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OPPORTUNITIES TO USE MOBILE GIS APPLICATIONS IN THE FORMATION OF TOURIST AND LOCAL LORE COMPETENCIES IN STUDENTS: CASE STUDY IN ALMATY, KAZAKHSTAN

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Abstract: Since the use of mobile GIS-applications in the formation of tourist and local lore competencies of students affects the knowledge and professional competence of future teachers, it is very important to first determine the attitude of teachers and professors to the use of mobile GIS-applications and assess the level of use of mobile applications by students. Therefore, this article provides for the possibility of using mobile GIS applications in the organization of tourist and local lore activities of students of the educational program "Geography". The effectiveness of organizing tourist and local lore events using mobile GIS applications was determined by conducting interviews and questionnaires. The survey consisted of two parts, and a total of 72 students took part in it voluntarily. In the course of the study, we studied the formation of tourist and local lore competencies from mobile GIS applications as a result of the study: 1) "Road navigation" from mobile GIS applications - 2GIS (79.1%); 2) "For viewing and studying" from mobile applications - ArcGIS QuickCapture (56.9%); 3) Google planet Earth "Virtual globe" (52.8%); 4) based on the mobile applications "Cartography and Navigation", we determined the efficiency of using the GIS4MOBILE-x (41.7%) and 5) the City bus for "GPS monitoring" (100%). In this regard, we are confident that the use of these mobile applications will be effective in organizing tourist and local lore events. The use of these technologies in teaching makes it possible to update educational approaches, introduce new pedagogical technologies and form competencies.

Key words: geography, mobile GIS, tourism, local lore, student, competence

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INTRODUCTION

Over the past decade, the world-class smartphone industry has grown rapidly and has become one of the most affordable products on the consumer market. The development of smartphones and their ability to perform many functions contributed to the emergence of mobile GIS applications and the growth of their users (Rickles et al., 2017). Currently, there is a tendency to use mobile GIS applications in education. The advantages of using mobile GIS in educational programs, especially in higher education institutions (universities), have been proven in many studies (Chatel and Falk, 2017; Trigueros, 2018; Turan et al., 2018). Modern mobile GIS applications allow you to develop skills in organizing tourist and local lore activities. Tourist and local lore skills are the knowledge of the activity of future teachers in the process of organizing excursions, trips, hikes and expeditions, studying the features of the native land and its personal

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practical experience, the formation of a personality. The increase in academic research aimed at teaching tourist and local lore activities using mobile GIS applications proves the usefulness of this technology (Whalley and Rewhorn, 2016).

University teachers will be able to include tourist and local lore activities organized using mobile GIS applications in the educational programs of geography, history, and tourism. In addition, with the help of many mobile GIS applications, Bloom is able to achieve several levels of taxonomy (Zwartjes, 2019). Students will be able to expand their knowledge, understanding of geospatial ideas and processes and technology for organizing tourist and local lore activities using virtual Globes such as Google Earth, ArcGIS Earth, 3D Earth. It also allows you to organize tourist and local lore activities, determine the route, study the features of your native land, and use the accumulated material in tourism, local lore, and pedagogical activities (Patterson, 2007). Mobile GIS applications for the formation of skills in organizing tourist and local lore activities (Google Maps, Maps.me, Yandex map, 2GIS, Yandex.Navigator, GIS Surveyor, Locus GIS, GIS Mapper, MapltFast, Mapit GIS, ArcGIS QuickCapture, Land Map, Google Earth, ArcGIS Earth, 3D Earth, GPS Fields Area Measure, UTM Geo Map, Compass 54/55, P.L.A.N.I.T. Radar aircraft: GIS4Mobile-X, Satellite Tracker – satellites, CityBus, live aircraft). Scientists who conducted research on the use of these applications in geographical education and tourist and local lore, Allen (2007), Armstrong and Bennett (2005), Michael and Hof (2013), Drach et al. (2016), Zablotsky (2014), Lee (2020), Stenger (2017), Yap (2016), Carbonell and Bermejo (2017), Huang and Chen (2018), McNamee and Bogert, (2018) the works are valuable. An analytical review of research on the use of mobile GIS applications by future teachers showed that, in accordance with the specifics of the professional direction of professional activity, it was clarified that there are geographers, historians and tourism specialists who carry out tourist and local lore work with students.

The concepts of native land, tourism and local lore, their relationship, forms and functions of behavior have been considered in detail in the research of many geographers Ayzhan et al. (2021), Hevko (2020), Nurbol et al. (2022), Zaporozhets (2015) the organization of tourist and local lore activities and the possibility of using GIS mobile applications in geographical education have not yet been systematically considered. This is becoming one of the main issues of training specialists, which contributes to improving the effectiveness of the educational process and ensures the effective creation of a training system. In particular, an urgent problem is the formation of tourist and local lore competencies of future geography teachers of the Republic of Kazakhstan (RK). The state program for the development of the tourism industry of the Republic of Kazakhstan for 2019-2025 states that "the level of qualification of teachers and specialists familiar with technologies of the tourist and local lore direction is insufficient. The need for professional development of teachers of the tourist and local lore direction is 69.2%" (Resolution of the Government of the Republic of Kazakhstan dated May 31, 2019), which indicates the complexity of the problem. Also, despite international studies showing a positive attitude of future geography teachers to the organization of tourist and local lore activities (for example, Mazbayev et al., 2020; Pecelj et al., 2018), the status of tourist and local history studies in the educational programs of higher educational institutions of the Republic of Kazakhstan is low (Azhayev et al., 2020; Issakov et al., 2021). Scientists who studied the organization of tourist and local lore activities Iskander (2016), Braslavska and Roghi (2019), Demeuov et al. (2020) believe that the tourist and local lore competencies of future geography teachers should be clearly structured. Therefore, for the structuring of tourist and local lore competencies, it is important to determine the component composition of the studied phenomenon. Thus, when organizing tourist and local lore events with the widespread use of mobile GIS applications, the Geoinformation knowledge and tourist and local lore competence of future teachers will increase and will be useful for interested parties.

The purpose of this study was to determine the effectiveness of using mobile GIS applications in the formation of tourist and local lore competencies of students of educational programs "Geography" in higher educational institutions of Almaty, Kazakhstan. Abai Kazakh National Pedagogical University and Kazakh National Women's Teacher Training University, located in Almaty with educational programs "Geography", were chosen as the object of research. Tourist and local lore skills are primarily associated with a high level of self-improvement of the individual and individual type of activity, which is formed initially during listening to lectures at the University, and then developed through the use of GIS programs during the internship. Therefore, it is very important to determine the possibility of using mobile GIS applications in the organization of tourist and local lore activities of future geography teachers. This study is based mainly on a reliable network of studies conducted in English-and Russian-speaking countries. As it became known to the authors, studies using mobile GIS applications in the organization of tourist and local lore activities in the educational programs of the Republic of Kazakhstan "Geography" have not yet been published. Therefore, future geography teachers are trying to contribute to the literature by offering conclusions to determine the effectiveness of using mobile GIS applications in the formation of tourist and local lore skills.

METHODS

1. Component composition of the formation of tourist and local lore competencies

Analyzing the views of scientists on the organization of tourist and local lore activities of students of the educational program "Geography" in higher educational institutions of the Republic of Kazakhstan, we believe that it is necessary to clearly structure the tourist and local lore competence of future geography teachers. Therefore, in order to identify effective ways of structuring, we determined the component composition of the studied phenomenon (motivational and emotional-value; active-cognitive and subject-professional acquisition of new knowledge; self-development and research competence). We will also evaluate the possibility and effectiveness of organizing tourist and local lore activities of future geography teachers using mobile GIS applications on the basis of theoretical analysis, concretization, generalization of components that form tourist and local lore competencies. In particular, the search for tourist and local lore objects, obtaining brief information about tourist and local lore objects, indicating the route of delivery to the address by car, bus, taxi, bicycle and walking, indicating traffic jams, marking tourist and local lore objects, determining the location of the

object, measuring distances, using GPS trackers – we will evaluate the possibilities of drawing a local lore route, displaying several thematic maps of the world at different scales in 3D format using web views and various services, entering and viewing individual files in KML or KMZ formats on the globe, marking, orientation with compus, measuring azimuth angle, measuring the height of the Earth, tracking moving objects with artificial Earth satellite with GPS sensors, buses, trains, etc. We will also consider the formation of the future geography teacher's mental abilities, deep knowledge in the field of Tourism and local lore, preparation for research activities, the ability to develop professionally in research practice in the field of Tourism and local lore, and the skills of selecting or constructing a pedagogical algorithm for their implementation.

2. Interview

The effectiveness of organizing tourist and local lore activities of students of educational programs "Geography" using mobile GIS applications was determined by conducting interviews and questionnaires. In order to determine the ratio of students of the educational programs "Geography" to the effectiveness of organizing tourist and local lore activities using mobile GIS applications, we interviewed the faculty and professors of the Abai Kazakh National Pedagogical University (KazNPU) and the Kazakh National Women's Teacher Training University (KNWTTU) located in Almaty. 20 teachers from two universities took part in the interview. It was attended by 14 teachers of KazNPU and 6 teachers of KNWTTU. During the conversation, students of the educational programs "Geography" discussed the possibility of using mobile applications in the organization of tourist and local lore events: «Road navigation» (Google Maps, Maps.me, Yandex maps, 2GIS, Yandex.Navigator), for «Review and study» (GIS Surveyor, Locus GIS, GIS Mapper, MapltFast, Mapit GIS, ArcGIS QuickCapture, Land Map), «Virtual globes» (Google Earth, ArcGIS Earth, 3D Earth), «Map and navigation» (GPS Fields Area Measure, UTM Geo Map, Компас 54/55, P.L.A.N.I.T., GIS4Mobile-X) and for GPS tracking (Satellite Tracker - Satellites, CityBus, Planes Live: Aircraft Radar).

3. Survey

According to the plan, the questionnaire was taken secretly from students of 3-4 courses of the educational program "Geography" of KazNPU and KNWTTU. The survey consisted of two parts, and 72 students took part in it voluntarily. It was attended by 37 students of the 3rd year of KazNPU (26 girls, 11 boys) and 13 students of the 4th year (10 girls, 3 Boys) (a total of 40 students). Also, 17 students of the 3rd year of KNWTTU and 15 girls of the 4th year (a total of 32 students) took part. In the first part of the questionnaire, information was obtained about the name of the university, course, age, gender. As a result, it turned out that the age of students is between 18 and 20 years. Of these, 32.4% are 18 years old, 26.5% are 19 years old, and 20.6% are 20 years old or older. In total, 92.3% of students are girls. In the second part of the survey, 16 questions were asked, aimed at identifying students ' knowledge and skills, views on local lore, the level and motivation of using mobile GIS applications, its main disadvantages and advantages, as well as effective mobile applications (Figure 4; Table 2). The survey questions were evaluated as yes or no.

RESULTS

1. Formation of tourist and local lore competencies

As a result of the study, the problem of preparing future geography teachers for tourist and local lore work, we identified the methodological system for conducting tourist and local lore studies, the scope of application of local lore information and the competence components of Tourism and local lore, analyzing the concepts of native land, tourism and local lore, their relationship, forms and functions of behavior. We also noted the dominance of the traditional approach in the preparation of future geography teachers for tourist and local lore work. Due to the weak connection between individual professional disciplines and practices of the tourist and local lore direction, it turned out that there is no teamwork. It is proved that the motivational and value relationship in the formation of tourist and local lore competencies of future geography teachers allows self-development in the organization of tourist and local lore work and the organization of research work with students. Taking into account the views of scientists on the tourist and local lore competence of future geography teachers, we determined the capabilities and effectiveness of all components based on the original structure of the formation of tourist and local lore competencies. They are as follows:

1.1 Motivational and emotional-value component

In the tourist and local lore Service, emotions are considered as a factor in assessing reality, depending on how much the future geography teacher can realize himself. The emotional state of a geographer student affects both external and internal motives of educational activity. In the organization of tourist and local lore work of students, confidence, surprise, delight, doubt, curiosity, etc.we consider emotions to be positive, but all of them stimulate action. The identified motives form complexes of internal and external incentives for the future professional activity of geographer students, in particular, in tourist and local lore work.The emotional appeal of tourist and local lore work allows us to develop creative thinking as a stimulus for knowledge and innovation in the surrounding known objects and phenomena. Interest in tourism and local lore is of great importance for geography students. Interest in studying the peculiarities of the native land is an internal positive emotion that contributes to a deeper perception and understanding of tourist and local lore information. Curiosity, propensity to learn are integral indicators of the emotional and value competence of future geography teachers of tourist and local lore competence. Therefore, we emphasize that professional experience is the defining values for the future geography teacher: education, reliability, fairness, self-esteem, tolerance, creativity, love for children.

1.2 Active-cognitive and professional component of obtaining new knowledge

The active and cognitive component implies the acquisition of new experience of tourist and local lore work, scientific

knowledge and skills, the result of which is personal development and self - improvement. Pedagogical dictionaries explain activity as a measure of purposeful, systematic transformation of the environment and oneself based on the ability of a person to conscious work and social activity, mastering the achievements of material and spiritual culture. Activity manifests itself in creativity, communication. An integral characteristic of activity is an active life position of the individual, which is expressed in his principled, consistent defense of his views, leadership, efficiency, and psychological adaptation to action. Expressing the desire of geographer students to engage in cognitive activities, their actions are not only a condition, but also a means of achieving the goal of tourist and local lore work. Therefore, cognitive activity is a necessary condition for the self-development of the individual. This is an independent work of the student in the formation and development of spiritual, mental, physical and other abilities and inclinations. The use of pedagogical technologies in tourist and local lore work of geography teachers contributes to the development of their cognitive activity and professional interests. Therefore, cognitive interest appears before us as the preferred direction of a person in the field of knowledge. Thus, the active cognitive component includes the development of cognitive activity in future geography teachers, which contributes to increasing students ' motivation to learn information about the environment. Understanding the cognitive need and the purpose of cognitive activity determines the purpose of tourist and local lore work of future geography teachers. This is accompanied by the skills of moral and emotional self-regulation, tolerance and self-control in the conditions of non-standard walking.

1.3 Component of self-development and research competence

The result of the formation of the research component is the research skills of students, which we combined into several groups:

- ability to plan tourist and local lore work (defining educational tasks depending on the purpose of local history research; designing the final result of work for six months or a year; determining ways to achieve results; planning stages and tools for studying local knowledge; planning individual work with students, club work);
- information skills (selection of the necessary information and its creative processing; presentation of the material in a logical, accessible, figurative, expressive form; stimulating students 'interest in local lore information; highlighting the main and secondary objects; presenting the material within the framework of a problematic approach that encourages students to discuss; taking into account the peculiarities of assimilation, perception, understanding of information about their native land, promoting the development of students' cognitive activity in finding, processing and mastering tourist and local lore information);
- organizational and managerial skills (organization of the life of students on the hike, coordination of their activities with the activities of the tourist group, formation of a sense of cooperation with colleagues and students, participation in joint activities; creating conditions for success for each student; clarity of interaction and perception of the individual, purposeful influence on the student, reflection of an individual style of communication);
- ability to analyze and self-analyze (understand the team and each student; diagnose the success and level of knowledge of students; and adequately assess the creative approach of students to the tasks of tourist research; analyze the experience of other teachers in order to use effective forms, methods and approaches in the practice of tourist and local lore work; justify new pedagogical technologies based on the analysis of the achieved results and demonstrate their effectiveness; teaching students to analyze and self-analyze their local lore and tourist work). Thus, the formation of the research component provided for the acquisition of experience of creative activity in the form of effective decision-making skills in non-standard conditions of a tourist trip, the results of which are fixed in the form of knowledge in the field of Tourism and local lore. In the study, we identified the components of the formation of tourist and local lore competencies of geographer students: "motivational-emotional-value", "active-cognitive and subject-professional acquisition of new knowledge" and "self-development and research competence". Systematic analysis of students, the position of competence, scientific, profile, practice-oriented positions and pedagogical conditions, forms tourist and local lore competencies.

2. Opportunities for students to use mobile GIS applications

As a result of the study, it was proved that the analysis of the content of the concepts "region", "native land", "local lore", "tourism", "local lore and tourist activity", "training of future geography teachers" using mobile GIS applications allows us to determine the direction of training future geography teachers for tourist and local lore work, study the features of the native land and use the accumulated material in local lore and tourism, teaching activities. After all, in the last decade, in the identification of tourist and local lore objects and the passage of tourist routes, smartphones have come to the fore among many categories of gadgets that are firmly embedded and used in the life of every person. In addition, modern smartphones perform many functions in the process of tourist and local lore, such as photo and video shooting, instant messages and data exchange, making and receiving calls, determining the location and route of tourist and local lore objects with an accuracy of up to several meters, receiving various information with constant access to the internet and much more.

In this regard, there is a tendency to use mobile GIS applications in the organization of tourist and local lore activities at the world level (Lambrinos and Asiklari, 2014). Due to the constant expansion and intensive dynamic development of cities, the ability of a person to control changes in the environment has decreased. In this case, mobile GIS applications help, which allow you to quickly navigate and navigate the terrain of unfamiliar places, and contain complete, accurate, geo – information about geographical, tourist and local lore objects. Currently, iOS, which can be used in organizing tourist and local lore activities, is; Microsoft Windows; by reviewing the Mac OS X (iTunes) operating systems and mobile GIS applications "App Store" and "Google Play" for the Android operating system, we found that there are about 250 GIS applications in Google Play and about 150 in the App Store. Among them, information about some applications that can be downloaded for free is given in the Lower Table (Table 1).

As we have already noted, there are quite a lot of types of mobile GIS applications that can be used in organizing tourist and local lore activities. Future geography teachers will be able to download and use them on their smartphones when preparing for tourist and local lore work. We have grouped GIS applications in smartphone app stores based on their functional features:

1) Road navigation mobile apps (Google Maps, Maps.me, Yandex maps, 2GIS, Yandex.Navigator) - search for an address or tourist and local lore objects; get brief information about tourist and local lore objects, show the route of delivery to the address by car, bus, taxi, bicycle and walking, show traffic jams, mark tourist and local lore objects, determine the cordinate of the object, etc.can perform services online and offline.

2) Mobile applications for review and study (GIS Surveyor, Locus GIS, GIS Mapper, MapltFast, Mapit GIS, ArcGIS QuickCapture, Land Map) it can provide services for marking observation points of surface surveys, entering data, calculating the area, measuring distances, drawing a tourist and local lore route using GPS trackers, etc.

Table 1. Free download options for GIS applications in the App Store and Google Play mobile app stores

+	Google Play	App Store
Google Maps	+	+
Maps.me	+	+
Yandex Maps	+	+
2GIS)	+	+
Yandex. Navigator	+	+
GIS Surveyor	+	-
Locus GIS	+	-
GIS Mapper	+	-
MapltFast	+	-
Mapit GIS	+	-
ArcGIS QuickCapture	+	+
Land Map	+	+
Google Earth	+	+
ArcGIS Earth	+	+
3D Earth	+	+
GPS Fields Area Measure	+	+
UTM Geo Map	+	-
Компас 54/55	+	+
P.L.A.N.I.T.	-	+
GIS4Mobile-X	+	+
Satellite Tracker - Satellites	+	+
CityBus	+	+
Planes Live: Aircraft Radar	+	-

3) Virtual Globes (Google Earth, ArcGIS Earth, 3D Earth) web – displays several thematic maps of the world on different scales in 3D format, allows you to insert and view individual files in KML or KMZ formats into the globe, put signs, view tourist and local lore objects, etc.

4) Mobile cartographic and navigation applications (GPS Fields Area Measure, UTM Geo Map, Компас 54/55, P.L.A.N.I.T., GIS4Mobile-X) it can perform functions such as determining the location of tourist and local lore objects, registering coordinates, measuring the area and distance, orientation with compus, measuring the angle of Azimuth, measuring the height of the Earth, drawing contours, or some of them.

5) Mobile apps for GPS tracking (Satellite Tracker - Satellite (in rus, Satellite Tracker – Спутники), CityBus, Planes Live: Aircraft Radar (in rus, Самолеты Live: Радар самолетов)) GPS sensors are installed on artificial Earth satellites, buses, trains, etc.designed to track moving objects.

Using mobile GIS apps, we noticed the following advantages:
- ability to access spatial and attribute GIS data at any time and anywhere;
- ability to determine the location of a user or object in space using GPS sensors and display it on a digital map;
- ability to work in places where there is no internet connection (offline mode), and then sync changes with the database;
- ability to perform work such as data processing, measurement, analysis, and transmission.

2.1 Survey results

In addition, at the beginning of the study, we interviewed the faculty and professors of the Abai Kazakh National Pedagogical University and the Kazakh National Women's Teacher Training University, located in Almaty, aimed at determining the ratio of students of the educational programs "Geography" to the effectiveness of organizing tourist and local lore activities using mobile GIS applications. 20 teachers from two universities took part in the interview. There were 14 teachers from KazNPU and 6 teachers from KNWTTU. In inervu, route navigation (Google Maps, Maps.me , Yandex map, 2GIS, Yandex) for viewing and research (GIS Surveyor, Locus GIS, GIS Mapper, MapltFast, Mapit GIS, ArcGIS QuickCapture, Earth map), virtual Globes (Google Earth, ArcGIS Earth, 3D Earth), cartographic and navigation (GPS, UTM Geo Map, Compass 54/55, P. L. A. N. I. T. Gis4mobile-X) and mobile GPS tracking applications (satellite tracker – satellites, city bus, live aircraft: radar aircraft) the possibility of using mobile applications in the organization of educational programs and local lore events for students of tourist orientation was considered. The results of the interview showed a split in opinions. Indeed, during the interview, there were teachers and people who doubted that mobile GIS applications would be effective in organizing tourist and local lore events, as well as those who believed that the result would be higher. The reason for their skepticism was due to the density and complexity of mastering programs for using mobile GIS applications. However, the number of supporters who believe that the use of mobile GIS applications in the organization of tourist and local lore events allows students to develop competence components "for the acquisition of new active–cognitive and subject-professional knowledge" prevailed. You can see in this video below (Figure 1). During the interview, there were supporters of the use of mobile GIS applications in the organization of tourist and local lore activities (70%), those who doubted it (20 %) and abstained (10%). Of these, 72% of KazNPU teachers supported, 21% expressed doubts and 7% abstained. At the same time, 67% of the

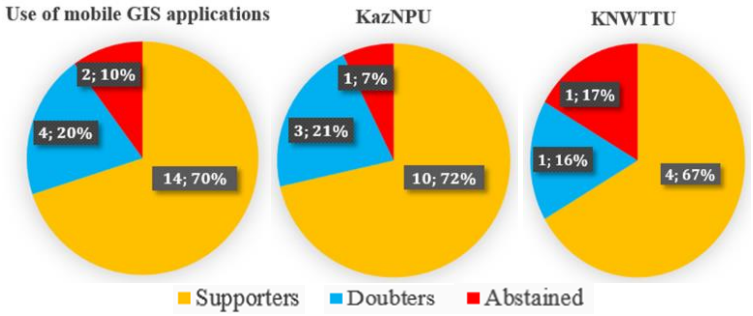

Figure 1. Results of the interview on the use of mobile GIS applications in the organization of tourist and local lore activities

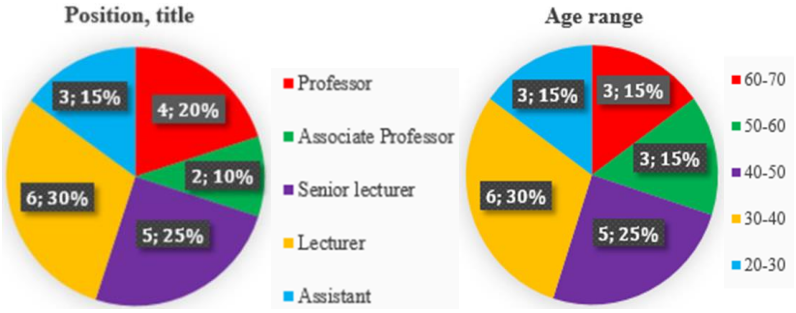

Figure 2. Position and age characteristics of the teaching staff of KazNPU and KNWTTU

teaching staff of KNWTTU supported, 16% expressed doubts and 17% abstained. In this regard, we found that the teaching staff of both universities supports the issue raised by us. Also, the degree and age of the teaching staff of both universities showed that they have the opportunity to master and use new information technologies in training (Figure 2). Analyzing the results of the interview, we came to the conclusion that in order to use mobile GIS applications in the organization of tourist and local lore activities, it is necessary to determine the level and motivation of future geography teachers to use mobile applications. After all, in the organization of tourist and local lore activities, future geography teachers should be able to: search for objects, get brief information about objects, determine the route to get to the address in the car, bus, taxi, bicycle and walking, determine traffic jams, mark tourist and local lore objects, determine the cordinate of the object and measure distances, visual analysis and marking and drawing objects. Therefore, it was important to determine the current state of Use and mastering of mobile GIS applications by students and assess the possibility of their use in the organization of tourist and local lore activities.

According to the plan, the questionnaire was taken secretly from students of 3-4 courses of the educational program "Geography" of KazNPU and KNWTTU. The survey consisted of two parts, and 72 students took part in it voluntarily. It was attended by 37 students of the 3rd year of KazNPU (26 girls, 11 boys) and 13 students of the 4th year (10 girls, 3 boys) (a total of 40 students). Also, 17 students of the 3rd year of KNWTTU and 15 girls of the 4th year (a total of 32 students) took part. In the first part of the questionnaire, information was obtained about the name of the university, course, age, gender. As a result, it turned out that the age of students is between 18 and 20 years. Of these, 32.4% are 18 years old, 26.5% are 19 years old, and 20.6% are 20 years old or older. In total, 92.3% of students are girls. In the second part of the survey, 16 questions were asked, aimed at identifying students ' knowledge and skills, views on local lore, the level and motivation of using mobile GIS applications, its main disadvantages and advantages, as well as effective mobile applications (Table 2). The survey participants and the results of the survey were shown in the table below (Table 2).

Table 2. Results of the 7th and 11th survey questions

Group	Name of the mobile application	Number of students using the mobile application, total 72 students		Percentage %
		KazNPU 40 student	KNWTTU 32 student	
Question 7. Which of the mobile GIS applications "Road navigation" did you use the most when visiting tourist and local lore objects?	Google Maps	4	3	9.7
	Maps.me	1	1	2.8
	Yandex Maps	2	1	4.2
	2GIS	31	26	79.1
	Yandex. Navigator	2	1	4.2
Question 8. Which of the mobile GIS apps for "Review and study" have you used the most during the learning process or practice?	GIS Surveyor	2	3	6.9
	Locus GIS	3	1	5.6
	GIS Mapper	1	2	4.2
	MapltFast	1	1	2.8
	Mapit GIS	4	3	9.7
	ArcGIS QuickCapture	23	18	56.9
	Land Map	6	4	13.9
Question 9. Which of the "Virtual Globes" do you use the most?	Google Earth	18	20	52.8
	ArcGIS Earth	9	7	22.2
	3D Earth	13	5	25
Question 10. Have you tried using mobile GIS applications "Cartographic and navigation?" Which one have you seen?	GPS Fields Area Measure	14	11	34.7
	UTM Geo Map	5	1	8.3
	Compass 54/55	3	4	9.7
	P.L.A.N.I.T.	1	3	5.6
	GIS4Mobile-X	17	13	41.7
Question 11. Have you tried mobile GIS apps for GPS tracking?	Satellite Tracker–(Satellite)	-	-	-
	City Bus	40	32	100
	Planes Live: Aircraft Radar	-	-	-

Thus, analyzing the results of student surveys, the results showed 2GIS (79.1%) from the mobile GIS applications "road navigation", ArcGIS QuickCapture-(56.9%) from the mobile applications "review and research", Google Earth from the virtual globe (52.8%), GIS4Mobile – X (41.7%) from the mobile applications "cartography and navigation" and city Bus for GPS monitoring (100%). We also received a restrained answer to questions 12-16 of the questionnaire: "what mobile GIS applications, in your opinion, will be useful for organizing tourist and local lore events? The answer to the question" 2GIS " was 37%, city Bus - 26%, Google Earth - 19%, 3D Earth - 13% and Google Maps - 5%. Well, "do you have the opportunity to learn Mobile GIS applications?" and "do you want Mobile GIS applications to be taught while reading"? we received the answer "yes" from the student "64%" to two questions. In addition, the advantages of using mobile GIS applications in the organization of tourist and local lore events: with the help of the mobile application, students can identify the necessary tourist sites and regions, where you can specify, identify and receive accurate information about

them, make a route in advance and receive self-development and research, motivational, emotional-value, active-cognitive and subject-professional knowledge. To the disadvantage: given the large territory of Kazakhstan, the constant need for the Internet to use mobile applications indicates that the network is not always good everywhere. Unfortunately, we cannot deny such facts. However, students of Kazakhstan are not deprived of the innovations and new innovative technologies that are taking place in the world. Students of the university will be able to use the ability to draw a tourist and local lore route with the help of GPS trackers, display thematic maps in 3D format at different scales with the use of web views and various services, enter and view individual files in KML or KMZ formats on the globe, put signs, measure the height of the Earth, track moving objects with artificial satellite of the earth with GPS sensors, buses, trains, etc.

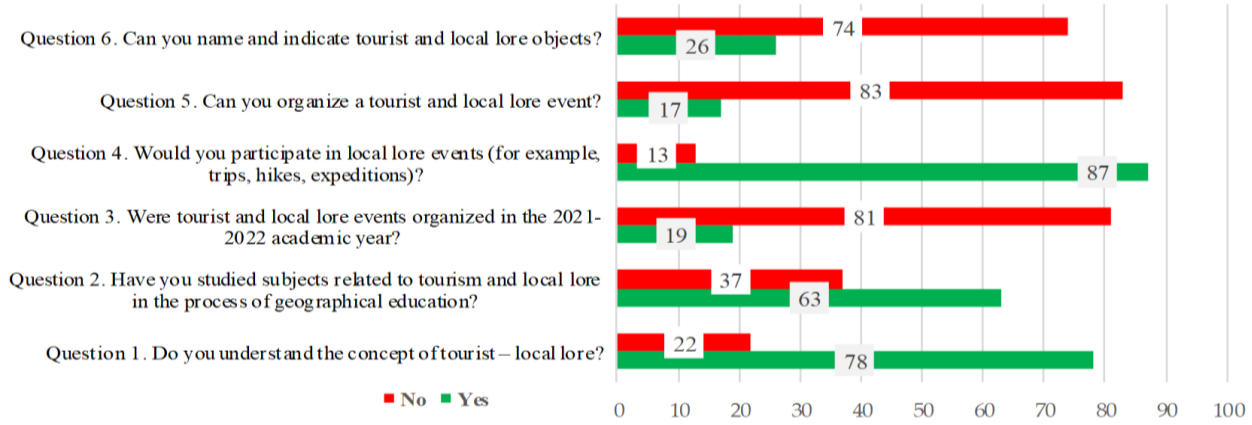

Figure 3. Results of 1-6 survey questions, %

DISCUSSION

In this study, we identified the most effective types of mobile GIS applications that can be used in the organization of tourist and local lore activities of students of educational programs "Geography" in higher educational institutions of the Republic of Kazakhstan, Almaty. Also, analyzing the views of scientists on the organization of tourist and local lore activities, we have clearly structured the tourist and local lore competencies of future geography teachers. Structure motivational and emotional value; active cognitive and subject-professional assimilation of new knowledge; includes components of self-development and research competence. The results of the study are unique. After all, we have identified the possibility of forming components aimed at mastering the knowledge and skills of Tourism and local lore, developing students ' creative abilities through the use of mobile GIS applications for students of educational programs "Geography" in the organization of tourist and local lore activities. This was achieved thanks to the selfless efforts of the research team. Formation of the emotional and value component of tourist and local lore competence - expressed the personal significant and valuable ideals, beliefs, views of the future geography teacher, local lore competence, his position in the organization and conduct of tourist and local lore work. This is because emotions play an important role in the work of geography students, as they concentrate a person's imagination and direct it to action. A positive emotional state during tourism and local lore classes, the presence of a source of emotional satisfaction contribute to the formation of tourist and local lore competencies of geographer students. The creator of the theory of emotions E. Ilyin (2001) distinguishes between negative and positive emotions. Negative emotions are excitement, anxiety, fear, hopelessness, resentment, frustration, anger, sadness, etc.and positive emotions are pleasure, joy, fun, surprise, curiosity, sense of humor, confidence, etc.

This allows you to monitor the tourist and local lore work of geography students. We also considered cognitive activity in tourist and local lore work as the ability to acquire knowledge and research skills in the field of Tourism and local lore, as a personal trait that combines important qualitative characteristics, as a manifestation of purposeful cognitive activities of students to study the territory of their native land. Therefore, in order to correctly formulate the goal and choose ways to achieve results in the formation of tourist and local lore competencies, geographer students must master rational methods of thinking activity. Psychological and pedagogical assessment is carried out by Slastenin (2002) emphasizes the development of mental activity, the gradual formation of mental actions. These postulates are necessary for future geography teachers to conduct tourist and local lore work. Developing the ability of geographer students to think independently, we use cognitive tasks to compare, establish logical connections, and work with local rules of tourist organizations. Melnyk (2019) on the component of self-development and research competence draws attention to the contradictory nature of internal and external factors of research activity of students: understanding this contradiction and the desire to overcome it becomes the driving force for personal development as a whole. Focus on the research component in the tourist and local lore competence of future geography teachers Mukhtar et al. (2016) it is confirmed by the opinion that "the research activity of students has inexhaustible, not to the end realized opportunities for the formation of a creative and search position of the individual". The organization of tourist and local lore activities in geographical education using mobile GIS applications will allow updating educational approaches, introducing pedagogical technologies (Brooks, 2018; Sinha, 2017), as well as modernizing tourist and local lore work of future geography teachers, developing tourism and local lore as an effective tool for the formation of a professional, training future geography teachers as applicants, researchers, discoverers of the peculiarities of the native land. The organization of tourist and local lore activities using mobile GIS applications provides a clear context for geographical education in the region and helps future geography teachers to better understand natural and social phenomena and processes (Xiaoling et al., 2017). Therefore, it will

be effective to use mobile GIS applications on smartphones and tablets in the process of continuous training and field work. An example of this is the high demand of the Survey123 for ArcGIS software complex in geographical education of tourist and local lore objects for students of Tver State University in Russia (Midorenko and Zherenkov, 2020). Currently, Mobile GIS applications integrated with GIS platforms such as ArcGIS Online have a great opportunity to be used in the organization of tourist and local lore activities of future geography teachers and in geographical Education (Sebastian and Miguel, 2017). With their help, you can perform the following sequence of works (Figure 4). Formation of the motivation of the future geography teacher to organize tourist and local lore activities using mobile GIS applications, the importance of personal motives for improving the value of his mobile GIS applications and the quality of training in tourist and local lore, the value attitude of the geographer student to conducting scientific research, the ability to take a creative approach to solving educational problems and improve the educational process. Therefore, it is necessary to combine the content and motivational capabilities of the individual, which implies not only the formation of the ability to independently master knowledge and methods of action using mobile GIS applications, but also the consolidation of cognitive needs and internal views that stimulate tourist and local lore work. Therefore, the use of mobile GIS applications in Educational Research in the context of hiking is effective for the current level of Organization of tourist and local lore work. This is because cognitive motivation as a driving force for educational activities in the field of Tourism and local lore is necessary to emphasize the expediency of acquiring new knowledge and to develop the ability to study the native land and strengthen self-improvement skills.

Figure 4. The possibility of using mobile GIS applications integrated with ArcGIS Online platforms in geographic education for students

CONCLUSIONS

Now in the world, the smartphone industry is rapidly developing and is available in the consumer market. Especially with the growing number of users of mobile GIS applications, smartphones are performing many functions. In this regard, the role of using mobile GIS applications in education is increasing and is becoming more useful for students of Higher Education Institutions (Universities). University students in tourist and local lore activities from the mobile GIS applications" road-navigation" 2GIS; from the mobile applications "review and study"ArcGIS QuickCapture; from the "virtual globe" Google Earth; The use of GIS4Mobile-X and City Bus mobile applications for GPS tracking will be effective from mobile applications "cartographic and navigation". After all, as a result of studying the issue of preparing future geography teachers for tourist and local lore work on the basis of a competency-based approach, we determined: the methodological system for conducting tourist and local lore studies, the scope of application of local lore information and the competence components of Tourism and local lore, analyzing the concepts of native land, tourism and local lore, their relationship, forms and functions of behavior. We also noted the dominance of the traditional approach in the preparation of future geography teachers for tourist and local lore work. Due to the weak connection between individual professional disciplines and practices of the tourist and local lore direction, it turned out that there is no teamwork. It is proved that the motivational and value relationship in the formation of tourist and local lore competencies of future geography teachers allows self-development in the organization of tourist and local lore work and the organization of research work with students.

It was determined that the components of the formation of tourist and local lore competence of future geography teachers and its performance indicators are professional experience, which were the defining values necessary for conducting tourist and local lore work-education, reliability, fairness, self - esteem, tolerance, creativity, interest in work. The components of the structure of training future geography teachers for tourist and local lore work based on a competency-based approach were also known. The effectiveness of organizing tourist and local lore activities of future teachers using mobile GIS applications was evaluated. This study is based mainly on a reliable network of studies conducted in English and Russian – speaking countries and provides conclusions for determining the effectiveness of using mobile GIS applications in the organization of tourist and local lore activities in educational programs "Geography".

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