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O‘RGANISH NAZARIYALARINING QIYOSIY TAHLILI: BIXEVIORIZM, KOGNITIVIZM, KONSTRUKTIVIZM VA KONEKTIVIZM

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Annotatsiya

Ushbu maqolada ta’limdagi to‘rtta asosiy nazariy paradigma — bixeviorizm, kognitivizm, konstruktivizm va konektivizm — qiyosiy tahlil qilinadi. Maqolada har bir nazariyaning tarixiy rivojlanishi, asosiy namoyandalari va nazariy asoslari ko‘rib chiqiladi. Nazariyalar o‘rtasidagi o‘xshashliklar va asosiy farqlar ilmiy jihatdan tahlil etiladi. Bixeviorizm o‘rganishni stimul-reaksiya mexanizmlari orqali izohlasa, kognitivizm ichki kognitiv jarayonlarga e’tibor qaratadi. Konstruktivizm bilimni faol qurilish jarayoni sifatida talqin etsa, konektivizm raqamli davrda o‘rganishni tarmoqlar va texnologiyalar orqali izohlaydi. Maqolada ayniqsa konektivizmning dolzarbligi va zamonaviy ta’limdagi o‘rni alohida ta’kidlanadi. Natijalar shuni ko‘rsatadiki, ushbu nazariyalar bir-birini inkor etmaydi, balki o‘rganish jarayonining turli jihatlarini yoritib, o‘zaro to‘ldiradi.

Kalit so‘zlar: bixeviorizm, kognitivizm, konstruktivizm, konektivizm, o‘rganish nazariyalari, pedagogika.

СРАВНИТЕЛЬНЫЙ АНАЛИЗ ТЕОРИЙ ОБУЧЕНИЯ: БИХЕВИОРИЗМ, КОГНИТИВИЗМ, КОНСТРУКТИВИЗМ И КОННЕКТИВИЗМ

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Аннотация

В статье представлен сравнительный анализ четырёх основных теоретических парадигм в образовании: бихевиоризма, когнитивизма, конструктивизма и коннективизма. Рассматриваются историческое развитие, ключевые представители и теоретические основы каждой теории. Научно анализируются сходства и фундаментальные различия между ними. Если бихевиоризм объясняет обучение через механизмы «стимул–реакция», то когнитивизм акцентирует внимание на внутренних когнитивных процессах. Конструктивизм трактует знание как активный процесс его конструирования, тогда как коннективизм объясняет обучение через сети и технологии в цифровую эпоху. Особое внимание уделяется актуальности коннективизма и его роли в современном образовании. Полученные результаты показывают, что данные теории не исключают друг друга, а дополняют, освещая различные аспекты процесса обучения.

Ключевые слова: бихевиоризм, когнитивизм, конструктивизм, коннективизм, теории обучения, педагогика.

COMPARATIVE ANALYSIS OF LEARNING THEORIES: BEHAVIOURISM, COGNITIVISM, CONSTRUCTIVISM AND CONNECTIVISM

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Abstract

This article provides a comparative analysis of four major theoretical paradigms in education: behaviourism, cognitivism, constructivism, and connectivism. The paper examines the historical development, key proponents, and theoretical foundations of each theory. Similarities and fundamental differences between the theories are scientifically analysed. While behaviourism explains learning through stimulus-response mechanisms, cognitivism focuses on internal

cognitive processes. Constructivism interprets knowledge as an active construction process, while connectivism explains learning through networks and technologies in the digital age. The article places particular emphasis on the relevance of connectivism and its role in contemporary education. The findings suggest that these theories do not negate each other but rather illuminate different facets of learning and complement one another.

Keywords: behaviourism, cognitivism, constructivism, connectivism, learning theories, pedagogy.

Learning theories are conceptual systems that explain how students acquire knowledge, develop behaviour, and grow cognitively. From the early twentieth century to the present day, several major learning theories have emerged and formed the foundation of pedagogy. Behaviourism, cognitivism, constructivism, and connectivism have become the key reference points of educational psychology and pedagogy [1].Behaviourism emerged in the late nineteenth and early twentieth centuries, explaining learning through observable changes in behaviour. Ivan Pavlov, John B. Watson, and B.F. Skinner are among its founders. This theory explained the human learning mechanism through the relationship between stimulus and response [2].Cognitivism arose in the 1950s and 1960s as an alternative to behaviourism. Scholars such as Jean Piaget, Jerome Bruner, and David Ausubel focused on internal thought processes. This approach established cognitive processes—memory, attention, perception, and problem-solving—as the basis of learning [3].Constructivism developed between the 1970s and 1990s. Drawing on the ideas of Lev Vygotsky, Jean Piaget, and John Dewey, this theory proposed that the learner does not passively receive knowledge but actively constructs it. It evolved in two directions: social constructivism and individual constructivism [4].Connectivism was proposed in 2004–2005 by George Siemens and Stephen Downes as a product of the twenty-first century. Grounded in the idea that knowledge resides in networks in the age of the internet and digital technologies, this theory offers a new paradigm for learning [5].The purpose of this research is to conduct a comparative analysis of these four theories, identify their similarities and differences, and evaluate their significance in contemporary education. To compare the theories, a comparative analysis matrix—widely used in the scholarly literature—was employed. The matrix covers the following dimensions: the nature of knowledge, the role of the learner, the role of the teacher, sources of motivation, the relationship with technology, and key criticisms [10].

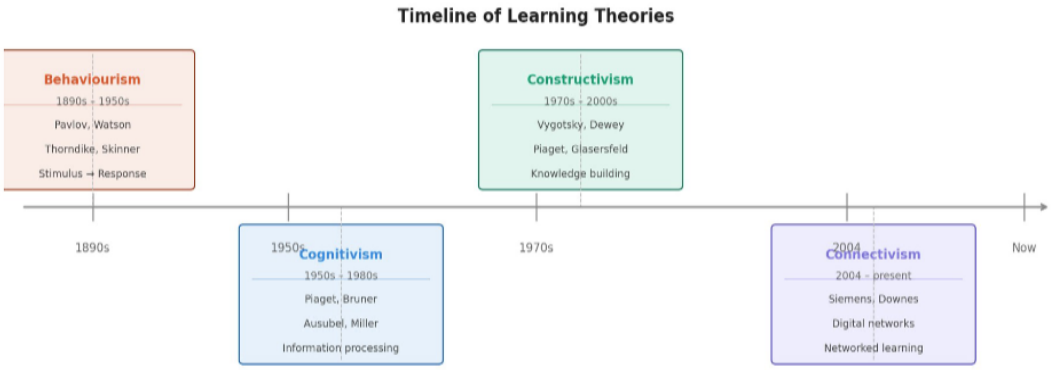

Figure 1. Chronological development and key founders of four learning theories (GOST reference: Schunk, 2019; Siemens, 2005; Vygotsky, 1978; Watson, 1913)

Behaviourism took shape in the late nineteenth and early twentieth centuries. The theory's roots lie in Ivan Pavlov's (1849–1936) experiments on classical conditioning. By studying conditioned reflexes related to food in dogs, Pavlov was the first to scientifically demonstrate the conditioned and unconditioned stimulus-response mechanism [11].

John B. Watson (1878–1958) formally proclaimed behaviourism as a science. His 1913 article *Psychology as the Behaviourist Views It* is considered behaviourism's programmatic document. Watson argued that psychology should study only observable behaviour and that internal mental states are not a proper subject of scientific inquiry [12].

B.F. Skinner (1904–1990) advanced behaviourism to a new level. His operant conditioning theory demonstrated the possibility of shaping behaviour through reinforcement and punishment. In his works *Verbal Behaviour* (1957) and *The Technology of Teaching* (1968), Skinner provided a detailed justification of the behaviourist approach to education [13].

The core concepts of behaviourism include the conditioned reflex, the stimulus-response (S-R) bond, reinforcement, extinction, generalisation, and discrimination. These concepts present the learning process as a mechanical and measurable system [14].

In behaviourist education, the learner is regarded as a passive vessel (*tabula rasa*) who receives knowledge from the outside. The teacher acts as the source of information and the controller of behaviour. This approach places particular emphasis on practice and repetition. Programmed instruction and machine-based learning in education were created on a behaviourist foundation [2].

The behaviourist approach was widely applied in school education: daily drills, tests and examinations, grading systems, and disciplinary measures are all grounded in behaviourism. The traditional structure of textbooks also largely reflects behaviourist principles [15]. However, critics regard behaviourism as one-sided because internal thinking, motivation, and emotional states are left out of consideration. Chomsky (1959) criticised Skinner's *Verbal Behaviour*, demonstrating that language cannot be explained by conditioning alone [3].

Cognitivism: The Theory of Knowledge — Historical Development and Founders

Cognitivism took shape during the "cognitive revolution" of the 1950s and 1960s. Several factors contributed to its emergence: advances in computer science, Noam Chomsky's discoveries in linguistics, and growing dissatisfaction with behaviourism [6].

Jean Piaget (1896–1980) is one of the founders of cognitive developmental theory. His concepts of schema, assimilation, accommodation, and equilibration explained how knowledge is constructed. Piaget divided children's cognitive development into four stages: sensorimotor, preoperational, concrete operational, and formal operational [7].

Jerome Bruner (1915–2016) made a significant contribution to learning theory. His concept of the "spiral curriculum" proposes that complex subjects be revisited and deepened each year. Bruner's idea of discovery learning is also an important component of the cognitive approach [8].

David Ausubel (1918–2008) developed the theory of meaningful learning. He emphasised the importance of connecting prior knowledge with new information. Ausubel's concept of the "advance organizer" is widely applied in teaching [9].

At the heart of cognitivism lies the information processing model. This model distinguishes three stages of memory: sensory memory, working (short-term) memory, and long-term memory. The memory model of Atkinson and Shiffrin (1968) is the principal theoretical schema of cognitivism [10].

Cognitive Load Theory (Sweller, 1988) proposed that the learner's mental capacity is limited and that instructional materials should be designed with this in mind. This theory has found broad practical application in the design of learning materials [11].

Cognitivism had a major impact on instructional design: concept maps, advance organizers, problem-based learning, and metacognitive strategies are all grounded in cognitivism.

The teacher no longer acts as a transmitter of information but instead takes on the role of facilitator [12].

In terms of criticism, it is often argued that cognitivism does not adequately account for emotion, motivation, and social factors. Furthermore, results obtained under laboratory conditions do not always transfer to real learning environments [13].

Constructivism: The Constructivist Theory — Historical Development and Founders

Constructivism emerged in the second half of the twentieth century as a reaction against behaviourism and the model of transmitting ready-made knowledge, drawing on the ideas of John Dewey, Lev Vygotsky, and Jean Piaget. The core premise of constructivism is that the learner does not passively receive knowledge but actively constructs it through interaction with prior experience and the surrounding environment [14].

Lev Vygotsky (1896–1934) is one of the founders of social constructivism. His concept of the Zone of Proximal Development (ZPD) is defined as the distance between tasks a learner can perform independently and tasks they can perform with competent assistance. The concept of scaffolding is based on Vygotsky's ideas [15].

John Dewey (1859–1952) advanced the idea of experiential learning. His principle of "learning by doing" laid the practical foundations of constructivism. Dewey's philosophy of progressive education continues to exert great influence to this day [16].

Ernst von Glasersfeld developed the direction of radical constructivism. According to him, knowledge never reflects objective reality; rather, it remains a subjective construction built in the mind of the learner. Although philosophically controversial, this idea had a notable impact on educational methodology [7].

The core concepts of constructivism are active learning, contextual learning, social interaction, reflection, and authentic tasks. The learner integrates prior knowledge with new information and strives to construct personal understanding [8].

Situated learning, a theory that grew out of constructivism, emphasises the necessity of acquiring knowledge in real-life contexts. Jean Lave and Etienne Wenger's concept of the "community of practice" also reflects a constructivist approach [9].

Constructivism forms the basis of methodologies such as Project-Based Learning (PBL), cooperative learning, Problem-Based Learning, and inquiry-based learning. The "flipped classroom" model also embodies constructivist principles [10].

Critics note the difficulties of implementing constructivism in practice, its unsuitability for all learners, particularly when studying new material, and the complexity of assessment. Kirschner, Sweller, and Clark (2006) criticised the constructivist "minimal guidance" approach [11].

Connectivism: A Theory for the Digital Age

Connectivism emerged in the first decade of the twenty-first century and was proposed as a learning theory for the digital age. George Siemens published *Connectivism: A Learning Theory for the Digital Age* in 2004, outlining the theory's core principles. Stephen Downes explained the nature of connective knowledge in his 2005 article *An Introduction to Connective Knowledge* [16].

Several socio-technological factors contributed to the emergence of connectivism: the mass spread of the internet and the World Wide Web, the rise of social networks, the exponential growth of data, and the rapid obsolescence of knowledge. As Siemens (2004) noted, contemporary people need to know not only what they know, but also where to find what they need [5].

Connectivism provided the intellectual foundation for the Massive Open Online Courses (MOOCs) movement. In 2008, Siemens and Downes delivered the course *Connectivism and Connective Knowledge* online to 2,200 students—an event recorded in history as the first MOOC. Subsequently, platforms such as edX, Coursera, and Udacity brought connectivist ideas to millions

[17].

Siemens (2004) identified the following core principles of connectivism:

(1) learning and knowledge rest in diversity of opinions;

(2) learning is a process of connecting specialised nodes or information sources;

(3) learning may reside in non-human appliances;

(4) the capacity to know more is more critical than what is currently known;

(5) the ability to see connections between fields, ideas, and concepts is a core skill [18].

The central concept of connectivism is the "network." The theory holds that knowledge resides in the nodes and connections of a network. The learner must expand their knowledge network by forming new nodes and connections. This approach answers the question "Where is knowledge?" with "In the network" [19].

Siemens and Conole (2011) identified four key characteristics of connectivism: distributed knowledge, networked learning, integration with technology, and continuous change. These characteristics fundamentally distinguish connectivism from earlier theories [20]. Although empirically testing connectivism is complex, a number of studies support its core ideas. Downes (2012) distinguished two types of knowledge in the theory of connective knowledge: qualitative and quantitative. Connective knowledge is characterised not as a single fact but as a relationship between two or more entities [16]. Empirical research suggests that learning through social networks may improve retention and transfer of information compared to traditional instruction. Bransford, Brown, and Cocking's (2000) study *How People Learn* also provides valuable insights into the dependence of knowledge on context and networks [9]. Although research into MOOC effectiveness remains limited, certain findings have been established. Yang et al. (2013) studied the participation of more than 35,000 students in Coursera courses and found that social interaction in a connective learning approach increases motivation. However, completion rates remain persistently low, indicating one of the weak points of connectivism. When the four theories are analysed in depth, a number of important similarities emerge. First, all theories place the learning process at the centre and regard the development of the learner as a primary goal. Second, all theories acknowledge the connection between prior experience and new knowledge, even if they interpret this connection differently [11]. Third, all four theories recognise the role of motivation in learning. Fourth, they all accept that context and environment affect learning. Fifth, all theories attend to the relationship between teacher and learner, even if they conceptualise this relationship differently. The principal difference between the theories lies in their views on the nature of knowledge and the mechanism of learning. Behaviourism regards knowledge as objective and external, transmitted through stimuli, and views the learner as a passive receiver. Cognitivism views knowledge as information and explains the process of its processing; the learner is more active, but still essentially reactive.

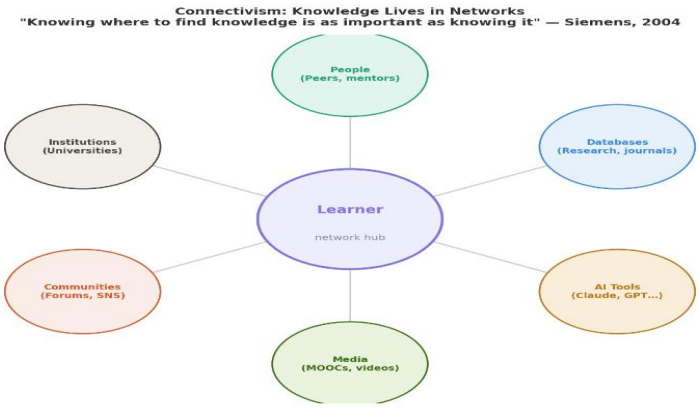

Figure 4. Connectivist knowledge network: learner as central node (Siemens, 2004; Downes, 2007; Kop, 2011)

Constructivism considers knowledge to be subjective and actively under construction; the learner is a builder of knowledge. Connectivism describes knowledge as distributed across networks and in constant change; the learner is a creator of and connector within networks. The teacher's role also shifts progressively: controller → supporter → guide → partner [13]. The relationship with technology also differs. Behaviourism uses technology for drill and repetition; cognitivism for organising information; constructivism for collaboration and creation; connectivism views technology as an inseparable part and environment of learning itself [1].

This research conducted a comparative analysis of behaviourism, cognitivism, constructivism, and connectivism, reaching several important conclusions. First, these four theories illuminate different facets of learning and do not negate one another. In practice, the most effective educational system combines the best aspects of all of them. Second, each theory has strengths suited to particular contexts and goals. The behaviourist approach is effective for forming basic skills and habits; cognitivist and constructivist methods are useful for explaining complex concepts and solving problems; and the connectivist approach is especially relevant for self-directed development in digital environments.

Third, connectivism remains the most pressing theoretical challenge in contemporary education. In the digital age, knowledge becomes obsolete rapidly, the volume of information continues to grow, and networks are assuming ever greater importance. Under these circumstances, the core ideas of connectivism—learning through networks, knowledge management, and continuous connectivity—are exceptionally relevant.

Fourth, for any modern learning theory or pedagogical system, it is essential to understand these four approaches and apply them purposefully. In designing educational systems, an eclectic approach that combines the best ideas from each theory leads to the most effective outcomes.

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