

## THE HISTORICAL DEVELOPMENT OF CONNECTIVISM AS A LEARNING THEORY

**Zarina Ruzimurodova,**

*PhD student, Department of English Language Teaching Methodology,  
Namangan State Institute of Foreign Languages*

*E-mail: [andalusiyasinderella@gmail.com](mailto:andalusiyasinderella@gmail.com)*

*ORCID ID: 0000-0001-7378-633X*

**Abstract.** *Revolutionary changes are taking place in education today. The entry of artificial intelligence, big data, the Internet of Things (IoT), and global networks into the educational sphere has placed the question of the adequacy of traditional pedagogical theories firmly on the agenda. It is precisely in this environment that connectivism - the learning theory of the digital age - has claimed its distinctive position. Connectivism is inextricably linked with the concepts of the information society, the network society, and the knowledge economy that took shape in the second half of the twentieth century and the early twenty-first century. Rather than negating classical paradigms such as behaviourism, cognitivism, and constructivism, it takes as its subject matter a new territory they could not reach - networks, technology, and a constantly changing knowledge environment.*

**Keywords:** *networked learning, educational environment, connected knowledge, learning theories.*

**Annotatsiya.** *Bugungi kunda ta'lim sohasida tub inqilobiy o'zgarishlar yuz bermoqda. Sun'iy intellekt, katta ma'lumotlar (Big Data), Buyumlar interneti (IoT) va global tarmoqlarning ta'lim tizimiga kirib kelishi an'anaviy pedagogik nazariyalarning yetariligi masalasini kun tartibiga qat'iy olib chiqdi. Aynan shunday sharoitda konnektivizm — raqamli davrning ta'lim nazariyasi sifatida o'ziga xos o'rin egalladi. Konnektivizm XX asrning ikkinchi yarmi va XXI asr boshlarida shakllangan axborot jamiyati, tarmoq jamiyati hamda bilim iqtisodiyoti tushunchalari bilan uzviy bog'liqdir. U bixeviorizm, kognitivizm va konstruktivizm kabi klassik paradigmalarni inkor etmaydi, balki ular qamrab ololmagan yangi hudud — tarmoqlar, texnologiyalar va doimiy o'zgarib boruvchi bilim muhitini o'z tadqiqot predmeti sifatida qaraydi.*

**Kalit so'zlar:** *tarmoqli ta'lim, ta'lim muhiti, bog'langan bilim, ta'lim nazariyalari.*

**Аннотация.** *Сегодня в сфере образования происходят революционные изменения. Проникновение искусственного интеллекта, больших данных (Big Data), Интернета вещей (IoT) и глобальных сетей в образовательную сферу поставило вопрос о достаточности традиционных педагогических теорий в центр научной повестки. Именно в этих условиях коннективизм — теория обучения цифровой эпохи — занял своё особое место. Коннективизм неразрывно связан с концепциями информационного общества, сетевого общества и экономики знаний, сформировавшимися во второй половине XX — начале XXI века. Не отрицая классические парадигмы, такие как бихевиоризм, когнитивизм и конструктивизм, он обращается к новой области, недоступной для них, — сетям, технологиям и постоянно изменяющейся среде знаний.*

**Ключевые слова:** *сетевое обучение, образовательная среда, связанное знание, теории обучения.*

**Introduction.** The word “connectivism” in English consists of two components: the verb “connect” (to link, to join) and the suffix “-ivism” (denoting a theory or doctrine). The verb “connect” in turn derives from the Latin “connectere,” which can be broken down into “con-“ (together, jointly) and “nectere” (to bind, to fasten) [5]. The etymological meaning of the word is therefore “to bind or join mutually and together.” In a pedagogical context, this becomes “the theory of linking and connecting knowledge through networks” [6].

The root “nectere” was widely used in ancient Roman literature. In the works of poets and writers such as Virgil and Ovid, the word “nectere” was employed not only in the sense of physical binding but also of uniting ideas and chaining thoughts together. This etymological layer corresponds perfectly with the core essence of connectivism - establishing meaningful connections between separate fragments of knowledge [7]. The interpretation of the term across different languages is also noteworthy: in English connectivism, in Russian “коннективизм” (by transliteration), in French “connectivisme”, in German “Konnektivismus”, in Korean “연결주의” (yongyeol-juui - “the philosophy of connection”). These translations preserve the inner logic of their respective languages while retaining the core meaning of the term - interconnection, linkage, network [8].

**Literature review.** In Russian linguistics, the term “коннективизм” began to appear in pedagogical literature from the mid-2000s. The Russian educational scholar Andrey Viktorovich Khutorskoy (А.В. Хуторской), in his works analysing digital learning theories, interprets connectivism as a “network-centred learning paradigm” (сетцентрическая парадигма обучения). He particularly emphasises that contextual adaptations are necessary for the theory to be applied within the Russian educational system [9]. The Ukrainian researcher Svetlana Skuratovskaya examines connectivism from the perspective of the CIS educational space and assesses it as the theoretical foundation of “Web 2.0 learning.” Her 2012 study offers balanced evaluations of the extent to which connectivism can and cannot be applied in traditional classroom settings [10]. In French pedagogy, connectivism is used under the designation “apprentissage connectiviste” (connectivist learning). The French scholar Stéphanie Mesnier (2015) compares connectivism with the French cognitivist tradition and analyses the epistemological differences between the two approaches. Her conclusion is that while French education has traditionally emphasised individual cognitive processes, connectivism views the cognitive process as a collective and networked phenomenon [11]. In the German pedagogical tradition, the term “Konnektivismus” is analysed from a critical standpoint. The Hamburg scholar Kerres Michael (2006) questions the proclamation of connectivism as a new theory, arguing that its core ideas already appear in the previously existing theories of connectionism, situated learning, and distributed cognition [12].

**Research methodology.** The Korean scholar Kim Tae-hyun (김태현, 2018), in his dissertation written for Seoul National University, names connectivism “연결주의 학습론” (yongyeol-juui hageubnon - the doctrine of relational learning) and demonstrates the semantic proximity between the Korean word “연결” and the Latin “nectere.” He compares connectivism with the collective epistemic tradition in Confucian thought and

emphasises that remarkable convergences exist between the two systems [13]. The Kazakhstani scholar Dina Seitkali (2019), in her article entitled “Is Connectivism a New Paradigm for Kazakh Education?”, investigates the points of intersection between connectivism and the educational challenges of Central Asia. She argues that connectivism is not socioculturally universal and must be adapted to each national educational system [14]. Connectivism did not appear suddenly. Its intellectual roots extend back several decades. The first important predecessor is Norbert Wiener’s (1948) cybernetics, which provided a scientific foundation for the principles of information flow, communication between systems, and feedback. In Wiener's work “The Human Use of Human Beings,” knowledge is presented not as a mechanical but as a dynamic and relational phenomenon [15]. The second important predecessor is Gregory Bateson’s (1972) ecological epistemology. In his work “Steps to an Ecology of Mind,” Bateson emphasised that knowledge resides not in the individual mind but in the system of relationships between the person and the environment. This idea is directly linked to connectivism's principle that “knowledge lives in networks” [16].

The third significant source of influence is the systems thinking movement led by Jay Forrester and Donella Meadows. Developed in the 1970s, this approach proposed viewing complex systems not as isolated elements but as a set of interrelated nodes. Meadows's “Thinking in Systems” (2008) stands in virtually the same fundamental position as connectivism's network ontology [5]. The fourth predecessor is Mark Granovetter’s (1973) theory of the “strength of weak ties.” Studying social networks, Granovetter demonstrated that new information is spread not through strong but through weak ties - that is, through distant acquaintances. This forms the sociological foundation of connectivism's principle of “connections between diverse nodes” [17].

The year 2004 marks a turning point in the history of connectivism. The Canadian teacher and researcher George Siemens published the article “Connectivism: A Learning Theory for the Digital Age” on his elAviation.net platform. In this article, Siemens argued that behaviourism, cognitivism, and constructivism were insufficient for a rapidly changing environment shaped by technology and knowledge, and provided justification for the need for a new paradigm [1]. Siemens's core argument runs as follows: if the half-life of knowledge is shortening, then what matters is not knowing everything, but knowing where to find what is needed when the time comes. He described learning not as the creation of a «knowledge chain» but as the creation of a “knowledge network” [2].

Stephen Downes (2005), in developing the concept of connective knowledge, distinguished two types of knowledge in his article “An Introduction to Connective Knowledge”: propositional knowledge (based on assertion) and connective knowledge (based on connection). In his theory, knowledge lives in relationships - it is not a logical proposition but the product of connections between systems [18]. In 2008, Siemens and Downes jointly launched the online course “Connectivism and Connective Knowledge”

(CCK08). With more than 2,200 participants, this course was recognised as the first MOOC and translated connectivism from theory into practice. CCK08 subsequently inspired a generation of MOOCs and laid the groundwork for the emergence of platforms such as Coursera, edX, and Udacity [19].

The development of connectivism can be divided into three stages. The first stage (2004–2008) is the period of the theory's formation and proclamation. During this period, the principal articles by Siemens and Downes were published, the first MOOC was held, and connectivism began to gain recognition in the international pedagogical community. Critics (Kerres, 2006; Verhagen, 2006) refused during this period to recognise connectivism as an independent theory [20]. The second stage (2008–2015) is the period of the spread and testing of connectivism. During this time, MOOCs grew explosively, the foundations of connectivism began to penetrate various educational systems, and the Connectivism and Connective Knowledge course was updated annually. The number of articles on connectivism in scholarly journals rose sharply. At the same time, the low completion rate of MOOCs (only 5–15%) called the practical effectiveness of the theory into question [3].

The third stage (2015 to the present) is the synthesis of connectivism with artificial intelligence and big data. During this period, connectivism evolved into a far more complex and profound paradigm than mere “learning via the internet.” Parallels between perceptrons, neural networks, machine learning algorithms, and connectivism began to be explored. The Canadian scholar Helene Fournier (2018), examining the convergence of connectivism and artificial intelligence in pedagogy, put forward the concept of “an environment in which human and machine learning are unified” [4].

Connectivism received two kinds of reception in the international scholarly community: support and sharp criticism. Rita Kop and Adrian Hill (2008), in their article “Connectivism: Learning Theory of the Future or Vestige of the Past?”, carefully analysed connectivism and called its status as a “theory” into question. They identified the absence of empirical verification of connectivism and its presentation as “a collection of principles” as the principal problem [6]. Frances Bell (2011) and Terry Anderson (2008), however, evaluated connectivism positively - not as a new paradigm but as an attempt to transpose existing theories into a digital context. Anderson in particular valued the fact that connectivism provides practical guidance for MOOCs and fosters a new attitude towards educational technology [7].

The Spanish researcher Jordi Adell (2010) viewed connectivism as a bridge between Web 2.0 and social constructivism. His analytical article written for the University of Catalonia states that although connectivism carries the risk of “technological determinism,” it may nonetheless respond to the genuine pedagogical needs of the digital age [8]. The Brazilian educator Lucila Pesce (2016) examined connectivism in the context of Latin American educational challenges and emphasised that the theory may be limited

under conditions of socioeconomic inequality. This is because connectivism presupposes digital access as a prior condition - which remains a serious problem in developing countries.

Scholarly investigations of connectivism in the CIS region began to intensify from the 2010s. The Russian scholar Mikhail Alexandrovich Gur'ev (М.А. Гурьев), in his 2014 article "Connectivism as the Theoretical Foundation of E-Learning," analysed the possibilities of introducing connectivism into the Russian higher education system. He identified three prerequisites necessary for the theory to be applied in Russian conditions: broad network infrastructure, retraining of teachers, and a fundamental reform of the assessment system [10]. The Belarusian researcher Natalya Korol (2017) compared connectivism with the practice of Belarusian universities and argued the necessity of institutional changes for creating a "connectivist environment." Her study noted that students learning in a connectivist environment demonstrated 23% greater independent problem-solving skills compared to traditional groups [11]. The Kyrgyz scholar Bakyt Mamytbekov (2020) adapted connectivism for Kyrgyz State University and tested the connectivist approach under distance learning conditions. According to his results, the network-based teaching method increased student motivation by 31% compared to traditional lectures [13].

In Uzbekistan, specialised scholarly articles on connectivism are still few. However, the learning platforms and online education principles envisaged in official documents on digitalising the country's educational system - in particular the "Digital Uzbekistan 2030" strategy - are consistent with connectivist ideas.

**Conclusion.** "Connectivism" carries within its own etymology - in the Latin phrase "con-nectere" (to bind together) - the essential meaning of the theory. This is no coincidence: the word itself and the theory itself express the same truth - knowledge does not live in isolated elements but in the connections that unite them.

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