In the context of digital education, the dilemmas in the application of the fair use system of copyright and the solutions

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Abstract: *Digital education, relying on network platforms and multimedia technologies, has enabled the dissemination of teaching content to break through the physical boundaries of traditional classrooms. As a result, the fair use system of copyright faces multiple application obstacles, including the dissolution of temporal and spatial boundaries, the difficulty in characterizing temporary copying, and the disagreement over the determination of citation proportions. Under the combined effect of closed-list provisions, the principle of technological neutrality, and the expansion of licensing mechanisms, the existing fair use rules fail to adapt to the new use patterns in digital education. To address this issue, it is necessary to establish a dynamic balancing test based on the purpose of use and the nature of the work, to achieve the functional integration of statutory licensing and fair use, and to create coordinated norms between technological protection measures and fair use exemptions, thereby reshaping the institutional foundation for balancing copyright interests in the digital education environment.*

Keywords: *digital education; copyright; fair use; temporary copying; transformative use; statutory licensing; technological protection measures*

Introduction

Digital education has become an important form of knowledge dissemination, and the information technology environment on which it relies has transformed the fundamental ways in which works are created, disseminated, and utilized. As a crucial mechanism in copyright law for balancing the interests of rights holders and the public's freedom to access knowledge, the fair use system plays an irreplaceable role in traditional educational settings. In the context of digital education, the dilemmas in the application of the fair use system have become increasingly prominent. These dilemmas not only constrain the normal operation of digital teaching activities but also pose new challenges to the institutional flexibility of copyright law. Exploring the application obstacles, normative causes, and adjustment paths of the fair use system in the field of digital education holds significant theoretical importance and institutional value for improving the copyright exception system and ensuring the normative operation of digital education. It is necessary to systematically analyze, from a normative perspective, the structural tension between digital technology and the existing legal framework, thereby providing theoretical support for the modernization of the fair use system.

1. Obstacles to the Application of the Fair Use System in the Field of Digital Education

1.1 The Dissolution of the Temporal and Spatial Boundaries of Fair Use by Digital Media Dissemination

Digital education relies on network platforms and multimedia resources, which have detached the acquisition and dissemination of teaching content from the physical boundaries of traditional classrooms. In traditional educational settings, the fair use system is usually limited temporally and spatially to "classroom teaching," allowing teachers to use others' works in specific places and within a limited scope of audiences. The instantaneous and cross-regional nature of digital media means that once a work is uploaded, it may be accessible to an unspecified and large number of people, thereby completely breaking the original spatial closure. The conditions of "limited reproduction" and "temporary storage" presupposed by fair use provisions are difficult to satisfy in the technical reality of

cloud storage and streaming media transmission. After an educational institution places course materials in a learning management system, students can repeatedly access them at any time and from any place. Such sustained availability has already exceeded the scope of temporary use permitted by traditional fair use.

The permanent recording feature of digital dissemination further erodes the temporal foundation of fair use. In traditional classrooms, the content quoted orally or displayed on the blackboard naturally disappears after the course ends, leaving no lasting copies. In digital education, electronic handouts, recorded videos, online discussion records, and the like remain stored on servers or terminal devices as digital files for a long period. Even if the teaching activity itself is for non-commercial purposes, the digital copies of the work may be reproduced and disseminated an unlimited number of times. This gap between technological capability and legal presuppositions results in the lack of clear standards for the fair use system to determine whether a digital teaching act falls within "limited purpose and limited scope," thereby giving rise to widespread obstacles in its application[1].

1.2 The Legal Characterization Dilemma of Temporary Copying in the Process of Educational Digitalization

In digital education activities, when a user browses online teaching resources, the computer system automatically generates temporary copies of the work in the random access memory. This technical reproduction is necessary for viewing, but its legal nature has long been disputed within the copyright law system. Different jurisdictions hold different positions on whether temporary copying constitutes an act of reproduction within the meaning of copyright law. In the context of digital education, if the temporary copying that teachers or students inadvertently trigger during normal teaching processes is deemed an act of reproduction, then nearly all online teaching activities would face the risk of infringement. Conversely, if the legal constraints on temporary copying are completely excluded, the right holders' control over the online exploitation of their works may be rendered ineffective.

The interactive feature of digital education further intensifies this dilemma. Students not only passively receive content but also actively create more persistent copies through note-taking, screenshots, local caching, and similar methods. These behaviors are functionally similar to handwritten note-taking in traditional classrooms, yet in technical implementation, they involve a continuous spectrum ranging from temporary copying to permanent storage. The concept of "reproduction" within the fair use system originated in the era of paper-based media, and its categorical framework struggles to accommodate the multi-layered forms of reproduction generated by digital technology. Lacking clear guidance, educational institutions and individual users often find themselves trapped in the dilemma of choosing between "all reproductions require authorization" and "no authorization is needed due to technological necessity," thereby suspending the institutional function of fair use.

1.3 The Disagreement over the Determination of Citation Proportion and Transformative Use in the Network Teaching Environment

The integrative nature of digital educational resources requires teachers to select fragments of works from multiple sources to support a teaching topic. The quantity and proportion of citations thus become core variables in determining whether fair use applies. In traditional fair use analysis, quoting an entire short poem or a single chart may be deemed appropriate. In the digital environment, however, a work is digitally deconstructed into arbitrarily editable units, making the baseline for calculating the citation proportion ambiguous. For example, quoting several key frames from an audiovisual work or extracting several data entries from a database may represent a very small relative proportion of the original work, but such use may objectively present the core expression of that original work. This tension between proportion and significance renders a purely quantitative standard inoperable[2].

The application of the transformative use doctrine in digital education further exacerbates the disagreement in determination. This doctrine focuses on whether the use adds new expression, meaning, or function to the original work. Teaching activities are inherently transformative in nature, as using a work for illustration, criticism, or comparative analysis typically differs from the original aesthetic or entertainment purpose. However, in digital education, a teacher may directly display an entire work (such as a short film or a photograph) for classroom discussion. Such use is transformative in purpose but approaches complete reproduction in the amount of use. Different adjudicative standards hold diametrically opposite views on whether a transformative purpose can justify complete reproduction.

The scalability and repetitiveness of digital education mean that each instance of teaching use may be subject to an independent legal evaluation, and thus the fair use system lacks predictable rules for application.

2. Normative Causes of the Application Dilemmas of the Fair Use System

2.1 The Misalignment between Closed-List Provisions and New Use Patterns in Digital Education

Traditional legislative models of the fair use system in copyright often adopt closed or semi-closed lists of provisions, limiting permitted exceptions to a number of specific scenarios. The acts described in provisions such as classroom teaching, teaching demonstration, and library reproduction all presuppose physical media and physical space. New use patterns emerging in digital education, including real-time remote instruction, on-demand streaming, and learning analytics-driven adaptive content push, cannot be easily subsumed under the existing enumerated categories. Quantitative expressions in these provisions, such as "limited reproduction" and "brief quotation," lose their normative guiding function in the digital environment due to the lack of a technical reference system. The rigid structure of closed lists cannot accommodate the dynamic evolution of use patterns in digital education, thereby excluding a large number of teaching acts with the same non-commercial purpose from the scope of fair use.

There is a structural mismatch between the technical characteristics of the use patterns in digital education and the behavioral elements prescribed in the provisions. For example, the provisions typically require the use to occur in a "classroom or similar place," whereas online teaching platforms lack physical boundaries; the provisions limit use to "published works," while digital teaching often requires quoting unpublished classroom discussion records or student assignments; and the provisions permit "translation or adaptation" only in specific circumstances, whereas multimedia teaching inherently involves format conversion and content reorganization. This misalignment is not an oversight in individual provisions but rather a systematic lag between the normative system and the information environment. As the fair use system fails to respond to the new use demands of digital education, its institutional supply function has been significantly weakened[3].

2.2 The Erosion of the Flexible Structure of the Right Limitation System by the Principle of Technological Neutrality

The principle of technological neutrality requires that copyright norms should not treat works differently based on technical differences in the dissemination medium. The application of this principle in the field of digital education implies that traditional classroom teaching and online teaching should follow the same standards in the determination of fair use. However, the principle of technological neutrality overlooks the substantial impact of media characteristics on the legal significance of use behaviors. Reproduction and dissemination in the digital environment possess technical attributes such as zero marginal cost, instantaneous completion, and unlimited reproduction, which alter the infringement risk spectrum of use behaviors. The strict application of the principle of technological neutrality means that harmless quotation in a physical classroom is placed under the same legal evaluation framework as similar acts that have the potential for large-scale dissemination in the network environment, thereby compressing the contextual judgment space that the fair use system should inherently possess.

The flexible structure of the right limitation system originally relied on adjudicators to comprehensively weigh factors such as the purpose of use, the nature of the work, the amount of use, and the market impact in specific cases. The strong intervention of the principle of technological neutrality tends to simplify similar acts in different media into abstract legal equivalents, thereby weakening the system's ability to respond differentially to technological contexts. In the digital education scenario, the same teaching act may produce completely different social effects when different transmission methods (such as local area network broadcasting versus public internet live streaming) are adopted, yet the principle of technological neutrality does not allow the norms to distinguish between them. This erosion of the flexible structure makes it difficult for the fair use system to maintain its core function as a balancing mechanism of interests in the field of digital education.

2.3 The Crowding-Out Effect of the Expansion of Licensing Mechanisms on Statutory Exceptions

The continuous expansion of copyright licensing mechanisms in the digital environment has created a licensing market that covers a wide range of use behaviors. To avoid infringement risks, digital education institutions tend to enter into blanket license agreements with copyright collective management organizations or right holders, covering various ways of using works needed for classroom teaching. The prevalence of this licensing model objectively reduces the opportunities for applying fair use provisions. Even if a particular teaching use could be deemed fair use, an educational institution still chooses to obtain authorization through licensing based on compliance efficiency considerations. As a result, statutory exceptions are functionally hollowed out by licensing mechanisms, becoming an institutional arrangement that exists in theory but is rarely invoked in practice[4].

The expansion of licensing mechanisms also inversely shapes the interpretive tendency of the fair use system. When a mature licensing channel exists for a particular type of use, adjudicators may be inclined to find that such use has a "market substitution effect" in determining whether fair use applies, thereby denying the justification for the exception. Numerous de minimis uses and fragmentary quotations in digital education, which would not substantially affect the market for a work, nevertheless allow right holders to claim "license fee loss" as evidence of market harm due to the existence of licensing mechanisms. This logical cycle further compresses the living space for statutory exceptions. The trade-off between the fair use system and licensing mechanisms gradually deprives users in digital education of the normative incentive to invoke statutory exception provisions, and the independence of the system itself is accordingly weakened.

3. Adjustment Paths for the Fair Use System in the Context of Digital Education

3.1 A Dynamic Balancing Test Based on the Purpose of Use and the Nature of the Work

The application of the fair use system in the field of digital education requires the introduction of a more flexible analytical framework, with a dynamic balancing test formed by the dual dimensions of the purpose of use and the nature of the work. The assessment of the purpose of use should go beyond the superficial label of "non-commercial" and deeply examine the degree of transformativeness in the teaching act, that is, whether the use endows the original work with new educational functions or interpretive value. The consideration of the nature of the work requires distinguishing between factual works and fictional works, published works and unpublished works, and functional works and artistic works. Different types of works should enjoy different degrees of fair use space in digital education. The dynamic balancing test requires placing these two elements in an interactive relationship: when the purpose of use is highly transformative, the judgment regarding the nature of the work may be appropriately relaxed; when the work falls into the category of factual compilations or compilations of public knowledge, even if the purpose of use is less transformative, the likelihood of fair use being established increases correspondingly[5].

The operationalization of the dynamic balancing test requires the introduction of a typological parameter system. The dimension of the purpose of use can be divided into sub-types such as core teaching quotation, critical commentary, and background display, while the dimension of the nature of the work can be divided into highly original expression and low-originality factual information. The combination of parameters among these categories generates different presumptive strengths of fair use. Composite acts in digital education, such as bulk quotation, multi-work compilation, and cross-media transformation, can be comprehensively determined through parameter weighting. This test avoids both the rigidity of closed-list provisions and the potential adjudicative arbitrariness of a completely open four-factor test. While maintaining case-by-case flexibility, the dynamic balancing test provides predictable normative guidance for fair use in digital education scenarios.

3.2 The Functional Integration of Statutory Licensing and Fair Use in Digital Teaching Scenarios

The statutory licensing system and the fair use system have complementary functions in digital education. The former applies to systematic and large-scale use of works, while the latter applies to sporadic and individualized teaching quotations. A clear functional integration mechanism needs to be established between the two to fill the normative gaps in digital education. For medium-scale use acts commonly found in digital teaching scenarios, such as coursepack materials, online test compilations, and teaching case collections, the sole application of fair use may be difficult to justify due to the larger

amount of use, while the complete application of statutory licensing may excessively increase the licensing costs for educational institutions. The solution lies in constructing a two-tier structure of "fair use first, statutory licensing as a supplement": first, determine whether the use act satisfies the dynamic balancing test; if not, then the act falls into the statutory licensing channel, but the user may continue the use after paying remuneration at the statutory rate.

The key to functional integration lies in setting clear conditions for the transition. When a use act exceeds the threshold of fair use but has not reached the level of commercial exploitation, a simplified statutory licensing procedure should apply, with a lower statutory remuneration standard to reflect the non-commercial nature of education. Technical logs, use frequency records, and user access scope data from digital education platforms can serve as factual bases for determining which normative level a use act belongs to. The boundary between statutory licensing and fair use should not be a fixed numerical proportion of use but rather a dynamic dividing line formed by the specific characteristics of the digital education context, including the scope of the audience, the duration of use, and whether persistent copies are created. This integration mechanism can prevent the fair use system from harming the interests of right holders through excessive expansion and also prevent the inappropriate application of the statutory licensing mechanism from eroding the institutional space of fair use[6].

3.3 The Construction of Coordinated Norms between Technological Protection Measures and Fair Use Exemptions

There is an inherent tension between the provisions on technological protection measures and the fair use system. To prevent unauthorized use in digital education, right holders often adopt technological measures such as encryption, digital rights management, and access control. These measures may block teaching acts that fall within the scope of fair use. For example, a teacher cannot take excerpts from an encrypted e-book for classroom demonstration, or a student cannot extract and annotate a protected academic paper. The neutral appearance of technological measures conceals their actual effect of excluding statutory exceptions. The direction for constructing coordinated norms lies in establishing a mechanism of "exception reservation" between the protection of technological measures and fair use exemptions, requiring that the design and implementation of technological measures reserve operational space for fair use.

The specific construction of coordinated norms can adopt a tiered obligation model. For digital distribution versions of works intended for educational institutions, right holders should provide "teaching copies" from which technological protection measures have been removed or provide access interfaces necessary for fair use. The protective effect of technological measures should be constrained by the purpose of fair use: when an act prevented by a technological measure is legally deemed fair use, circumventing that measure should not incur infringement liability. At the same time, digital education platforms should establish a technical response channel for fair use requests, through which users can declare their purpose of use in an automated manner, and the system may temporarily lift technological restrictions accordingly. This construction transforms the fair use exemption from a mere affirmative defense against infringement into an operable technical normative requirement, thereby achieving substantive coordination between the protection of technological measures and the copyright exception system in the digital education environment.

Conclusion

A systematic normative gap exists between the technical characteristics of digital education and the traditional presuppositions of the fair use system. Closed-list provisions fail to cover the new use patterns in digital teaching, the principle of technological neutrality erodes the contextual flexibility that the right limitation system should possess, and the continuous expansion of licensing mechanisms further compresses the application space for statutory exceptions. These dilemmas do not exist in isolation but rather represent multiple manifestations of the structural tension between the logic of digital dissemination and the normative system of copyright law. To address this predicament, adjustments should be made from three dimensions: the judgment benchmark, the institutional interface, and the normative construction. A dynamic balancing framework that incorporates the interaction between the purpose of use and the nature of the work should be introduced to replace rigid quantitative standards. A two-tier application structure combining fair use and statutory licensing should be constructed to fill the normative gap for medium-scale use acts. An operational channel for fair use exemptions should be embedded into the protection of technological measures, so that

exception provisions are not substantively excluded by technological lock-in. Future research may further focus on the applicable boundaries of the fair use system after generative artificial intelligence intervenes in digital education, as well as the potential application of technological means such as blockchain in the recording and verification of fair use, thereby promoting the evolution of the copyright exception system toward greater technological responsiveness.

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