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Problems of continuity of the content of the chemistry course in secondary schools and universities

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Abstract. The article examines the current issues of the relationship between chemistry education in secondary schools and universities. The discrepancy between the expectations of universities and the knowledge of high school graduates is introduced into the context, and key problems preventing the successful continuity of educational programs are identified. The current state of the content of the chemistry course at school and the requirements of universities for the level of training in this subject are analyzed. The authors analyze the current situation in educational programs, identifying contradictions between the requirements of universities and the level of training of high school graduates in the field of chemistry. The article examines in detail the key factors influencing the continuity of learning, such as differences in curricula, teaching methodology and evaluation criteria. The authors also offer an overview of existing methods and mechanisms for ensuring continuity and evaluate their effectiveness. The article highlights the roles of teachers, educational institutions and students in improving the coherence of educational programs, as well as provides specific recommendations for solving these problems. The article also provides an overview of the existing mechanisms for ensuring continuity and their effectiveness. Based on the study, specific recommendations are proposed to improve coordination between educational levels. The roles of teachers, educational authorities and universities in solving these problems are highlighted. In conclusion, the importance of joint efforts of all participants in the educational process to ensure high-quality training of future specialists in the field of chemistry is emphasized.

Keywords: continuity, chemistry, education, secondary school, higher education.

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Introduction

Issues of continuity of the content of a chemistry course from secondary school to higher education are of significant interest for the educational environment. There is a wide range of studies devoted to analyzing the current state of continuity in teaching chemistry and identifying the problems that students face when moving from school to university.

In this study, the authors highlight a century of development in chemical education, starting with the publication of the first article in 1921. They examine changes in educational contexts in detail, focusing on learning goals and outcomes, scientific reasoning and problem solving, and preferences and approaches to learning chemistry.

Student success and the high school-university transition: 100 years of chemistry ed-

ucation research. A key finding of the study is the identification of an achievement gap between secondary school and tertiary education in chemistry. Despite advances in the understanding of effective teaching and learning, curriculum expectations and cognitive demands have increased significantly since the early 1900s. The resulting comprehensive picture of the factors influencing student success provides valuable lessons for improving chemistry teaching and learning [1].

Continuity in the system of permanent chemical education: School–higher educational institution. A study conducted at Monash University highlights the importance of adequately preparing students for chemistry at the tertiary level, underscoring the need for a higher level of chemistry education in high school. The research found that students' perceptions of their preparedness varied, with a significant difference between those enrolled in General Chemistry and those in Advanced Chemistry. Only 29.1% of General Chemistry students felt prepared compared to 40.1% of Advanced Chemistry students, suggesting that a stronger foundation in high school chemistry leads to greater confidence and readiness for university-level courses [2].

The scientific and methodical aspects of continuity considered the specificity of the implementation of the professional orientation of the subject "chemistry" at various stages in the system of continuing education. The possibility of professionalizing the subject through the inclusion of relevant information in basic training courses and the creation of chemical courses integrated with special disciplines was emphasized. The experience of creation of multi-level educational institutions oriented on practical application of knowledge has been analyzed. The necessity of conformity of results of professional education to requirements of consumers has been allocated [3].

The Problem of Continuity in Teacher Education in a Complex World. In the paper, the authors identified the features of new general education programs based on the principle of spiral vision, in accordance with the cognitive theory of Jerome Bruner. An important conclusion is the lack of systematic training of future teachers for the implementation of a spiral approach in education in the programs of pedagogical universities [4].

Special attention should be paid to the work of Mike Horsley, Bruce Knight, which notes the effective interaction of the university with secondary schools to ensure the continuity and continuity of learning in the context of the transition of schools to specialized training, A new learning environment is being developed to provide vocational guidance to students. Professional high school students have higher motivation to learn, and thus higher learning outcomes. The university receives students motivated to receive higher education in a certain specialty [5].

Problemy preemstvennosti shkol'nogo i vuzovskogo obrazovanija. The author describes that flipped learning has gained popularity as a method to create an active learning environment in classrooms and lecture halls. Numerous reports highlight its growing use in chemistry education at higher education institutions. The review examines the rationale behind adopting the flipped learning approach, how educators have implemented it, and the evaluations of these implementations. The analysis shows that flipped learning is highly popular with students, as educators use it to increase engagement and allow for a deeper understanding of the subject matter. Despite the flexibility in implementation, there is a certain consistency in how it has been adopted across different settings. The author also discusses the lessons learned from these evaluations and provides suggestions for future implementations based on evidence-based methods [6].

The author explains that student preparedness is a crucial element in the transition to university, shaped by a range of factors including academic ability, prior knowledge, self-efficacy, and a variety of study and life skills. In the context of chemistry education, students' perceptions of preparedness are closely linked to their prior theoretical

learning and hands-on laboratory experience. These perceptions are also influenced by factors like science identity, gender, and their secondary school background. The research aimed to explore both learners' and educators' views on students' preparedness when starting chemistry studies at the tertiary level, using a mixed methods approach, including surveys, focus groups, and interviews.

Key findings from the study include a strong correlation between students' self-perception of preparedness and their academic performance. It also highlighted that students with negative perceptions of their readiness are often at risk academically, though their perceptions tend to improve by the end of the semester. Interestingly, gender disparities present at the beginning of the semester diminish by its end, and students from private schools generally feel better prepared. Additionally, there is a significant divide between secondary and tertiary educators' views on student preparedness, with secondary educators being more optimistic while tertiary educators perceive many students as underprepared.

Curriculum continuity and school to university transition: science and technology programmes in Malawi. The implications of this study suggest the need for clear communication of academic expectations at the onset of university courses and efforts to better align the perceptions of secondary and tertiary educators regarding student preparedness [7].

The author explains that this study investigates the use of data mining tools to analyze how different methodologies in chemistry lab classes influence students' perceptions of the importance of lab work for their learning and motivation. While frequency analysis of survey responses did not distinguish between student opinions based on the teaching methodologies used, the k-means clustering approach offered a more detailed understanding. The clustering model identified which teaching methodologies were viewed by students as most beneficial for learning chemistry and boosting their motivation.

Problems of higher and secondary school interaction. The study analyzed data from 3447 students from Portuguese secondary schools, using the k-means clustering method with values of k ranging from 2 to 4. One of the key strengths of the study is its methodological approach, as well as the diverse school backgrounds of the students, which allows for individual-level analysis [8].

Preemstvennost' uchebnyh programm po urovnjam obrazovanija. Shuinshin researched the question of ensuring the continuity of educational programs of general secondary education and higher education in natural sciences, with an emphasis on chemistry, in the conditions of updating the content of education [9].

Experience of problems relative to curriculum continuity and school transfer in teacher-training courses. Consideration of the problem of continuity of chemistry requires a comprehensive approach covering both the substantive and methodological aspects of education [10]

Rol' proforientacii v uslovijah nepreryvnosti i preemstvennosti obrazovanija. Existing research provides valuable data and suggestions for improving this important field of education and underlines the importance of continuity in chemistry teaching from high school to university. The works emphasize that the critical period of transition requires not only conformity of the course content, but also the application of effective teaching strategies [11].

The analysis of literary sources revealed significant problems in modern curricula and methods of teaching chemistry, which affect the continuity of content between school and university. These aspects play a key role in the formation of the scientific competence of future teachers and their successful integration into the educational programs of higher education.

The modern higher school requires a deep reform, taking into account changes in the goals and value orientations of education, which concern all levels of the educational system. The purpose of modern higher ed-

ucation, including chemical education, is to increase the general and professional level of the student, his intellectual potential, that is, it requires the formation and development of the student as a professionally competent, culturally developed, creative personality. This means the education of a person who is ready for continuous self-education, capable of active and professional participation in the solution of current problems in order to successfully work in the future, constantly changing social and economic conditions. Achieving these goals is impossible without changing the character of the existing organization, without creating it as a joint search activity of the teacher and the student. Interpersonal communication aimed at students' conscious mastering of the subject and development of intellectual activity should be carried out.

On the initiative of the First President of the Republic of Kazakhstan N.A. Nazarbayev, within the framework of the implementation of the National Plan «100 concrete steps», 5 steps are planned in the field of education, aimed at improving the quality of human capital based on the standards of the OECD countries.

In the 76th chapter of the National Plan «100 concrete steps» consists in a phased transition to 12-year education, updating the standards of school education for the development of functional literacy. It is emphasized that it is necessary to introduce private financing in higher classes, to create a system of promotion of successful schools. In connection with the updating of school education standards, changes were made to the curriculum.

Along with the reform of the education system in pedagogical universities, the system of teaching subjects is being revised in connection with the transition of educational standards in schools to updated content. It corresponds to new requirements of society and goals of professional chemical education, as well as new achievements of pedagogical and chemical science and practice. Changes made to school programs should be included in the educational program of training specialists who will teach chemistry in the future.

The structure of the typical curriculum for the subject «Chemistry» for grades 7-11 of secondary education has changed with updated content. This program provides an opportunity to preserve the continuity of education by combining it with the subjects of geography, biology and physics included in the natural science cycle. Features of the typical curriculum are that the content of the sections and those subjects meets the requirements of the time, aimed at the formation of socialization skills. The typical curriculum determines the content of each subject, as well as knowledge and skills in accordance with the cognitive abilities of students.

The updated content of chemistry supports the use of creative approaches to solving problems, develops critical and constructive thinking of students, as well as a wide range of experimental and practical skills.

The chapter «Analytical research methods» was added to the updated program of the 10th grade (natural science) on the subject «Chemistry». In this chapter, students get acquainted with the use of modern research tools, elemental, functional, molecular and phase analysis. At the same time, they will understand the use and significance of the chromatographic method. Analyzes concepts such as chromatography, paper chromatography, carrier, stationary phase, mobile phase, chromatogram. At the end, the paper is subjected to laboratory work by the chromatography method. This has a positive effect on the development of students' skills in using laboratory equipment and conducting experiments with modern analytical methods of research when studying this subject.

Depending on the type of activity formed during the chemistry education of general education students, experimental knowledge and skills can be conditionally divided into five groups:

I) organizational, that is, planning of experiments, selection of reagents and equipment, effective use of time, tools and meth-

ods at work, implementation of self-control, maintenance of cleanliness and order in the workplace, independent performance of work;

II) technical, that is, use of reagents and equipment, assembly of equipment and devices from ready-made parts, performance of chemical operations, observance of technical safety rules;

III) measurement, that is, measuring the volume of liquids and gases, measuring the mass of objects, measuring the temperature and density of liquids, processing the results of measurements;

IV) intellectual, etc. e. clarifying the purpose and tasks of the experiment, creating a hypothesis, describing the observed phenomena and trends, analyzing the results of the experiment, determining the causal relationship, summarizing and drawing conclusions;

V) construction, that is, assembly, repair, improvement and creation of equipment, devices and installations, their preparation in graphic form (pictures and drawings).

The division of experimental knowledge and skills into five separate groups does not solve the problem of their good assimilation by students. Some students can acquire organizational skills, others intellectual skills, and others technical skills.

To teach the specified chapter, future chemistry teachers must master physical and chemical research methods. It is very important to pay attention to mastering the skills of applying physical and chemical methods of analysis, based on the direct dependence of the physical properties of a substance on its structural and chemical composition. These methods require special training of teachers and the development of special methods of forming students' skills, which provide concrete results in determining the composition of the subject.

Mastering physico-chemical methods of research is one of the important elements of chemical education and the general system of higher education, so it should be included in the university education system. Therefore, it is clear that the course «Physico-chemical research methods» should be included in the educational program of students studying chemistry in pedagogical direction.

This course introduces students to modern physical methods of research, their possibilities and limitations, theoretical introduction to solving real experimental problems, determination of the chemical structure of substances, and the study of chemical and physical properties of substances and their relationship with their chemical structure.

This problem determined the purpose of the research.

The purpose of the study is to compile the scientific and methodological bases of teaching the system of physico-chemical analysis methods in continuous chemical education.

Subject of research: the process of teaching chemistry in secondary schools and universities.

Research subject: methodology of teaching the system of physico-chemical analysis methods in continuous chemical education.

In order to achieve the objective of the research review, it was necessary to solve the following tasks:

1. Analysis and generalization of the state of the problem of organizing and conducting physico-chemical research methods in modern secondary schools and pedagogical universities (based on the analysis of existing school programs, textbooks, teaching aids, as well as on the basis of studying the work experience of teachers of pedagogical universities).

2. To determine the level of formation of students' chemical knowledge based on the analysis of the results of various experimental tasks.

3. Development of methodological

guidelines for conducting laboratory work on physico-chemical methods of research based on continuous education.

4. Checking the effectiveness of the proposed methodology of conducting laboratory-practical lessons on the quality of education of students.

Materials and methods

In this work, theoretical and empirical research methods are used to analyze the methods of formation of experimental skills of high school students within the framework of teaching the subject «Chemistry».

In addition, taking into account the current educational requirements, the relevance of effective teaching methods based on physico-chemical methods of research is being developed. Development of physico-chemical methods of research gives students unique opportunities to acquire practical skills and deep understanding of technological processes. During the training, the practical aspects of these technologies are discussed in the educational process, and advantages and conclusions arising due to the general difficulties of pedagogy when using any innovations in educational practice are determined.

Results

A pedagogical experiment was organized in order to check the effectiveness of the proposed methodology of conducting laboratory-practical classes on the quality of education of students, and it included Kyzylorda city 42 students of 10 «A» and 10 «B» classes of the school-lyceum I.Kabilov №12 participated. The 3rd and 4th year students of specialty 6B01515-Chemistry Korkyt Ata Kyzylorda University, , participated in this experiment as observers during pedagogical practice.

Based on the analysis of the results of various experimental tasks, the results of the survey conducted in order to determine the level of formation of chemical knowledge and experimental skills of students are presented in Table 1.

Table 1. The result of the survey conducted in order to determine the level of formation of chemical knowledge and experimental skills of students

Shaft	Formation level	
	Level	Percentage
First level	Bottom	71
Second level	Average	21
Third level	Top	8

Based on the obtained data, it turns out that all studied skills are at the level of initial formation and only at the level of formulating questions. This is explained by the fact that chemistry teachers pay a lot of attention to the formation of knowledge in lessons, but they do not always ensure the establishment of possible connections between general academic skills and experimental skills that we are considering.

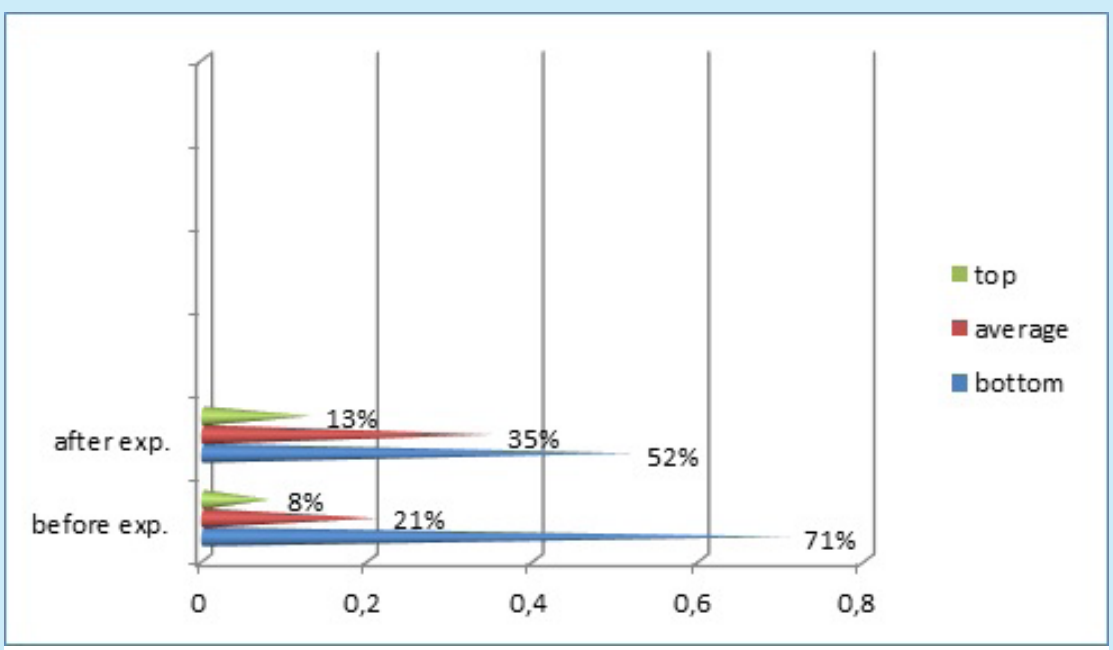
The formative stage of the experiment was aimed at evaluating the effectiveness of methods aimed at developing research skills when studying the chapter «Analytical research methods» in the program of the 10th grade (natural science) of the school-lyceum named after I. Kabylov №12, Kyzylorda. After conducting the pedagogical experiment, we conducted a repeated diagnosis to determine the level of formation of students'

research skills. Laboratory work was conducted on the topic «Paper chromatography» and tasks were presented to students on the chapter «Analytical research methods», the completion time was 45 minutes. The results of the diagnostic task are presented in table 2 and figure 1.

Table 2. The level of formation of research skills according to the results of the final diagnosis

Shaft	Formation level	
	Level	Level
First level	Bottom	52
Second level	Average	21
Third level	Top	13

Figure 1. Levels of formation of research skills according to the results of the initial and final diagnostics



Such skills as developing hypotheses and experimenting remained at the initial level, but increased quantitatively. For example, the minimum level was initially 71%, but after the experiment it was reduced to 52%. The number of secondary school students increased from 21% to 35%. The number of students with basic education increased from 8% to 13%. During the experiments, such skills as problem solving, distinguishing between objects and things, defining concepts, formulating questions, and drawing conclusions improved. Research skills contribute to the formation of students' cognitive motivation, the development of a research attitude and the active acquisition

of new knowledge.

On the basis of continuous education, the need to develop methodological guidelines for conducting laboratory work using physical and chemical methods of research has been determined. That is why at the Korkyt Ata Kyzylorda University, the course «Physico-chemical research methods» (5ECTS) was introduced for the preparation of the educational program 6B01515-Chemistry, taking into account the recommendations of the discussion employers. chemistry teacher. The topics of the course program include professional development related to updating the content of the chemistry subject at school, the ability to manage changes, the development of digitalization and digital competence, and the preparation of future teachers in the field of physical and chemical studies. chemical education. Students familiarize themselves with modern physical and chemical methods of research, their possibilities and limitations, solve real experimental tasks; determination of the chemical structure of substances and determination of the relationship between chemical and physical properties of substances and their chemical structure. Master the theoretical foundations of spectral (optical), electroanalytical (electrochemical), chromatographic methods of analysis. It is known that experimental knowledge and skills are formed during regular laboratory experiments, practical classes and reports on experiments. The success of this work often depends on the teacher's knowledge of the content and structure of experimental knowledge and skills, as well as on the conditions for the effective use of various chemical experiments. Therefore, when teaching this course, much attention is paid to the implementation of practical work, including the formation of experimental knowledge and skills of students in mastering the methods of physical and chemical research.

Discussion

The results of our study confirm the existing problem of the gap in chemistry education between high school and universities, which is consistent with the findings of other researchers. For example, [1] points to the existence of an achievement gap between school and university chemistry education, which is largely due to the increased cognitive demands on students. Our data support this conclusion: 71% of students at the initial stage of the experiment demonstrated a low level of research skills, indicating insufficient preparation in high school. At the same time, research by [2] shows that the level of students' preparation for studying chemistry at university varies depending on their previous education, with students who took an advanced chemistry course feeling more confident. Our results confirm this trend: after the implementation of the experimental program, the proportion of students with a high level of research skills increased from 8% to 13%, indicating a positive impact of targeted training in methods of physical and chemical analysis. Other studies, such as the work of [4], highlight the importance of implementing the spiral approach to chemistry education. However, our data show that current high school programs do not provide sufficient preparation for a smooth transition to university education, which coincides with the researchers' findings about the insufficient systematic preparation of future teachers to apply this approach.

Research by [5] emphasizes the need for interaction between universities and schools to ensure continuity of education. Our study also confirms this finding: the introduction of the course "Physicochemical Methods of Analysis" into the curriculum of students of pedagogical specialties increased their level of readiness to teach chemistry in schools.

Thus, our results confirm and complement existing research, pointing to the need to modernize educational programs, increase the role of laboratory work, and strengthen interaction between schools and universities. This will eliminate the gap in student preparation and ensure a smoother transition to the next level of education.

In the system of general and higher education, the general chemical component has an important place, which ensures the modernization of an important part of the general culture, which is the basis for the devel-

opment of a scientific worldview, as well as continuous general professional education.

Based on the analysis of existing school programs, textbooks, teaching aids, as well as on the basis of studying the work experience of teachers of pedagogical universities, a number of problems in the organization and conduct of physico-chemical research methods in modern secondary schools and pedagogical universities were identified. The main problem is the lack of special laboratories for physical and chemical research and the obsolescence of facilities and equipment. These problems do not allow students to fully master the methods of physical and chemical research.

Therefore, according to the chemistry curriculum, it is necessary to determine the types of skills and abilities that students develop depending on their level of preparation and personal abilities. In this regard, we decided to divide the experimental knowledge and skills of the students into three levels.

The first level includes the knowledge and skills necessary for all students to master the content of the chemistry curriculum. At this level, students perform laboratory experiments or practical classes according to instructions, but need the help and supervision of the teacher. Depending on the level of mastery of mandatory skills, students should be required to perform the experiment on their own.

At the second level, students are expected to have the knowledge and skills to independently perform a chemical experiment without specific instructions, when the situation is changed, using algorithmic steps for the experiments. Students do not need much help and supervision from teachers.

The third level describes the knowledge and skills of students who are creative in performing chemical experiments, can act independently, and are interested in chemistry. Learners do not need the help and supervision of teachers.

Conclusion

In conclusion, the key role of ensuring a smooth transition in the educational trajectory from high school to university in developing the competence of future specialists in the field of chemistry is emphasized. The work summarizes the results of modern research, highlighting factors that significantly influence the success of this transition.

On the basis of the analysis of existing school programs, textbooks, textbooks, as well as the study of the work experience of teachers of pedagogical universities, an analysis of the state of the problem of the organization and implementation of physical and chemical methods of research in a modern general education school is carried out. and pedagogical universities. For students to master the methods of analytical research, it is determined that students who have a chemical education in the pedagogical field must master the methods of physical and chemical research.

Based on the analysis of the results of various experimental tasks, the level of formation of students' chemical-experimental knowledge was determined by the experimental method. It is shown that experimental skills formed by students are at the initial level of formation and they can only formulate questions. The results of the work of students of the 3rd and 4th courses, who mastered the methods of physical and chemical research, were reflected in the final experiment. At the final diagnosis, a quantitative and qualitative analysis of the improvement of the level of chemical knowledge and experimental skills of students was carried out.

On the basis of continuous education, methodological guidelines for conducting laboratory work on physical and chemical methods of research, which are presented in the form of additional classes to the educational process, have been developed.

In conclusion, the obtained results provide a basis for the development of practical recommendations aimed at the optimization of educational programs and teaching methods. This, in turn, contributes to the

more effective formation of future chemists and analysts who are ready to successfully cope with the demands of modern society and the labor market.

Bibliography

1. **Stone D. C.** Student success and the high school-university transition: 100 years of chemistry education research //Chemistry education research and practice. – 2021. – Т. 22. – №. 3. – С. 579-601. https://doi.org/10.1039/d1rp00085c
2. **Vasilevskaya E. I., Sechko O. I.** Continuity in the system of permanent chemical education: School–higher educational institution // Образование через всю жизнь: непрерывное образование в интересах устойчивого развития. – 2013. – Т.
3. **Василевская Е.И., Швядене С.И., Лиепене Н.П.** Реализация преемственности и профессиональной направленности курса химии в системе непрерывного образования «школа-колледж-университет». – 2015.
4. **Zholdasbayeva Z., Gilmanshina S., Abyzbekova G.** The Problem of Continuity in Teacher Education in a Complex World //ARPHA Proceedings. – 2022. – Т. 5. – С. 1863-1880.
5. **Тригорлова Л.Е., Лузгина Н.Н.** Реализация преемственности в образовательной системе «школа–университет» на кафедре химии факультета довузовской подготовки. – 2022.
6. **Гордеева И.В.** Проблемы преемственности школьного и вузовского образования // Образование через всю жизнь: непрерывное образование в интересах устойчивого развития. – 2013. – Т. 11. – №. 2. – С. 301-303.
7. **Nampota D.C., Thompson J.J.** Curriculum continuity and school to university transition: science and technology programmes in Malawi //Compare. – 2008. – Т. 38. – №. 2. – С. 233-246.
8. **Rozantsev G.M., Shved E.N.** Problems of higher and secondary school interaction //Russian Journal of General Chemistry. – 2013. – Т. 83. – №. 6. – С. 1252-1256.
9. **Шуиншина Ш.М.** и др. Преемственность учебных программ по уровням образования //Международный журнал экспериментального образования. – 2019. – №. 2. – С. 23-28.
10. **Gorwood B.T.** Experience of problems relative to curriculum continuity and school transfer in teacher-training courses //Routledge Library Editions: Education Mini-Set N Teachers & Teacher Education Research 13 vols. – Routledge, 2021. – С. Vol227: 71-Vol227: 102.
11. **Новик И.Р., Жадаев А.Ю., Волкова Е.А.** Роль профориентации в условиях непрерывности и преемственности образования // Проблемы современного педагогического образования. – 2017. – №. 54-4. – С. 104-111.

References

1. **Stone D.C.** Student success and the high school-university transition: 100 years of chemistry education research //Chemistry education research and practice. – 2021. – Т. 22. – №. 3. – С. 579-601. https://doi.org/10.1039/d1rp00085c
2. **Vasilevskaya E.I., Sechko O.I.** Continuity in the system of permanent chemical education: School–higher educational institution // Obrazovanie cherez vsju zhizn': nepreryvnoe obrazovanie v interesah ustojchivogo razvitija. – 2013. – Т.
3. **Vasilevskaja E.I., Shvjadene S.I., Liepene N.P.** Realizacija preemstvennosti i professional'noj napravlennosti kursa himii v sisteme nepreryvnogo obrazovanija «shkola-kolledzh-universitet» [Realization of continuity and professional orientation of chemistry course in the system of continuous education "school-college-university"]. – 2015.
4. **Zholdasbayeva Z., Gilmanshina S., Abyzbekova G.** The Problem of Continuity in Teacher Education in a Complex World //ARPHA Proceedings. – 2022. – Т. 5. – С. 1863-1880.
5. **Trigorlova L.E., Luzgina N.N.** Realizacija preemstvennosti v obrazovatel'noj sisteme «shkola–universitet» na kafedre himii fakul'teta dovuzovskoj podgotovki [Realization of continuity in the educational system "school-university" at the Department of Chemistry of the Faculty of Pre-University Training]. – 2022.
6. **Gordeeva I.V.** Problemy preemstvennosti shkol'nogo i vuzovskogo obrazovanija [Problems of continuity of school and university education] // Obrazovanie cherez vsju zhizn': nepreryvnoe obrazovanie v interesah ustojchivogo razvitija. – 2013. – Т. 11. – №. 2. – С. 301-303.
7. **Nampota D.C., Thompson J.J.** Curriculum continuity and school to university transition: science and technology programmes in Malawi //Compare. – 2008. – Т. 38. – №. 2. – С. 233-246.
8. **Rozantsev G.M., Shved E.N.** Problems of higher and secondary school interaction //Russian Journal of General Chemistry. – 2013. – Т. 83. – №. 6. – С. 1252-1256.
9. **Shuinshina Sh.M.** i dr. Preemstvennost' uchebnyh programm po urovnjam obrazovanija [Continuity of curricula by levels of education] // Mezhdunarodnyj zhurnal jeksperimental'nogo obrazovanija. – 2019. – №. 2. – С. 23-28.
10. **Gorwood B.T.** Experience of problems relative to curriculum continuity and school transfer in teacher-training courses //Routledge Library Editions: Education Mini-Set N Teachers & Teacher Education Research 13 vols. – Routledge, 2021. – С. Vol227: 71-Vol227: 102.
11. **Novik I.R., Zhadaev A.Ju., Volkova E.A.** Rol' proforientacii v uslovijah nepreryvnosti i preemstvennosti obrazovanija [The role of career guidance in the context of continuity and continuity of education] // Problemy sovremennogo pedagogicheskogo obrazovanija. – 2017. – №. 54-4. – С. 104-111.

Орта мектеп пен жоғары оқу орындарындағы химия курсы мазмұнының сабақтастық мәселелері

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Аңдатпа. Мақалада жалпы білім беретін мектептер мен жоғары оқу орындарындағы химия білімінің өзара байланысының өзекті мәселелері қарастырылған. Жоғары оқу орындарының күтулері мен орта мектеп түлектерінің білімдері арасындағы сәйкессіздік контекстке енгізіліп, білім беру бағдарламаларының табысты сабақтастығына кедергі келтіретін негізгі мәселелер анықталды. Мектептегі химия курсының мазмұнының қазіргі жағдайы және жоғары оқу орындарының осы пән бойынша дайындық деңгейіне қойылатын талаптары талданады. Авторлар жоғары оқу орындарының талаптары мен химия саласындағы орта мектеп түлектерінің дайындық деңгейі арасындағы қайшылықтарды анықтай отырып, білім беру бағдарламаларындағы қазіргі жағдайды талдады. Мақалада оқытудың сабақтастығына әсер ететін негізгі факторлар, мысалы, оқу бағдарламаларындағы, оқыту әдістемесіндегі және бағалау критерийлеріндегі айырмашылықтар егжей-тегжейлі қарастырылған. Сондай-ақ авторлар сабақтастықты қамтамасыз етудің қолданыстағы әдістері мен тетіктеріне шолу жасайды және олардың тиімділігін бағалайды. Мақалада білім беру бағдарламаларының үйлесімділігін арттырудағы мұғалімдердің, оқу орындарының және студенттердің рөлі атап өтіледі, сондай-ақ осы мәселелерді шешу бойынша нақты ұсыныстар берілген. Мақалада сонымен қатар сабақтастықты қамтамасыз етудің қолданыстағы тетіктеріне және олардың тиімділігіне шолу жасалады. Зерттеу негізінде білім беру деңгейлері арасындағы үйлестіруді жақсарту бойынша нақты ұсыныстар ұсынылады. Бұл мәселелерді шешуде мұғалімдердің, білім беру органдарының және университеттердің рөлі ерекше көрсетілген. Қорытындылай келе, химия саласындағы болашақ мамандарды сапалы дайындауды қамтамасыз ету үшін оқу үдерісіне барлық қатысушылардың бірлескен күш-жігерінің маңыздылығы атап өтілді.

Түйінді сөздер: сабақтастық, химия, білім беру, мектептің жоғары сыныбы, жоғары білім.

Проблемы преемственности содержания курса химии в средней школе и высших учебных заведениях

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Аннотация. В статье рассматриваются актуальные вопросы взаимосвязи химического образования в общеобразовательной школе и вузах. В контекст вводится несоответствие между ожиданиями вузов и знаниями выпускников вузов, а также выявляются ключевые проблемы, препятствующие успешной преемственности

образовательных программ. Проанализировано современное состояние содержания курса химии в школе и требования вузов к уровню подготовки по этому предмету. Авторы анализируют современную ситуацию в образовательных программах, выявляя противоречия между требованиями вузов и уровнем подготовки выпускников вузов в области химии. В статье подробно рассматриваются ключевые факторы, влияющие на непрерывность обучения, такие как различия в учебных программах, методике преподавания и критериях оценки. Авторы также предлагают обзор существующих методов и механизмов обеспечения преемственности и оценку их эффективности. В статье освещена роль преподавателей, образовательных учреждений и обучающихся в повышении связности образовательных программ, а также даны конкретные рекомендации по решению этих проблем. Также в статье представлен обзор существующих механизмов обеспечения преемственности и их эффективности. На основе исследования предложены конкретные рекомендации по улучшению координации между уровнями образования. Выделены роли преподавателей, органов управления образованием и университетов в решении этих проблем. В заключение подчеркивается важность совместных усилий всех участников образовательного процесса для обеспечения качественной подготовки будущих специалистов в области химии.

Ключевые слова: непрерывность, химия, образование, средняя школа, высшее образование.

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