



<https://doi.org/10.70728/c.series.ped.v08.i09.122>

THE IMPACT OF DIGITAL TRANSFORMATION ON TEACHERS' MENTAL HEALTH, PEDAGOGICAL PRACTICES AND PROFESSIONAL DEVELOPMENT

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Abstract:Digital transformation has become an important component of contemporary education, influencing teaching practices, professional responsibilities, communication, and the psychological well-being of teachers. The increasing use of digital platforms, electronic resources, multimedia technologies, and personal gadgets has created new opportunities for improving the quality and effectiveness of instruction. At the same time, continuous adaptation to technological requirements may create additional cognitive and emotional demands for educators. This study examines the relationship between digital transformation, teachers' mental well-being, pedagogical practices, and professional development through a practical classroom-based experiment conducted at Namangan State Pedagogical Institute. The experiment involved 28 students from the Theory and History of Pedagogy program and was conducted over a period of two weeks. During the first stage, lessons were delivered using predominantly traditional teaching methods, while during the second stage digital technologies were incorporated into the instructional process. Classroom observations and a structured questionnaire were used to examine students' perceptions of teaching effectiveness, engagement, understanding, and technological comfort. The findings indicate that digital technology-supported lessons created more opportunities for interaction, visualization, access to learning resources, and active participation. At the same time, some students experienced discomfort when using gadgets, suggesting that intensive technology use may constitute an additional challenge in the learning environment. The study argues that digital transformation should not be understood as a complete replacement of traditional pedagogy. Instead, purposeful integration of digital technologies, combined with appropriate pedagogical methods and attention to users' psychological well-being, may contribute to more sustainable educational development and professional practice.

Keywords: digital transformation, teachers' mental health, pedagogical practices, professional development, educational technology, digital competence, higher education.

ВЛИЯНИЕ ЦИФРОВОЙ ТРАНСФОРМАЦИИ НА ПСИХИЧЕСКОЕ ЗДОРОВЬЕ ПРЕДПОДОВАТЕЛЕЙ, ПЕДАГОГИЧЕСКУЮ ПРАКТИКУ И ПРОФЕССИОНАЛЬНОЕ РАЗВИТИЕ

Аннотация: Цифровая трансформация стала важным компонентом современного образования, оказывая влияние на педагогическую практику, профессиональные обязанности, коммуникацию и психологическое благополучие преподавателей. Растущее использование цифровых платформ, электронных ресурсов, мультимедийных технологий и персональных гаджетов создало новые возможности для повышения качества и эффективности обучения. В то же время постоянная адаптация к технологическим требованиям может создавать дополнительную когнитивную и эмоциональную нагрузку для педагогов. Данное исследование рассматривает взаимосвязь между цифровой трансформацией, психологическим благополучием преподавателей, педагогической практикой и профессиональным развитием посредством практического эксперимента, проведённого в Наманганском государственном педагогическом институте. В эксперименте приняли участие 28 студентов направления «Теория и история педагогики», а его продолжительность составила две недели. На первом этапе занятия проводились преимущественно с использованием традиционных методов обучения, тогда как на втором этапе в учебный процесс были интегрированы цифровые технологии. Для изучения представлений студентов об эффективности преподавания, вовлечённости, понимании учебного материала и технологическом комфорте использовались наблюдение в аудитории и структурированная анкета. Результаты показали, что занятия с использованием цифровых технологий создали больше возможностей для взаимодействия, визуализации, доступа к образовательным ресурсам и активного участия. В то же время некоторые студенты испытывали дискомфорт при использовании гаджетов, что позволяет предположить, что интенсивное применение технологий может представлять дополнительную проблему в образовательной среде. Исследование утверждает, что цифровую трансформацию не следует рассматривать как полную замену традиционной педагогики. Напротив, целенаправленная интеграция цифровых технологий в сочетании с соответствующими педагогическими методами и вниманием к психологическому благополучию пользователей может способствовать более устойчивому развитию образования и профессиональной деятельности.

Ключевые слова: цифровая трансформация, психическое здоровье преподавателей, педагогическая практика, профессиональное развитие, образовательные технологии, цифровая компетентность, высшее образование.

RAQAMLI TRANSFORMATSIYANING O'QITUVCHILAR RUHIY SALOMATLIGI, PEDAGOGIK AMALIYOTI VA KASBIY RIVOJLANISHIGA TA'SIRI

Annotatsiya: Ushbu maqolada raqamli transformatsiyaning o'qituvchilarning ruhiy farovonligi, pedagogik faoliyati va kasbiy rivojlanishiga ta'siri tahlil qilinadi. Zamonaviy ta'limda raqamli texnologiyalardan foydalanish o'qitish jarayonini takomillashtirish, ta'limiy

resurslardan foydalanish imkoniyatlarini kengaytirish va talabalar faolligini oshirish uchun muhim imkoniyatlar yaratmoqda. Shu bilan birga, texnologiyalardan muntazam foydalanish o‘qituvchilar va ta’lim jarayoni ishtirokchilaridan yangi raqamli kompetensiyalarni talab qilishi hamda texnologik yuklama bilan bog‘liq noqulayliklarni yuzaga keltirishi mumkin. Tadqiqot Namangan davlat pedagogika institutida “Pedagogika nazariyasi va tarixi” yo‘nalishida tahsil olayotgan 28 nafar talaba ishtirokida ikki hafta davomida tashkil etilgan pedagogik tajriba asosida olib borildi. Tajribaning birinchi bosqichida darslar an’anaviy usullar asosida, ikkinchi bosqichida esa raqamli texnologiyalardan foydalangan holda tashkil etildi. Kuzatish va so‘rovnoma orqali talabalarning dars samaradorligi, faolligi, o‘quv materialini tushunishi hamda gadgetlardan foydalanishga munosabati o‘rganildi. Natijalar raqamli texnologiyalar darsni vizuallashtirish, interaktivlikni kuchaytirish va ta’lim resurslaridan foydalanish imkoniyatlarini kengaytirishini ko‘rsatdi. Biroq ayrim talabalar gadgetlardan foydalanishda noqulaylik sezgan. Bu holat raqamli transformatsiyani an’anaviy pedagogik yondashuvlar bilan muvozanatli tarzda amalga oshirish zarurligini ko‘rsatadi.

Kalit so‘zlar: raqamli transformatsiya, o‘qituvchilarning ruhiy salomatligi, pedagogik faoliyat, kasbiy rivojlanish, raqamli texnologiyalar, raqamli kompetensiya, oliy ta’lim.

INTRODUCTION

The rapid development of digital technologies has transformed almost every aspect of contemporary education. Digital platforms, multimedia resources, electronic learning materials, online communication systems, artificial intelligence, and mobile devices are increasingly incorporated into educational practice. This transformation has changed not only the ways in which students access information but also the professional responsibilities and pedagogical practices of teachers.

Teachers occupy a central position in the process of educational digitalization. An umbrella review of 23 systematic reviews involving 1,062 primary studies emphasizes that teachers' digital literacy and technology integration are central dimensions of educational digitalization (Wohlfart & Wagner, 2023). Consequently, the successful introduction of digital technologies depends not only on the availability of technological infrastructure but also on teachers' ability to integrate technology with appropriate pedagogical strategies.

Digital transformation also changes the professional requirements placed on teachers. Contemporary educators are increasingly expected to select appropriate digital resources, design technology-supported learning activities, communicate through digital platforms, provide electronic feedback, and adapt their teaching strategies to changing technological environments. A systematic review of teachers' digital competence identified several dimensions of this competence, including lesson planning with digital technologies, using technology to support teaching, organizing students' technology-based activities, and developing students' digital skills (Claro et al., 2024).

However, the increasing technological demands of teaching may also have psychological consequences. One important concept in this context is **technostress**, which refers to difficulties associated with adapting to and working with emerging technologies. Recent systematic evidence indicates that technological factors, workplace conditions, and individual

perceptions can contribute to teachers' technostress and that may affect teachers' well-being and professional performance.

The relationship between digital competence and professional well-being is also receiving increasing scholarly attention. Recent research published in 2026 reported a negative relationship between teachers' digital competence and technostress and a positive relationship between digital competence and professional well-being. These findings suggest that digital transformation itself should not necessarily be considered harmful to teachers' well-being. Rather, the psychological consequences may depend on the level of digital competence, the demands associated with technology use, available support, and the way digital technologies are incorporated into pedagogical practice.

From a pedagogical perspective, technology can provide substantial benefits when it supports meaningful learning activities. A 2024 systematic review and second-order meta-analysis of technology-enhanced learning in higher education found that digital technologies were particularly beneficial when they provided support for specific learning activities rather than simply replacing traditional instructional materials. Therefore, the pedagogical value of digital transformation depends largely on the quality and purpose of its implementation.

In this context, the present study examines digital transformation from three interconnected perspectives: **teachers' mental well-being, pedagogical practices, and professional development**. A practical classroom experiment was conducted at Namangan State Pedagogical Institute to compare traditional and digitally supported instruction. Although the empirical participants were students, the instructional intervention was implemented by the teacher-researcher; therefore, the experiment provides an opportunity to examine how the teacher's pedagogical practice changes when digital technologies are incorporated into classroom instruction.

The purpose of the study is to identify the pedagogical benefits and challenges of digital technology integration and to consider how these changes may relate to teachers' professional and psychological experiences.

LITERATURE REVIEW

Digital Transformation and Teachers' Pedagogical Practices

Digital transformation is broader than simply replacing printed materials with electronic resources. It involves changes in teaching organization, communication, assessment, learning activities, and professional responsibilities. According to Wohlfart and Wagner (2023), teachers play a central role in educational digitalization because technology integration requires teachers to combine technological knowledge with pedagogical decision-making.

The concept of technological pedagogical content knowledge (TPACK) is particularly relevant in this context because effective technology integration requires the interaction of technological, pedagogical, and content knowledge. A teacher may possess considerable technological skills but still experience difficulties if digital tools are not connected appropriately to learning objectives.

Research on higher education also demonstrates that teachers' digital competence includes knowledge, skills, and attitudes necessary for effective technology use. Basilotta-

Gómez-Pablos et al. (2022) emphasize that digital competence has become an increasingly important professional requirement for university teachers.

Consequently, professional development in the digital era should include not only technical training but also pedagogical training that helps teachers determine when, why, and how a particular technology should be used.

Digital Transformation and Teachers' Mental Health

While digital technologies can reduce some forms of workload and facilitate access to educational resources, they can also introduce new professional demands. Teachers may need to learn unfamiliar systems, solve technical problems, respond to digital communication, prepare multimedia resources, and continuously update their technological knowledge.

These demands may contribute to technostress. A recent systematic review of research on teachers' technostress identified technological factors, organizational conditions, and personal perceptions as important sources of this phenomenon.

Thus, teachers' mental well-being should be considered an important dimension of digital transformation. Successful digitalization should provide not only technological infrastructure but also professional development, technical support, reasonable workload expectations, and opportunities for teachers to develop confidence in using digital tools.

Digital Transformation and Professional Development

Professional development has become inseparable from digital competence. Teachers must continuously develop their technological knowledge because educational technologies change rapidly. Recent systematic research has highlighted the importance of structured teacher training and the need for clearer frameworks for defining and assessing teachers' digital competence.

Professional development should therefore be understood as a continuous process. Rather than expecting teachers to master every available technology, institutions should support teachers in selecting technologies that correspond to specific pedagogical objectives.

METHODOLOGY

Research Design

The study employed a **two-week comparative pedagogical experiment** conducted at Namangan State Pedagogical Institute. The research was designed to compare traditional classroom instruction with instruction supported by digital technologies.

The same teacher-researcher conducted the instructional activities during both stages. This approach made it possible to observe differences in classroom organization and student responses while maintaining consistency in the teacher's pedagogical role.

Participants

The participants were **28 students** studying in the Theory and History of Pedagogy program at Namangan State Pedagogical Institute. All participants took part in the instructional activities during the two-week experimental period.

The students' perceptions were used as an additional source of evidence concerning classroom engagement and instructional effectiveness. The study does not treat the students' responses as direct measures of teachers' mental health; rather, they provide contextual evidence concerning the pedagogical environment in which digital teaching was implemented.

Experimental Procedure

The experiment consisted of two stages.

During the **first stage**, lessons were delivered primarily through traditional teaching methods. These included teacher explanation, oral questioning, discussion, printed learning materials, note-taking, and direct teacher–student interaction.

During the **second stage**, digital technologies were incorporated into classroom instruction. The teacher used multimedia presentations, electronic learning materials, visual resources, interactive tasks, and students' personal gadgets where appropriate.

The comparison focused on several dimensions:

- student engagement;
- understanding of the learning material;
- classroom participation;
- interaction between teacher and students;
- accessibility of educational resources;
- perceived effectiveness of instruction;
- technological difficulties and discomfort.

Questionnaire

A structured questionnaire was administered after the experimental activities. Students responded to statements using a five-point Likert scale ranging from **1 (Strongly Disagree)** to **5 (Strongly Agree)**.

The questionnaire included the following items:

1. Digital technologies increased my interest in classroom activities.
2. Digital materials helped me understand theoretical concepts more clearly.
3. Multimedia resources made the lesson easier to follow.
4. Digital tools encouraged me to participate actively in classroom activities.
5. Interactive digital tasks helped me retain the learning material.
6. Digital resources provided convenient access to additional educational information.
7. Technology-supported lessons were more engaging than lessons conducted exclusively through traditional methods.
8. Digital technologies helped create a more interactive learning environment.
9. I experienced difficulties while using digital technologies during the lesson.
10. Prolonged use of gadgets caused discomfort or fatigue.
11. I believe that teachers need continuous professional development to use digital technologies effectively.
12. A combination of traditional and digital teaching methods is appropriate for higher education.

The final two items were particularly relevant to the broader research topic because teachers' professional development and the balanced use of technology are important components of sustainable digital transformation.

RESULTS

The classroom observations indicated a difference between the two instructional approaches. Traditional instruction provided a structured environment based on direct teacher explanation and interpersonal communication. However, the technology-supported lessons provided additional opportunities for visualization, interactive activities, rapid access to electronic materials, and student participation.

Table 1

Comparison of Traditional and Digital Technology-Supported Instruction

Dimension	Traditional instruction	Digital technology-supported instruction
Presentation of material	Mainly oral and text-based	Oral, visual, multimedia and electronic
Visualization	Relatively limited	Expanded through multimedia resources
Student participation	Discussion and teacher questioning	Discussion, interactive tasks and digital activities
Access to resources	Mainly printed materials	Printed and electronic resources
Classroom interaction	Primarily teacher–student	Teacher–student and technology-supported interaction
Lesson flexibility	Relatively fixed	Greater flexibility in presenting materials
Technological demands on teacher	Lower	Higher
Potential technology-related discomfort	Limited	Reported by some students

The observations suggest that digital technology created additional pedagogical opportunities but simultaneously increased the technological demands associated with lesson preparation and implementation.

Table 2

Observed Benefits and Challenges of Digital Transformation

Benefits	Challenges
Greater visualization of theoretical material	Some students experienced gadget-related discomfort
Increased opportunities for interaction	Additional technological preparation for the teacher
Access to electronic educational resources	Need for digital competence
More varied instructional activities	Potential screen fatigue
Opportunities for active student participation	Dependence on functioning devices and resources
Support for modern pedagogical practices	Need for continuous professional development

An important finding was that students generally responded positively to the technology-supported instructional format, particularly where digital resources were directly connected to the content of the lesson. However, some students experienced discomfort when using gadgets, indicating that technology use should be carefully regulated.

DISCUSSION

The findings of the classroom experiment are consistent with the broader literature emphasizing that the educational value of technology depends on pedagogical implementation. Sailer et al. (2024) found that technology-enhanced learning produces stronger cognitive benefits when digital tools support specific learning activities rather than merely replacing non-digital instruction.

The present experiment similarly suggests that digital technology was most useful when it added visualization, interaction, or access to additional resources. This indicates that the teacher remains central to the learning process even in a digitally enhanced classroom.

The experiment also illustrates the connection between digital transformation and professional development. When teachers integrate digital tools into their lessons, their professional role expands. They must select appropriate technologies, prepare digital materials, anticipate technical difficulties, and manage students' interaction with technology. Therefore, digital transformation creates a need for continuous professional learning.

At the same time, the reported discomfort among some students demonstrates that digitalization has limitations. The increased availability of gadgets does not automatically mean that longer periods of screen-based learning are pedagogically desirable. Excessive technology use may create physical discomfort and reduce the quality of classroom interaction for some learners.

From the perspective of teachers' mental health, this finding is important because teachers are responsible for managing not only their own technological workload but also the learning environment created through technology. Recent research on technostress emphasizes that technological demands can influence teachers' well-being and professional performance. Therefore, institutions implementing digital transformation should consider teachers' workload, training needs, technical support, and psychological well-being alongside technological infrastructure.

CONCLUSION

Digital transformation is increasingly shaping contemporary pedagogical practice. The two-week classroom experiment conducted at Namangan State Pedagogical Institute with 28 students demonstrated that digital technology-supported instruction can provide important pedagogical advantages, particularly in terms of visualization, interaction, access to learning resources, and student engagement.

However, the experiment also identified limitations. Some students experienced discomfort associated with gadget use, demonstrating that technology should not be introduced simply for the sake of digitalization. Its use should be connected to clearly defined pedagogical objectives.

For teachers, digital transformation represents both an opportunity for professional development and a potential source of additional technological demands. Continuous

professional training, appropriate institutional support, manageable workloads, and attention to well-being are therefore essential components of sustainable educational digitalization.

The findings support a balanced approach in which digital technologies complement rather than completely replace traditional pedagogical methods. Such an approach may allow teachers to benefit from technological innovation while maintaining direct human interaction and protecting the well-being of participants in the educational process.

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