

Technological Adaptation and Cultural Contradictions: An Analysis of the Socio-Cultural Roots of Teacher Anxiety in the Intelligent Era*

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Abstract. In the era of intelligence, teachers are facing the challenges of new educational technologies, and technological anxiety has become an issue that cannot be ignored. Existing research often starts from the perspective of the technology acceptance model, neglecting the impact of diverse factors such as individual adaptation of teachers, socio-cultural environment, and cultural differences on technological anxiety. However, the emotional state of teachers will affect the effectiveness of their use of technological tools. This study attempts to apply theories of cross-cultural adaptation, postmodern social theory, Hofstede's cultural dimensions theory, social constructivism theory, and combine representative empirical research to deeply explore the socio-cultural factors and mechanisms behind the formation of teachers' technological anxiety, and propose suggestions from various social levels. From the perspective of socio-cultural contradictions, teachers' technological anxiety is mainly caused by differences in teachers' ability to adapt to technology, the impact of technology on educational practices, attitudes towards technology in different cultural backgrounds, and obstacles in the construction of technological cognition. To balance the contradiction between teachers' technological adaptation and socio-culture in the intelligent era, it is necessary to enhance the individual technological adaptability of teachers; construct a technology-friendly socio-cultural environment; pay attention to cultural differences, promote equal acceptance of technology; guide the social construction of positive technological cognition, and cultivate teachers' positive attitude and motivation for using technology.

Keywords: Intelligent era, Teachers, Technological anxiety, Socio-culture.

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1. Introduction

In the pilot programs propelled by artificial intelligence to enhance teacher development, the profound integration of artificial intelligence and education has escalated the challenges faced by educators. The evolution of teacher roles and the factors influencing teachers' acceptance of intelligent education have been extensively discussed and analyzed by scholars. However, the emotional well-being of teachers, especially their technology-induced anxiety, remains relatively underexplored. Excessive technological anxiety among educators hinders their utilization of technology in teaching practices, diminishing their receptivity to new technologies and their adaptability to technological shifts. Thus, this study aims to unearth the causes of technology-related anxiety among teachers in the intelligent era, uncover its socio-cultural origins, and endeavor to suggest targeted mitigation strategies.

2. Forms of Technological Anxiety Among Teachers in an Intelligent Teaching Environment

2.1 Cognitive Challenges

In the era of intelligence, teachers' cognitive challenges are chiefly manifested in their understanding and mastery of new technologies, as well as their adaptation to teaching modes and role alterations prompted by these advancements [1]. Against the backdrop of the fusion between artificial intelligence and pedagogy, teachers are compelled to persistently acquire and hone new technological knowledge and skills. For many, this undeniably introduces substantial cognitive stress. On one hand, teachers are tasked with comprehending and mastering intricate technological operations, which may surpass their cognitive capacities. On the other, they are also expected to grasp and adapt to the shifts in teaching paradigms and roles triggered by these novel technologies, potentially challenging their pedagogical beliefs and established teaching habits [2]. When faced with unfamiliar technologies and pedagogical methods, if teachers experience bewilderment and unease, they may develop resistance and apprehension towards these technologies—termed as "technological anxiety." Excessive technological anxiety might subsequently hamper a teacher's acceptance of new technologies. As such, the cognitive challenges experienced by educators can be regarded as a prominent reactive feature of technological anxiety among teachers in the intelligent era.

2.2 Professional Insecurity

A significant portion of teachers' professional insecurity stems from concerns that new technologies might supplant their roles, coupled with doubts about their ability to adapt to these innovations [3]. Some studies suggest that the introduction of novel technologies might impact the professional role of teachers, possibly even substituting portions of their responsibilities, undoubtedly heightening their sense of professional insecurity [4]. Such feelings of insecurity can lead to technological anxiety, as teachers may fear their inability to adjust to the new technological milieu or perceive threats to their professional standing. Consequently, there's a profound linkage between teachers' professional insecurity and technological anxiety: feelings of job insecurity can evoke technological anxiety, which in turn might amplify the initial insecurity. This interconnectedness has been corroborated in various studies. For instance, one research identified that when teachers feel their professional status is threatened by emerging technologies, their levels of technological anxiety significantly intensify [5]. Another study found that a teacher's technological anxiety can foster resistance towards new technologies, thereby exacerbating their sense of professional insecurity further.

2.3 Barriers to Technological Cognitive Construction

Teachers primarily face barriers to technological cognitive construction in terms of their limited understanding and acceptance of new technologies, coupled with a lack of capability to utilize them effectively [7]. These obstacles arise from the complexities and uncertainties surrounding new technologies and are exacerbated by teachers' own knowledge and skill limitations. This might cause feelings of confusion and unease when confronted with novel technologies and instructional paradigms, leading to technological anxiety. Various studies indicate that these barriers in teachers' technological cognitive construction can be precursors to technological anxiety. For example, when teachers perceive a deficit in their cognitive capabilities, their levels of technological anxiety tend to surge significantly [8]. Conversely, a teacher's technological anxiety can lead to resistance towards new technologies, further amplifying their cognitive construction barriers. Hence, there is a deep-seated connection between teachers' barriers to technological cognitive construction and technological anxiety. This interrelation is affirmed in several research findings. One such study

discerned that when teachers, while engaging with new technologies, feel their cognitive prowess is inadequate, their technological anxiety levels rise notably [9]. Another research pinpointed that the technological anxiety experienced by teachers can lead to aversion towards new technologies, thereby intensifying their barriers to technological cognitive construction further [10].

3. Analysis of the Sociocultural Origins of Teachers' Technological Anxiety in the AI Era

3.1 Individual Adaptation: Teachers and New Technologies

Based on the theory of cross-cultural adaptation, we can delve into the process of teachers adapting to new educational technologies. The cross-cultural adaptation theory primarily discusses the individual's process of adjusting when faced with a new cultural environment. It posits that adapting cross-culturally is not just about understanding and adjusting to a new culture. It also encompasses managing conflicts between the original and new cultures and finding a balance between the two. In the context of educational technology, new tech can be perceived as a "new culture." As teachers adjust to this "new culture," they must overcome challenges in understanding and mastering the new technology and cope with the pressures of adapting to new teaching modes and roles. For instance, teachers might attend professional development courses, learning about new educational technologies and teaching strategies to enhance their technological capabilities and teaching efficacy. Concurrently, teachers might also explore how to integrate these new educational technologies into their teaching practices to cater to students' learning needs [11]. These challenges might induce technological anxiety in teachers, which can, to some extent, be interpreted as issues related to cultural adaptation. For example, when teachers try to understand and master new technologies, they might encounter conflicts with their existing teaching philosophies and habits, representing clashes between the old and new cultures. Furthermore, as teachers adjust to new teaching modes and roles, they might feel pressured, which can be viewed as challenges in balancing the relationships between the original and the new cultures. Therefore, when teachers face new educational technologies, their technological anxiety can be understood as a response in the cross-cultural adaptation process, leading to the issues of technological anxiety.

3.2 Social Forces: The Impact of Technology on Teaching Practices

Postmodern social theory emphasizes the intertwined effects of technology, knowledge, and power. In the realm of educational technology, this theory reveals that educational technology is not just a tool but a social force that profoundly affects educational practices and the roles of teachers [12]. As teachers encounter new educational technologies, they are inevitably influenced by various social forces. For example, they might enhance their technological abilities and teaching efficacy by participating in professional development courses, learning about new educational technologies and instructional strategies. Concurrently, teachers might also explore integrating these new technologies into their teaching practices to meet students' learning needs [13]. These shifts might induce profound unease and confusion as they challenge teachers' professional identities and their understanding of education [14]. If this unease and confusion aren't addressed and alleviated effectively, they might evolve into technological anxiety. Furthermore, the introduction of educational technology might raise issues of power. In educational practices, those who command the technology might also wield control over instruction. This could lead to anxiety among teachers as they might fear that their standing and influence in teaching might be undermined [15]. Such anxiety might intensify their technological anxieties. Therefore, from the perspective of postmodern social theory, teachers' technological anxiety is not just a fear and discomfort towards new technology but is more a concern and confusion about new instructional models, roles, and power dynamics. The emergence of this anxiety is influenced by individual psychological factors as well

as sociocultural impacts. Only by deeply understanding these factors can we find effective strategies to alleviate teachers' technological anxiety.

3.3 Cultural Contradictions: Causes of Technological Anxiety in Different Cultural Dimensions

Hofstede's cultural dimension theory offers a theoretical framework for comparing different cultures, dividing them into five dimensions: power distance, individualism versus collectivism, masculinity versus femininity, uncertainty avoidance, and long-term versus short-term orientation. These five dimensions help us comprehend the varied reactions and challenges individuals from different cultural backgrounds might face when encountering new educational technologies. The dimensions of power distance, individualism versus collectivism, and uncertainty avoidance are particularly significant in understanding and comparing cultural factors of technological anxiety among teachers from different backgrounds. In a cross-cultural study, researchers found that uncertainty avoidance significantly influences technology acceptance. In cultures with high uncertainty avoidance, teachers are more inclined to follow rules and procedures, whereas in those with low uncertainty avoidance, teachers are more open to changes and risks. This can affect teachers' acceptance of new technologies and their feelings of technological anxiety. Power distance has also been shown to affect technology acceptance. It reveals society's acceptance of inequality. In cultures with a large power distance, teachers might rely more on guidance from authorities and experts, while in those with a small power distance, they might be more inclined to independently explore and learn about new technologies. Individualism and collectivism also influence teachers' technological adaptation and anxiety to some extent. They describe the relationship between individuals and collectives. In individualistic cultures, teachers might lean more towards individual learning and practice, while in collectivist cultures, they might lean more towards collective learning and practice [16]. Therefore, when confronted with new educational technologies, the degree to which teachers accept, adapt, and the resultant technological anxiety are influenced by different cultural dimensions. These cultural dimensions not only influence teachers' acceptance of new technologies but also greatly shape their feelings of technological anxiety.

3.4 Social Construction: Teachers' Cognitive Construction of Technology

Social constructivism emphasizes that knowledge is co-constructed by individuals within specific social and cultural contexts [17]. It accentuates the interaction between an individual and their social environment. When understanding and interpreting new knowledge and technology, an individual's socio-cultural background plays a pivotal role. As teachers face new educational technologies, their comprehension and acceptance levels are often based on their own socio-cultural backgrounds. For instance, teachers might interpret and understand new educational technologies based on their educational philosophies, teaching experiences, and social environments, and this process of interpretation is a form of social construction. In this process, multiple factors might trigger teachers' technological anxiety. First, they might feel uncertain and perplexed about new educational technologies, leading to resistance and anxiety. Secondly, there might be concerns that new technologies will alter their teaching methods and roles, generating further anxiety. Finally, they might worry about their inability to use the new technologies effectively to meet students' learning needs, leading to additional anxiety. In practical teaching scenarios, there are numerous examples of teachers interpreting and constructing an understanding of new educational technologies under socio-cultural influences. Some teachers might integrate new technologies into their practices based on their educational philosophies and experiences, while others might choose to avoid them, fearing the change in their teaching methods and roles [18]. Hence, it's evident that teachers' interpretations and acceptance of new educational technologies, as well as the resulting technological anxiety, are outcomes of social construction influenced by their socio-cultural backgrounds. This process of social construction not only affects their understanding and acceptance of new educational technologies but also greatly shapes their technological anxiety.

4. Strategies to Address Teachers' Technological Anxiety in the Era of Intelligence

4.1 Enhancing Teachers' Technological Adaptability

From the research above, the importance of enhancing teachers' individual technological adaptability is clear. Firstly, the improvement in teachers' technological competence and teaching strategies is a continuous process. This requires the support of educational policies and practices, as well as constant experimentation and refinement in teaching methods [19]. Moreover, improving teachers' compensation has also been identified as a successful strategy. Better-compensated teachers are more likely to make long-term commitments in their teaching, which is crucial for enhancing their technological competence and teaching strategies. In addition, a teacher's technological adaptability is also related to their teaching environment. Teachers need to work in an environment that supports their pedagogical advancements, enabling them to better address increasingly complex issues related to technology, society, politics, and ethics. Lastly, teachers' technological adaptability not only depends on how they use technology but also on how technology enhances teaching and learning. Therefore, there's a need to focus on how teachers employ digital teaching strategies to improve student learning outcomes, and to encourage them to adopt innovative pedagogical methods to boost their technological adaptability.

4.2 Constructing a Technologically Friendly Socio-cultural Environment

When it comes to creating a technologically friendly socio-cultural environment, the focus should be on altering the socio-cultural setting to mitigate teachers' technological anxieties. A pivotal step is to establish an environment that supports and encourages teachers to use new educational technologies. This can be achieved by providing consistent technological support, including technology training and resources, and by encouraging teachers to share their experiences and practices with technology. Additionally, the support and encouragement from school leaders are crucial. Their attitudes and actions can influence teachers' perspectives and adoption of new educational technologies. For instance, if school leaders actively endorse and motivate teachers to use new technologies, teachers might be more willing to try and incorporate these tools, thereby alleviating their technological anxiety. However, merely providing technological support and encouragement isn't sufficient. Attention must also be directed towards teachers' psychological and emotional needs. Research suggests that technological anxieties among teachers often correlate with their mental and emotional states, such as their fears and apprehensions concerning new educational technologies [20]. Therefore, psychological support like counseling and emotional backing is necessary to assist teachers in navigating their technological concerns. Moreover, an open and inclusive socio-cultural environment should be fostered, encouraging teachers to voice their doubts and concerns about new technologies and the challenges they face while integrating them. Constructing a tech-friendly socio-cultural setting requires a multi-pronged approach, encompassing technological backing and encouragement, addressing teachers' mental and emotional needs, and nurturing an open and inclusive socio-cultural milieu.

4.3 Focusing on Cultural Differences to Promote Equitable Technology Adoption

Within the framework of establishing a technologically friendly socio-cultural environment, educational institutions and policymakers should emphasize and promote technological training for teachers. Such training should not just focus on the operation and application of technology but should also underscore cultural sensitivity. This way, teachers can effectively use and disseminate new educational technologies across varied cultural contexts. For instance, a study revealed that by offering culturally sensitive technological training, teachers can better understand and adapt to students from diverse cultural backgrounds, subsequently enhancing their teaching efficacy.

Another study highlighted that, given the impact of cultural differences on technology acceptance, designing and implementing educational technologies tailored to local cultural needs can effectively diminish teachers' technological anxieties and amplify their technology acceptance rate. Consequently, educational institutions and policymakers should emphasize cultural sensitivity in technological training to foster equitable technology adoption.

4.4 Guiding the Societal Construction of Positive Technology Perceptions

The perspective of social constructivism unveils the fluidity and malleability of technology perceptions, suggesting that they are not static but collaboratively constructed by people within specific social and cultural contexts. Therefore, guiding the societal construction of positive technology perceptions can be approached from various angles, including education, public participation, and media dissemination. The education sector and schools can offer technology education to assist teachers in understanding and mastering new educational technologies. This form of education not only provides technical knowledge and skills but also aids teachers in understanding and accepting new educational technologies, thereby reducing their technological anxieties [21]. The role of public participation in technological decision-making is pivotal. It can be achieved through various means like public consultations, forums, and voting. By engaging the public, transparency and fairness in technological decisions can be enhanced, fostering greater trust and acceptance of technology. Furthermore, media and social networks can play a crucial role in shaping public perceptions of technology. Leveraging their influential power can help in disseminating positive technology narratives and stories, elevating public awareness and acceptance of new educational technologies, and ultimately reducing technological apprehensions, especially among teachers.

5. Conclusion

This study meticulously examines the influence of technological anxiety within the educational sphere and the underlying drivers of this phenomenon. By analyzing the interplay among multiculturalism, educational settings, and individual educators, it is revealed that this form of anxiety goes beyond an individual's adaptation to new technologies. Instead, it is profoundly rooted in the intricate interweaving of societal, cultural, and individual dynamics. Such anxieties not only reflect educators' apprehensions toward the unknown and the tension between traditional and modern paradigms but also underscore an ongoing introspection regarding educational methodologies and objectives in this rapidly evolving technological era. While technological advancements persistently challenge educational practices, it is pivotal to ensure that these advancements genuinely serve the long-term goals of education. Consequently, future research directions should prioritize how to strategically and effectively integrate technology with education rather than merely pursuing technological novelty. Furthermore, a profound contemplation of the philosophical foundations and cultural contexts of education is essential, aiming for a balanced progression and reform in education.

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