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THEORETICAL METHODOLOGY FOR TEACHING PROCESSES OF URBAN INNOVATIVE DEVELOPMENT IN GEOGRAPHY EDUCATION

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The innovative development of cities has become a priority for the development of the world digital economy, which is widely reflected in the official documents of leading international organizations (UN, OECD, European Commission), as well as in scientific research by foreign scientists (Web of Science, Scopus).The article analyzes the problems of teaching trends in innovative development of cities in geographical education. Teaching the geography of cities is closely related to such disciplines as social and economic geography of the world, economic geography of Kazakhstan. Therefore, the analysis of trends in the development of cities of the world and the country, the differentiation of the state of urbanization and the inclusion of the main positions in the content of education are among the topical issues of geographical education. In this regard, it is becoming increasingly important to study the trends of innovative development of cities in Kazakhstan, which have become the largest production centers of the country, where the centers of education, culture, a set of natural resources and production facilities are concentrated, which served as the basis for writing our article. Purpose of the article: theoretical justification of teaching trends in innovative development of Kazakhstan cities and the development of its teaching methodology in geography. The role and place of studying cities in geographical education has been determined. The study reviewed the theory of innovative urban development. The analysis of experience and samples of innovative development of the city was carried out. Based on the data obtained, the program of the "geography of cities" elective course for students of the 9th grade has been compiled. The elective course was based on Almaty case and planned to be conducted for 34 hours, 1 time per week. The subject content includes 5 modules: the history of the city, natural conditions and resources, socio-cultural life, economic situation and directions of development of world cities.

Key words: *innovation, innovative city, economic development, sustainable development, urban infrastructure.*

ГЕОГРАФИЯЛЫҚ БІЛІМ БЕРУДЕ ҚАЛАЛАРДЫҢ ИННОВАЦИЯЛЫҚ ДАМУ ҮРДІСТЕРІН ОҚЫТУДЫҢ ТЕОРИЯЛЫҚ-ӘДІСТЕМЕСІ

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Қалалардың «инновациялық дамуы» әлемдегі цифрлық экономиканы дамытудың басымдылығына айналды. Бұл жетекші халықаралық ұйымдардың (БҰҰ, ЭЫДҰ, Еуропалық комиссия) ресми құжаттарында, сонымен қатар шетелдік ғалымдардың ғылыми зерттеулерінде (Web of Science, Scopus) кеңінен көрініс табуда. Мақалада қалалардың инновациялық даму үрдістерін географиялық білім беруде оқытудың мәселелері талданады. Қалалар географиясын оқыту, дүниежүзінің әлеуметтік және экономикалық географиясы, Қазақстанның экономикалық географиясы секілді пәндермен тығыз байланысты. Сол себепті, әлемдегі және еліміздегі қалалардың даму трендтерін талдау, урбандалу процесінің жағдайын саралау және негізгі ұстанымдарды білім беру мазмұнына енгізу географиялық білім берудің өзекті мәселелері қатарында саналады. Осы орайда, еліміздің ірі өндірістік орталықтары ретінде қалыптасқан, білім беру, мәдениет ошақтары шоғырланған, табиғи ресурстар мен өндіріс объектілерінің жиынтығы болып табылатын Қазақстан қалаларының инновациялық даму үрдістерін зерттеудің маңызы арта түспек, бұл біздің мақаламыздың жазылуына негіз болды. Мақаланың мақсаты: Қазақстан қалаларының инновациялық даму үрдістерін

оқытуды теориялық негіздеу және оны географияда оқытудың әдістемесін жасау. Қалаларды оқып-үйренудің географиялық білім берудегі рөлі мен орны айқындалды. Зерттеуде қалалардың инновациялық даму теориясына шолу жасалып, инновациялық қала дамуының тәжірибелеріне, үлгілеріне талдау жасалды. Алынған мәліметтер негізінде 9-сынып оқушыларына арналған «Қалалар географиясы» элективті курс бағдарламасы құрастырылған. Алматы қаласы мысалында жазылған элективті курс 34 сағатқа, аптасына 1 рет жүргізуге жоспарланған. Пән мазмұны 5 блоктан тұрады: қаланың тарихы, табиғат жағдайы және ресурстары, әлеуметтік мәдени өмірі, экономикалық жағдайы және әлемдік қалалардың даму бағыттары.

Түйінді сөздер: *инновация, инновациялық қала, экономикалық даму, тұрақты даму, қалалық инфрақұрылым.*

ТЕОРЕТИЧЕСКАЯ МЕТОДОЛОГИЯ ПРЕПОДАВАНИЯ ПРОЦЕССОВ ИННОВАЦИОННОГО РАЗВИТИЯ ГОРОДОВ В ОБУЧЕНИИ ГЕОГРАФИИ

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Инновационное развитие городов стало приоритетным направлением развития цифровой экономики в мире, что нашло отражение не только в официальных документах ведущих международных организаций (ООН, ОЭСР, Европейская комиссия), но и в научных исследованиях многих зарубежных ученых. В статье анализируются проблемы преподавания процессов инновационного развития городов в географическом образовании. Преподавание географии городов тесно связано с такими дисциплинами, как социальная и экономическая география мира, экономическая география Казахстана. Поэтому анализ трендов развития городов мира и нашей республики, дифференциация состояния процесса урбанизации и включение основных позиций в содержание образования являются одними из актуальных вопросов географического образования. В связи с этим все большее значение приобретает изучение тенденций инновационного развития городов Казахстана, которые стали крупнейшими производственными центрами страны, где сосредоточены очаги образования, культуры, представляют собой совокупность природных ресурсов и объектов производства, что послужило основой для написания нашей исследовательской работы. Цель статьи: разработка теоретическо-методических основ обучения процессам инновационного развития городов Казахстана в процессе обучения географии. Определены роль и место изучения городов в географическом образовании. В исследовании проведен обзор теории инновационного развития городов, проведен анализ опыта, моделей инновационного развития городов. На основе полученных данных составлена программа элективного курса «География городов» для учащихся 9 класса; элективный курс, написанный на примере города Алматы, годовая учебная нагрузка 34 часов, 1 раз в неделю. Содержание дисциплины состоит из 5 блоков: история города, природные условия и ресурсы, социокультурная жизнь, экономическое положение и направления развития мировых городов.

Ключевые слова: *инновация, инновационный город, экономическое развитие, устойчивое развитие, городская инфраструктура.*

Introduction. Globalisation, urbanisation and industrialisation are recognised as three important factors shaping human development in the 21st century.

Modern cities are changing and developing rapidly, and this gives impetus to find new solutions to the problems that arise in cities. Populations with good social conditions and education can express the need for high-quality services and use every opportunity of the city to improve their quality of life.

The rapid growth of industrial-era cities has transformed small towns into large metropolitan areas. According to the Organization for Economic Co-operation and Development (OECD), currently more than half of the world's population (55%) live in cities, and by 2050 more than 2/3 will become citizens[1, p. 121]. Cities make up 80% of the world gross domestic product (GDP) and this share is constantly growing in leading countries.

The People's Division of the United Nations Department of Economic and Social Affairs has been producing urban and rural population projections for all countries of the world and their major metropolitan areas for decades. All statistics are updated for 6 years. Based on the data presented for the last year, 2018, it is shown that the share of urban population in Kazakhstan will not exceed 58.6% until 2025[2]. In the current year 2024, the share of urban population in Kazakhstan is 62.7%, which exceeds the above forecast. This suggests that the urbanization trend in the country is very rapid. Moreover, Kazakhstan has the highest level of urbanization among the Central Asian countries.

If you look at figure 1, during the years of independence in the country there was a city called Almaty with a population of one million. There are currently 3 millionaire cities in Kazakhstan.Based on the National Statistical Bureau of Kazakhstan, it is Almaty (2.2 million), Astana (1.5 million) and Shymkent (1.2 million) that are actually registered. These cities are also hotbeds of urbanisation. A similar situation is repeated in the regional centres of the country [3]. As a result, there is a growing human power in relation to the city, which in turn is an incentive to explore the city. Many cities face various problems, such as unemployment, social inequality, pollution, etc.

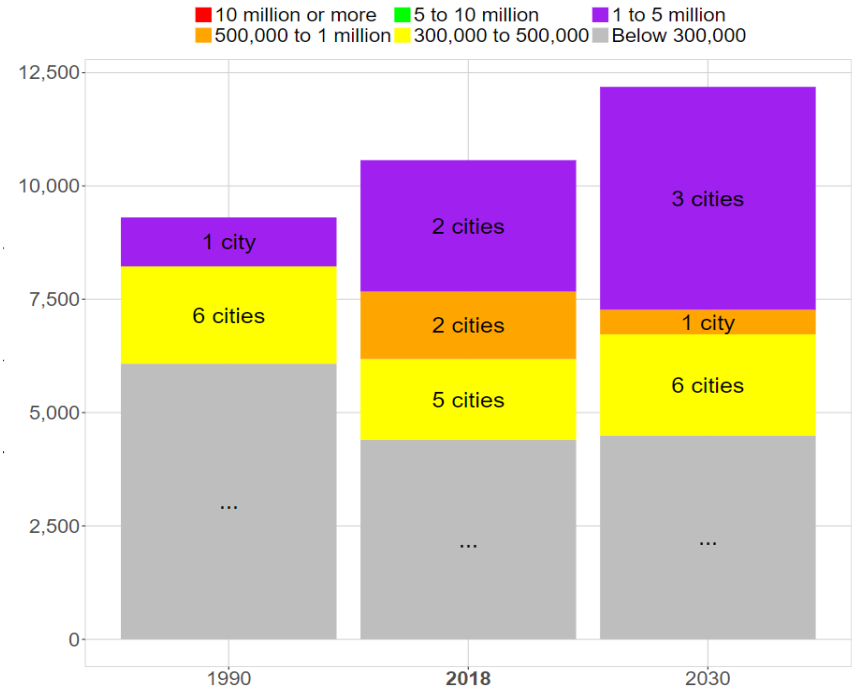


Figure 1 – Urban population by size of urban settlement. Kazakhstan

Cities bring people closer together and become stronger the closer they are to each other. It is the power of urbanisation that leads to a range of ideas and concepts.Urbanisation has “positive” and “negative” social, economic and environmental impacts [4, p. 14]. This means that the sustainable development of cities depends on social, economic, environmental and governance factors. While the harmonious development of the 3 spheres (social, economic, environmental) that form the basis of a given city is the foundation of its stability, the mutual continuity of the intellectual achievements that will be reflected in the areas that form the basis of the city will be the beginning of sustainable innovative development (Figure 2).

The effects of the mutual continuity of the above basic rules in an urban environment can be described as follows:

- *Social impact,* the development of human capital – the main drivers of social innovation. This means that improving the quality of education and health care, developing a highly skilled workforce and a mature political and institutional environment are the foundations for the development of a social society.

- *Economic influence,* cities are moving towards knowledge – intensive effective economic specialisation and increased geo-economic competition for the international division of labour. This is the basis for the growing competition in the Global Urban Creativity Index.

- *Environmental impact,* a modern innovation city should above all be a 'green' city. This means that it must meet environmental requirements and become a comfortable living environment without waste. This will ensure the city's viability.

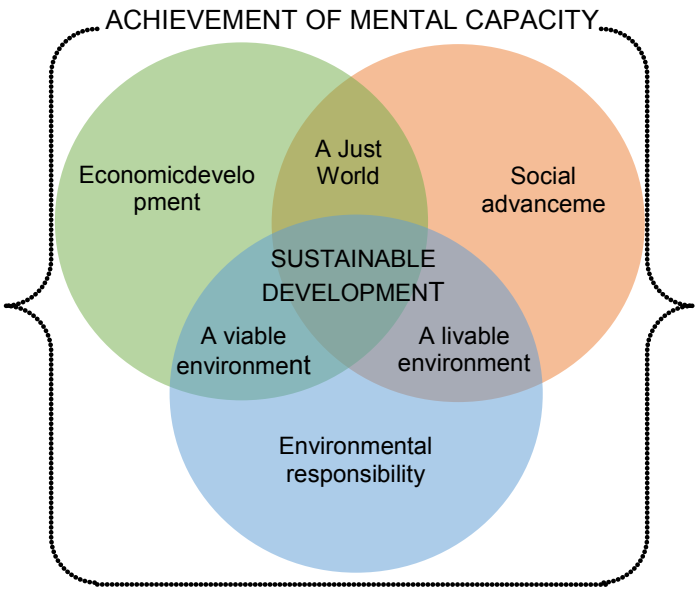


Figure 2 – Principles of sustainable innovative development of the urban environment

The interrelationship between the rules of innovative urban development is a complex one and they should not be considered in isolation from each other. Each of them reinforces the other when it is effective. Moreover, the weakness of some elements will affect the effectiveness of others. The transition to innovative development based on the achievements of education, science and spirit will become the main trend in the development of cities of the XXI century [5].

In order to support continuous and sustainable development, the city needs new high quality Information and Communication Technology (ICT) solutions, new centralised management capabilities, new services and infrastructure upgrades.

“Innovative city” concepts tend to focus on improving city services through the use of digital technology.

A common argument for the innovative nature of cities is the colocation of economic factors and research institutions that facilitate the creation and flow of knowledge. The creation of innovation through interactions between government, industry and universities is conceptualised through three spiral models.

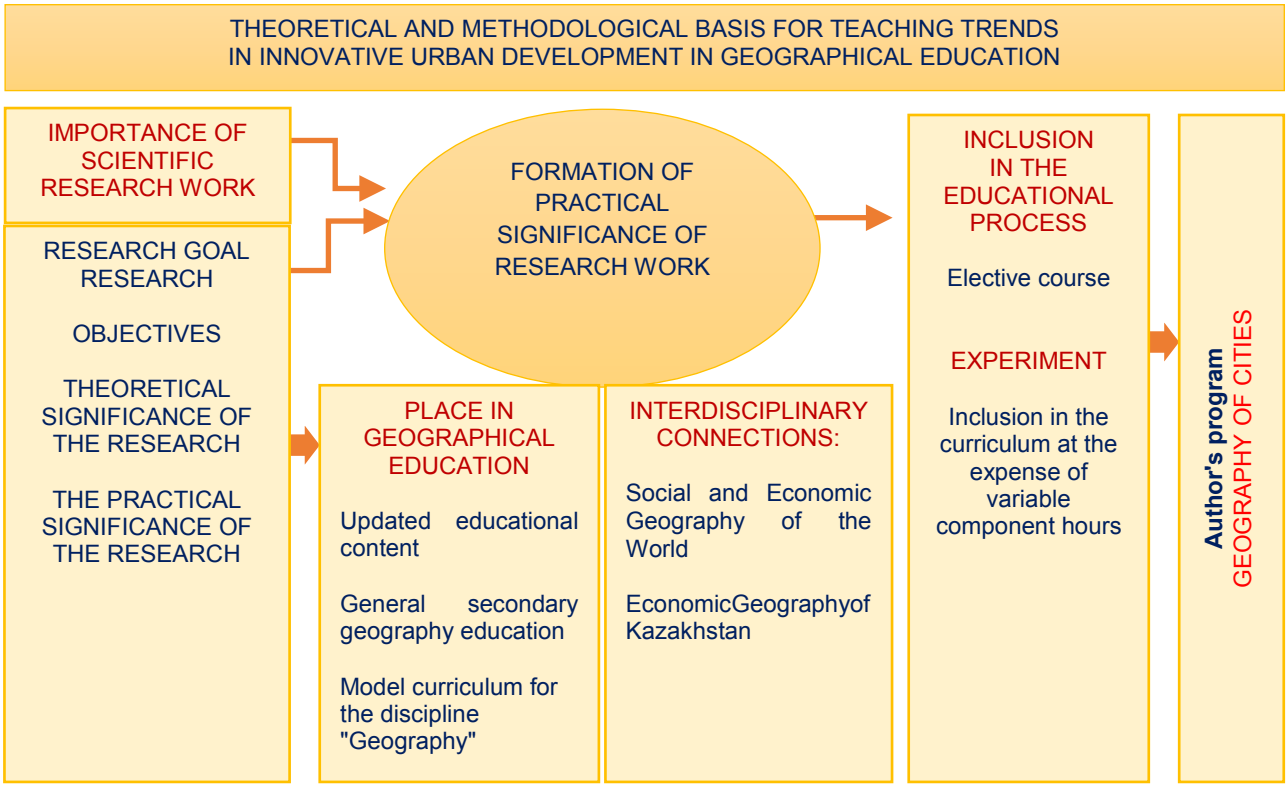
Universities are not only knowledge provider or incubator for startups, but also intermediaries and custodian of knowledge. This leads to knowledge management intermediation between forms and local governments, involving various stakeholders, including the public. As a result, universities are seen as a key element of a city's knowledge economy, creating innovative cities [6, p. 2].

The social infrastructure of an innovative city is mainly related to human capital. Human capital is the abilities and skills of a person or group. Human capital, innovation and productivity are crucial for smart cities. And the importance of educational systems in developing human capital is very high [7, p. 5]. Educational institutions (secondary education, higher education institutions) are seen as the main element of a city's knowledge-based economy, creating innovative cities.

Decree No. 545 of the Minister of Education and Science of the Republic of Kazakhstan dated 25 October 2017 approved the model curriculum for the subject “Geography” of updated content of basic secondary education for grades 7-9. The aim of the subject “Geography” is to educate a personality with a developed geographical thinking, geographical culture, holistically perceiving the geographical picture of the world. The tasks of the discipline are to reveal the geographical image of the world, to develop a scientific approach for students to the relationship between nature and society, their spatial features. To develop knowledge of geographical terms and concepts, spatial thinking, and the ability to use geographical knowledge in practice and in everyday life [8].

In doing so, it is necessary to clarify the trends in the innovative development of Kazakhstan's cities, which served as the basis for our research work, to determine the place in geography, the content of education and the relevance of the main positions in the curriculum. The structure of our research presented in Table 1.

Table 1 – The content and structure model of a research paper



Regarding the importance of the research topic, economists argue that today's global competition is not between countries but between cities: the competitiveness of states is determined by the capabilities of megacities and cities.

And innovations play an important role in the development of the urban economy, as they create an opportunity to attract new productive forces to production, increase the efficiency of work and production, the quality of produced goods and services, contribute to improving the quality of human life. In the process of developing and using innovations, the process of human development takes place – the realisation of its intellectual abilities, creates conditions for further creative growth [9, p. 1-2].

Introducing the concept of the Innovative City, Peter Hall said: “It is a city of a new social form that has changed socially and economically through innovation that has emerged through the integration of many innovations. The development of these cities depends on the role of science and technology, including the dominance of independent innovation and the priority of innovative culture, i.e. the development of technology, education, intelligence and culture of people in systemic contact”, he summarized [10, p. 22-23].

The Chinese urban scientist Sh. Fang also confirms Peter Hall’s opinion. He formulates innovative formation and development of cities into four stages: 1) the initial phase, in which the driving force of urban development becomes the dependence on natural resources; 2) the average period, when urban development depends on the activities of capital; 3) the subsequent period, in the development of the city innovation takes the leading role. 4) The last stage, in which human intelligence and mental capacity dominate (Figure3) [11, p. 1095-1114].

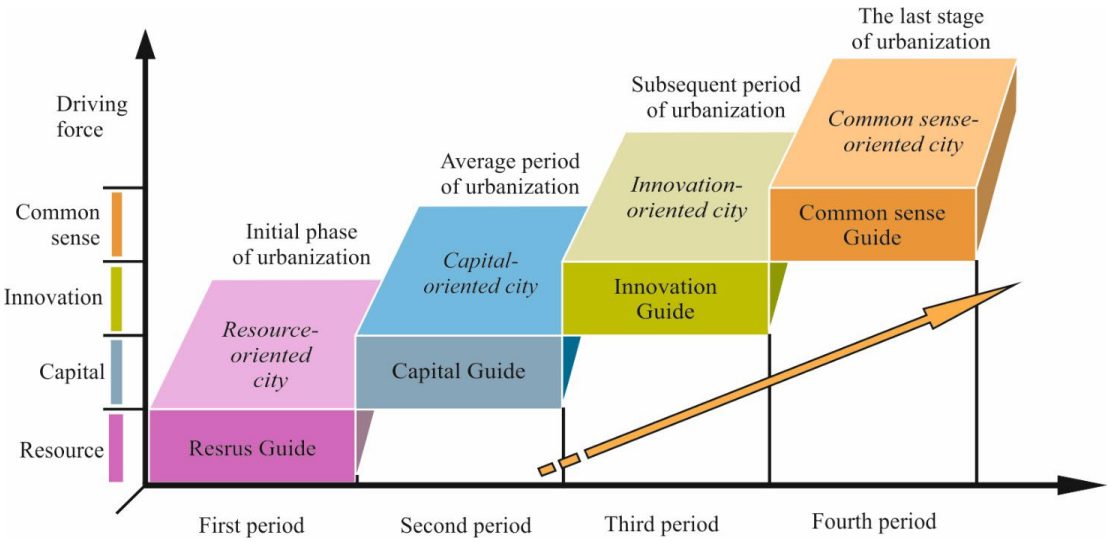


Figure 3 – Strategic phases of innovative urban development

The listed 4 stages of urbanization in Fang's work can be accessed as the achievement of incremental or strategic development. That is, as we move to the next stage, the driving force behind society's development changes. Changing periods or creating a society based on mental achievement may take a short time for cities in some developed countries, while for some developing and other countries the process is likely to take a long time, even centuries. However, from a Kazakh perspective on the system cited by Fang, it can be seen that the current state of Kazakhstan's single-industry cities, including cities such as Tekeli and Zhezkazgan, is in the area of resource and capital management. The entry of these cities into the program “Development of single-industry towns – 2020”, the allocation of abundant funds from the state, indicates that the period of resource leadership is “weakening” and “entering” the period of capital leadership.

Meanwhile, Charles Landry, founder of COMEDIA (a prestigious institution that studies innovative cities in the UK), identifies seven elements from the alternative factors that underpin the creation of an innovative city. These are: innovative population, leadership and determination, diversity of people, genius, positive sense of community, urban space and infrastructure, access to the internet [12, p. 67-87]. That is to say, the main role in the innovative formation of the city in Landry's writings is played by the abilities of the inhabitants.

This means that cities play an important role in the social and economic life of the country and the world. The formation of a competitive society, information and technological advances, the main demand for innovative solutions. This suggests the need to pay particular attention to the geography of cities, which explains the relevance of the research topic.

The goal of the article is to theoretically justify the teaching of the innovative development processes of Kazakhstan’s cities and to develop a methodology for teaching this subject in geography.

The objectives of the research are:

- ✓ To review the theory of innovative urban development;
- ✓ To analyze the practices and models of innovative city development;
- ✓ To define the role and place of studying cities in geographic education;
- ✓ Based on the obtained data, to develop the curriculum for the elective course "Geography of Cities."

Material and methods. In order to determine the importance of cities in the social and economic development of the country and the world, as well as to identify the significance of introducing the elective course "Geography of Cities" into the geography curriculum of schools in the Republic of Kazakhstan, a survey method was applied. Since our research subject is the city of Almaty, the survey was conducted with geography teachers from city schools via docs.google.com. The survey consisted of 3 questions, and a total of 48 teachers voluntarily participated. In the future, we plan to expand this research to other regions of the country.

In addition, the design of the elective programme included an analysis of the methodological geographical literature from a theoretical point of view, as well as normative documents on the research topic and educational standards in geography, model educational programmes, textbooks and teaching aids.

The programme of the elective course includes theoretical analysis of world and national urban development trends, analysis of the urbanisation process and evaluation of statistical data through comparative analysis.

Research results. Based on the analysis of the teacher survey data, it was found that 54.6% of the respondents were familiar with global urban development trends and 33.3% of the respondents used terms such as Smart City, Innovative City, Digital City and Eco-City in their teaching on the topic. And the remaining 12.5% indicated that they were not familiar with the city concepts.

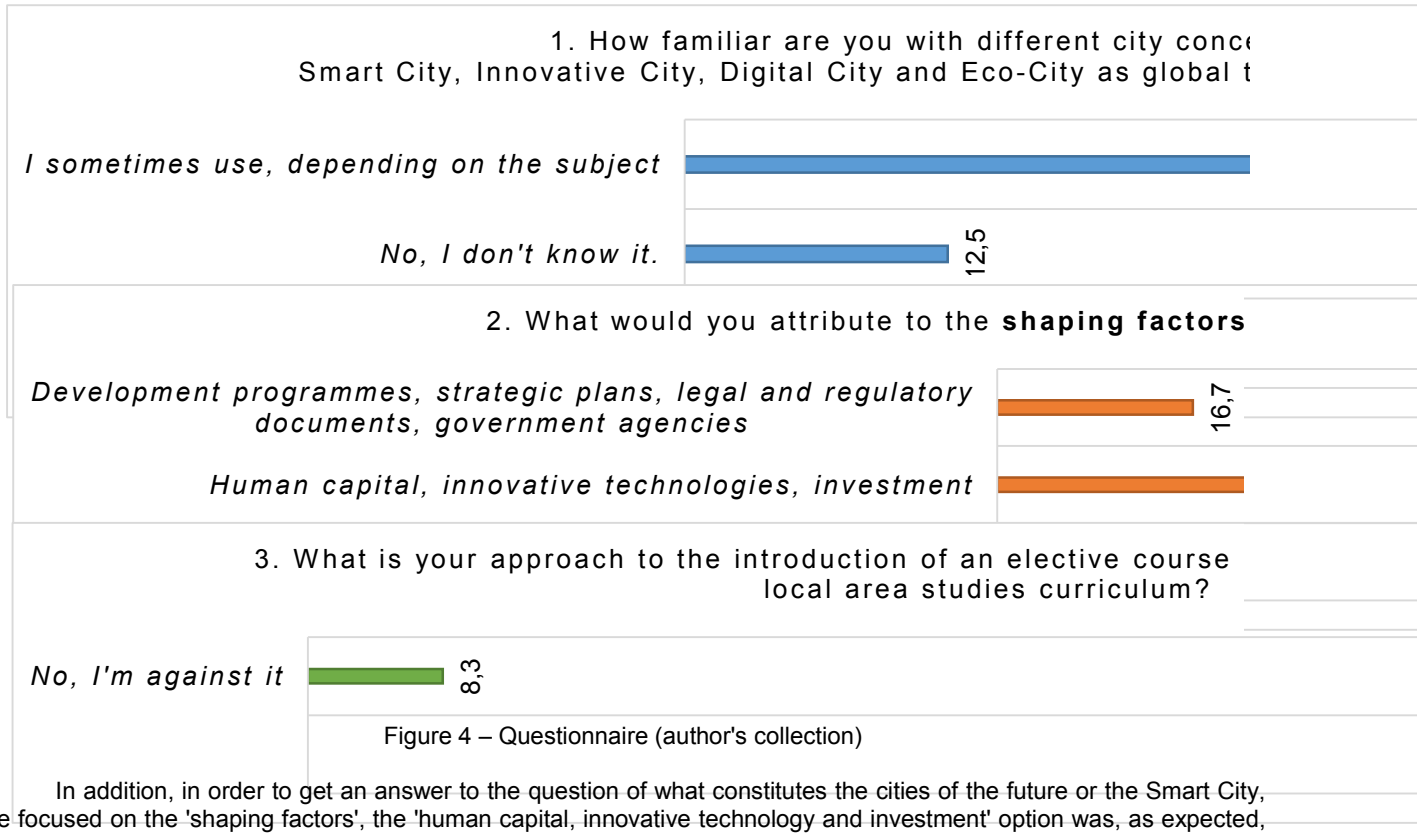


Figure 4 – Questionnaire (author's collection)

In addition, in order to get an answer to the question of what constitutes the cities of the future or the Smart City, we focused on the 'shaping factors', the 'human capital, innovative technology and investment' option was, as expected, chosen by the vast majority of teachers, i.e. 68.8%. This is due to the fact that each city has governing bodies and urban development programmes, but usually the level of urban development varies.

In our final question, 91.7% of the respondents indicated that they make use of the inclusion of the optional course "Geography of cities" in the local history curriculum.

Thus, according to the results of the survey, the theoretical study of cities and the introduction of “Geography of cities” into the curriculum and teaching process of school geography is currently a very topical issue.

Socio-economic issues in cities with updated geographical content of education, activities on industrial and innovative development, the state of the urbanization process are considered by sections IV and V of the textbook of the 9th grade “Geography” (Figure5) [13, p. 66-76, 125].

In higher education content, this process includes disciplines related to urban geography, urbanization, etc. But they are all taught as a component of choice.

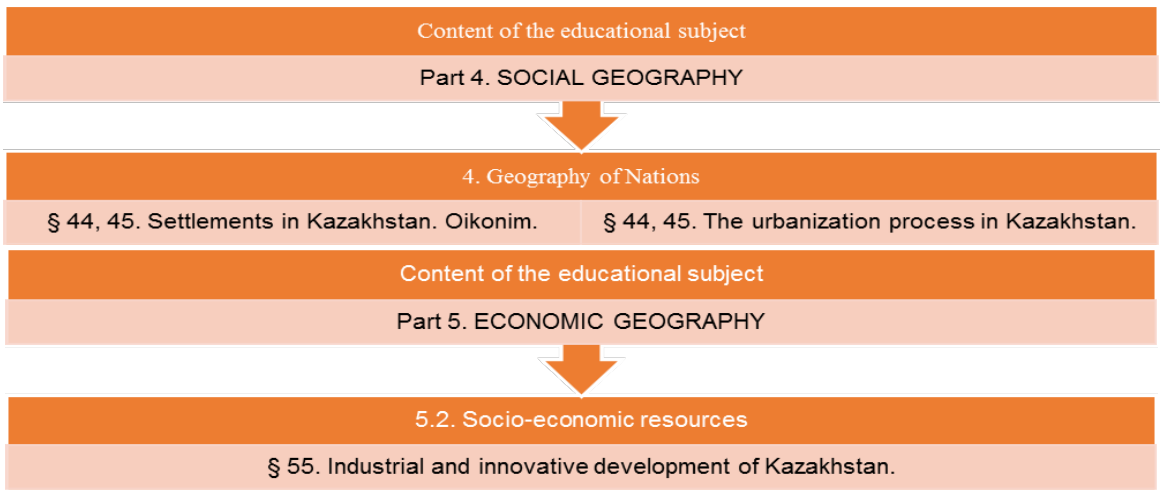


Figure 5 – Place in geographical education

In general, although the geography of cities is considered in the content of university education, the state of the modern urbanisation process, the development of world cities, and new concepts require a new content to study this process.

In this connection, we have prepared and presented the programme of the optional course “Geography of cities” for the 9th grade of secondary school. We hope that the optional course will contribute to the students' knowledge of the geographical picture of the world, acquaintance with the structure, directions of development of the world's cities, starting with their own city, understanding of the economic relations between the city and the country, knowledge of the terms and concepts of urbanisation.

The content of the “Geography of cities” elective focuses on the comprehensive study of the cities of Kazakhstan. In particular, it covers a wide range of issues: history, nature, socio-economic situation of settlements (population, demography, economic spheres and cultural life), innovative areas of infrastructure and state of the environment.

New trends in the development of global cities will be highlighted: the “Innovative city”, the “Smart city”, the “Eco-city”, etc. This created content can be seen as a model for the study of other cities or regions of the country. The aim of the elective course is to give students an understanding of their hometown and to create conditions for personal development [14, p. 77-81].

The analysis of current urbanization trends, the current state of cities, development trends, the theory of innovative urban development, foreign and domestic innovative urban development, models, advantages and disadvantages of innovative urban development were covered in sections IV-V of our course.

The teaching of urban geography closely connected with such disciplines as social and economic geography of the world, economic geography of Kazakhstan.

The teaching of the elective course “Geography of cities”, which is implemented in the secondary education system, is considered as a regional component and corresponds to the main goals and tasks of the model curriculum of the discipline “Geography” of updated content.

The course program consists of complex content blocks, which systematized in the table below:

Table 2 – Structure of the Elective Programme

HISTORY OF THE CITY			
The history of urban studies	Stages in the historical development of the settlement	Formation of economic sectors	Development of urban planning
NATURAL CONDITIONS AND RESOURCES			
Geographical location and topography of the city	Climate	Hydrography	Landscapes
SOCIO-CULTURAL LIFE			
Administrative and territorial division	Human capital development	Cultural and spiritual development	
ECONOMIC STATUS			
Administrative and territorial division. Industries and main economic indicators. State of the tourism industry and tourism potential.	Identify areas for development with an analysis of the current state of cities. Ecocity, Smart city, Digital city, Liveable city.		
THE DIRECTIONS OF DEVELOPMENT OF WORLD CITIES			
State of the environment. Impact of economic activity on the environment. The spread of harmful substances into the environment.	Theory of urban innovation, experience, models of urban innovation, stages of urban innovation development, city rankings.		

PROGRAM
THE GEOGRAPHY OF CITIES
(Using the city of Almaty as a case study)

For 9th grade students
(once a week, total 36 hours)

Aim of the course: To give students an insight into their home town, to familiarise them with the development trends of the world's cities and to create the conditions for the development of a personality capable of perceiving the world in its entirety.

Task of the course:

- comprehensive study of Kazakhstan's cities;
- to cover a wide range of issues: history, nature, socio-economic situation (population, demography, economic spheres, cultural life), innovative infrastructure spheres, state of the environment;
- show the role of cities in the territorial economic structure and spatial settlement
- analyse the trends and concepts of global urban development;
- develop skills to apply knowledge of urban geography in everyday life, in one's own business.

Stabilisation (content) section
“Geography of cities”.
The content part of the elective course.

PART I. HISTORY OF THE CITY

In the “History of the city” section, students carry out a theoretical analysis of the history of the study and periods

of historical formation of the city.

The main objectives of this unit are to familiarise students with the data on the study of the city in historical documents and scientific literature. Scientists make a theoretical analysis of their writings on the stages of historical formation and development. Formation of economic sectors: historical aspects. Evaluation of urban development.

PART II. NATURAL CONDITIONS AND RESOURCES

Part 2, consists of several subdivisions. The subdivisions are written in an easy-to-understand manner, revealing the content of the section. It begins with the geographical location and stops entirely at the relief, geological and tectonic structure, climate, hydrography, land cover and fauna of the city.

PART III. SOCIO-CULTURAL LIFE

The topics in part 3 are arranged and systematised with links to each topic. Population and demography of the city. The problem of migration. Religious and national composition. The development of human capital. The cultural and spiritual life of the city. In general, an analysis of the population, social life of Almaty will be carried out.

PART IV. ECONOMIC STATUS

This section analyses the theory of urban economic development. It presents the strategy for the development of Almaty as a city of the future. The economy of the city. The industries. The future vision of urban development. Evaluation of the tourism potential.

PART V. THE DIRECTIONS OF DEVELOPMENT OF WORLD CITIES

In this section, students will focus on the problems that negatively affect the ecology of the city as a center of agglomeration. Conducts environmental monitoring. Completes theoretical knowledge on environmental restoration, greening.

Analyses the current state of the world's cities and identifies areas for development. Performs a comparative analysis. Performs design works.

Conclusion. The introductory part of our article was based on the analysis of the theory of innovative urban development, the assessment of urban development potential, the analysis of foreign and domestic experiences and models of innovative urban development. Thanks to the historical and comparative method, analysis of statistical data, review of scientific literature and articles, the purpose of theoretical research was achieved, the essence of the theory of innovative urban development was revealed and a conceptual explanation was given. In accordance with the model curriculum of education updated content in accordance with the purpose of our research work identified the place of the problem of cities in geographical education.

With the purpose of analysis of history, nature, social and economic position of cities (population, demography, economic spheres, cultural life), innovative infrastructure spheres, modern trends of urbanisation, directions, concepts of development of world cities the content-structural model of studying trends of innovative development of cities in geography was made. As a result of the research work, on the basis of the Protocol No. 3 of the Educational-Methodical Council of 03.06.2021 the author's programme for students of 9th grade of Geography in schools with the Kazakh language of instruction “Geography of cities (on the example of Almaty)” was introduced into the educational process as a part of the renewed educational content.(Figure 6).

A large number of schools are now using the programme of elective courses in their teaching.

a) b)

Figure 6 – «Geography of cities» Certificate of authoring

According to the experimental stage of our research work, from September 1, 2021, the Specialized Lyceum No. 92 named after Mahatma Gandhi in Almaty city undergoes training as an elective course “Geography of Cities”. In the 2022-2023 academic year, 136 students from 9 grades studied in this course, and this 2023-2024 academic year, 150 students replenishing their knowledge of the course. The model of the optional course outlined in the content of secondary education can be used not only in the context of Almaty, but also in teaching in other cities and regions of the country. The completed work will be a prerequisite for practical application of the acquired knowledge of geography,

formation of skills for its use in everyday life. That is, it corresponds to modern requirements of modernisation of educational system and science and allows to develop research, cognitive, creative skills of students.

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