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FALSAFA VA HAYOT
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FORMATION OF SCIENTIFIC SCHOOLS AND THEIR PRACTICAL SIGNIFICANCE IN ORGANIZING SCIENTIFIC ACTIVITY

Annotation. The development of scientific schools is essential for advancing scientific knowledge and organizing research efforts. These schools, comprising groups of researchers with specific methodologies, theoretical frameworks, and research objectives, have profoundly influenced the course of scientific discovery. From the academies of ancient Greece to contemporary research institutions, academic schools have historically created collaborative environments that encourage innovation and rigorous scientific inquiry. By analyzing historical examples and modern practices, this article seeks to highlight the achievements and challenges involved in the formation of scientific schools. It explores the fundamental principles, historical evolution, and practical significance of these schools in contemporary scientific pursuits.

Key words: scientific schools, philosophy, activity, cooperation, scientific community, interdisciplinary research, knowledge, innovation in science, academic cooperation, historical evolution of scientific schools.

ILMIY MAKTABLARNING SHAKLLANISHI VA ULARNING ILMIY FAOLIYATNI TASHKIL ETISHDAGI AMALIY AHAMIYATI

Annotatsiya. Ilmiy maktablarning shakllanishi ilmiy bilimlarni yuksaltirish va ilmiy urinishlarni tizimlashtirishning ajralmas qismidir. Tegishli metodologiya, nazariy asoslar va tadqiqot maqsadlariga ega bo‘lgan tadqiqotchilar guruhlarini o‘z ichiga olgan ushbu maktablar ilmiy kashfiyotlar traektoriyasiga sezilarli ta’sir ko‘rsatdi. Tarixiy jihatdan qadimgi Yunoniston akademiyalaridan tortib zamonaviy tadqiqot muassasalarigacha ilmiy maktablar innovatsiyalar va qat’iy ilmiy izlanishlarni rag‘batlantiradigan hamkorlik muhitini ta’minlagan. Tarixiy misollar va zamonaviy amaliyotlarni o‘rganish orqali ushbu maqola ilmiy maktablarning rivojlanishi bilan bog‘liq yutuqlar va muammolarni yoritishga qaratilgan. Ushbu maqola ilmiy maktablarning asosiy tamoyillari, ularning tarixiy evolyutsiyasi va zamonaviy ilmiy urinishlardagi amaliy ahamiyatini o‘rganadi.

Kalit so‘zlar: ilmiy maktablar, falsafa, faoliyat, hamkorlik, ilmiy hamjamiyat, fanlararo tadqiqotlar, bilim, fandagi innovatsiyalar, akademik hamkorlik, ilmiy maktablarning tarixiy evolyutsiyasi.

ФОРМИРОВАНИЕ НАУЧНЫХ ШКОЛ И ИХ ПРАКТИЧЕСКОЕ ЗНАЧЕНИЕ В ОРГАНИЗАЦИИ НАУЧНОЙ ДЕЯТЕЛЬНОСТИ

Аннотация. Развитие научных школ имеет важное значение для развития научных знаний и организации исследовательской деятельности. Эти школы, состоящие из групп исследователей с конкретной методологией, теоретической базой и исследовательскими целями, оказали глубокое влияние на ход научных открытий. От академий Древней Греции до современных исследовательских институтов академические школы исторически создавали среду сотрудничества, которая поощряла инновации и строгие научные исследования. На основе анализа исторических примеров и современной практики данная статья призвана осветить достижения и проблемы, связанные с формированием научных школ. В нем исследуются фундаментальные принципы, историческая эволюция и практическое значение этих школ в современных научных исследованиях.

Ключевые слова: научные школы, философия, деятельность, сотрудничество, научное сообщество, междисциплинарные исследования, знания, инновации в науке, академическое сотрудничество, историческая эволюция научных школ.

INTRODUCTION

The advancement of science directly influences a state's economic, technological, and social development. Research and innovation generate new sources of economic growth, create jobs, and enhance social welfare. Consequently, countries prioritize science and implement various programs to support scientists and researchers. Numerous studies underscore the importance of science for the state; for instance, scientific research is crucial for boosting interstate economic competitiveness. Furthermore, the development of science and technology through scientific schools increases the potential to solve social issues and improve the quality of life.

MATERIALS AND METHODS

The development of scientific schools is underpinned by the use of comparative-historical methods, logical reasoning, systematic approaches, innovative strategies, comparative analysis, generalization, and data processing techniques. Establishing scientific schools is crucial for fostering innovation, ensuring the coherence of knowledge, and achieving stability in scientific research. These research schools act as intellectual centers that nurture young researchers, promote collaborative efforts, and uphold high standards of scientific inquiry. In the context of globalization, the creation of scientific schools is increasingly relevant, highlighting their practical significance and role in organizing scientific activities. Often led by distinguished scientists, these schools consist of unified

groups of researchers with shared theoretical frameworks, methodologies, and research objectives. They are essential for advancing scientific knowledge, promoting innovation, and ensuring the continuity of scientific research across generations. The creation of scientific schools addresses the need to solve complex scientific problems, develop interdisciplinary cooperation, and maintain rigorous academic standards.

DISCUSSION AND RESULTS

The concept of scientific schools dates back to ancient times when scientists gathered around prominent thinkers to engage in and contribute to scientific discourse. For instance, the Platonic Academy and the Lyceum, founded by Plato and Aristotle, were early examples of organized intellectual communities. These institutions facilitated knowledge transfer, fostered critical thinking, and debate, thereby laying the groundwork for future academic schools. The emergence of the first scientific schools marked a decisive period in the history of science, characterized by the systematic pursuit of knowledge and the establishment of fundamental principles guiding scientific research. The origins and development of these early schools, their scientific-philosophical foundations, historical contexts, and the contributions of renowned thinkers had a lasting impact on the evolution of scientific thought.

Founded in the sixth century BC, the School of Miletus is often regarded as one of the earliest scientific schools in Western history. Established by Thales, considered one of the first pre-Socratic philosophers, the School of Miletus included successors such as Anaximander and Anaximenes, who shifted from mythological explanations to rational inquiry and observation of natural phenomena [Столяров А.А 2002. С. 1216]. The development of these first scientific schools was a significant stage in the evolution of human understanding and systematic study of the natural world. Often associated with influential figures and intellectual movements, these schools laid the foundation for modern scientific disciplines and methodologies. Their philosophical underpinnings played a crucial role in shaping approaches to research, experimentation, and the dissemination of knowledge.

In the natural philosophy system of ancient sages, cosmology held a central place. This cosmological approach was pivotal to early Greek philosophy because the first philosophers were not only interested in the origin and structure of the cosmos but also in teaching about the beginnings and causes of everything. These foundational teachings integrated existing philosophical concepts, serving as a preliminary school that shaped the trajectory of philosophical inquiry [Бакина Валентина Ивановна 2017. №7. – С. 58-62].

The Pythagorean School, founded by Pythagoras in the 6th century BC, is another early example of a scientific school with its own philosophical orientation. Pythagoras and his followers, known as the Pythagoreans, were primarily concerned with mathematics and its application to understanding the universe. The Pythagorean theorem establishing the relationship between the sides of a right

triangle is one of their most enduring contributions. Pythagoreans believed that numbers and mathematical relationships were fundamental to the structure of the universe. This epistemological foundation led them to study various fields, including astronomy, music, and geometry, through a mathematical lens. The Pythagorean school's emphasis on mathematical order and harmony influenced later scientific developments and philosophical thought.

In particular, the achievement of spiritual and spiritual education is the main goal of the school "If the Pythagoreans can endure five years of endless tests and prove that they are faithful and worthy of the teachings they receive, that is, without saying lom-mim for five years, without seeing Pythagoras behind the curtain, only if they enjoy and get used to his speeches and lectures, a great reward awaits them. That is, they had the opportunity to meet Pythagoras directly after five years. In this case, changes occur in their inner world. Their inner feelings and experiences are found in their own way." [Ямвлих. О 2002. – 192 с.]

Plato's Academy, founded by Plato in Athens in the 4th century BC, is one of the most prestigious scientific schools in Western history. The academy was a center of philosophical and scientific research and attracted students and scholars from all over the Greek world. Plato's emphasis on the importance of abstract reasoning and the search for eternal truths shaped the Academy's approach to scientific inquiry. Plato's theory of forms, which emphasizes that the material world is a reflection of a higher, immutable reality, influenced the philosophical outlook of the Academy. This perspective encouraged the pursuit of knowledge through contemplation and dialectical thinking rather than just empirical observation. The academy's contributions to fields such as geometry, astronomy, and ethics greatly influenced later scientific and philosophical thought.

The lyceum, founded by Aristotle in the 4th century BC, is an important achievement in the development of early scientific schools. Unlike Plato, Aristotle emphasized the importance of empirical observation and systematic investigation in understanding the natural world. The Lyceum became a center for research and teaching in various disciplines, including biology, physics, and ethics. Aristotle's approach to scientific research, that is, the classification and analysis of empirical data, laid the foundation for the scientific method. His contributions to logic, particularly the development of syllogistic reasoning, laid the foundation for rational argumentation and deduction. Lyceum's emphasis on empirical research and logical analysis influenced the development of science for centuries to come.

In general, the rationalist and deductive approaches of the Academy and Lyceum helped to develop a systematic methodology of scientific research. These approaches laid the groundwork for the development of formal scientific methods, emphasizing the importance of logical consistency and consistency in scientific theories. Aristotle's work at the lyceum laid the foundation for the classification and systematic study of living organisms. His observations and analyzes of various species led to the development of principles of taxonomy and comparative anatomy. Aristotle's approach to biology, which emphasized empirical observation and classification, influenced the development of the field for centuries. Aristotle's

contribution to biology went beyond classification as he also studied the principles of physiology, reproduction and development. His systematic approach to the study of living organisms laid the foundation for further research in this field, including the development of modern biological classification systems and the study of evolutionary relationships.

The Middle Ages are often recognized in the history of science as a period when scientific schools were not formed on a large scale. However, this period was marked by important intellectual activity, especially in the fields of natural philosophy, mathematics, and medicine. The medieval scientific schools, deeply rooted in the philosophical traditions of the ancient world, adapted to the previous knowledge and expanded, thus playing a decisive role in the integrity and development of scientific thinking. The Middle Ages are characterized by the interaction of various cultural, religious and intellectual influences. The decline of the Western Roman Empire, the rise of the Byzantine Empire, the spread of Islam and the establishment of European universities in the Middle Ages played a decisive role in shaping the scientific landscape of the period. The development of science in the East provided more results in the Middle Ages.

At the beginning of the 9th century, Caliph Ma'mun Arrashid founded "Bayt ul Hikmat" in Baghdad and served for the further development of science under the name Ma'mun Academy. In the academy, Muhammad Khorezmi, Khalid ibn al-Malik al-Marwarrudi, Al-Abbas ibn Said al-Jawhari, Ahmad ibn Abdullah al-Marwazi, Ahmad al-Farghani, Abu Fazl al-Hamid ibn Wase' ibn Turk al-Khuttali, Abu Yusuf Yaqub ibn Sabbakh al-Kindi and many other Central Asian scientists created and made a great contribution to the development of various sciences. Also, the translation movement played an important role in the further expansion of the activities of this scientific center. Islamic scholars translated and preserved Greek, Persian, and Indian scientific texts, integrating and expanding this knowledge. The synthesis of these diverse intellectual traditions led to significant advances and the formation of scientific schools that emphasized empirical research and rational analysis.

The School of Salerno in southern Italy was a famous center of medical education and practice in the Middle Ages. Founded in the 9th century, the school attracted students and scholars from various parts of Europe and the Islamic world, turning it into an important branch of medical knowledge and innovation. The philosophical direction of the Salerno school was characterized by a pragmatic approach to medical knowledge, emphasizing the importance of empirical evidence and practical application. This approach contributed to the development of medical science and the formation of traditions of medical education, which influenced the further development of the field.

The Salerno school emphasized the importance of empirical observation and practical experience in the study and practice of medicine. Using a variety of sources, including Greek, Roman, and Islamic medical texts, he integrated this knowledge into a comprehensive medical curriculum [Salernitana 2024. PP.254.].

Founded in the 12th century, the University of Paris became one of the leading centers of scholasticism and scientific research in Europe in the Middle Ages. The University's Faculty of Arts was particularly influential in the study of natural philosophy, attracting scholars from all over Europe. One of the most prominent figures associated with the University of Paris, Thomas Aquinas contributed greatly to the synthesis of Aristotelian philosophy with Christian theology [Grant, Edward, 1996]. Albertus Magnus, another important figure at the University of Paris, made significant contributions to natural philosophy, particularly in the fields of biology and mineralogy. His encyclopedic works on plants, animals and minerals showed a comprehensive approach to the study of nature, combining empirical observation with philosophical analysis. The philosophical orientation of the University of Paris was marked by a commitment to scholasticism, which emphasized systematic thinking, dialectical analysis, and the integration of faith and reason. This approach created a rigorous intellectual environment that contributed to the development of natural philosophy and scientific methodology [Wippel, John F., 2000].

Although the medieval scientific schools were deeply rooted in the philosophical traditions of the ancient world, they also introduced important innovations that contributed to the evolution of scientific thought. The following sections explore the main philosophical foundations and innovations characteristic of medieval science. In the Middle Ages, the emergence of scientific schools and their philosophical foundations played a decisive role in the development of scientific thought and methodology. Distinguished by their commitment to empirical observation, rational inquiry, and the integration of faith and reason, these schools laid the groundwork for later advances in a variety of scientific disciplines. showed. Their emphasis on rigorous methodology, interdisciplinary collaboration, and the pursuit of knowledge through systematic research laid the foundation for future scientific advances. The legacies of these scientific schools continue to influence contemporary scientific research, highlighting the enduring importance of their philosophical foundations and methodological approaches. The Middle Ages was not a period of intellectual stagnation, but a period of significant changes and renewals in the history of science.

As a result of the expansion of knowledge and the emergence of special sciences during the Renaissance, scientific schools began to acquire a more structured form. The Medici Academy in Florence, supported by the influential Medici family, became a center for artists, scientists and philosophers, creating an atmosphere of collaboration that led to important achievements in various fields. The Scientific Revolution re-emphasized the importance of scientific schools, with figures such as Galileo Galilei and Johannes Kepler creating their own schools of thought, promoting empirical observation and experimentation.

The 19th-20th centuries witnessed the formalization of scientific schools within universities and scientific institutions. Prominent representatives of the school include the Copenhagen School of Quantum Mechanics led by Niels Bohr and the Vienna Circle, which contributed greatly to the philosophy of science

[Stadler, Friedrich, 2001]. These schools are distinguished by their rigorous methodological approaches, collaborative efforts, and the activities of young researchers, thus serving to shape the direction of modern science [Kragh, Helge, 1999].

On the basis of pedagogical studies, O. Grezneva proposed the following classification of the scientific school:

1. According to the type of communication between the representatives of the scientific school: scientific flow, scientific group, independent institution.
2. According to the status of the scientific idea: experimental, theoretical.
3. According to the scope of the researched field of science: in a narrow field, comprehensive.
4. According to the functional direction of the created knowledge: fundamental, practical.
5. According to the form of organization of members' activities: based on the individual or collective form of organization of scientific research works.
6. According to the description of communication between generations: one-level, multi-level.
7. According to the form of institutionalization: informal, circles, institutional.
8. According to the level of location: national, local, personal [Грезнева.О. 2004. № 5. – С. 43.].

We can witness that the development of scientific schools in world science is also developing in our country in connection with the structure of scientific research institutes, higher education institutions, and academies. The number of scientific schools operating in the Samarkand State University named after Sharof Rashidov is 24, the National University of Uzbekistan named after Mirzo Ulugbek has 43, and the Tashkent Institute of Chemical Technology has 5.

In our country, scientific schools covering physics, mathematics, philology, pedagogy, psychology, philosophy, history, technology and other fields are recognized by the international scientific community.

CONCLUSION

Key features of science schools include leadership founded by distinguished scholars, shared research paradigms, strong collaborative networks, and strong institutional support. The process of building a research school includes identifying a critical research focus, recruiting and mentoring talented researchers, developing a coherent research agenda, and building a collaborative community. Through the collaboration of scientific schools, new results are investigated, support innovation by combining different perspectives, and accelerate the dissemination of knowledge through publications and conferences. Challenges facing science schools include maintaining cohesion among emerging fields of research, balancing tradition with innovation, adapting to technological change, and expanding inclusivity. Addressing these challenges is critical to the continued relevance and impact of science schools in the dynamic landscape of scientific research. Schools of science play an important role in promoting scientific integrity

by establishing and maintaining high standards of research. A commitment to scientific integrity helps to increase public confidence in scientific results and enhances the credibility of scientific institutions.

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