community.

The research of Richardson et al. (2017) demonstrated a positive relationship between social presence and student satisfaction and perceived learning in online environments.

Based on the theoretical analysis, five dimensions of effective teacher–student relationships can be identified.

Table 1. Main dimensions of teacher–student relationships in digital learning environments

Dimension	Main characteristics
Pedagogical interaction	Dialogue, guidance, feedback
Social presence	Accessibility, participation, communication
Emotional support	Empathy, trust, encouragement
Digital competence	Platform literacy, online communication
Collaborative learning	Group work, cooperation, peer learning

Source: Developed by the author based on the reviewed literature.

The analysis suggests that these dimensions should function as an integrated pedagogical system. Their interaction creates favorable conditions for academic motivation, student engagement, and effective learning.

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3.4. Development prospects in higher education

For higher education institutions, improving teacher–student relationships requires a transition from technology-centered education toward human-centered digital pedagogy.

The following measures are recommended:

1. Developing institutional standards for online teacher–student communication.
2. Improving teachers' digital pedagogical and communication competencies.
3. Introducing regular online consultations and individualized feedback.
4. Expanding collaborative learning and interactive educational activities.
5. Ensuring equal access to digital educational resources.
6. Strengthening academic ethics, mutual respect, and information security.

For Uzbekistan, these priorities are particularly relevant to the modernization of higher education, the development of digital educational resources, and the integration of national educational institutions into the international academic environment.

4. CONCLUSION

The study demonstrates that teacher–student relationships remain a fundamental component of educational effectiveness in the digital age. Although digital technologies provide new opportunities for communication and learning, the quality of pedagogical relationships depends primarily on human interaction, trust, emotional support, and professional communication.

The theoretical contribution of this study is the identification of five interconnected dimensions of effective digital pedagogical relationships: pedagogical interaction, social presence, emotional support, digital competence, and collaborative learning.

The practical implications emphasize the importance of developing human-centered digital learning environments in which technology supports rather than replaces meaningful teacher–student communication.

Future research should empirically examine the proposed dimensions through student surveys, teacher interviews, and comparative studies in higher education institutions.

Ultimately, the success of digital education depends not only on technological innovation but also on the ability of teachers and students to establish meaningful, supportive, and collaborative relationships.

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