Inherent Tensions and Systemic Integration: The Dialectical Transcendence and Logic of Quality Generation in Online Education

Zirong Tang[1], Lianjin Tian[1,2,*]
[1]*Institute of Teacher Education, Yibin University, Yibin, Sichuan, China*
[2]*Institute of Higher Education, Yibin University, Yibin, Sichuan, China*
**Corresponding Author*

Abstract: This study addresses the core theoretical challenge facing online education as it becomes a mainstream form: how to transcend a purely techno-instrumental perspective, systematically resolve its inherent structural contradictions, and achieve a high-quality return to the essence of education. Employing theoretical construction and speculative analysis, and while reaffirming the constant essence of education as teacher-student interaction aimed at the "turn of the soul," this research originally proposes a three-level "Tension-Fusion" analytical framework. The framework first identifies three fundamental internal tensions arising from the conflict between the technological logic and the educational logic in online education: the tension between spatio-temporal extensibility and situational fragility, the tension between online convenience and process opacity, and the tension between learner autonomy and outcome uncertainty. The study then introduces process philosophy and situated learning theory to establish "relational becoming" as the theoretical lens for resolving these tensions. Finally, it demonstrates three paths of dialectical transcendence for achieving high-quality online education: building a teacher-student learning community to re-embody context; promoting the deep integration of content, technology, and methodology to optimize the teaching-learning process; and establishing a developmental assessment system that permeates the entire learning process to drive the continuous generation of quality. The conclusion indicates that high-quality online education is not a direct product of technology, but is dynamically constructed through sustained relational interaction and practice within a systematic framework that acknowledges tensions and actively pursues fusion. The proposed framework offers a new theoretical tool and analytical paradigm for understanding and advancing the development of online education.

Keywords: Online Education; Inherent Tensions; Dialectical Transcendence; Quality Generation; Integration Pathways

1. Introduction

The trend of integrating technology and education is unstoppable, and online education is poised to become the "main battlefield" of future education. However, achieving high-quality online education is not determined by technology alone, but rather by the very nature of online education itself, along with its inherent advantages and disadvantages. Therefore, to realize high-quality online education, it is essential first to clarify its fundamental nature and to identify its strengths and weaknesses. Only on this basis can we formulate effective pathways for its implementation, thereby sketching a future blueprint for high-quality online education.

2. From Adherence to Educational Essence to Reconstructing Practical Paradigms: The Evolution and Debates in Research on High-Quality Development of Online Education

The rise of online education is not merely a technological event, but a profound manifestation of the ongoing dialogue between technology and the essence of education in the new era. The existing research trajectory can be organized into three major domains: the perpetual inquiry into the essence of education, the diagnosis of the structural contradictions inherent in online education, and the exploration of an integrated future paradigm. First, the logical starting point of research lies in a profound consensus on and reaffirmation of the

"essence of education." Regardless of how educational forms change, its core remains the enlightenment of the mind and the turning of the soul through teacher-student interaction. Discussions on online education must be built upon this cornerstone, recognizing that "online" represents an innovation in medium and methods, while "education" is its immutable kernel. The academic community generally agrees that technological empowerment must serve this fundamental purpose, guarding against the encroachment of instrumental rationality upon value rationality [1]. Second, research focus has concentrated on the "inherent tensions" highlighted by online education. A substantial body of literature reveals its double-edged sword effect: while granting education spatio-temporal extensibility, resource abundance, and learning autonomy, it has also led to the weakening of teaching contexts, the "black-boxing" of learning processes, and the uncertainty of learning outcomes. These tensions are summarized as contradictions such as "online convenience versus process opacity" and "personalized comfort versus outcome uncertainty" [2]. Researchers point out that many current debates stem from using the yardstick of traditional education to simplistically measure the output of online education, failing to fully recognize its uniqueness and potential equivalence in terms of teaching interaction and process assessment as a new form [2]. Finally, cutting-edge research is shifting from problem diagnosis to the construction of a "fusion paradigm." This constitutes the core trend in the current development of the literature, mainly reflected in three dimensions: firstly, goal fusion, i.e., a shift from knowledge transmission to the cultivation of core competencies, with the purpose of assessment moving from selection to promoting holistic human development [1]. Secondly, pathway fusion, advocating for the construction of a learner-centered teacher-student learning community and bridging tensions through online-offline blending and the integration of diverse methods [1]. Thirdly, at the theoretical level, the core of mechanistic integration is epitomized by the maturation of the “integration of learning and assessment” paradigm. This evolution transcends mere technical application, representing a fundamental philosophical shift in understanding educational quality. Rooted in process philosophy and social constructivism, this perspective reconceptualizes quality not as a fixed outcome to be measured post hoc, but as a dynamic, relational phenomenon that continuously emerges within the interactive network of teacher-student dialogue, meaning negotiation, and reflective practice. Therefore, deeply embedding assessment into the entire learning process—leveraging technology for accompanying collection, visualization, and diagnostic feedback of multidimensional learning data—operationalizes this “relational becoming” view of quality. Its ultimate aim is to utilize the evaluative act itself as a catalyst for cognitive deepening and metacognitive development, thereby forming a generative feedback loop oriented toward continuous improvement and growth.

In summary, existing research has clearly outlined the evolutionary path of online education from tracing its essence, through analyzing its contradictions, to exploring new paradigms. However, most studies either discuss "essence" and "practice" separately or present "advantages" and "disadvantages" side by side. They have failed to incorporate all three into a unified, generative theoretical framework that systematically reveals how inherent tensions arise and how they can be transformed through systematic fusion practices. It is precisely within this research context and gap that this article attempts to propose the "Tension-Fusion" analytical framework, aiming to provide a coherent theoretical explanation and practical guidance for promoting the high-quality development of online education.

3. The Analytical Framework of "Tension-Integration" for the Quality Development of Online Education

The pursuit of high-quality development in online education is not merely a process of technological enhancement but a profound evolution driven by inherent contradictions, aiming at a fundamental reconfiguration of the educational paradigm. This section proposes a systematic "Tension-Integration" analytical framework designed to diagnose core contradictions within online education practice and provide coherent theoretical guidance and practical pathways for their transcendence. Grounded in a relational ontology of education, this framework conceptualizes quality as a dynamic product generated through the continuous interplay of "human—technology—content—environment." Its operational logic

follows a three-stage progression: identifying native tensions, integrating diverse theoretical perspectives, and translating them into innovative practice.

3.1 First Level: Identifying Core Tensions—The Native Paradox Between Technological Convenience and Educational Principles

The framework begins by uncovering three structural tensions arising from the collision between the inherent properties of technological media and the fundamental requirements of educational activity. These tensions are not defects but constitutive features and the very starting point for the development of online education as a new form.

Spatio-temporal Tension: The Paradox of Ubiquitous Access and Embodied Disconnection. While network technology dismantles the physical barriers of education, creating a ubiquitous environment for learning "anyone, anywhere, anytime" [3], it simultaneously leads to a "decontextualization" of the educational setting and a loss of embodied co-presence among teachers and students. The collective cognitive atmosphere and emotional bonds traditionally fostered through shared physical space and immediate non-verbal communication become attenuated, risking an atomized and isolated learning experience. This tension embodies the conflict between technology's boundless connectivity and the shared presence essential for meaningful educational interaction.

Process Tension: The Paradox of Learner Autonomy and the Diagnostic Black Box. Digital learning grants learners unprecedented autonomy in choosing their learning paths and accessing information. However, this highly self-directed process often appears as a "black box" to educators. It becomes difficult for teachers to accurately discern the genuine engagement, cognitive struggles, or emotional states of learners behind the screen, rendering traditional feedback and intervention mechanisms based on direct observation largely ineffective [4]. This tension highlights the contradiction between the autonomy of the learner's visible actions and the opacity of the diagnostic process for the educator.

Effect Tension: The Paradox of Personalized Adaptation and a Common Quality Baseline. Online education champions personalized learning, promising adaptation to individual styles and paces. Yet, this "one-size-fits-one" approach faces significant challenges in ensuring a foundational, common baseline of educational quality. The assessment of learning outcomes resists simple, uniform metrics, while the results themselves, heavily dependent on learners' intrinsic motivation and metacognitive skills, exhibit high uncertainty and a fragmented distribution. The core of this tension lies in the conflict between the value of personalized development and the universal demand for public accountability in educational quality.

3.2 Second Level: Theoretical Integration—A Paradigm Shift from Instrumental Rationality to Relational Generation

To address these tensions, it is necessary to move beyond viewing technology as a mere efficiency tool. A more holistic, relational understanding of education must be formed by integrating multiple theoretical lenses.

Embodied Cognition Theory: Infusing 'Bodily' Presence into Virtual Space. To mitigate the spatio-temporal tension, the perspective of embodied cognition is crucial. It challenges the mind-body dichotomy, asserting that cognition is deeply rooted in the body's interactions with the environment [5]. This guides online education design away from abstract information delivery and toward creating multimodal, interactive, and immersive virtual learning environments (e.g., VR/AR scenarios, high-fidelity simulations). The goal is to enable knowledge construction through "technologically-mediated bodily experiences," thereby re-establishing cognitive and affective anchors in the digital realm.

Social Constructivism and Community of Practice Theory: Reconstructing the Social Fabric of Knowledge Construction. In response to the process tension, social constructivism posits that knowledge is built through social negotiation. This necessitates re-embedding online learning within vibrant "communities of practice." The teacher's role should evolve from a primary knowledge transmitter to a designer and facilitator of the learning ecology. The core task becomes designing collaborative activities, guiding in-depth discussions, and nurturing community norms to transform dispersed individuals into a collective engaged in knowledge creation, making the learning process visible through interactive dialogue [6].

Integration of Learning and Assessment: Aligning Data Intelligence with Human-Centric Developmental Evaluation. To resolve the effect

tension, the principle of "integrating assessment with learning" must be implemented, where evaluation is deeply embedded in and continuously promotes the learning process. This requires leveraging learning analytics and educational data mining to conduct multi-dimensional, continuous data collection and analysis, shifting the focus from "assessment of learning" to "assessment for learning." In this model, AI systems can handle the diagnostic feedback on standardized, quantifiable learning behaviors, while human teachers concentrate on the developmental assessment of higher-order thinking, collaboration, and values, forming a synergistic human-machine evaluation loop.

3.3 Third Level: Practical Transformation—Converting Tensions into Drivers of Systemic Innovation

Guided by the above integrated perspectives, the framework culminates in three pathways for transforming theoretical tensions into practical catalysts for systemic innovation.

Relational Integration: Building a Multi-Layered, Human-Centric Support System. In practice, a synergistic "human-human—human-machine" support network must be systematically constructed. This includes: (1) "Three-Teacher Synergy" at the instructional layer: establishing a professional division of labor among a "Lead Instructor" (for knowledge navigation), "Tutor" (for skill training), and "Class Supervisor" (for emotional support and progress tracking) to ensure comprehensive coverage of cognitive, skill-based, and affective dimensions; (2) Fostering "Knowledge Co-creation" within Learner Communities: encouraging learners to transition from passive consumers to active creators and sharers through mechanisms like virtual studios, cross-regional project teams, and peer review; (3) Enabling "Intelligent Learning Companionship": deploying AI learning companions to provide instant feedback and personalized pathway suggestions, thereby filling gaps in interpersonal support [7].

Process Integration: Constructing an Embedded, Visual Formative Assessment System. The key is to render the entire learning process transparent through datafication and visualization, using these insights to drive instructional optimization. This involves: (1) Designing Diverse Interaction Nodes: embedding data collection points across all activities, including live sessions, discussions, project work, and reflective journals; (2) Developing Dynamic Learner Profiles: integrating behavioral, content analysis, and interaction data to generate evolving, holistic profiles for each learner, making the learning journey visible; (3) Implementing Proactive Instructional Interventions: enabling teachers to deliver timely, personalized support—such as tailored resource recommendations, early-warning alerts, and targeted tutoring sessions—based on data-driven insights, achieving precision in teaching.

Ecological Integration: Toward an Integrated Smart Education Ecosystem of Connectivity, Content, and Governance. High-quality online education cannot exist as an isolated platform; it must evolve into an open, integrated ecosystem. This demands: (1) Achieving "Grand Connectivity" among Platforms: promoting data interoperability and service coordination across national, regional, institutional platforms, and various tools to dismantle "information silos"; (2) Restructuring Curriculum Content into "Large Models": moving beyond fragmented knowledge delivery to design interdisciplinary, project-based, and generative curricular "world models" organized around core concepts and authentic problems; (3) Establishing "Grand Coordination" in Governance Mechanisms: forming collaborative innovation and ethical governance frameworks involving multiple stakeholders (industry, academia, research) to collectively address challenges like the digital divide, data privacy, and algorithmic bias, thereby steering technology toward beneficial ends.

In summary, the "Tension-Integration" framework posits that elevating the quality of online education is fundamentally a dialectical process. It requires confronting internal paradoxes, achieving creative theoretical synthesis, and ultimately realizing the transformation and transcendence of these contradictions in complex practice. The ultimate aim is to harness technology to cultivate a smarter educational world that more effectively unlocks human potential and enriches the experience of learning.

4. An Essential Perspective on Online Education

Understanding the essence of online education serves as the logical starting point for implementing high-quality online education, just as grasping the essence of education is

fundamental to delivering high-quality education itself. Exploring how to understand the nature of online education can be approached through its typology, semantics, and developmental theory, as various definitions of online education inherently contain clues to its essence.

4.1 The Core of Online Education is Education, Not Being "Online"

Online education, referred to as Online education or E-learning, is a form of education that facilitates the dissemination and acquisition of knowledge through information technology, networked information technology, or online platforms. The United States, as the birthplace of online education, first applied it within corporations for employee training. After 1998, it gained momentum worldwide and gradually entered academic institutions. The establishment of the non-profit "Khan Academy" website in 2007, known for its gamification and flipped classroom model, became a landmark for online education. Subsequently, the emergence of Coursera, Udacity, and edX marked three major milestones. While sharing common features such as flipped learning, online forums, and study groups, each also possesses distinct characteristics: Coursera features in-video quizzes, Udacity emphasizes active learning and problem-solving, and edX integrates online and offline elements. The founders of Coursera, two Stanford University computer science professors, aimed to collaborate with top global universities to offer open online courses, attracting numerous prestigious institutions from its inception. Udacity developed curricula in areas like Artificial Intelligence, Data Science, Autonomous Systems, Natural Language Processing, and Computer Vision, and has collaborated with leading Chinese tech firms like Baidu and Tencent to create a series of online courses. edX, launched in May 2012 as a joint online teaching initiative by MIT and Harvard University, aims to complement campus education and enhance its quality. In recent years, online education has evolved to include trends like MOOCs, SPOCs, Flipped Classrooms, and Micro-lectures [8]. The categories of online education are diverse. Based on the nature of the supply and demand sides, it can be classified into online school-based, online compulsory, and online commercial types. According to the number of participants on the supply and demand sides, it can be summarized as one-to-one tutoring, small online classes, and large online classes. By delivery mode, it divides into live-streaming and pre-recorded types. By educational level, it categorizes into online higher education, online secondary education, online primary education, and online preschool education. Clearly, regardless of the classification criteria, the root lies in online education itself, and the core of online education remains education.

4.2 The Distinction between Online Education and Traditional Education Lies in Educational Technology, Not Educational Content

There is no difference in educational content between online education and traditional education. The distinction lies in their methodologies: traditional education employs conventional methods, while online education utilizes internet-based technology. Online education merely alters the methods, means, or technology of instruction. The terms "online" and "traditional" serve only as qualifying modifiers. Therefore, the essence of online education, the essence of traditional education, and the essence of education itself remain fundamentally identical. As Huang notes, the transformative impact of digital technology on education is primarily confined to the levels of environment and methodology. Whether through chalkboard instruction in a physical classroom or algorithm-driven content deliver on a digital platform, the core knowledge and overarching educational objectives retain their consistency. Technology functions merely as a "delivery mechanism and interactive medium," without altering the fundamental nature of education [9].

Although online education manifests in various forms, each represents a specific instantiation or particularization of its underlying essence, reflecting the distinct characteristics of these different models. Concurrent with this trend of diversification within online education, teaching materials are also evolving in multiple directions. This diversification is evident primarily in three areas: educational content, pedagogical models, and payment structures. Digital textbooks are emerging as a new dynamic, potentially replacing printed ones, with e-books representing a future direction for publishing. Pedagogical models are becoming increasingly varied, with flipped classrooms, virtual worlds, smart campuses, gamified learning, one-on-one

tutoring, and open online courses emerging as significant trends. Payment methods are also diversifying, with models based on copyright licensing, service fees, knowledge payment, and education payment gaining traction. Consequently, printed books may evolve towards a premium market segment, while printed textbooks could face a crisis of relevance. Although online education is developing new and diverse trends, these do not alter its essential nature. Similarly, while online education undoubtedly introduces new challenges—such as digital copyright issues arising from changes in knowledge production, or usage rights complexities stemming from exponentially increased access to information—these are not challenges that the field of education alone can resolve. They involve policy, legal, and other sectors. Such challenges, however, do not affect the essence of online education itself.

Clearly, neither the emerging trends nor the attendant challenges associated with online education alter its essential nature. Therefore, semantically and substantively, online education shares the same essence as traditional education, which is, ultimately, the essence of education itself.

4.3 Online Education Shares the Same Essence as Traditional Education

The essence of online education, like that of ancient education, is realized through educational activities and interactions between teachers and students, aiming to enlighten minds or awaken souls. The essence of education cannot be divorced from human activity involving teachers and students; it must be actualized within specific educational practices. This essence does not change with alterations in method or technology. While influenced by specific socio-historical contexts, which impart particular value orientations and shape individuals for specific historical circumstances, the essence of education remains inextricably linked to the educational activities of a given era. Thus, the history of education does not alter its essence.

The foundational thinkers of Eastern and Western antiquity held remarkably similar understandings of education's essence, both depicting a vibrant scene of educational activity. Confucius of China advocated that education lies in "not instructing until the student is genuinely perplexed, not enlightening until the student is genuinely frustrated," thereby keeping students in a state of intellectual fermentation and contemplation. Plato of the West focused on igniting the innate goodness within the student's soul to achieve a "turning of the soul"—education cannot pour knowledge into a soul that does not already possess it, just as one cannot put sight into blind eyes [10]. Over millennia, Eastern and Western explorations of education have produced many differing discourses. These differences merely reflect various value propositions about cultivating people. Historically, numerous schools of thought have emerged—such as theories of innate goodness, innate evil, religiosity, naturalism, instrumentalism, individual-centric, and society-centric views—all seeking to realize their respective values through educational activity. Furthermore, some educational schools are mutually contradictory, yet this does not impede the realization of education's essence. For instance, Mencius's theory of innate goodness stands in stark opposition to Xunzi's theory of innate evil. The former posits that humans possess innate sprouts of goodness, while the latter argues that human nature is inherently evil. Yet, their ultimate goal is the same: to guide humans toward goodness, differing only in their chosen means or methods. The theory of innate goodness seeks to nurture and preserve these sprouts so they may grow, whereas the theory of innate evil aims to constantly "transform nature and eliminate artifice" through corrective measures. Both are realized within educational activities. Similarly, the educational views of Derrida and Rousseau's naturalistic education appear fundamentally contradictory. In his Of Grammatology, Derrida posits that if human nature requires the supplement of acquired education, then nature is not the essence of humanity; the supplement is more important and constitutes the human essence. Although their viewpoints are opposed, this does not affect the realization of education's essence, as they merely employ different educational methods to achieve remarkably similar ends: Naturalistic education emphasizes the cultivation of a free spirit, arguing that to renounce freedom is to debase oneself, and to renounce life is to annihilate one's existence; thus, to renounce human nature at any cost is contrary to both nature and reason [11]. Derrida, conversely, advocates that teachers should approach students with indeterminacy, engage with them with an open

mind, strive to explicate themselves to students without making demands, thereby allowing students to understand themselves [12]. Both unify their educational purposes within educational activities. Just as "the movement of phenomenon and essence in the social realm is the product of purpose" [13], their educational practices necessarily conform to the laws of education and can evidently "create a world in their own image."

From the perspective of action theory, education is fundamentally an action process centered on communicative interaction between people. This action is characterized by distinct interactivity and subjectivity, serving as a core pathway for self-revelation and mind shaping [14]. Habermas noted that the essence of communicative action is reaching mutual understanding through linguistic mediation, and education is precisely a paradigmatic form of such action—whether through face-to-face dialogue in a physical classroom or real-time discussions on a digital platform, the core remains the construction of meaning and spiritual interaction between teachers and students. Research on educational technology in the age of artificial intelligence further corroborates that the value of technology lies not in the sophistication of the tool itself, but in whether it serves the essential goals of education [15]. Functions like live interaction and virtual seminars in online education are essentially technological extensions of the traditional "questioning, answering, and dialectical thinking." The instant feedback provided by AI learning companions merely substitutes for some mechanical tutoring work; what truly determines educational effectiveness remains the deep connection between teachers and students based on knowledge and affect. This optimization of educational form by technology is analogous to paper replacing bamboo slips or blackboards replacing sand trays—it has never touched the essential core of "cultivating people through interaction."

Surveying the history, present state, and future trends of education, its essence is nothing other than the "Dao (Way) of cultivation" inherent in the process of educational activity: cultivating the Dao of nature pertains to how knowledge is acquired; cultivating the Dao of personhood pertains to how to be a person; cultivating the Dao of the mind pertains to how to elevate one's life real; cultivating the Dao of society pertains to how to serve society. Although the Dao of cultivation in education has different categories and purposes, influenced by the traditions, politics, and culture of various nation-states, these distinctions do not change the essence of education. Therefore, both traditional and online education unfold their specific subject knowledge content around this essence of education, an essence realized through educational activities.

Online education merely provides advanced technological means but does not alter the essence of education. Furthermore, its essence can only be realized within educational activities and interactions, thereby achieving educational aims. However, how online education realizes its essence requires a careful consideration of its inherent strengths and weaknesses to formulate pathways for achieving high-quality online education.

5. Distinguishing the Strengths and Weaknesses of Online Education

Undoubtedly, online education has made a significant impact on traditional education. Its strengths—such as abundant resources, freedom from spatiotemporal constraints, speed and immediacy, repeatability, personalization, and affordability—are unparalleled by traditional methods. Conversely, its weaknesses lie precisely in the contextual absence, the teacher's limited understanding of student learning, the often weak interaction and feedback loop between teachers and students, and the ineffectiveness in guaranteeing outcomes. Clearly, the strengths and weaknesses of online education are primarily manifested in the contradictions between: the transcendence of time and space versus contextual fragility; online convenience versus process opacity; and autonomous choice versus uncertain outcomes.

5.1 The Contradiction between Transcendence of Time and Space and Contextual Fragility

Online education has altered the spatiotemporal dimensions of education, transforming the traditional classroom into a mobile one. Access to online education is possible wherever one has internet-connected devices like mobile phones or computers, undoubtedly granting it a quality of spatiotemporal transcendence. This transcendence refers to online education's ability to surpass and operate free from the limitations of time and space. It is evidenced in two ways:

firstly, the number of students online education can accommodate achieves an "unlimited+" effect, unrestricted by physical space; secondly, students who miss a live session can utilize the replay function to learn, thus freeing education from temporal constraints. The ability to conduct education anytime, anywhere, regardless of the teacher's and students' physical locations, constitutes a significant advantage that traditional education cannot match.

However, the rapidly advancing remote communication technologies of the global mass media network have not only, in a sense, rendered systems and national borders ineffective barriers against the flow of risk information [16], but the deluge of information brought by technology has also caused traditional worldviews to vanish without a trace, forcing culture to capitulate to technology [17]. Moreover, the technological advantage that allows teachers and students to interact in a virtual space across different times and distant locations itself gives rise more profoundly to a crisis of context. In reality, within this virtual space, a spatiotemporal distance exists not only between teacher and student but also among students themselves. The language exchange occurring across this divided time and space in online education is clearly less conducive to fostering the emotional exchange and intellectual spark that arise more easily from proximate spatiotemporal communication in traditional education. Consequently, education, which "relies on the spiritual communication between teacher and student" [18], is defeated by the spatiotemporal distances inherent in online education.

Thus, the contextual fragility of online education refers to its characteristic of virtualizing the discursive context due to a lack of genuine, situated interaction and dialogue. It is evident that spatiotemporal distance has lost its overt influence in online education enabled by network technology; the fragility of context constitutes a weakness of this mode. Therefore, the transcendence of time and space brings online education the advantage of breaking through spatiotemporal barriers, but it also precipitates a crisis of fragile educational context. This contextual fragility evidently hinders the realization of the essence of online education.

5.2 The Contradiction between Online Convenience and Process Opacity

Online education does not require a traditional classroom; teachers and students can conduct it using tools like smartphones or computers with internet access. Whether for instructors or learners, online education brings ease and convenience. There is no need to calculate travel time to a physical classroom to avoid being late, as in traditional education. Both parties need only spend a minimal amount of time preparing the necessary online tools at a suitable location. Thus, the convenience of online education refers to its characteristic of being handy, facilitating access, and reducing costs. This convenience reflects how online education is more relaxed and accessible, significantly shrinking temporal, economic, and human resource costs. Selecting an appropriate location as the educational site reduces transportation expenses and saves time, thereby lowering economic and temporal costs. The "unlimited+" effect on student capacity means the number of required teachers can be greatly reduced. Furthermore, eliminating the need for multimedia equipment in a traditional classroom saves expenses like electricity, thus reducing human resource and economic costs.

However, while online platforms may display student check-ins and even some interactions, the genuine state of student learning and their psychological engagement consistently resides in an unseen "black box." Therefore, online education possesses the characteristic of an unknowable educational process, constituting its process opacity. Of course, students can always see the teacher's instruction during the online process, but it is exceedingly difficult for the teacher to grasp the true situation of each individual student. A student might be sleeping, playing games, or merely logged in passively. The teacher's understanding of students' online learning status is often akin to the parable of the blind men and an elephant. The actual physical space occupied by the student at the other end of the online connection should not become a blind spot for education, yet the opacity of the process remains a weakness of online education. "Know yourself and know your enemy, and you will never be defeated in a hundred battles"; the same principle applies to education.

Consequently, while the convenience of online education saves temporal, economic, and human resource costs, it simultaneously plunges the educational process into an unknown "black box" state. This process opacity consistently hinders the realization of the essential purpose of

online education.

5.3 The Contradiction between Individual Comfort and Outcome Uncertainty

Online education allows for a better expression of individuality for both teachers and students. Teachers can more autonomously select diverse educational resources, choose preferred online platforms, and students can learn in any posture they find suitable, thereby attaining a sense of personalization and comfort within the online educational environment. Teachers have a variety of choices: they can select the best educational content, the optimal online platform, and the most suitable pedagogical methods, enabling their individual teaching style to be more fully realized. Similarly, students can express their personalities in a more relaxed manner. They can choose to learn while sitting, reclining, or standing—completely in a state of relaxation—free from facing the teacher's gaze or unexpected criticism. Therefore, online education possesses the characteristic of unleashing the individuality of both teachers and students, significantly liberating their innate tendencies, which constitutes its nature of individual comfort.

However, the state of absolute freedom for students in online education inevitably leads to uncertainty in learning outcomes and an absence of quality assurance. Clearly, this lack of guaranteed quality constitutes the uncertainty of online education outcomes, which is reflected in the persistent difficulty teachers face in judging whether the essential purpose of online education has been achieved. When educational outcomes are hard to assess, it becomes equally challenging to formulate strategies for enhancement or improvement: feedback in online education is often delayed, creating a timeliness gap that makes it difficult to correct emerging pedagogical issues; student performance is not readily apparent, limiting teachers' ability to tailor instruction to individual needs, which in turn stifles teacher initiative and hinders the improvement of student learning behaviors; students with weaker self-discipline may be physically "online" but not mentally engaged—perhaps playing games, chatting on QQ, or doing other things—and failure to address these issues inevitably leads to a further deterioration of their learning outcomes. Consequently, the uncertainty of learning effectiveness or the lack of robust quality assurance constitutes a significant weakness of online education.

Online education possesses both strengths and weaknesses, consistently manifesting the contradictions between them. Evidently, online education is undoubtedly a "double-edged sword"; while showcasing its advantages, it also brings inherent weaknesses. In particular, "shortcomings in areas such as contextual presence and interaction" [19] can even lead to profoundly unsatisfactory educational results. Although online education boasts spatiotemporal superiority, online convenience, and individual comfort unparalleled by traditional education, its contextual fragility, process opacity, and outcome uncertainty persistently hang over it like a "Sword of Damocles," continually hindering the realization of its essential purpose. Therefore, only by leveraging its strengths and overcoming its weaknesses can online education achieve high quality.

6. Practical Pathways to High-Quality Online Education

Type your main text in 11-point Times New Roman, single-spaced. Do not use double-spacing. Be sure your text is fully justified, flush left and flush right. Please do not place any additional blank lines between paragraphs.

Online education possesses strengths such as the transcendence of time and space, online convenience, and individual comfort, as well as weaknesses including contextual fragility, process opacity, and outcome uncertainty. Its strengths undoubtedly grant online education greater potential for development and position it as a mainstream trend in the future of education. However, its weaknesses constrain the realization of education's essence. In practicing online education, people inevitably miss the advantages found in traditional education, such as emotional exchange, process interaction, and feedback incentives. Therefore, ensuring the high-quality development of online education requires: creating an online education with a sense of teacher-student community to enhance its contextuality; constructing an online education where multiple elements are mutually integrated to enrich interactions among all parties (bilateral and multilateral); and building an online education with a cohesive and unified process evaluation system to guarantee feedback and incentives for all involved.

6.1 Creating Online Education with a Sense of Teacher-Student Community

Teachers and students are the dual subjects in online education. Creating an online education imbued with a sense of teacher-student community can enhance the contextuality, autonomy, and generative nature of educational activities, facilitating the autonomous construction of knowledge. Since its proposal in the 1980s, the concept of community has drawn significant attention within situated learning theory [20]. The teacher-student community embodies the meaning of community primarily by transforming the long-standing teacher-subject/student-object opposition into an equal, organic ecosystem. The adversarial teacher-student relationship in traditional education presents difficulties in mobilizing student autonomy. In online education, where access to information is easier, a similarly oppositional relationship between the teacher as subject and student as object is even more detrimental to student self-directed learning. Clearly, creating an online education with a sense of teacher-student community can guide both parties towards developing shared interests, common value orientations, and joint ideal pursuits.

Every online education course requires the establishment of a corresponding teacher community, positioning the teacher as a guide for its members, and students as developers, researchers, and explorers of the community-meaningful online education. Furthermore, under the umbrella of the teacher community, several inquiry communities should be formed. Each inquiry community can consist of 4-8 members to further strengthen the cohesion of the online education. Inquiry communities can be formed freely by students, or by grouping students with similar interests, or by arranging students with different strengths or interests together, thereby forming inquiry communities characterized by freedom, shared interest, and complementarity. Regardless of the type of community constructed, the goal is to attract students and make them willing participants in all activities—both online and offline—conducted within the online education framework.

Evidently, building online education with a sense of teacher-student community can overcome the weakness of fragile contextuality in online education. This is because students, as participants, remain at the core of the online education [21] and can gain "privileges" such as higher learning performance [22], greater prestige and encouragement [23], and richer emotional support. This facilitates the students' role transformation from "knowledge recipients" to "knowledge creators."

6.2 Building Online Education through the Integration of Multiple Elements

Establishing an online education characterized by the integration of multiple elements aims to overcome the weakness of process opacity and enhance the interactivity of online education. The integration of content and technology is the foundational prerequisite for this interactivity; the integration of process and method is its key; and the integration of online and offline (O2O) components serves as its vital support.

The integration of educational content and technology is essential for online education to be conducted effectively. This integration requires, on one hand, that both teachers and students be familiar with common online platforms, capable of operating them flexibly, and able to embed educational content within these platforms to deliver the corresponding online instruction. On the other hand, it necessitates fusing content and technology across all phases of online education—such as live streaming, recorded lectures, Q&A sessions, assessments, video conferences, and chapter completion checks—ensuring that each segment readily facilitates interactive effects.

The integration of educational process and method manifests the interactive scenarios of online education. It mainly includes the fusion of process and method in live instruction, in discussion/seminars, and in sharing sessions. The live instruction process is one where the teacher primarily lectures to disseminate knowledge. As this process can easily lead to student fatigue, integrating the scientific nature of knowledge with the engaging quality of the narrative can enhance the appeal of the interactive process. The discussion/seminar process involves disseminating knowledge through inquiry communities, aiming to stimulate students' independent thinking, innovative viewpoints, logical argumentation, and an open, inclusive discussion atmosphere. This requires teachers to create a conducive seminar environment and provide appropriate guidance. The sharing process is where student disseminate and share the experiences, insights,

and inspirations gained from their learning. This process focuses on cultivating students' innovative thinking and capabilities. Therefore, students need to focus on the thematic nature of the course during the preparation stage, manage time limits during the sharing, and teachers should provide measured commentary for guidance at the session's conclusion.

The integration of online and offline (O2O) components is crucial support for enhancing the interactivity of online education. To evaluate outcomes such as problem-solving in Q&A, community collaboration, specialized research, information feedback, and learning diagnostics, online education can host Q&A, feedback, and diagnostic assessments. These can also be situated within offline processes facilitated by online platforms, online communication, questionnaires, etc. Meanwhile, community collaboration and specialized research projects may require students to complete work offline before sharing results online. Furthermore, teachers need to utilize offline time to "take the pulse and diagnose" (conduct in-depth analysis of) student learning outcomes.

Therefore, realizing an online education that integrates multiple elements can not only overcome the "blind spot" of the student endpoint in online education but, more importantly, achieve deeper educational interaction. This enables participants to gradually move from the periphery to the core of the online education, transforming from "outsiders" to "experts" [24]. The entire online education endeavor can thus be realized through continuous processes of dialogue, sharing, contribution, mutual assistance, and debate, ultimately achieving high-quality online education.

6.3 Building an Online Education with Cohesive and Unified Process Evaluation

Strengthening process evaluation represents a trend in the reform and development of educational assessment and serves as a powerful measure to ensure high-quality online education. Process evaluation, which matured gradually since the 1980s, is an assessment approach that unifies the focus on both process and outcome. Its theoretical roots lie in the notion that "the essence of an organism lies in its process of activity; the entire universe manifests as an ever-renewing process of activity" [25]. Similarly, education is a process of living, growth, and the reconstruction of experience [26]. As "education carries its own reward at every moment" [27], the standard for its perfection can only be reflected through the process, not merely evaluated based on outcomes [28].

Building an online education with cohesive and unified process evaluation requires incorporating all measurable processes of online education into its assessment system. The final grade for online education would then be the sum of all process evaluation grades. This concept has been deeply implemented in higher education through technological empowerment. For instance, Zhengzhou University introduced AI technology to establish a smart evaluation system. Leveraging the U-Course Evaluation platform, it constructed categorized evaluation indicators for "knowledge memorization – knowledge application – critical thinking assessment – innovative research." In practical implementation, constructing an embedded, intelligent formative assessment system is paramount to resolving the effect tension and ensuring a common quality baseline. Such a system is predicated on learning analytics and educational data mining. It performs systematic collection and analysis of multimodal process data—including online interactions, resource utilization, task completion, and community discourse—transforming previously opaque learning states into explicit, dynamic learner profiles. Consequently, algorithm-driven models can provide personalized suggestions for learning path adaptation and early-warning alerts for at-risk learners. This, in turn, liberates human instructors to focus their expertise on the developmental assessment of higher-order thinking, collaborative skills, and value formation. This synergy creates a new human-machine collaborative evaluation modality, effectively dissolving the dual dilemmas of process opacity and outcome uncertainty in online learning. It shifts the paradigm of quality assurance from relying solely on terminal outputs to actively nurturing and steering the entire generative process.

The process of online education can generally be divided into the live instruction process, the seminar/discussion process, the sharing process, and the examination process. Educational evaluation, therefore, focuses on measuring student performance or effectiveness within these respective processes: The live instruction process primarily evaluates students' online

presence, level of interaction, and quality of information feedback. The measured grade for this process constitutes the live instruction or regular participation grade. The seminar/discussion process mainly evaluates students in the form of inquiry communities. All students integrate into corresponding communities focused on specific topics, utilizing offline time to prepare for topic discussions and PPT sharing. Evaluation can combine peer assessment with teacher assessment. The average of these comprehensive scores forms the seminar grade, with members of the same community receiving the same grade. The sharing process requires each student to prepare a thematic exploration (e.g., experiment-based, classic literature reading, or other types). This exploration and PPT creation also occur offline, followed by a presentation of research findings to teachers and peers. Evaluation can employ a multi-dimensional comprehensive evaluation, with the grade set as a special project score. A joint study by Anhui University and South China Normal University found that such sharing process evaluation, based on platforms like blogs, could allow course design to explain up to 70% of the variance in learning experience [29]. Online examinations, similar to traditional ones, can take the form of tests or papers, with the result constituting the examination grade.

The participatory structure and interactive quality of an online learning community constitute its crucial social foundation for educational effectiveness. Insights from sociology and communication studies reveal a consistent pattern in technology-mediated, large-scale collaborative platforms: user participation typically follows a distinct power-law distribution. A large majority of members remain in a passive, observational state (“lurking”), a minority contribute intermittently, and a very small core of active participants generates the majority of content. This empirical regularity underscores that high-quality online education cannot assume deep interaction will emerge spontaneously among all learners. It necessitates proactive pedagogical intervention in the participatory structure. This can be achieved by deliberately designing tiered teacher-student and peer learning communities, crafting scaffolded collaborative tasks with clear role differentiation, and establishing reputation or feedback mechanisms that reward quality contributions. Such strategies are essential to motivate and guide learners from peripheral participation toward central, engaged involvement, thereby reconstructing a vibrant social network for knowledge construction in virtual spaces and counteracting the learner isolation that arises from contextual fragility and emotional distance. This enables them to continuously and actively create or generate high-quality educational content, thereby promoting the in-depth development of online education.

7. Conclusion and Outlook

Online education is a form of education that disseminates knowledge through information technology and networked information technology. At the technological level, it represents a new form distinct from traditional education. Perspectives based on its typology, semantics, and development reveal that the essence of online education is no different from that of traditional education; it shares the same essence as education itself. All true education lies not in the mere inculcation of knowledge, but in illuminating the path forward, enabling students to "turn around to face the sun" and achieve a turning of the soul. Therefore, online education must, through interaction, ignite students' passion and methods for acquiring knowledge, foster their confidence in mental growth and intellectual elevation, and encourage them to develop reverence for life and belief in the prospect of a better future.

As online education is situated within the contradictions between its strengths and weaknesses—spatiotemporal transcendence versus contextual fragility, online convenience versus process opacity, and autonomous choice versus uncertain outcomes—it must necessarily leverage its strengths, overcome its weaknesses, and realize its essence to secure its future. Clearly, once an online education imbued with a sense of teacher-student community is established, once its multiple elements are mutually integrated, and once its process evaluation becomes cohesive and unified, online education will be filled with vitality and become the new norm for future education. High-quality online education will become the "main arena" of future education.

Acknowledgments

This paper was financially supported by The 2023 Entrusted Project of the Research Center

for Reform and Development of Newly Established Universities, with the grant number XJYX2023W03 and the project title "Research on the Departmental System Reform in Application-Oriented Undergraduate Universities".

References

[1] Xin, T.; Nie, Z.; Shi, W.; Zhang, S. Integration of Learning and Assessment: The Conceptual Shift and Implementation of Educational Evaluation. Open Education Research, 2025, 31(5): 30-38.

[2] Huang, D.; Xu, Z.; Gao, Z.; Zhao, W. Revisiting the Debate on Online Instruction: From Appearance to Essence. Journal of Henan Polytechnic University (Social Sciences), 2023, 24(4): 106-115.

[3] National Academy of Education Administration. China Smart Education Development Report (2024-2025). 2025. Retrieved from the official website of the Ministry of Education.

[4] Du, M.; Wang, S.; Wang, Z.; et al. Process Data-Driven Quality Evaluation Design for Online Open Courses. Distance Education in China, 2024, 44(9): 90-100.

[5] Zhou, J.; Qian, X. The Embodied Transformation of Online Education Serving Lifelong Learning for All: Theoretical Conception and Practical Pathways. Adult Education, 2024, 44(10): 48-55.

[6] Jin, L. Digital Torch: Igniting Collective Learning Wisdom and Driving Online Knowledge Co-Creation. Hebei Economic Daily (Theory Section), 2025-06-26.

[7] Huang, R. Integrating Large AI Models into Education: Conceptual Shifts, Morphological Reshaping, and Key Initiatives. Academic Frontiers, 2024, (14): 23-30.

[8] Waard, I. D.; Koutropoulos, A.; Hogue, R. G.; et al. Merging MOOC and MLearning for Increased Learner Interactions. International Journal of Mobile and Blended Learning (IJMBL), 2012, 4(4): 34-46.

[9] Huang, R. The Internal Logic of Digital Technology Empowering Current Educational Transformation—From Environment, Resources to Digital Pedagogy. Basic Education in China, 2024, (1): 10-17.

[10] Plato. The Republic. Guo, B.; Zhang, Z., Transl. The Commercial Press, 2015.

[11] Rousseau, J.-J. Discourse on the Origin and Basis of Inequality Among Men. Li, P., Transl. The Commercial Press, 2007.

[12] Ruitenberg, C. Giving Place to Unforeseeable Learning: The Inhospitality of Outcomes-Based Education. Philosophy of Education Yearbook, 2009: 266-274.

[13] Lukács, G. The Ontology of Social Being (Vol. 2). Chongqing Publishing House, 1993.

[14] Liu, X. On the Return of Education to Its Origin from the Perspective of Action. Journal of Southwest University (Social Sciences Edition), 2024, 43(11): 66-76.

[15] Shi, S.; Wegerif, R.; Yuan, L. Dialogic Educational Technology Theory in the Age of Artificial Intelligence. Open Education Research, 2025, 30(1): 24-32.

[16] Beck, U. Risk Society: Toward a new Modernity. Sage publications, 1992:133.

[17] Postman, N. Technopoly: The Surrender of Culture to Technology. He, D., Transl. Peking University Press, 2007.

[18] Jaspers, K. What Is Education? Zou, J., Transl. SDX Joint Publishing Company, 1991.

[19] Hua, P.; You, J. Research on Factors and Shortcomings Improvement of Online Teaching Quality in Universities Based on TQM. China Educational Technology, 2021, (10): 80.

[20] Brown, J.S.; Collins, A.; Duguid, P. Situated Cognition and the Culture of Learning [J]. Educational Researcher, 1989, 18(1): 32-41.

[21] Xu, Y.; Chen, L. Exploring the Complexity of Student-Student Interaction-Dominated Online Learning. Distance Education in China, 2021, (10): 17.

[22] Cho, H.; Gay, G.; Davidson, B.; Ingraffea, A. Social Networks, Communication Styles, and Learning Performance in a CSCL Community. Computers & Education, 2007, 49(2): 309-329.

[23] Russo, T. C.; Koesten, J. Prestige, Centrality, and Learning: A Social Network Analysis of an Online Class. Communication Education, 2005, 54(3): 254-261.

[24] Duan, J.; Wang, X. A Study on the Social Interactive Behaviors and Participation Patterns of High- and Low-Performing Learners in the Context of Open Online Courses. e-Education Research, 2016, (11): 43-50.

[25] Whitehead, A. N. Process and Reality. China City Press, 2003.

[26]Dewey, J.; Boylston, J. A.; Kaplan, A. The Later Works of John Dewey. Southern Illinois University Press, 2015.
[27]Dewey, J. Democracy and Education. People's Education Press, 2001.
[28]Li, Y. Curriculum Evaluation. Shanghai Education Publishing House, 2002.
[29]Wang, D.; Zhang, L. Blog-Integrated Formative Assessment in AI Courses: Enhancing Learning Engagement and Outcomes. Educational Sciences, 2025, 15(3): 189-203.

