

Exploring Innovative Educational Concepts within Virtual Education Systems

Hongsheng Zhu¹

E-mail: 824054556@qq.com

School of Chinese Language and Literature, Huangshan University, Huangshan 245041, China

Abstract: Utilizing information and communication technology (ICT), virtual education (VE) combines text, speech, graphics, film and television, cartoons, and human-computer interactive elements, thereby expediting the dissemination and exchange of information. Concurrently, it fosters information sharing and value augmentation, enhancing the learning gratification and efficacy of learners. This ultimately makes education more accessible, convenient, and seamless and lays a strong foundation for global education integration. In the future, the role of teachers and parents will become increasingly diminished in the realm of advanced VE. Learners will immerse themselves in multiple roles, such as teachers, parents, and classmates, and truly realize autonomous and lifelong learning. The development of VE should adhere to the educational concept of combining scientific narrative with humanistic narrative. We should expand the educational imagination space and create new virtual educational entities and educational content through scenario assumptions. This will enable us to achieve a full process of educational transformation with the support of new technologies, empowering future education. It will also form a new educational model, known as “future discourse,” which enriches and supplements existing educational research paradigms. The teaching process should be carried out using an integrated interface and overall path, allowing students to perceive and participate in reality. This approach advocates for process participation and even thought experiments. Paradigm innovation has been demonstrated in the cross-border integration of natural science, social science, and humanities.

Keywords: virtual education system; learners; education concept; innovation

1. Introduction

With the rapid growth of information science and technology, a new form of education called virtual education (VE) has been promoted worldwide. Distinct from conventional forms of education, the inception and development of VE is not just an educational technological breakthrough but also a qualitative leap in educational innovation and concept. Every significant advancement in the history of education is rooted in the rapid progress of science and technology, leading to a substantial shift in the demand for skilled individuals. Furthermore, major developments in education are evident in the innovation of educational technology and the breakthroughs and updates in educational philosophy. When analyzing the various challenges and crises in education, it becomes apparent that the primary cause is a lack

¹ Hongsheng Zhu (1968—), associate professor of School of Chinese Language and Literature, Huangshan University.

of progress or a crisis in educational philosophy. Therefore, an advanced educational philosophy serves as the primary benchmark for evaluating the development and effectiveness of education. To achieve innovative development in education and establish a scientific and reasonable guiding ideology for schooling, it is necessary to first innovate the educational philosophy. This will enable us to provide forward-looking and guiding and practical principles for education development based on advanced educational philosophy.

Based on this, the present study discusses the innovation and development of educational philosophy in the VE system. Furthermore, as the learning in the VE system is more independent compared to that in conventional education led by teachers, this study focuses on researching the innovation and development of self-learning education within the VE system.

2. Learning Theory Architecture of the VE System

2.1 Conceptualization of VE

Virtual education (VE) constitutes a novel educational paradigm facilitated by information and communication technology (ICT) innovations, particularly manifested through the Internet. This multifaceted concept comprises a wide spectrum of educational services delivered via digital channels, spanning beyond traditional learning programs to encompass career development training and guidance. Moreover, VE comprises any learning process transpiring within a virtual reality environment or virtual classroom setting. Hence, the current landscape includes a multitude of institutions offering online courses, online schools providing education and diverse services, virtual labs, digital universities, and university consortia fortified by information technology—all collectively encompassed within the realm of VE.^[1]

The underpinnings of VE are inherently linked to virtual reality technology. Its evolution is inevitable as it emerges as a confluence between the global education paradigm and developments in ICT. Virtual reality technology, a comprehensive information technology that emerged towards the end of the twentieth century, leverages three-dimensional graphics generation, multi-sensor interaction, and high-resolution display technologies to create immersive three-dimensional virtual environments using a variety of sensors and visualization tools to engage users' visual, auditory, and tactile senses, thereby enabling users to interact with and manipulate objects within the virtual world and engendering a sense of immersive and experiential depth. Notably characterized by its immersive, interactive, and multi sensory attributes, virtual reality technology has found widespread application across various domains, including medicine, architecture, mechanical engineering, military, sports, aerospace, and entertainment, as well as educational teaching and experimental activities.^[2]

2.2 Enhanced Efficiency and Equitability in the VE System

In tandem with technological advancements and the progressive evolution of educational paradigms, VE has gradually emerged with unparalleled advantages, establishing itself as the mainstream mode of education in the 21st century. VE has fundamentally transformed the “three fixed notions” of conventional physical education, namely fixed teaching time, fixed teaching location, and fixed teaching process. This transformative shift engenders temporal flexibility, enabling effective learning at the convenience of individuals, anytime and

anywhere, underpinned by their pedagogical approaches and personal pace. Enabled by network technology, education has transitioned from having a predominantly physical presence to establishing a virtual system, effectively orchestrating a “displacement” in temporal, spatial, and procedural dimensions. Consequently, a physical divide between teachers and students, a spatial divide between pedagogical interactions and learning environments, and a temporal divide between teaching and learning processes have been established. This separation does not foster alienation and bolsters efficiency and accessibility owing to its nonrestrictive and seamless combination.

Underpinned by ICT, VE not only expedites the dissemination and exchange of information but also facilitates information sharing and appreciation; it further enhances learner satisfaction and efficacy, rendering education more streamlined and accessible. Education within the VE framework is characterized by robust credit exchange and interaction, conducted across a wide spectrum and within the most opportune temporal windows. This is achieved while optimizing the utilization of the most economical resources, considering human, material, and financial aspects. Furthermore, the constant presence of virtual educators within the VE environment, coupled with a perpetual virtual educational context that complements acquired knowledge, engenders a shift from traditional one-way knowledge transmission and acquisition to a dynamic multi-directional communication model, leading to a marked increase in teaching efficiency.

VE has brought about a transformative shift in the realm of educational technology, expanding the temporal and spatial dimensions of learning. This has reshaped the process of education delivery, yielding a system that is more flexible, convenient, and personalized to individual needs and developmental aspirations. Thus, remote online education has emerged as a novel mode of lifelong learning; the ideal of human acceptance of lifelong education has ultimately become a reality and is perfectly reflected under the conditions of VE.

Every teaching process in the virtual space of interconnected interaction integrates text, speech, graphics, film and television, animation, and human–computer interactions. The best teachers, schools, and courses are now accessible to learners at all levels of society, providing equal opportunities to receive high-quality education. Moreover, it allows to transcend national borders and social ideologies to integrate global educational resources, facilitating the equal dissemination of high-quality educational resources to all humanity. Equity in education is most comprehensively reflected.

2.3 Achieving Multi-Modal Learning Transitions in the VE System

Learning within VE systems exhibits distinct characteristics when compared to conventional physical teaching systems. In the latter, the temporal distribution, content, and progress of learners' education operate within entirely independent management frameworks. However, VE systems allow learners to switch between self-managed and managed learning modes. In particular, the targeted adjustments to learning content, methodologies, and forms based on the tracking and analysis of big datasets make learning more efficient owing to timely optimization (Fig. 1).

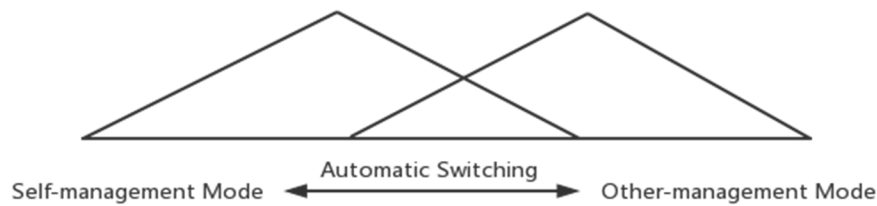


Fig. 1 Multi-modal learning transitions in virtual education (VE)

2.4 Multifaceted Learner Engagement Enabled by the VE System

In conventional physical teaching systems, learners typically acquire knowledge through the procurement of books and subsequently attaining learning goals through reading, practical application, and assessments. Learners merely receive knowledge without active participation in the educational process. However, VE systems offer four distinct models: teacher-guided, parent-guided, independent learner, and group communication and cooperation modes. In these modes, learners are integrated into a virtual environment, where learners, as visitors or members of the community, engage in various types of community-driven roles, which is similar to the type of participation under community theory (Table 1).

Table 1 Typologies of learner participation in the VE system

Participation ladder type	
Arnstein ^[3]	Nonparticipation (Manipulation, Therapy), Tokenism (Informing, Consultation, and Placation), Citizen Power (Partnership, Delegated Power, and Citizen Control)
Pretty ^[4]	Manipulative Participation, Passive Participation, Participation by Consultation, Participation by Material Incentives, Functional Participation, Interactive Participation, Self-mobilization
Butler ^[5]	Imposition, Petition, Advice, Representation, Equality

2.5 Continuous and Upward-Spiraling Learning Trend in the VE System

The effective application of advanced ICT within the VE system allows learners to independently select from diverse learning methodologies, such as systematic or fragmented approaches, linear or circular progressions, and single-discipline or interdisciplinary pathways. Importantly, the VE system transcends temporal and spatial limitations, enabling learners to immerse themselves in unhindered learning at their convenience within the parameters of their schedules. Figure 2 presents a continuous learning system that resembles elements of both discontinuity and non discontinuity, and Figure 3 presents a closed learning loop that spirals upward.

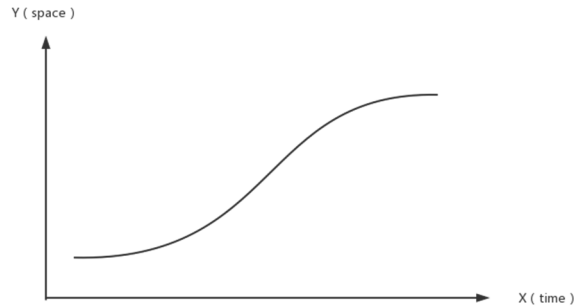


Fig. 2 Learning continuum

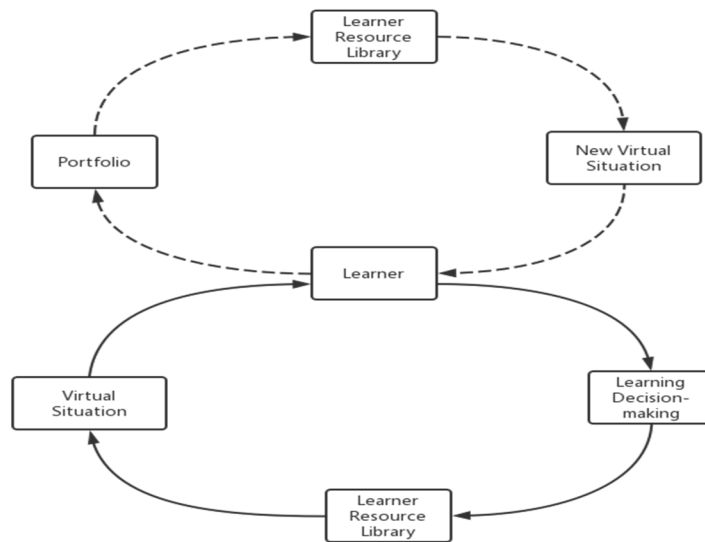


Fig. 3 Closed learning loop

2.6 VE System Learning Model

Based on the above research, we can formulate a learning model encapsulating the learning process within a mature or ideal VE system (Fig. 4):

This model is delineated by five processes: self-directed learning, learning decision-making, information delivery and reception (pertaining to self-learning), learning guidance, and evaluation and feedback. It further includes two memory components: a learning resource repository and profiles of self-learners. Intertwining these elements are nine information flows between contents: addresses, categorized information, multimedia applications, learning resources, learning decisions, information queries, interactive relations, learner information, and evaluation feedback. The entire operation framework is articulated through the following phases: 1. Self-learners establish their learning goals, contents, and methodologies. 2. They navigate through learning resources, categorize information, and identify suitable learning content. 3. Multimedia interfaces engage in searches and procure learning resources based on self-learners' query conditions, subsequently delivering them to self-learners. 4. They

establish interactive relationships with multimedia and complete learning within the virtual environment. 5. Learning content, processes, and results are observed, evaluated, and assessed within the context of multimedia interactive interactions. 6. The system demonstrates two characteristics in the interaction process:

1) Multiplicity of roles

In the VE system, a one-to-one correspondence between individual learners and specific learning environment/system content is unnecessary. Learners can undertake multiple roles, transitioning from being spectators (passive participants) to active designers and implementer within the virtual learning context. Moreover, learners can assume roles such as self-learners in a learning environment or under a teacher's instructional guidance and may also play the role of instructional guides. Similarly, multiple self-learning individuals may represent a single system content in a given learning environment, where self-learners collaborate and cooperate, and multiple individuals collaborate and play as a single team.

2) Multiple learning processes

The learning content within a system is structured in a mesh-like framework, accommodating the specific conditions and objectives of individual learners. As learning progresses, new conditions are introduced, enhancing the richness of interactive responses from the system. This generates a spectrum of new learning processes and content options for self-directed exploration. For example, a single VE public course can be tailored to cater to mathematical and biological preferences, with different classes of learning content, methodologies, and processes. Moreover, classroom learners and “self-study learners” participating in laboratory and fieldwork activities engage in completely different virtual contexts. Furthermore, the model accommodates course retakes, leveraging a database of self-learner information and harnessing the potential of big data, allowing the selection and provision of “more appropriate” learning contexts based on the strengths and weaknesses of self-learners.

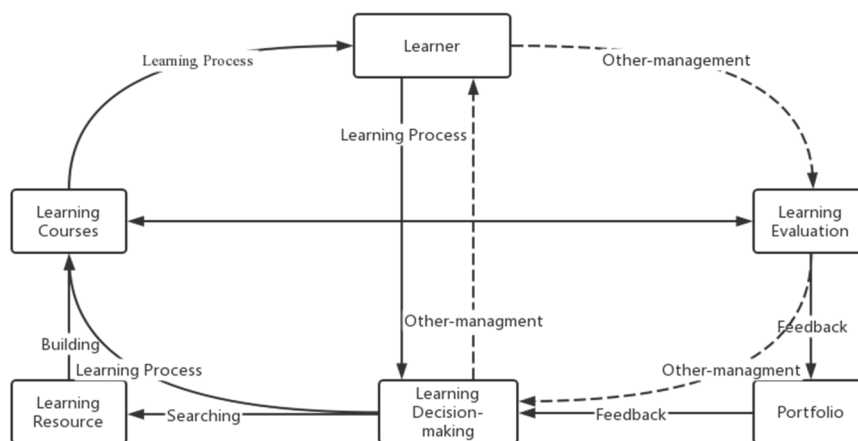


Fig. 4 Learning model based on VE systems

3. Educational Concepts Integral to the VE system

3.1 Notion of Educational Philosophy

Although there exist diverse interpretations of educational philosophy, a relatively unified understanding converges on the core contents encapsulated within it. Essentially, educational philosophy addresses some pivotal questions: What kind of individuals should education cultivate? How should this cultivation be realized? How should education be developed, and what should be its guiding principles? Thus, the educational philosophy constitutes a comprehensive framework of human development and a theoretical and systematic conceptual system with relative stability, continuity, and directional awareness. The primary questions that must be addressed for this educational development include: What kind of education concept is established? What kind of skilled individuals are trained? What kind of quality concept is used to examine qualified students? The emergence of innovative educational philosophies is the cultural emblem that propels Chinese education toward prosperity.^[6]

3.2 Advanced Educational Concepts

Establishing advanced educational philosophy and principles is imperative and is an inevitable requirement for the scientific development of education. Underpinning this endeavor are concepts such as “student-centered” approaches, “individualized development for every learner,” “holistic emphasis on learners’ development, changing the concept of subject-oriented education,” “independent, cooperative, and investigative approach,” “the promotion of diverse teaching and learning modalities,” and “outcome-based education.” These are all scientific, effective, and advanced new curriculum concepts that are explored in the process of education reform and evolution. Socrates’s “Education is not indoctrination, but igniting the flame”; Sukhomlinsky’s “Education - it is first of all anthropology”; Dewey’s “Education is a social process; education is growth; education is not preparation for life but is life itself”; Tao Xingchi’s “Teaching is doing”; Ye Shengtao’s “Education is cultivating habits”; and other educational ideas are advanced educational ideas within the education and pedagogical landscape.

Evidently, the application of advanced science and technology in constructing a virtual learning environment serves a singular purpose: the enhanced attainment of learning goals and the accelerated cultivation of adept individuals that contemporary society requires.

3.3 Essential Educational Tenets for VE Systems

Through previous comparative studies, we have learned that the VE system has completely different characteristics from traditional physical education (Table 2). In response to these characteristics, we must establish advanced educational concepts in order to make education truly effective (Figure 5):

Table 2 The Difference between Physical Education and VE

Classification	Physical Education	Virtual Education
Information transmission technology	Media such as books, notes, textbooks, and handouts	Information and communication technology

Teaching arrangements	Fixed teaching time, fixed teaching location, and fixed teaching process; phased learning	The physical separation between teachers and students, the spatial separation between teaching and teaching venues, and the temporal separation between teaching and learning processes; Lifelong learning
Teaching methods	I teach and you learn	Integrated teaching
Teaching content	Knowledge independence and self-sufficiency	Knowledge openness, sharing, and value augmentation
Teaching objectives	Problem-oriented and outcome-oriented goals	Achievement-oriented and process-oriented goals

① Educational narratives within VE systems should blend scientific and humanistic narratives, while prioritizing education and focusing on humanistic literacy. It relies on advanced science and technology and emphasizes that the cultivation of scientific and technological knowledge is inevitable for social progress and development. However, we cannot exclusively focus on scientific and technological domains, nor can we train learners to be cold machines or antisocial and anti-human technological monsters. VE systems should diligently nurture learners with a comprehensive humanistic literacy, cultivating an environment seamlessly conducive to the amalgamation of humanities and science. This can be realized by establishing interdisciplinary and humanities-integrated virtual teaching and research institutions or organizations, fostering an educational spirit and cultural atmosphere that accentuates both domains. Furthermore, by synergizing adult education with talent development, VE systems can holistically propel students toward comprehensive development.

② In an integrated interface and overall path, VE performs teaching through active participation in real-world scenarios and the encouragement of process engagement and thought experiments. It demonstrates paradigm innovation by traversing the crossroads of natural science, social science, and humanities. Virtual teaching expands the space of educational imagination, fabricating novel virtual educational dimensions through scenario assumptions. Bolstered by technological support, it realizes the entire process of educational transformation, empowers future education, and forms a set of “future discourse” and imagination. Therefore, it is necessary to forge novel paradigms that expound upon these concepts, enriching and harmonizing with prevailing educational research paradigms. Vigilance towards dynamic regulation and tailored instruction aligned with individual aptitudes emerges as paramount. Using big data, dynamic monitoring and real-time adjustments ought to be seamlessly integrated, facilitating precise and efficient customization of teaching content, methodologies, and progression. Teaching can also be targeted based on learners' evolving interests, emotional fluctuations, situational shifts, and other accidental factors to cultivate unique and irreplaceable talents.

③ VE systems allow us to build a team and cultivate teamwork spirit. Within virtual communities, learners constantly undergo immersive, interactive, and multi sensory experiences such as role allocation, identity transformation, and team collaboration. Therefore, cultivating teamwork spirit through team building by integrating multiple individuals stands as a pivotal advanced educational concept that must be upheld in VE systems.

④ Inextricably linked with cutting-edge science and technology, VE systems are based on real society and adopt and emphasize the cultivation of a forward-looking spirit. Therefore, it is an undeniable choice to attach importance to the cultivation of a forward-looking spirit and emphasize the cultivation of innovative talents. The essence of “knowledge is power” refers to transforming knowledge into the ability to transform the world. Without forward-looking and innovative talents, there is no power. In light of impending technological challenges such as “technological singularity” (artificial intelligence surpassing human capabilities) and questions such as “will artificial intelligence take away our jobs” (will artificial intelligence replace teachers), VE research is bound to face these continuous and unprecedented challenges (Fig. 5).

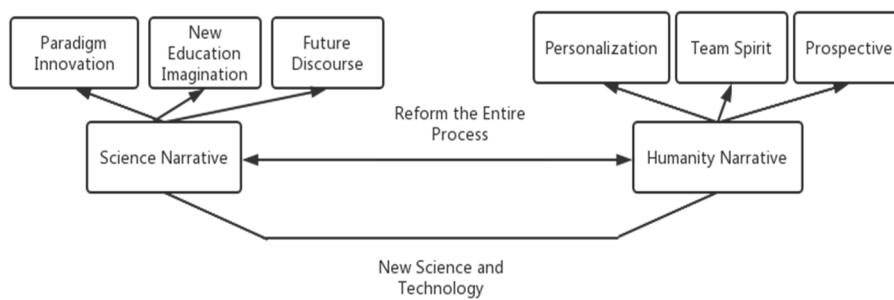


Fig. 5 Educational concepts

4. Conclusion

The rapid advancement of technology has accelerated the demand for skilled individuals. The types of skills needed are also changing fundamentally. Relying solely on conventional education models to train and prepare individuals systematically may not meet the requirements of today’s job market. Therefore, new educational approaches and models based on emerging technologies are increasingly being developed and promoted. Among these, the self-directed learning approach using virtual education (VE) systems is gaining traction due to its cost-effectiveness and high efficacy. Exploring and guiding the educational principles of this approach for healthy and sustainable development is crucial in the current educational landscape. Research has shown that among many advanced educational concepts, it is particularly important to advocate the combination of scientific and humanistic narratives in order to achieve the goal of cultivating humanistic literacy; Not only should we vigorously promote process participation, but we should also promote ideological experimentation, thus forming a set of "future discourse" and new educational imagination in education; We should attach importance to team building and cultivate students' teamwork spirit through sequential means; We should base ourselves on the real society, face the future, and emphasize the cultivation of students' forward-looking creativity.

References

- [1] Fu, Jia-Rong. Virtual education--a competitive strategy of higher education for globalization [J]. Hubei Social Science 2004(10):145-147.
- [2] Zhu Hai, Li Ruifen, Zhao Hui. Talking about virtual reality technology and virtualization of practical teaching [J]. Modern Distance Education 2005(3):64-66.
- [3] Sherry Arnstein. A Ladder of Citizen Participation. 1969. Richard T. LeGates & Frederic Stout (Ed.), The City Reader (second edition), Routledge Press, 2000. 240-241.
- [4] Stone, L. Cultural crossroads of community participation in development: A case from Nepal[J]. Human Organization,1989,48 (3):206-213.
- [5] Butler R W. Problems and issues of integrating tourism development[A]. D C Pearce, R W Butler, et al. Contemporary Issues in Tourism Development[J].London: Routledge,1999.65-80.
- [6] Lv Lizhi. Advanced education concept is the spiritual "atomic bomb" for the innovative development of higher education [M]. Hunan University Press 2013:11.