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Developing Students' Research Skills Through Field Work

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ABSTRACT: Fieldwork plays a crucial role in developing students' research skills by bridging theoretical knowledge with practical application. Despite its importance, challenges remain in effectively integrating fieldwork into geography education to maximize student learning outcomes. This study aims to address this gap by identifying effective strategies for enhancing research skills through field-based activities. A mixed-methods approach was employed, utilizing both quantitative and qualitative research techniques to analyze survey responses from 94 students. Research skill development activities were conducted both in and out of the classroom, and students' performance was assessed using survey-based evaluation tasks. The findings indicate a significant difference in research skill development between the control and experimental groups ($U=385.00$; $p<.05$), demonstrating the positive impact of structured fieldwork. Additionally, male students exhibited a faster and more accurate progression in research-related activities compared to female students. Standard deviation values of development indicators further supported these findings, highlighting key differences in skill acquisition. These results provide a foundation for refining fieldwork-based instructional methods, contributing to both theoretical advancements in geography education and practical improvements in teaching approaches.

Keywords: geographical knowledge, research skills, research activities, study-field work, geoinformation competence.

I. INTRODUCTION

Personal skills are important in performing any activity, more specifically, the goal can be achieved from the results of the development of research skills [1]. It is clear that students' literacy also develops in the formation of their skills [2]. The activity performed to develop skills is research [3]. The purpose of the research work is to determine the methodical ways of developing students' research skills by conducting study-field work. The types of tasks performed near natural geographical objects in educational field work are limited. Study-field work has its own characteristics and ways of conducting it, organized and conducted in the fields of science other than geography [4]. Study-field practice in higher educational institutions as a structural main element of the educational process, students perform individual or group research activities. As a result, they improve their joint activities and geographical knowledge, skills, and abilities [5]. Study-field work, especially in the natural sciences, has its own set of unique challenges. One of the key challenges lies in the limited scope of tasks that can be performed near natural geographical objects, as the environment might not always offer the full range of activities needed to develop research skills effectively. For example, certain geographical sites might not provide the necessary resources or conditions for conducting more advanced research activities, limiting the scope of fieldwork exercises.

Moreover, the organization and conduct of study-field work in fields outside of geography can also present challenges. Different fields of study have varying expectations for how research should be conducted

in a field setting. Study-field work in disciplines other than geography, such as astronomy or biology, often requires adapting the methodologies to fit the specific context, which can complicate the planning and execution of fieldwork tasks [4]. This adds a layer of complexity to the educational process, requiring careful planning and flexibility in the approach.

Conducting study-field research in an open field environment in the educational process helps to increase the value of the learning process [6]. Educational practical work is an important component of future specialist training. Tasks organized according to the interests and abilities of each student ensure the effectiveness of research work. Methodological approaches used in the classroom are also implemented in the field experience [7, 8]. This study is necessary because it explores fieldwork-based learning as an effective approach to enhancing students' research competencies, problem-solving skills, and ability to critically analyze information. In order to increase the activity of students, it has been studied by several studies that it is the main requirement in modern education that the teacher undertakes the development of research activities and presenting tasks, reports, and evaluation activities in the classroom [9]. The directions of research work are determined by lectures, practical, seminar classes in higher educational institutions. Field activities develop students' scientific writing, research, communication and research skills. They learn to present the results of field research in the form of a report [10, 11]. Experiences in fieldwork are implemented in result-oriented teaching. Prior to organizing and conducting practice-oriented learning activities, the importance of informing students' knowledge and professional development is determined [12].

The importance of fieldwork, the value and necessity of theoretical and practical knowledge arises from the relationship between the teacher and the student. In the development of personal skills, field activities are carried out by performing tasks in accordance with learning objectives [13]. Since the student's actions and curriculum development in the study of any geographical object are carried out by the teacher, the learning results are directly important to the teaching methods.

Scientific works to solve educational problems consider the possibility of joint research work [14, 15]. Collaboration and communication in the classroom are the key to achieving the best results in any research task.

One of the most important tasks in the modern education system is the rational organization of activities that combine theoretical information and work experience to form the abilities and competencies of students [16]. This activity is carried out in field work. However, we can determine the results of the research activities carried out in fieldwork using successfully developed methodological approaches. Activities in general classroom and non-classroom facilities to develop research skills have positive results. In field training situations, the learner develops knowledge, understanding, design and other cognitive activities. But by supplementing this set of activities and skills, we can clarify the relevance of our research. Therefore, it is necessary to develop methods that develop research skills in teaching, individually or in groups, and include the stages of problem identification, data collection, interpretation and analysis, evaluation, presentation during the research [6].

Research skills are not only in one field, but in all fields of society and education, it is an act of acquiring new knowledge that requires learning, skills, and labor activities. A person with a high level of research skills is in continuous professional development. Therefore, research skills help students to gain many experiences in new life stages and solve complex problems. In education, the knowledge and skills of a person are realized in research activities. It is known that pedagogical activities are conducted on the basis of effective teaching. It affects the full formation of research skills, which are formed during the application of theoretical knowledge of students in practice. Conducted research activities ensure the development of the learner's movement, orientation, analysis and search abilities, as well as the development of physical and mental labor. The importance of research is to work with activities that develop students' research skills using their theoretical knowledge in practice and raise the level of mastery of the subject. To ensure the achievement of a high level of knowledge with the help of research skills and the application of the master's knowledge in a new work environment as a professional geography specialist [7].

As one of the main goals of the modern education system, activities to develop research skills are important in the production of knowledge and expanding the horizons of consumers. Therefore, in

determining the prerequisites for the development of research skills in educational and field work, the following research questions can be proposed:

1. How important is it for students to perform tasks that form research skills in fieldwork?
2. Is it possible to get a positive result by offering tasks that develop research skills in fieldwork?

II. LITERATURE REVIEW

1. RESEARCH SKILLS

During the review of the literature related to the topic of the study, first of all, works on the development of research skills of the subject teacher were considered. Actions carried out by the teacher: disciplining students, creating a research environment, having a good relationship in the learning process and research activities, guiding them to eliminate obstacles and difficulties arising in fieldwork [8]. The teacher who guides in the educational process should educate his students to systematically identify and find a solution to the problem [9]. Because in research activities, students are eager to solve problem tasks. Usually, the developed lesson plan is implemented in the classroom. However, students are interested in learning in nature. A student with well-developed research skills strives to learn new things, to achieve success, to ask the right questions and to give the right answers, to plan actions to recognize and solve problems, and to develop comprehensively. The goal of the research can be fully achieved if the teacher provides systematic guidance in the development of research skills. The organization of tasks and solutions that require research activities leads to the fulfillment of educational goals. During the experiment, due to the interaction of the students, the results of the research find a solution in a positive direction. It has been studied that the most important role for students in carrying out research activities to find solutions to problems is a comfortable educational environment and communication with each other [10]. In research-based learning, the student's practical work provides an opportunity to solve problems in learning. For students, research skills are a prerequisite for a high-level manifestation of their pedagogical career. Because students are future graduates and professionals. Students can distinguish the need for data in gathering information. Research-oriented teaching is important for students to apply research skills in various activities, solving practical problems [11]. Research skills are the basis of scientific-theoretical and practical knowledge consisting of research activities [12]. The relevance of the research is determined by the results of the observation, control, processing activities carried out during the study of research skills. This is because activities at each stage of fieldwork directly affect the formation and development of research skills. Necessary prerequisites for the development of research skills: the teacher's direction, tasks and tools that require research activities, ways and methods of solving them, the level of establishing relationships with students during practice, the results of research problems [13,14].

If students in higher educational institutions develop their research skills in the process of teaching, there will be no obstacles when considering an alternative way of acquiring new knowledge while engaged in academic research. Developing research skills is a complex process. First, students need to develop communication skills. Second, information systematization is implemented. The tendency to prepare research methods and solutions, proposals, which is a complex aspect in the formulation of research questions, increases. Therefore, it is better to systematically develop research skills activities [15].

2. THE ROLE OF FIELDWORK IN THE DEVELOPMENT OF RESEARCH SKILLS

Some scientific studies [34, 35] concluded the importance of conducting the learning process outside the classroom (travel) for the active development of students' mental skills. It has been proven that it is possible to achieve results through research activities in learning materials. In order to increase the thinking space in the formation of students' knowledge in the study of the object, it is necessary to practice activities that constitute the development of research skills for students. And fieldwork is a form of training in accordance with the performance of these activities Study-field work increases the research result by being able to use geographic objects in real life conditions in natural conditions. The teacher contributes to the personal and

professional development of students by solving the questions of where and how to teach knowledge, what, where and to whom. During fieldwork, the relationship between students and the teacher is strengthened, and their value for conservation increases [16,17]. Study-field work supports the idea of nature protection. Theoretical components in conducting practical lessons for students in science subjects serve as a bridge in the development of research skills. Theoretical training and practical skills of the teacher are determined in the field experience [18,19]. The results of activities combined with field work and research skills lead to positive changes in the formation of a professional [20].

Fieldwork is a component of education. We consider educational fieldwork as an instruction and methodology based on a form that helps students gain experience. Learning in a social environment does not depend on a person's age. Because a person always develops by improving his knowledge in society. In this regard, a person learns in any part of society (medicine, education, law, agriculture, etc.) in performing research activities in field work. Therefore, he can perform field work in a professional or social environment, guided by his theoretical knowledge. Educational field work is a set of activities that are purposefully performed to help students acquire learning experience through interaction with real life situations. It can be considered as a combination of experiences that allow students to cover and deepen their ability to connect theory with practice. It is necessary to conduct research on the object-oriented students through field work experience while fulfilling the educational tasks. As a result, they can get a lot of valuable information and make sure of the truth of the previously formulated opinions.

III. MATERIAL AND METHOD

The issues identified in the research work are conducted and applied in accordance with the guidelines for the use of quantitative and statistical information [21]. A measurement method with high validity was used to determine students' thinking ability [22]. As a result of the research activities, independent questions with multiple choice options, based on the tasks performed in the study-field work, were created. Quantitative and qualitative comparisons were made, including qualitative predictive measures between the two groups according to some data [23]. In addition, an individual test was conducted, and analyzes were made according to the reliability of the test of the effect on memory and the amount of time. The study employed a mixed-methods approach that combined quantitative statistical analysis with qualitative insights to evaluate the effectiveness of teaching interventions aimed at developing students' research skills. By grounding the methodology in well-established educational theories and using validated measurement tools, the study offers valuable insights into how fieldwork-based teaching strategies can enhance research competencies among students. The results also highlight important gender differences in skill development, pointing to the need for more tailored educational approaches in the future.

1. STUDY POPULATION

1.1 Ethical Approval and Participant Consent

The study was conducted in compliance with ethical research guidelines, and ethical approval was obtained from the relevant institutional review board of the Kazakh National Pedagogical University named after Abay. Prior to participation, students were provided with detailed information about the study's purpose, procedures, and their rights as participants. Informed consent was obtained from all respondents, ensuring that participation was voluntary, and students had the right to withdraw at any stage without any consequences. Confidentiality and anonymity were strictly maintained, with survey data used solely for research purposes.

As respondents to the study, the 1st year (total - 45, male - 25, female - 20) and 2nd year (total - 49, male - 16, female - 33) students of the specialties "6B01516-Geography-History" and "6B05203-Geography" of the Department of "Geography and Ecology" of the Kazakh National Pedagogical University named after Abay, Institute of Natural Sciences and Geography participated. The total number of students is 94. Male students - 41. Female students - 53. Survey data obtained from students is intended to identify and analyze the

problems of fieldwork in the development of research skills in geographical education at a higher educational institution (Table 1, 2).

Table 1. Information about 1st year students who participated in the survey.

Sex	**%**
Female	44,44
Male	55,56
Age	
16-18	64,44
18-20	35,56
Conducting fieldwork –	
very important	86,67
medium importance	13,33
not important	-

Questionnaires were compiled using the Google form application and distributed through the social network WhatsApp. In accordance with the curriculum, the 2nd year students of the geography major conducted study-field work in the Almaty-Sharyn gorge - Kulsay lake - Kayindy lake - Bartogai reservoirs from May 29 to June 3, 2023. The survey questions of the research paper were collected from 2nd year students to determine their research skills on November 6-13, 2023 (Table 2).

Table 2. Information about 2nd year students who participated in the survey.

Sex	**%**
Female	67,35
Male	32,65
Age	
16-18	6,12
18-20	93,88
Conducting fieldwork –	
very important	85,71
medium importance	14,29
not important	-

2. INVESTIGATION TOOLS

The answers to the questions were obtained from the students in the form of an independent questionnaire from two groups. Analyzes of the questionnaire were given in order to determine the perception of activities performed in educational field work and tasks that caused complexity. The secondary research approach is also in the form of a questionnaire, but questions were given to students in the direction of determining the importance of tasks that develop research skills in field practice. The relevance of the U-test to the research objectives lies in its ability to determine whether the experimental group, which engaged in field-based activities, demonstrated a significantly higher level of research skill development compared to the control group, which had not yet undergone fieldwork. By analyzing survey scores from both groups, the test helped validate the hypothesis that experiential learning through fieldwork enhances students' ability to apply theoretical knowledge in practical settings. The significant differences in scores ($U=385.00$; $p<.05$) confirmed that structured field activities positively influenced research skill acquisition. These findings support the study's broader goal of identifying effective methods for integrating fieldwork into geography education to enhance student learning outcomes. We determined maximum 1 question with 30

points, average 20 points and minimum 10 points. Fieldwork for the control group is planned for the next school year. In conducting a survey on the U-test, the scores were taken from the control work in order to check the theoretical knowledge of the basic and professional subjects conducted for the majors, while the experimental group completed the task questions given in the survey during the study-field work, since the study-field work was conducted between May 29 and June 3, 2023. They used the acquired knowledge in carrying out activities that develop research skills.

3. DESIGN

A questionnaire was taken from the students, which determines their research skills, related to the performance of their activities in field work. The survey questions are included in the appendix (Section 1). Questionnaire questions were aimed at determining the difficulties caused by students in conducting study-field work, the development of research skills and the ability to master the results of research activities.

The next research activity was also conducted in the form of a survey, but it was conducted in order to determine the developed points of knowledge and research skills acquired during fieldwork. In the evaluation of the questions on the effectiveness of the development of research skills in educational and field work, we determined by marking a maximum of 1 question with 30 points, an average of 20 points, and a minimum of 10 points.

Using the U-test, the score indicators were determined, and the average rank and rank sums of the results of the control and experimental groups were determined.

Student respondents' answers are expressed in percentages in the tables below and calculated using the Mann-Whitney U-test, a statistical test used to evaluate differences between two independent samples. Average standard deviation indicators were used to determine the average value of the results of the experimental and control groups and the sum of the degrees of the results (Figure 6, 7).

IV. RESULTS

In Figure 1, the responses of students aged 16-18 (64.44%) and 18-20 (35.56%) to the third question of the survey are compared and analyzed by gender (Figure 1).

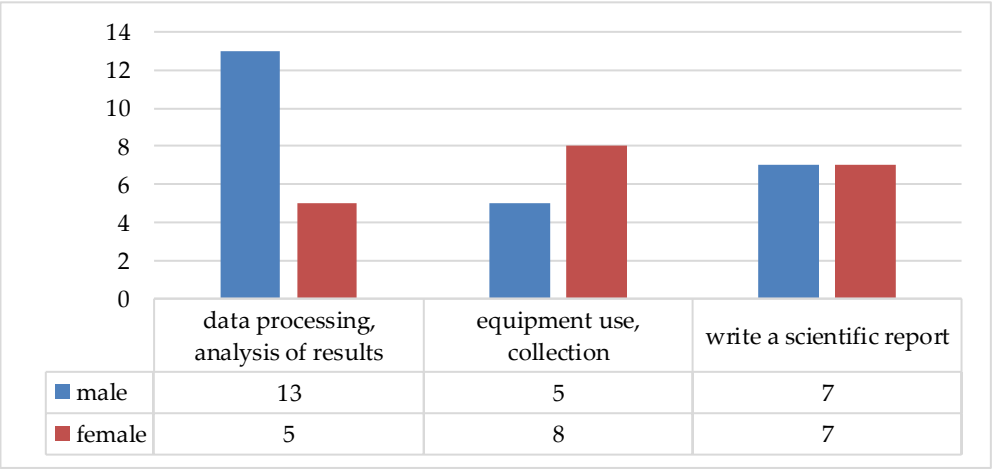
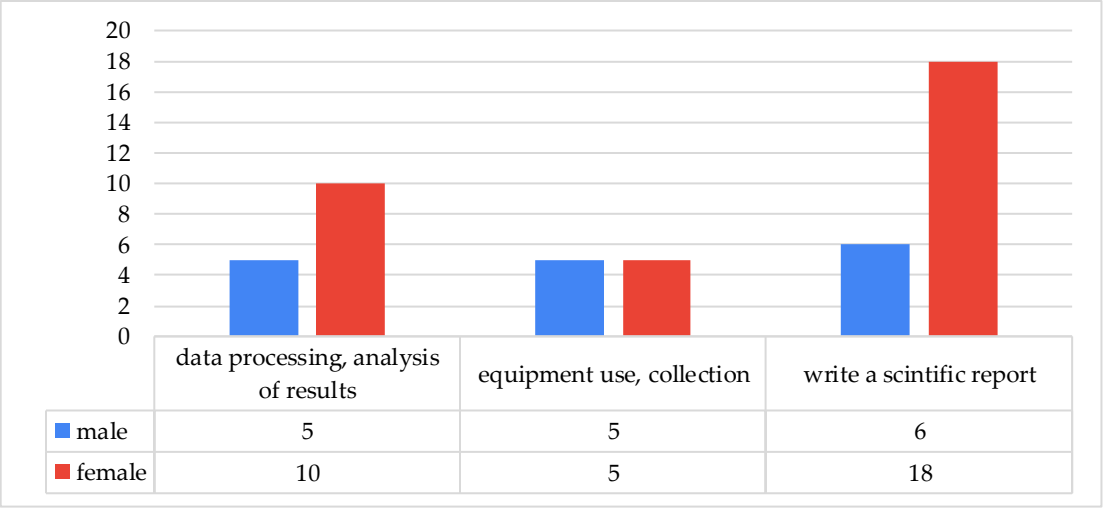


FIGURE 1. An indicator of the complexity indicators of the control group in doing research work.

The number of 1st year students of the control group who will conduct field work in the future is 45 people (100%). Answers: data processing, analysis of results - 18 students (40%), equipment use, collection - 13 students (28.89%), write a scientific report - 14 students (31.11%). On the basis of their theoretical knowledge, they determined the complexities of engaging in activities that are conducted in educational field work and develop research skills. As we can see in Figure 1, 13 (72.22%) male students in the period

when they did not conduct fieldwork predicted that the activities of processing information and analyzing the results would cause problems. Meanwhile, 5 female students (27.78%) indicated that they have a high tendency to work with information. 8 female students (61.53%) stated that the collection and use of equipment for the next study is a problem for the research activity. 5 male students (38.47%) showed that the work that increases work ability, which is considered the main dimensions of research activities used in fieldwork, does not cause any problems. The average indicator for female and male students shows the activity of writing scientific information and report, more specifically, after conducting research activities in field work. Therefore, in terms of performing field work, the easiest and most uncomplicated activity for students is writing a scientific report, while the rest of the activities are defined by students as complex work.

Figure 2 shows the analysis of the responses of 16-18-year-olds (6.12%) and 18-20-year-olds (93.88%) according to the third question of the survey compared to the gender composition (Figure 2).



	data processing, analysis of results	equipment use, collection	write a scintific report
male	5	5	6
female	10	5	18

FIGURE 2. An indicator of the complexity indicators of the experimental group in doing research work.

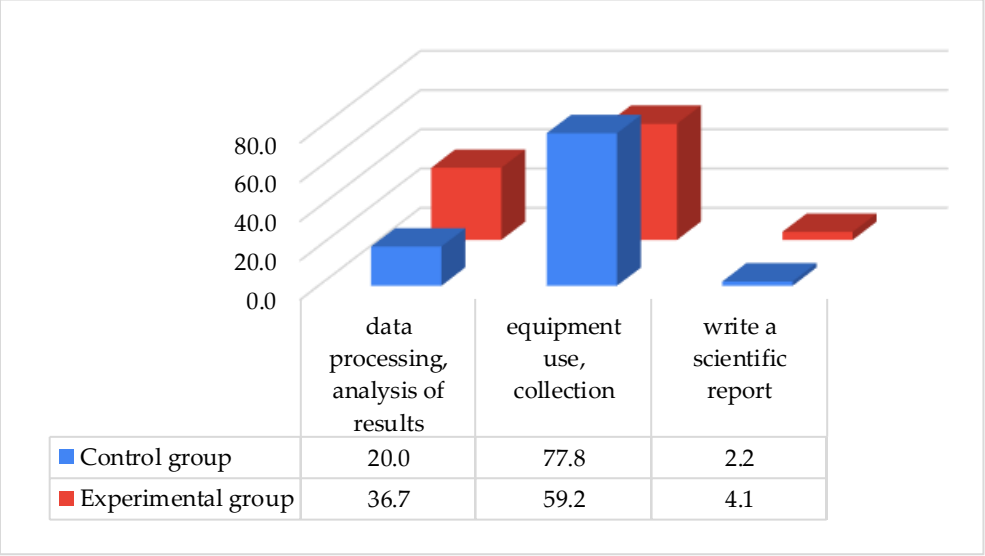
The number of 2nd-year students of the experimental group that conducted fieldwork is 49 people (100%). Answers: data processing, analysis of results - 15 students (30.60%), equipment use, collection - 10 students (20.40%), write a scientific report - 24 students (49%). Along with theoretical knowledge, he performed activities that develop research skills and gave his answers to the relevant questions based on his acquired knowledge, skills and abilities. Looking at the results from Figure 2, it was noted that male students (5 people - 33.33%) did not have any problems in performing research skills of processing information and analyzing results, while female students (10 people - 66.67%) worked with information and analyzing results determined that it did not interfere.

It was determined that the complexity index of the activities of using equipment for male and female students is average. For male students (6 people - 25%), it was determined that the activities of scientific writing, presentation, and reporting in conducting field work do not cause complications.

However, female students (18 people - 75%) showed that the level of complexity of the activity of scientific writing and report writing performed during the reporting (cameral) period of field studies is high. Based on the obtained results, we determined the tendency of students in the experimental group to form and develop research skills. We have come to the conclusion that male students develop their search, labor and research abilities faster and more correctly than female students in field work, which includes activities of research skills. Therefore, the research activities in fieldwork were not obstacles in the development of research skills for male students. Female students showed a higher tendency to work with research equipment performed in fieldwork than male students. Therefore, it has been proven that girls working with

equipment in educational field work cannot be realized without the necessary tools in determining the main problem.

We were able to determine several results in conducting qualitative calculations in the research work (Figure 3). "What Fieldwork Activities Develop Research Skills?" In response to the question, the control group (9 people) indicated the version of "data processing, analysis of results" the version of "use of equipment, collection" activities (35 people) and the version of "writing a scientific report" (1 person) (Figure 3).



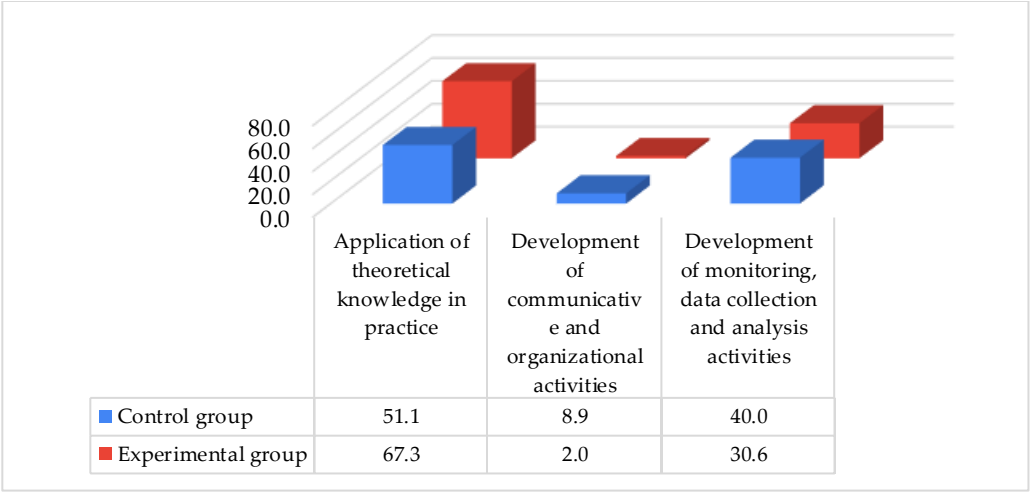
	data processing, analysis of results	equipment use, collection	write a scientific report
Control group	20.0	77.8	2.2
Experimental group	36.7	59.2	4.1

FIGURE 3. Survey question: "What activities in fieldwork develop research skills?".
Note: quantitative information is given as a percentage.

"What Fieldwork Activities Develop Research Skills?" according to the question, the experimental group (18 people) marked the version of "data processing, analysis of results", the version of "use of equipment, collection" (29 people) and the version of "writing a scientific report" (2 people) (Figure 3).

In the answers to the survey questions, the experimental group has determined that the activities performed in the study and field work have a large contribution to the activities of writing a scientific paper, reporting and processing data, and analyzing the results. Responses from the control group indicated that equipment use activities were an activity that developed research skills. It was determined that the most important of the activities performed in field work for students is to report on the work done in the field, to perform scientific works for the purpose of summing up. Other studies have shown that research writing improves students' reading, research, and problem-solving skills [24].

Analyzing the answers to the question in Figure 4, the control group's question "What are the tasks of the research skill in field work?" to the question marked the answers "application of theoretical knowledge in practice" (23 people), "development of communicative and organizational activities" (4 people), "development of monitoring, data collection and analysis activities" (18 people). And the experimental group's question "Research skills in fieldwork can be achieved through what tasks?" to the question marked the answers "application of theoretical knowledge in practice" (33 people), "development of communicative and organizational activities" (1 person), "development of monitoring, data collection and analysis activities" (31%-15 people) and they showed a high percentage of practical application of theoretical information in the development of research skills in their works.



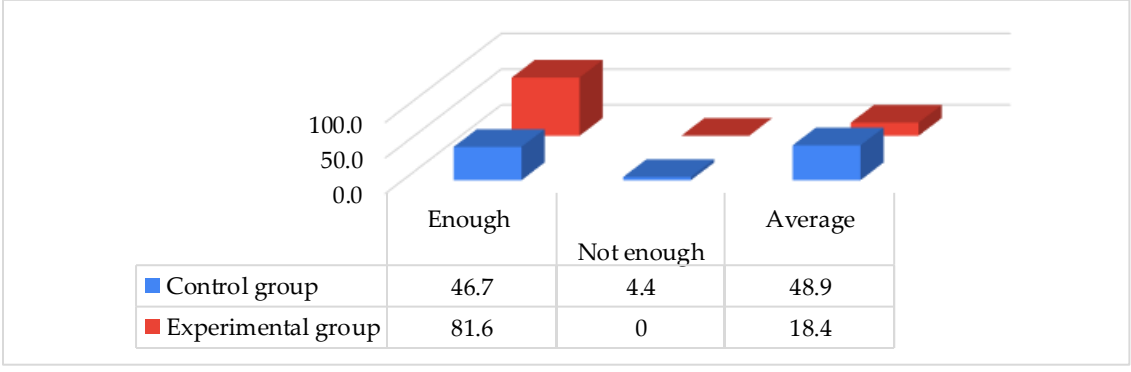
	Application of theoretical knowledge in practice	Development of communicative and organizational activities	Development of monitoring, data collection and analysis activities
Control group	51.1	8.9	40.0
Experimental group	67.3	2.0	30.6

FIGURE 4. The question of the survey: "What kind of tasks are used to achieve research skills in field work?"

Note: Quantitative information is given as a percentage

It is known that with the help of acquired theoretical knowledge, students can conduct field work without any obstacles. Researchers have found that students quickly perceive and differentiate changes in their personal lives and society, and make decisions easily. An important task of the control group is to perform organizational activities, analyze data, and control activities. The researchers who studied the general concept of "practice" in a broad sense and presented it as the concept of "good work" proved that it is "a set of activities carried out through joint organization and includes training in motivation and learning tasks that allow the development of experience" [25].

In the answers of the respondents to the survey question, the complex aspects of students' research activities in field work are considered. The control group pointed out that it is difficult to analyze the results of field work. But it is better to take into account that the field work of the control group will be organized in the future according to the curriculum in the next academic year. In the answers of the experimental group, the complexity of the use of equipment and scientific work, report writing was determined. When working with any student, if the teacher includes tasks aimed at writing and conducting scientific research in the fund of methodological approaches conducted in the geography class, reporting should not cause problems in performing scientific research.



	Enough	Not enough	Average
Control group	46.7	4.4	48.9
Experimental group	81.6	0	18.4

FIGURE 5. Question of the survey: "Your level of use of theoretical sources related to field work in educational and research activities?".

The inability of students to freely and scientifically express their thoughts in the process of education, the inability to identify problems related to the topic of research work, the frequent fear and anxiety of students, and the need to develop the activities of writing scientific research work have been studied in many works of scientists. Research skills activities can be used as an alternative instructional tool during the learning process by working with common tasks [26].

In our research work, we asked students to use theoretical and informational sources at a sufficient level in their field work. It is important to note that as a result of the completed tasks and activities in the field work, the control group was limited to theoretical information, and the answers of the experimental group showed the result of "adequate" level - (40 students) 81.6%, average level - (9 people) 18.4%.

The results of the activities performed in the educational field work were checked according to the score (Appendix 2 part). The control group (1st year) and the experimental group (2nd year) were grouped and some information was collected (Table 3).

Table 3. Statistical analysis.

Groups	N	Mean Rank	Sum of Ranks	U	p
Experimental group	49	62,14	3045,00	385,000	,000
Control group	45	31,56	1420,00		
Total	94				

The results of the U-test survey are shown in Table 3. The achievement scores of students in the experimental group, which used a new method of developing research skills, and students in the control group, which used a traditional teaching method, showed a significant difference between the groups [U=385.00; p<.05]. The average grade of the experimental group was 62.14, while the average grade of the control group was 31.56 (Figure 5). The result explained that there is a new approach that includes activities that develop research skills and is effective.

Note: the experimental group conducted fieldwork from May 29 to June 3, 2023. Fieldwork for the control group is planned for the next school year. In conducting a survey on the U-test, the score indicators were taken from the control work in order to check the theoretical knowledge of geography.

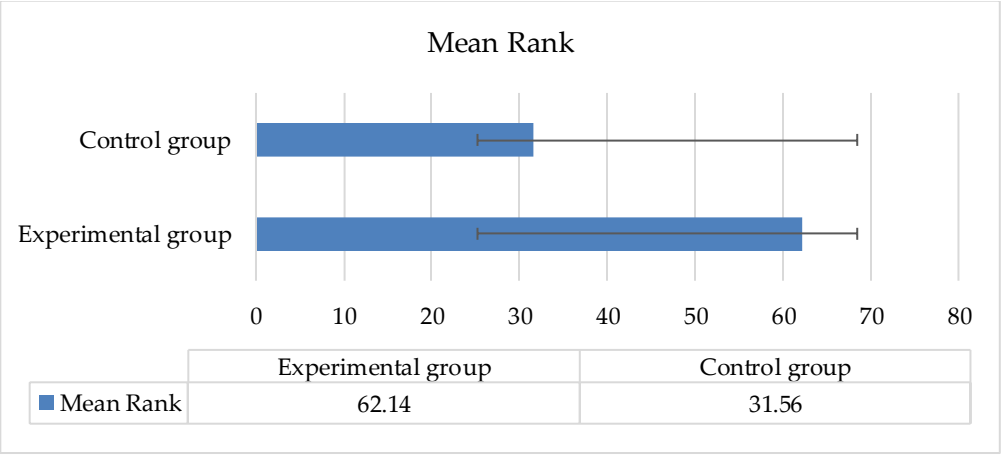


FIGURE 6. Average degree of results of experimental and control groups.

Note: copyright compilation.

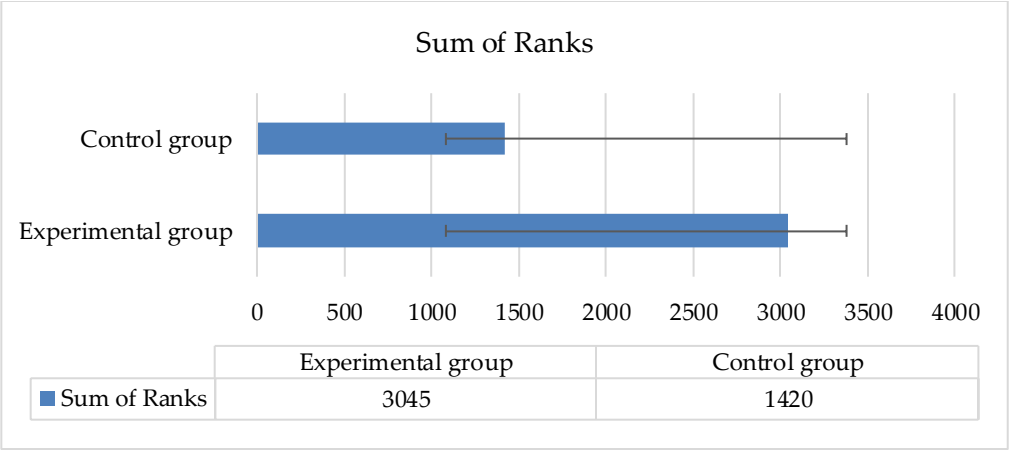


FIGURE 7. The sum of the degrees of the results of the experimental and control groups.
Note: copyright compilation.

V. DISCUSSION

In other scientific studies [26], we found similar approaches and results in the analysis of activities that develop research skills. To determine students' readiness to develop research skills as professionals, researchers collected data from students in the form of interviews. Conducted thematic content analysis in data processing. The purpose is to collect the content of information and methods of analysis of procedures involving research activities, to make conclusions. As a result, it was formulated with the development of research skills developed in training as a future professional after the research activity in the survey sample taken from the participants. In conclusion, the researchers made a progressive classification of the elements that emerged from the results of their experimental work: understanding the research process, searching the database, reviewing the literature, determining the indicators of the dissemination and evaluation of experiments. In their work, researchers [27] found that research experience is associated with the degree of feeling capable of performing basic research skills. In order to find out whether the self-efficacy of general research skills depends on the duration of time spent in the laboratory, the students' answers were examined based on the time span. Looking at the effectiveness of the overall research skills of the time spent on the research, he estimated the dimensions of the skills needed to conduct the experimental design. It has been proved that the time spent on research before becoming a professional is calculated in terms of years of research hypotheses, and research skills are determined in practical work that contributes to self-efficacy. They conducted research with the help of literary analysis, survey, and psychological testing methods. The study was conducted in phases. An experimental group was created by taking questionnaires from students of two courses similar to our study. According to the general research method, work performance, principles of organization, work education carried out with psychological and moral connection, comprehensive effects of personality were analyzed. Practice was carried out in accordance with the standard instruction on organizing and conducting educational field work. Students creatively performed practical work to expand and consolidate their acquired theoretical knowledge and developed theoretical and practical bases of understanding. As a result, the role of field work in the professional development of students and the attempt to determine the professional orientation of the future specialist were performed. The research subject, purpose and possibilities are analyzed. The importance and prospects of the research results were determined in the summary of practical activities. Experience has proven that the division into stages is a conditional activity, as the stages are a continuous dynamic process.

From research related to research skills, it was observed that the dimensions of decision-making skills are similar to the sub-dimensions of simple research skills. This is because the measures show the actions to be taken in the development of research skills in the teaching process, the selection of teaching methods and

approaches, work with information, and effective ways of solving real-life problems for students [28]. Study-field work often performs group tasks according to the topic during the given time. Tasks that develop research skills through group activities bring high results. This conclusion [29,30,31,32] has been consistently presented in researches that working in groups facilitates the development of research skills, helps students to develop their skills in a comprehensive way. Research shows that the most important thing in group work is to share the acquired knowledge among students, to stimulate their analytical and synthesis, creative thinking [33]. Comparing the research results with other scientific studies, we grouped them into the model shown below (Figure 8).

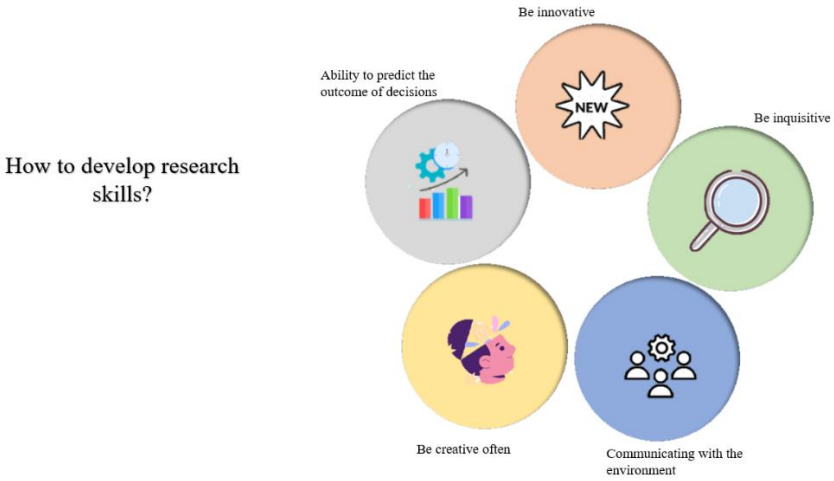


FIGURE 8. "How to develop research skills?".

Note: copyright compilation.

In the development of students' research skills in reporting works, the teacher's guidance and the use of innovative activities in the process of research will increase his ability to innovate. As a future professional, the student does not face difficulties in passing tests in the first career stages due to his ability to be innovative. Innovative and sharing activities on the part of teachers are a reflection of the maturity of best practices [34]. The greatest strength in conducting research is the review of research papers. A follow-up to innovation in the above model suggested by the authors' group is search. In the course of research, students should be introduced to effective methods and strengthened. Research, computational thinking, creation of an innovative strategic plan, offering solutions to problems, evaluation activities contribute to the development of research skills [35]. Creating a conducive learning environment is important in building and developing research skills. This is because communication with the environment is carried out through the study of the object and the processes taking place there. The object of research, the environment, communication activities create a need for conducting research [36]. People have many qualities, one of them is creativity. This is enhanced by cognitive activities through active work. Arousing curiosity and looking critically at the environment increases creative abilities. Creative thinking is a competency of professional activity and development. In development, students' creativity and creative thinking affect the formation of their actions in solving problems in their personal lives [37].

Based on the work of other scientists analyzed during the research [40], a descriptive image of the development of research skills in two different teaching situations was created (Figure 9).

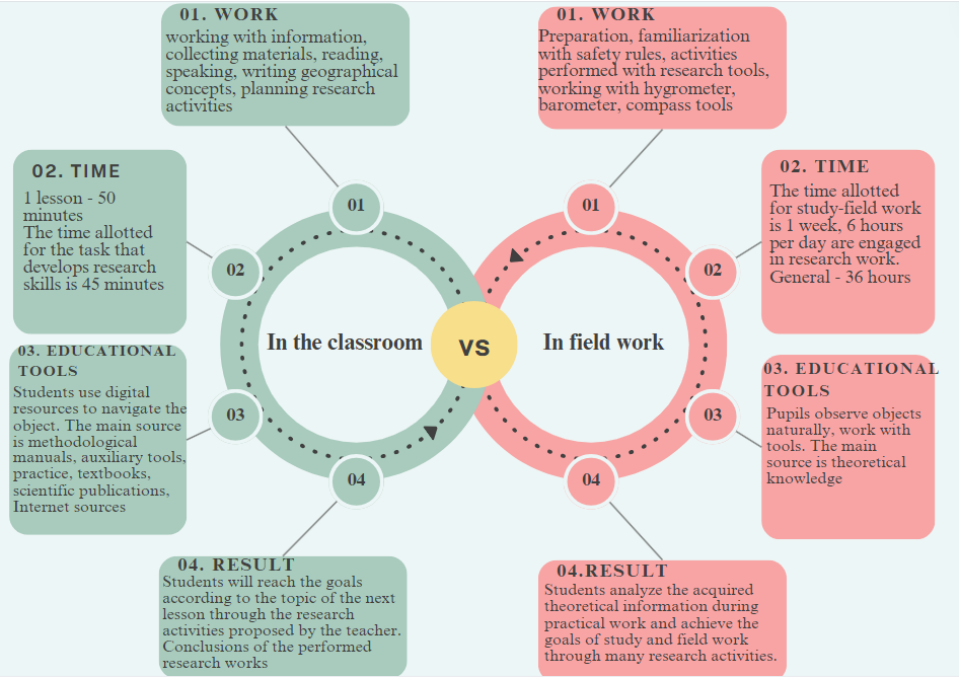


FIGURE 9. Image of field work in the classroom and outside the classroom.

Note: copyright compilation

In the development of students' research skills, the teacher considers the activities of independent thinking, research, analysis of the results of decisions and prediction, summing up in a new lesson every day. Analytical thinking is effective in implementing activities that develop research skills in learning situations. Creates and develops research skills to develop students' research abilities: problem solving, creativity, critical thinking, reflective thinking and information acquisition skills and communication activities, etc. includes [38, 39].

It has been proven that special values of educational development include students' relationships with others, ethics of cooperation, information literacy and systematic problem-solving activities [40]. The assessment of these activities should include elements of the tasks performed at all steps. A formal evaluation of the activities performed during group work is necessary for the development of research skills [41]. There are many methods that involve group activities. In the course of researching several literatures, we can recommend the "Research Organizer" approach (Figure 10).

The Research Organizer approach presented above includes a set of activities that develop research skills. The student presents descriptive information on the topic assigned to the group in the "a" level task. Works with theoretical information and facts. It has a lot of effect on removing obstacles in writing a scientific research paper. When performing the task at the "b, c" level, students determine the process of problems, analyze and monitor their solutions. In the complex part at the "c" level, he differentiates solutions to problems, makes scientific conclusions, and determines the results. By looking at the completed parts (diamond shape), the group can fully answer and the teacher can evaluate each part with an appropriate grade. By performing joint research, students develop teamwork skills. In each subject, students produce results using activities that develop research skills [41]. Based on the results of other studies, it can be concluded that training in education is training that develops research skills based on field research. In general, this conclusion affects the competence, learning level, character, and skills of students.

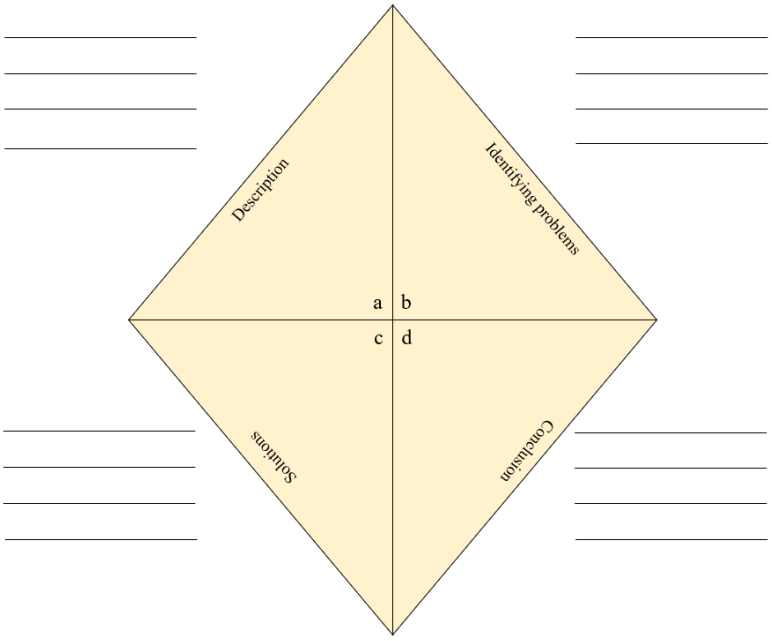


FIGURE 10. "Research organizer".

Note: copyright compilation.
a) easy task; b), c) medium level task; d) complex task.

Contribution to Theoretical and Practical Advancements in Education. The findings of this study provide valuable insights into the role of fieldwork in enhancing research skills among geography students. Theoretically, the study reinforces the importance of experiential learning and constructivist approaches in higher education, particularly within geography education. By demonstrating how fieldwork contributes to the application of theoretical knowledge in real-world settings, the research supports pedagogical frameworks that emphasize active learning, student engagement, and hands-on experience as essential elements in developing critical thinking and research competencies.

VI. CONCLUSION

As a result of the research, the level of activities performed by students in field work was determined. Students can achieve the goal of study and field work by performing activities that form and develop their theoretical knowledge in a practical sense. We have analyzed the importance of the activities performed in the educational field work and the information we have learned, and we have come to the following conclusion. In the analysis of the results of the survey, the students of the control group determined their answers based on their theoretical knowledge and related to the research activities in fieldwork. Meanwhile, students of the experimental group conducted field work in the approved facilities Almaty-Sharyn gorge - Kulsay lakes - Kayindy lake - Bartogai reservoirs in the period from May 29 to June 3, 2023, and gave answers to the questionnaire to determine the importance of activities that form and develop research skills. According to the answers, the work of the experimental group, which conducted study-field work, was given the main attention. In the following studies, we were able to determine the tendency of students to form and develop research skills conducted in educational and field work through a survey. More specifically, we came to the conclusion that male students develop their search, work and research abilities faster and more correctly than female students in fieldwork, which includes activities of research skills. In this regard, we can conclude that the research activities in fieldwork are not obstacles in the development of research skills for male students. It is proved that female students have a higher tendency to work with research equipment

performed in educational field work than male students, and it is proved that in the development of research skills, girls working with equipment in educational field work are carried out with the help of the equipment necessary for performing tasks. The U-test was used as a method to develop research skills from survey results. The scores of students in the experimental and control groups showed a significant difference between the groups [U=385.00; p<.05]. As a result, we offer tasks that develop research skills, work with information, analysis, differentiation activities, as well as problem identification and solution activities in future study-field work periods. The team of authors demonstrates the effectiveness of research results by presenting a "Research Organizer" approach that develops research skills. It is possible to achieve a positive result by using the proposed method in the field studies organized in the future in proving the hypothesis. In addition, the experimental results suggest that it is necessary to carry out a set of activities that form and develop research skills in daily classes (in the classroom) and field work (outside the classroom).

Based on the literature review and experimental work conducted in our research, we have proposed the answers to the proposed analysis questions in the initial part of the research. Tasks and activities that develop research skills are important in solving problems that arise in the personal life of students in addition to the educational process and in forming a person. Conducting the teaching process in the classroom and outside the classroom (in field work) does not prevent the achievement of results. On the contrary, by combining the set tasks with activities that develop research skills, they learn to think critically, accept problems, propose correct and easy, quick ways to solve them, evaluate and analyze, and get positive results.

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Author Contribution

First Author: Conceptualization, Data collection, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, writing –review & editing, Writing –original draft. Second Author: Design, Methodology, Supervision, Validation, Visualization, writing –review & editing. Third Author: Design, Methodology, Supervision, writing –review & editing.

Conflict of Interest

The authors declare no conflict of interest.

Data Availability Statement

Data are available from the authors upon request.

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