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Creating pedagogical conditions for formation of students' research competence

Currently, a wealth of attention revolves around the enhancement of professional competence of graduates of the 21st century, which contribute to a specialists' comprehensive professional and personal growth. In accordance to the strategy "Kazakhstan 2050", any university graduate must master an analytical and critical mindset, as well as apply their research knowledge and skills to solve a range of professional issues. In light of the above, universities are dealing with the task of forming a competent and capable specialist who will be able to sort out problematic tasks in the professional environment. To accomplish this goal, it is essential to form and foster students' research competence through the creation of pedagogical conditions at the university. The article clarified the concept of research competence and also defined its components (motivational-axiological, cognitive, activity and reflexive-evaluative), which mold a complete picture of research competence. We proposed three main types of work with students such as educational research, scientific-cultural research and scientific research activities, which are aimed at developing research knowledge, skills and abilities. To validate the effectiveness of the implemented pedagogical conditions, we compiled indicators of research competence and selected diagnostic methods such as interviews, tests, questionnaires, project methods, etc.

Keywords: research competence, components of research competence, research knowledge, research skills, research abilities, pedagogical conditions, educational research, scientific research, research project.

Introduction

"Kazakhstan Strategy 2050: new political course of an established state" is focused on modernizing research activities and fostering research competence [1]. The Kazakhstan Strategy 2050 also notes that the task of higher education institutions is to prepare future employees in accordance with employers' expectations, and the result of this work should not be a system of possessed knowledge, but the formation and application of various key competences such as research, communication, professional, social etc. It is worth emphasizing that it is significant for students to be provided with the opportunity to participate in research, which indicates the increasing importance of boosting research competence in the professional training of graduates of universities. Thus, the goal of our research in this article is to form and enhance students' research competence through the creation of pedagogical conditions at the university. To achieve this goal, we need to sort out the following tasks:

- define the essence of the concept of research competence;
- determine the essential components of research competence for its complete formation;
- create a number of pedagogical conditions at the university that contribute to the formation and enhancement of graduates' research competence.

Object of the study: the process of introducing pedagogical conditions at the university for the formation of research competencies.

Subject of the study: the formation of students' research competence at the university.

The concept of research competence in domestic pedagogy appeared in the early 90s, where scientists interpreted this concept in different ways. For instance, A. Mcmaugh and D. Saltmarsh defined research competence as a person's ability to independently select and apply accumulated knowledge in various situations and areas of life [2]. D.H Pritchard believed that research competence lies in the simultaneous acquisition of research knowledge and skills while engaging in research activities. [3]. N.A. Megahed interpreted research competence as not only the focused acquisition of knowledge but also the growth of cognitive and practical abilities [4]. If we turn to the opinion of R.H. Heersmink, he considered research competence as an independent cognitive activity, which implies possession of a set of special skills for sorting out problem situations [5]. We believe that research competence is a combination of research knowledge, skills and abili-

ties formed in the implementation of research activities which are vital to solve topical issues in the field of science and education.

Methods and materials

To solve the next task in the research, that are presented in the article, we scrutinized the essence of the component of research competence investigating the works of the following scientists such as E.F. Zeer [6], Sh.T. Taubaeva [7], V. A. Khutorovskaya [8] and others. Analyzing the works of the above scientists, we came to the conclusion that the components of research competence set up a holistic picture of research competence. Having studied the components of research competence proposed by various scientists, we defined our own set of components, which included:

- 1) motivational-axiological: a complete comprehension of the value of research, as well as the presence of internal and external motivation for solving problematic tasks in research;
- 2) cognitive: obtaining theoretical and methodological knowledge of research, as well as possession of research knowledge through investigating scientific methods, principles, approaches, etc.;
- 3) activity: solving a practical issue in research through the obtained research knowledge;
- 4) reflexive-evaluative: analysis and reflection of one's own research results, as well as the ability to give feedback and analyze the findings of other studies.

To enhance each component of research competence, it is to create pedagogical conditions at the university, where each university student will be able to apply their research knowledge, skills and abilities (competence) to solve problematic tasks not only within learning activities, but also in the implementation of professional ones.

Pedagogical conditions are a series of activities in an educational institution that allow ensuring high results for students through the clear organization of the educational, scientific and upbringing process [9].

The creation and implementation of pedagogical conditions for the formation of research competence consisted of several types of research work with students such as educational research, scientific-cultural research (work) and scientific research, where each of them implies the enhancement of components of research competence. To improve the motivational-axiological component of research competence within the framework of scientific-cultural work, we organized a scientific club "Young Researcher", where students discussed various problems in the field of education, participated in debates, intellectual games, etc. Scientific-cultural activities also imply scientific consultations with university professors, as well as friendly conversations, where each student can ask question of interest and ask for help if they encounter difficulties in solving any research problem. In addition, this activity is accompanied with the scientific excursions and internships, where students are sent to various scientific libraries and research institutes and universities to gain experience. In general, scientific-cultural activities allow to get acquainted with the features of scientific research work in a cultural and educational format, increasing the awareness of the value and significance of research work as well as their interest and motivation for research activities.

The strengthen of the cognitive component of research competence was carried out through the elective course "Fundamentals of Scientific Research", where the goal of this course is to replenish theoretical knowledge about conducting scientific research, where students will be able to apply research knowledge in practice.

The objectives of the elective course on the discipline "Fundamentals of Scientific Research" are as follows:

- 1) to prepare university students for conducting research of various types;
- 2) to provide theoretical preparation for research;
- 3) to expand knowledge in the field of scientific research methodology;
- 4) to acquaint with scientific methods of research and scientific knowledge;
- 6) to develop creative and critical thinking through solving research problems, etc.

Thanks to the elective course "Fundamentals of Scientific Research", students were able to define the aim of the research, set research tasks, draw up a plan, make a literature review, get acquainted with research methods, learn to choose principles, approaches and methods that are suitable for their research topic. Students settled on the following choice of research topics in the field of foreign language and pedagogical education such as:

1. Designing an English lesson in elementary grades using the CLIL method.
2. Formation of educational motivation in students of a language university through online resources.

3. Development of oral speech in junior classes based on interactive cognitive strategies in English lessons.

4. Use of interactive tools in the process of developing students' research skills when teaching a foreign language.

5. Use of educational platforms in teaching foreign languages at a university.

6. Gamification as a way of teaching English at primary school, etc.

The choice of topics for practical research was carried out through the personal interests of students, where each topic corresponded to their academic needs and level of preparation.

After increasing the motivational-axiological and cognitive components of research competence, students of the Faculty of Foreign Languages of Karaganda Buketov University gained motivation and research knowledge, which are indispensable in solving problems with the practical value of the research. The activity component of research competence was formed on the basis of scientific research work with students under the guidance of a selected scientific mentor (adviser). Each student had the opportunity to elect a scientific adviser according to his personal and scientific interests, where individual consultations and adjustment of scientific work on the research topic were carried out with him. Based on the results of research work, students must participate in the scientific and practical conference with prepared articles and reports about the project. The scientific and practical conference was organized at the Faculty of Foreign Languages on the topic "Perspectives and new trends in the development of foreign language education", where 30 people took part and demonstrated the results of the research project on the selected topics [10]. The main goal of the scientific research work with students was to form and foster research skills and abilities that are required for any type of research. Thus, it can be said that research skills and abilities are formed and developed under the conditions of implementation of research activities. It can be said that during the presentation of research projects at the scientific and practical conference, students of the Faculty of Foreign Languages demonstrated a strong level of formation of research knowledge, skills and abilities (competence) and flawlessly solved the research problem using scientific methods, principles, approaches, etc., and also created a research product through the compilation of a model, technology, pedagogical conditions, methodology, etc. carried out a practical value in research. It means that the practical product of conducted projects can be exploited in practice, for instance, at foreign language lessons at school, college, kindergarten, etc.

The set of pedagogical conditions at the university through educational research, scientific-cultural and scientific research work with students also allowed to form a reflexive-evaluative component of research competence, where each type of research work contributed to the raise of perception of adequate criticism from the scientific community, and also developed the ability to evaluate the results of not only their own research, but also to give feedback on the conclusions of other people's research work.

It is worth noting that during the presentation of research projects, students were not only able to answer the questions of the commissions, but also address questions to their colleagues and be interested in the problem of their research and critically evaluate their research results.

Consequently, the set of pedagogical conditions at the university created a favorable environment for the formation and development of students' research competence, as well as communicative, where students learned to use a foreign language as a means of obtaining and processing modern scientific information, thereby contributing to their professional growth and preparation for a future scientific career.

Results and Discussion

In order to check and evaluate the effectiveness of the composed pedagogical conditions at the university, we created a system of measuring the formation of research competence and selected the appropriate diagnostic methods, such as the test questionnaire of the desire for research activities based on the diagnostics of motivation for achievement by A. Mehrabian (modification) [11], a test of knowledge of the basics of scientific research (author's), a project method, a questionnaire "Determining the level of self-assessment of research activity" by S.V. Kovalev (modification) [12], etc. (Table 1).

Table 1

The system of assessment of the formation of research competence

Components of research competence	Indicators		
	Low	Average	High
1	3	4	5
motivational-axiological	the student lacks internal and external motivation to conduct scientific research. In addition, the student misunderstands the value of research work.	a student has external motivation as a teacher who encourages him to scientific activity.	a student can work independently without external support. The student's work is characterized by a creative approach. There is internal motivation.
cognitive	a lack of theoretical and methodological knowledge about science in general.	significant presence of theoretical and methodological knowledge about scientific research.	complete mastery of theoretical and methodological knowledge about scientific research and science in general.
activity	disability to design the theoretical and practical part of the research.	joint modeling of the research (theoretical and experimental research) with the scientific supervisor.	independent design and planning of all types of research without external support and guidance.
reflexive-evaluative	the student is characterized by an inability to evaluate the results of his own and others' scientific activity.	the student partially evaluates the results of the conducted research, can analyze his own and others' work.	the student critically discusses and evaluates the results of the conducted research, can analyze his own and others' work.

The pedagogical experiment was conducted at the Faculty of Foreign Languages of Karagand Buketov University with the participation of 30 students, which consisted of the following stages: initial, formative and final. At the initial stage of the experiment, the level of formation of research competence in all its components (motivational-axiological, cognitive, activity and reflexive-evaluative) was low, this was due to the fact that the university did not have a number of pedagogical conditions necessary for the formation and enhancement of research competence. At the formative stage, we set up a number of pedagogical conditions that contribute to the formation and boosting of research knowledge, skills and abilities, which consisted of 3 main works with students such as educational research, scientific-cultural and scientific research activities. Each type of work with students included a number of events that increase the level of formation of the components of research competence.

To test the motivational-axiological component of research competence at the final stage of the experiment, we applied a test questionnaire of the desire for research activities based on the diagnostics of motivation for achievement by A. Mehrabian (modification), where the essence of this test questionnaire is to determine the level of motivation and desire for success in the study, avoidance of failure during the study and lack of motivation and desire to conduct the study [11; 46]. Students were offered different statements about research activities and their attitudes to the implementation of scientific work. For each statement, participants need to choose the appropriate answer option that is closest to the student's personality:

- + 3 — completely agree = 7 points;
- + 2 — agree = 6 points;
- + 1 — rather agree than disagree = 5 points;
- 0 — neutral = 4 points;
- 1 — rather disagree than agree = 3 points;
- 2 — disagree = 2 points;
- 3 — completely disagree = 1 point.

The interpretation of the results depends on the total points scored, as indicated in the Table 2:

Sums of the test questionnaire of the desire for research activities based on the diagnostics of motivation for achievement by A. Mehrabian (modification)

The motivation for achievement is dominated by the desire for success in research	Dominance of the desire to avoid failure during the study	Lack of motivation and the desire for research despite of success or failure
from 165 to 210 points	from 76 to 164 points	from 30 to 75

According to the results of the experiment, it can be said that 82 % (from 165 to 210 points) of students are dominated by motivation and desire for success in completing the study. The high results were gained thanks to scientific-cultural work that increased the level of motivation, where various consultations and interviews with professors were held, as well as intellectual games, debates and visits to research institutes and research centers. The remaining 18 % have an avoidance of failure during the study and only 5 % lack motivation, which is evidenced by insufficient research knowledge, but the results of the final experiment were higher by more than 60 % (motivation) at the initial stage (Fig. 1).

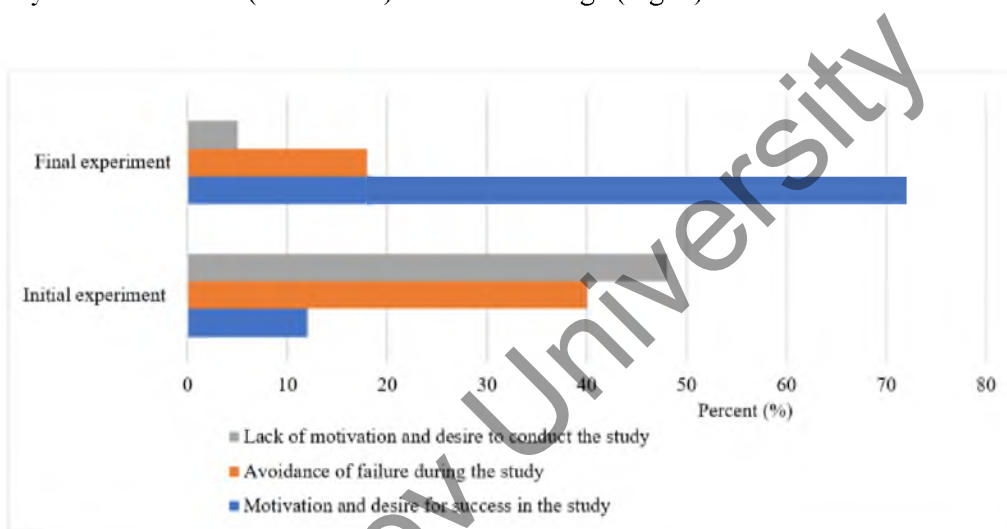


Figure 1. Results of initial and final experiment on the presence of the desire for scientific research activities based on the diagnostics of achievement motivation by A. Mehrabian (modification)

To determine the cognitive component of research competence, we composed a test to check knowledge of the fundamentals of scientific research, where 50 % of students received excellent results and 40 % obtained good scores, which indicates complete mastery of the research knowledge necessary to conduct the study. The results of the control and final experiment are presented in Figure 2.

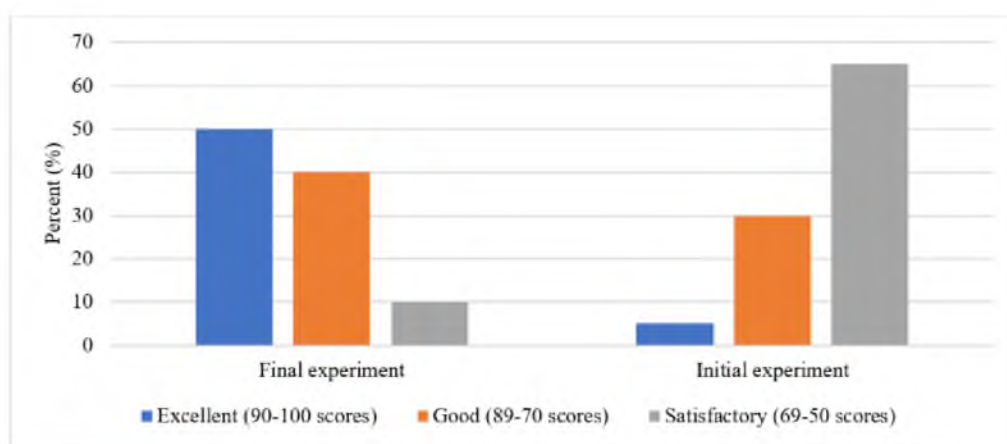


Figure 2. Results of the test on knowledge of the “Fundamentals of Scientific Research”

To determine the level of increase of the active component we applied the project method, where students had to create a research project and make a report at the scientific and practical conference, where articles were published based on its results [10; 15]. The assessment of the students' project at the conference was assessed according to the following criteria shown in Table 3.

Table 3

Criteria of assessing of research project

№	Criteria of assessing of research project	Scores				
		1	2	3	4	5
1	Relevance of the research problem					
2	Correct formulation of the aim and objectives of the research (project)					
3	Theoretical and methodological significance of the project					
4	Practical significance of the project					
5	Use of scientific methods					
6	Quality of the project and its applicability in practice					
7	Demonstration of communicative and research knowledge, skills and abilities					

It is worth noting that the research projects were highly appreciated, where 60% of students received the highest scores and were awarded prize places and diplomas of 1, 2 and 3 degrees; the remaining 40% were awarded certificates of participation in the scientific and practical conference. In addition, interviews were held among the participants, where they shared their experience and impressions after presenting the outcomes of research projects.

“This was the first participation in the conference, in general, I am very glad that the university organizes various scientific events where students can reveal their ideas. I not only shared my ideas, but also received feedback from the commission, as well as the speakers” — 1st year student, Sagdatov Arman, 1st degree diploma;

“Participation in the scientific and practical conference allowed me to gain experience in research activities, where I was able to share the results of my research, as well as see the work of other participants” — 2nd year student, Abishev Daniyar, 3rd degree diploma;

“I am very glad that the university provides the opportunity to participate in various scientific events such as intellectual games, debates, science club, conferences, etc., involving us in the research process” — 3rd year student” — 3rd year students, Samat Kamila, 2nd degree diploma.

“Despite not receiving a prize place, for me it was a great experience to participate in the scientific events, where I received recommendations on how to improve my research project. I think that at the next round table or conference I will definitely get a prize place” — 1st year student, Asylzhan Sharpatova, participant certificate.

The reflective-evaluative component of research competence was defined using S.V. Kovalev's questionnaire “Determining the level of self-assessment of research activity” (modification), where students were presented with 32 judgments about the results of the research conducted, where they had to put the corresponding points from 0 to 4 before each statement (4 points — very often; 3 points — often, 1 point — rarely, 0 points — never), where the total number of points indicates the following results of self-assessment of research activity:

- 0–43 points show a healthy self-assessment of their research competence, as well as the abilities and skills to evaluate others;

- 44–48 points demonstrate an average level of self-assessment of the research conducted, but often adapts to the opinions of others;

- 87–128 points demonstrate a low level of self-esteem and the experience of negative emotions during objective criticism, as well as the lack of ability to evaluate the results of the experiment [12; 67].

According to the questionnaire of S.V. Kovalev, the sum of the students' answers by 60% shows a high level of research knowledge, skills and abilities, healthy research self-esteem, where an individual can assess his weaknesses and strengths of his research and give constructive criticism to others, 30% of respondents believe that they have average self-esteem and do not take independent part in research activities on their own initiative, since they require external motivation in the form of a scientific consultant, the remaining

10 % of respondents replied that they feel insecure and lack of research competence and in research often rely on other people's opinions, without having their own reasoning (Fig. 3).

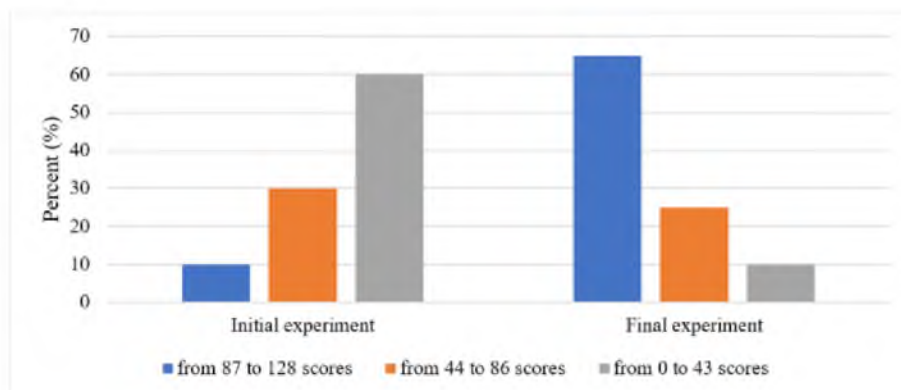


Figure 3. Results of the initial and final experiment on the formation of the reflexive-evaluative component according to the questionnaire of S.V. Kovalev

Conclusion

During the study, we defined the essence of the concept of research competence, where we consider it as a set of research knowledge, skills and abilities necessary to solve current problems in education and science. Its components (motivational-axiological, cognitive, activity and reflexive-evaluative) were also defined, as well as its role in educational, scientific and professional activities. In the world of globalization and digitalization, it is compulsory to have research knowledge, skills and abilities to critically assess a problem situation, use methods for collecting foreign language information, find a solution to a problem, etc. To achieve the aim of the study, we proposed the creation of pedagogical conditions in the university, consisting of 3 main types of work: educational research, scientific-cultural and scientific research activities. Various events and classes with students were organized for these types of research work, such as organizing a scientific club, a mentoring system, holding scientific and practical conferences, various scientific games and debates, visiting scientific libraries and research centers, etc., which ensured the improvement of all components of research competence: motivational-axiological, cognitive, activity and reflexive-evaluative. Finally, it can be said that the created pedagogical conditions at the university ensure the formation and advancement of research competence, which is paramount for a graduate of the 21st century.

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М.М. Момбекова

Педагогикалық жағдайлар жасау арқылы студенттердің зерттеу құзыреттілігін қалыптастыру

Қазіргі таңда маманның жан-жақты кәсіби және жеке өсуіне ықпал ететін ХХІ ғасыр түлектерінің кәсіби құзыреттілігін арттыруға көп көңіл бөлінеді. «Қазақстан-2050 стратегиясына» сәйкес жоғары оқу орындарының түлегі талдамалық және сыни ойлауы, сондай-ақ алған зерттеу білімі мен дағдыларын кәсіби міндеттер кешенін шешу үшін қолдануы тиіс. Жоғарыда айтылғандарға байланысты жоғары оқу орындарының алдында кәсіби ортада мәселелік міндеттерді шеше алатын құзыретті және қабілетті маман қалыптастыру міндеті тұр. Бұл міндетті орындау үшін университетте педагогикалық жағдай жасау арқылы студенттердің зерттеу құзыреттілігін қалыптастыру және дамыту қажет. Мақалада зерттеу құзыреттілігі ұғымы нақтыланған, сонымен қатар зерттеу құзыреттілігінің тұтас көрінісін қалыптастыратын оның компоненттері (мотивациялық-құндылық, когнитивтік, белсенділік және рефлексивті-бағалау) анықталған. Студенттермен жұмыстың үш негізгі түрі ұсынылған: ғылыми-зерттеу білімдерін, іскерліктерін және дағдыларын дамытуға бағытталған оқу-зерттеу, ғылыми-мәдени және ғылыми-зерттеу қызметі. Жүзеге асырылған педагогикалық жағдайлардың тиімділігін тексеру үшін зерттеу құзыреттілігінің көрсеткіштері құрастырылған және сұхбат, тест, сауалнамалар, жобалау әдістері және т. б. сияқты диагностикалық әдістер таңдалған.

Кілт сөздер: зерттеу құзыреттілігі, зерттеу құзыреттілігінің компоненттері, зерттеу білімі, зерттеу дағдылары, зерттеу қабілеттері, педагогикалық шарттар, оқу-зерттеулер, ғылыми зерттеу, зерттеу жобасы.

М.М. Момбекова

Создание педагогических условий для формирования исследовательской компетенции студентов

В настоящее время большое внимание уделяется повышению профессиональной компетенции выпускников ХХІ века, способствующей всестороннему росту специалиста. В соответствии со стратегией «Казахстан-2050» выпускник вуза должен обладать аналитическим и критическим мышлением, а также применять полученные исследовательские знания для решения комплекса профессиональных задач. В связи с этим, перед вузами стоит задача формирования компетентного и конкурентоспособного специалиста, который сможет решать проблемные задачи в профессиональной среде. Для выполнения этой задачи необходимо формировать и развивать исследовательскую компетенцию студентов, посредством создания педагогических условий в вузе. В статье уточнено понятие «исследовательская компетенция», а также определены ее компоненты (мотивационно-ценностный, когнитивный, деятельностный и рефлексивно-оценочный), которые формируют целостную картину исследовательской компетенции. Предложены три основных вида работы со студентами: учебно-исследовательская, научно-культурная и научно-исследовательская деятельность, которые направлены на формирование у студентов исследовательских знаний, умений и навыков. Для проверки эффективности реализованных педагогических условий были определены показатели исследовательской компетенции и выбраны методы диагностики, такие как интервью, тесты, анкетирование, проектные методы и т.д.

Ключевые слова: исследовательская компетенция, компоненты исследовательской компетенции, исследовательские знания, исследовательские навыки, исследовательские умения, педагогические условия, учебные исследования, научные исследования, исследовательский проект.

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