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IDEAS OF CENTRAL ASIAN AND EUROPEAN SCHOLARS ON CREATIVE AND LOGICAL THINKING

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Abstract
This article presents a comparative analysis of the ideas of Central Asian and European scholars on thinking. The study identifies common and distinct aspects of developing creative and logical thinking, and explores the application of historical-philosophical sources in pedagogical practice. The results contribute to optimizing the development of creative and analytical thinking in modern education.

Keywords: Creative thinking, logical reasoning, Central Asian scholars, European thinkers, philosophy of education, intellectual development.

Introduction

The 21st century is an era of scientific-technological revolution, globalization, and a dramatic expansion of communication opportunities. Under these conditions, the systematic development of creative and logical (analytical) thinking abilities is considered a crucial strategic task to ensure intellectual competitiveness at both individual and societal levels. Historically, studying the legacy of scholars who have reflected on thinking and its formation serves as a scientific foundation for deeply understanding contemporary educational issues and adapting them to modern contexts [1].

The views on thinking held by Central Asian scholars (e.g., Al-Farabi, Ibn Sina, Al-Biruni, Ulugh Beg, and others) and European thinkers (e.g., Plato, Aristotle, Descartes, Kant, and 20th-century psychologists) were formed in different historical, cultural, and methodological contexts. Their ideas provide valuable scientific and practical conclusions for modern educational theory and pedagogy, making this topic highly significant as a research subject.

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A review of existing literature shows that Eastern and Western scholars have emphasized different aspects of thinking; however, systematic comparative analyses of their mutual connections and integration are limited. Therefore, this article raises the following core issue: What are the interrelationships, differences, and applications to modern educational processes of Eastern and Western scholars' ideas on thinking (creative and logical)?

To address this issue, the research poses the following questions:

How do Central Asian scholars (Al-Farabi, Ibn Sina, Al-Biruni, Ulugh Beg, etc.) define and structure the core ideas of creative and logical thinking?

How do European thinkers (Aristotle, Descartes, Kant, and modern psychologists) explain logical and creative thinking and propose teaching methods?

How can these two cultural-philosophical traditions complement or integrate within modern educational systems?

Research Aim and Objectives.

Aim:

To conduct a comparative analysis of Central Asian and European scholars' ideas on creative and logical thinking and identify their practical applications in modern educational processes.

Objectives:

Systematize and classify the core scholarly ideas on thinking from Eastern and Western scholars.

·Compare these ideas pedagogically and methodologically, identifying commonalities and differences.

· Develop specific recommendations for education specialists based on the results, including suggestions for integrating these ideas into textbooks and methodological guides.

Research Object and Subject

Object: The thinking process and its formation in education.

Subject: Ideas on creative and logical thinking proposed by Central Asian and European scholars and their application in education.

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Research Methods

The article employs comparative-historical analysis, philosophical-analytical approach, and content analysis of literature. Historical sources (original works and translations), contemporary research articles, and psychological literature are analyzed together.

Literature Review

Views of Central Asian Scholars on Thinking.

Abu Nasr Al-Farabi. Al-Farabi interpreted issues of thinking and intellect by combining Eastern philosophy and Aristotelian logic. According to him, human thinking develops through three stages: logical analysis, intellectual proof, and creative inference. In his treatise "On the Intellect," he emphasizes the existence of "potential," "active," and "practical" types of intellect. For him, creative thinking manifests at the highest level of active intellect, as at this stage, humans are not limited by existing knowledge but create new meanings [2].

Al-Farabi considered logic the foundation of all scientific knowledge; thus, he developed the Aristotelian logical system in line with Eastern scholarly tradition. Researchers note that Al-Farabi described logical thinking as "a regulated form of reasoning."

Ibn Sina proposed a deep psychological and philosophical approach to the thinking process. He argued that the human brain initially receives information through sensory perception, then assigns meaning through stages of "imagination," "deliberation," and "thinking." He divides thinking into two main forms:

· logical (analytical) thinking

· creative thinking

He defines creative thinking as "the ability to derive new and previously non-existent meaning from several pieces of information" [3]. Ibn Sina considered the development of thinking as a psychological process that can be enhanced through education, environment, and practice.

Abu Rayhan Al-Biruni. Al-Biruni emphasizes logical thinking as the primary tool in scientific research methodology. He considered experience, observation, and comparison the foundations of knowledge: his idea that "intellect finds the right path through experience" aligns with the core principles of modern scientific methodology. Al-Biruni links creative thinking to psychological factors such as

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natural curiosity, wonder, and thirst for knowledge. Researchers highlight his "encyclopedic thinking," meaning he created new ideas by integrating knowledge from multiple fields [4].

Mirzo Ulugh Beg. Ulugh Beg based scientific thinking on mathematical and astronomical evidence. In his scientific school, observation, reasoning, verification, and inference were used as key stages of logical thinking [5].

Modern studies note that Ulugh Beg's scientific school is characterized by the "observation – analytical analysis – innovation introduction" model of creative thinking.

Views of European Thinkers on Thinking.

Aristotle is a common source for both Eastern and Western thinking traditions. As the founder of logic, he interprets intellect as "the ability to analyze relationships." His "syllogism" theory is recognized as the first scientific model of logical thinking [6][7].

René Descartes. Descartes proposed purifying thinking through methodical doubt. He bases logical thinking on the "principle of clarity and distinctness" and links creative thinking to "the independent freedom of the intellect" [8]. Descartes' "cogito" theory has served to ground the internal motivational character of creative thinking in subsequent psychological research.

Immanuel Kant. Kant divides thinking into two parts:

· intellectual (analytical) thinking,

· aesthetic (creative) thinking.

According to him, creativity arises from the "free play between imagination and intellect" [9]. Kant's theory of "aesthetic judgment" became the foundation for the development of creativity psychology in the 19th–20th centuries.

Modern Approaches: Guilford, Torrance, Piaget

J. Guilford advanced the idea in 1950 that "creative thinking is a distinct form of thinking" and explained creativity through divergent thinking [10].

E. Torrance created a system of tests to measure creative thinking, and his model is widely used in pedagogical research [11].

J. Piaget links logical thinking to the key stages of children's intellectual development – crucial for teaching methodology [12].

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Research Methodology

The methodological foundations of this research are directed towards a deep scientific, historical, and philosophical analysis of Central Asian and European scholars' views on creative and logical thinking. The research methods, considering the complexity of the content, were defined as multi-stage and integrative.

1.Historical-Comparative Analysis Method. The research focuses on the scholarly heritage of Central Asian scholars – Abu Nasr Al-Farabi, Abu Rayhan Al-Biruni, Ibn Sina, Alisher Navoi; and European thinkers – Aristotle, René Descartes, Immanuel Kant, John Dewey, and others. Using the historical-comparative method, the eras, scientific schools, and epistemological views of these thinkers were deeply compared. This method allowed comparison of Al-Farabi's interpretation of thinking and intellect as "the superior power distinguishing humans from animals" with Aristotle's views on logos, deduction, and categories. Furthermore, Ibn Sina's presentation of thinking stages as "imagination–affirmation–conclusion" was compared with Descartes' famous principle of "Methodical Doubt," clarifying the characteristics of thinking formation in different civilizations.

The historical-comparative approach primarily helped demonstrate the immense contribution of scholars' views to the development of modern sciences. At the same time, it was scientifically established that Central Asian thinkers' views on logical thinking were formed earlier than European philosophical traditions.

2. Philosophical-Analytical Approach. The philosophical-analytical method held a central role in defining the theoretical foundations of the research. This approach facilitated the interpretation of each scholar's views on thinking, cognition, and creativity from the perspectives of logic, epistemology, metaphysics, and axiology.

Al-Farabi's doctrine on the types of intellect – material intellect, knowing intellect, active intellect – was analyzed from the viewpoint of modern cognitive psychology. Al-Biruni's idea that "truth must be tested through experience" [4] was elucidated in connection with the subsequent formation of European scientific methodology. Furthermore, Descartes' "cogito, ergo sum" principle, Kant's theories on the limits of reason and synthetic judgments, and Dewey's

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theory of reflective thinking were studied in relation to the views of Central Asian scholars. This approach enabled identification of common epistemological foundations of the two scholarly schools.

3. Content Analysis Method. Terms, concepts, and ideas denoting creative, logical, reflective, and analytical thinking in the scholars' works were studied using specialized content analysis.

Systematic excerpts were selected from the following sources:

· Al-Farabi's "Treatise on the Intellect," "The Virtuous City"
· Methods of cognition in Al-Biruni's "India," "Geodesy"
· Stages of intellect in Ibn Sina's "Kitab al-Nafs," "The Book of Healing"
· Aristotle's "Organon" and "Metaphysics"
· Descartes' "Meditations"
· Kant's "Critique of Pure Reason"
· Dewey's "How We Think"

Through content analysis, the scholars' interpretations of concepts such as "intellect," "logic," "creation," "imagination," "analysis," "inference," and "innovation" were compared and classified. The most frequently occurring concepts in each text were identified, and ideas related to thinking were grouped.

4. Pedagogical-Methodological Analysis. In the practical part of the research, the impact of scholars' views on modern education, specifically the process of forming creative and logical thinking, was studied. For this purpose, scientific sources on modern pedagogy, constructivism, cognitive psychology, Bloom's taxonomy, metacognitive approaches, and 21st-century competencies were analyzed.

Special attention was paid to: the application of Al-Farabi and Aristotle's logical thinking theories in today's education; the connection of Al-Biruni's scientific inquiry methods with STEM fields; the alignment of Ibn Sina's views on the cognitive process with reflective teaching methods; the link between creativity and socio-cultural factors in the views of Dewey and Navoi. The pedagogical-methodological analysis revealed the influence of ancient sources on modern educational approaches to developing creative thinking.

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5. Comparative-Philosophical Synthesis. The ideas on thinking from Central Asian and European scholarly-philosophical schools were analyzed through deep synthesis. At this stage, the following scientific conclusions were formed:

· In both scholarly schools, the concepts of intellect and cognition are central to thinking.

· While Central Asian scholars linked thinking with practice, experience, and ethical perfection, European scholars explained it on a theoretical-rational basis.

· The systematic form of logical thinking (categories, syllogism, rules) began taking shape with Aristotle, but Al-Farabi and Ibn Sina perfected this system.

· Views on creative thinking find mutual harmony in Navoi's philosophy of creativity, Al-Biruni's scientific inquiry methods, and Dewey's educational theory.

Comparative synthesis strengthened the research's theoretical foundation and allowed viewing the thinking concepts of two cultures within a unified scientific model.

Analysis and Results

Now, a systematic comparison of the ideas on creative and logical thinking of Central Asian (Al-Farabi, Ibn Sina, Al-Biruni, Ulugh Beg, etc.) and European (Plato/Aristotle, Descartes, Kant, Dewey, and modern psychologists) scholars. The analysis is based on content analysis, historical-comparative, and philosophical-analytical methods.

Aspect Central Asian Scholars European Scholars

Logical System Logic linked to practice and ethical perfection; many inductive and empirical elements. Deductive system, formal logic and central categories (Aristotle). Methodical doubt – Descartes.

Creative Thinking Creativity as a spiritual and practical process; manifested through harmony of art, ethics, and knowledge. Creativity understood as a reflective, critical, and analytical process; emphasis on divergent and convergent thinking (Guilford, Torrance).

Epistemology Justification of knowledge based on experience, observation, and practical research (Al-Biruni, Ibn Sina). Knowledge based on intellectual categories and pure theoretical foundations (Kant); discussion of epistemology and limits of reason.

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Scientific Method Experience + induction + encyclopedic harmony; multidisciplinary approach. Deduction, experimental philosophical method, methodical doubt, and formal analysis.

Application to Education Forming thinking through moral education, observation, and practical exercises. Emphasis on critical reflection, methodical analysis, and structured teaching.

The diagram above compares the evaluated indicators of the two civilizations' scholars' views on three key indicators: logical system, creative thinking, and epistemology.

Overall Scientific Results.

· Complementarity: Central Asian and European scholars complement each other in thinking theory – one provides empirical-practical foundations, the other provides theoretical-formal structure.

· Dual Nature of Creativity: In the East, creativity is linked to spirituality and time, while in the West, it is based on structure and measurement – these differences can be utilized in shaping creativity development strategies in education.

Model for Educational Practice: The most effective educational approach combines:

a) teaching concepts/structures (Aristotle, Descartes);

b) providing practical and empirical exercises (Al-Biruni, Ibn Sina);

c) incorporating creative tasks and reflection (Dewey, Guilford).

Recommendations.

· Include logical structures (syllogism, argument construction) in lesson plans to develop precise analytical skills in students.

· Strengthen empirical thinking through practical laboratory and observation sessions (Al-Biruni's principles).

· Integrate divergent thinking exercises (Torrance methods) into lessons to measure and develop creativity.

· Implement interdisciplinary projects in education – linking historical-philosophical material with modern STEM fields.

Conclusion

The article conducted a comparative analysis of Central Asian and European scholars' views on creative and logical thinking. The results show that Central

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Asian thinkers developed thinking within an empirical, practical, and ethical context, while European scholars shaped it based on theoretical, formal, and structural systems. Creative thinking is explained in the East through spiritual-ethical approaches, and in the West through reflective and critical approaches. Integrating these approaches in modern education allows for the simultaneous development of logical precision and creative freedom in students. Furthermore, combining logical structures, empirical exercises, and divergent thinking increases the effectiveness of the educational process.

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