

# Continuity of Natural Science Education in the System of “School-University”

Shuinshina S. M.<sup>1</sup>, Alpeisov E. A.<sup>1</sup>, Zhakupov A. A.<sup>1</sup>, Burunbetova K. K.<sup>2</sup>

National Academy of Education of I. Altynsarina, Astana, Kazakhstan<sup>1</sup>

Center for Pedagogical Excellence, Ust-Kamenogorsk, Kazakhstan<sup>2</sup>

At the present time, new state compulsory standards for school education, standard curricula, and curricula have been developed. The programs of higher and postgraduate education do not take into account changes in educational curricula of secondary education. The future specialists of pedagogical universities are teachers of the school. Therefore, graduates of universities on pedagogical specialties, including scientific direction, should be profoundly aware of the content of subjects studied in secondary education. It is very important to understand the need to ensure the continuity of educational curricula of higher pedagogical and general secondary education in conditions of updating the content of education. The relevance of the research topic is due to the lack of continuity in the educational programs of higher pedagogical and general secondary education in conditions of updating the content of education; discrepancy of professional competences of young pedagogical staff, graduates of higher educational institutions, to the conditions of the updated content of school education; the lack of fundamental and applied research to date, considering the theoretical and methodological foundations for ensuring the continuity of natural science education in the “school-university” system in the context of updating the content of education; the need for the research in the context of the implementation of the State Program for the Development of Education of the Republic of Kazakhstan for 2016-2019, which indicates an increase in the prestige of the profession of teachers and an increase in their quality. These theoretical and methodological bases for ensuring the continuity of educational programs of higher pedagogical and secondary education in conditions of updating the content of education will make it possible to introduce changes in the educational curricula of higher and postgraduate education for the training of pedagogical personnel.

*Keywords:* continuity in the system “school-university”, natural sciences and mathematics, ensuring the continuity of educational content, training of teachers, state obligatory standard of education, curriculum.

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Sholpan Myrzakasymovna Shuinshina, candidate of pedagogical sciences, associate professor, National Academy of Education of I. Altynsarina, Astana, Kazakhstan.

Esenbay Ashimalievich Alpeisov, doctor of Technical Sciences, professor, National Academy of Education of I. Altynsarina, Astana, Kazakhstan.

Altynbek Amanzholovich Zhakupov, Ph.D., leading researcher, National Academy of Education of I. Altynsarina, Astana, Kazakhstan.

Karlygash Kabdrakhmanovna Burunbetova, candidate of biological sciences, Center for Pedagogical Excellence, Ust-Kamenogorsk, Kazakhstan.

### **Introduction**

Nowadays, the school education of Kazakhstan is at the stage of the new convert, while the priority became the infrastructure development and the transition to the updated content. Future specialists in pedagogical higher education institutions are teachers of the school. Therefore, graduates in teaching professions, including scientific direction, must deeply know the content of subjects studied in secondary education institutions. It is very important to understand the necessity out with ultimate tone of continuity of educational programmes of higher pedagogical and general secondary education in terms of updating the content of education.

For the first time the content of model curricula for science education for higher education institutions from the point of view of continuity of education in the system “school-university” in terms of updating the content of national education will be investigated.

### **Realisation of the Continuity in the System “School-University”**

Introduction to the education system of updating the content of primary, basic secondary, and general secondary education has highlighted the problems associated with ensuring continuity of the education system. In this regard, one of the conditions of education system modernization is the implementation of continuity between the different levels of education, in this case in the system “school-university”.

The changes occurring currently in the society and the education system require new approaches to the discussed problem: implementation of continuity with the current condition and prospects of the development of school and higher education.

The continuity and succession of education process should be provided at any stage of learning at the sequential development of the totality of educational programs and state compulsory educational standards of various levels and orientation.

In Article 12 “levels of education” of the Law of the Republic of Kazakhstan “about education”, the levels of education, including the basic principles of continuity and succession of educational programs, are defined:

- (1) Pre-school education and training;
- (2) Primary education;
- (3) Basic secondary education;
- (4) Secondary education (general secondary education, technical and vocational education);
- (5) Post-secondary education;
- (6) Higher education;
- (7) Postgraduate education.

In Paragraph 7 of Article 3, Law “principles of state policy in the field of education” says about the continuity of the educational process, providing continuity of its levels; in Article 10 (Paragraph 1) “the concept of the education system” of Chapter 3, a set of interacting documents, ensuring continuity of education levels is defined: the state educational standards and educational curricula<sup>1</sup>.

The continuity of the school and university levels of education includes education content, forms, methods and means of education, socio-psychological aspects of moral development, psychological and pedagogical

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<sup>1</sup> “Law on Education” of the Republic of Kazakhstan. Astana. Akorda. 27.07.2007 y.

conditions of formation of active creative personality, the objectivity in the assessment of quality of knowledge of graduates of secondary education institutions, as well as compatibility of school and university educational literature (Popov, 2015).

Change of system goals and pedagogical approaches in education requires the enhancement of the successive relations between general secondary school and university education, the search of new ways of their implementation for the realization of the continuity principle.

Continuity in education should have continuity in the content of the material being studied. The continuous development of a substantive material, which is included in the overall logic of the course as a whole, is created at each stage of the educational process of the base for studying the subject at a higher level. The expansion and deepening of the topics to be studied is achieved by creating a “pass-through” line in the content or principle of helicity when making project of the content of the subject, that is, a gradual getting of knowledge and skills, both vertically and horizontally.

In this regard, it should be taken into the principle of spiral arrangement of educational material for its study as the basis of the content of educational programs of general secondary education and structuring of the content material recommended through the study of interdisciplinary cross-cutting themes in classes and terms<sup>2</sup>.

The modern university graduate should not only have a high level of professionalism and be comprehensively developed person, but also have professional mobility and readiness for professional growth, acquiring new knowledge throughout life.

In many scientific studies abroad, the continuity in the system “school-university” is considered from the point of view of the successful continuation of study in the university of the school graduate. The theoretical basis of the problem of continuity in the system “school-university” was examined by V. S. Bezrukova, A. P. Belyaeva, G. N. Varkovitskaya, S. M. Godnik, and many other researchers. The development of ways of continuity of secondary and higher school was studied by G. E. Aleksandrova, A. A. Koverlyag, A. M. Lushnikov, and others.

In recent years, the problem of continuity in the system of continuous education is intensively investigated: continuity of the objectives, content and methods of education, and training in gymnasiums, lyceums, and classes with advanced study of certain disciplines (F. T. Akbasheva, M. N. Berulayeva, O. M. Kolomak, L. O. Filatova, and others); the problem of continuity in personality development of the students in the secondary and high school was investigated by R. N. Naurzybayeva, V. N. Maximova, and others; continuity in the process of general social and professional formation of the personality was developed by P. A. Korchemny, G. M. Romantsev, P. Smirnov, and V. V. Shapkin (Raikina, 2012).

Continuity in learning is reflected in the following:

(1) Further developments in pupils of all the positive that is inherent at the previous levels of education and training;

(2) To ensure consistency of knowledge and further development of content, forms, and methods of training;

(3) To advance the education and training of students, which implies to develop in the future;

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<sup>2</sup> On the peculiarities of the organization of the educational process in secondary schools of the Republic of Kazakhstan in the 2017-2018 academic year: Instructive and methodological writing (p. 395). Astana: National Academy of Education named after I. Altynsarina, 2017.

(4) Pro-actively use content, methods, and forms of education, contributing to the improvement of the individual (Godnik, 1990).

Also Kazakhstan scientists-teachers investigate given problem: N. I. Pustovalova, G. K. Bakizhanova, G. A. Omarova, T. V. Musina, L. N. Orazbekova, M. Khasenov, T. Duisebek, S. K. Ismagulova, and others. Under continuity, we mean the sequence of curriculum content and consistency in the arrangement of the educational material, relationship and consistency levels of education, and stages of educational work in the system “school-university”.

The mechanism ensuring this continuity is the organization of continuity among all levels science education in particular between school and university.

However, research conducted by these authors, was not focused on the problem of continuity of educational programmes of higher pedagogical and general secondary education in terms of updating the content of education.

At this point in our republic with the introduction of the school education updating the content of education, the graduates of pedagogical specialties are not fully prepared to continue professional activities in modern schools of Kazakhstan transferred to the updated content of education.

Thus, in the proposed research project it is planned to explore and prove the continuity of the training of young teachers, adapted to the conditions of the modern school of Kazakhstan, through changes in the curricula of higher education institutions, doing the preparation of pedagogical staff taking into account the updates of the content of school education.

Thus, the relevance of the proposed research is caused by:

(1) Lack of continuity of educational programmes of higher pedagogical and general secondary education in terms of updating the content of education;

(2) Incompatibility of professional competencies of young teaching staff, graduates to the conditions of the updated content of school education;

(3) The absence of fundamental and applied research, considering the theoretical and methodological foundations of the continuity of science education in the system “school-university” in conditions of updating the content of education;

(4) Necessity of the proposed research in the context of implementation of the state program of education development of the Republic of Kazakhstan for the years 2016-2019, where the increase of the prestige of teachers and improvement of their qualitative composition are indicated<sup>3</sup>.

The requirements to the content of education students of state educational standard of higher education States says: “The purpose of higher education is to provide training of qualified, competitive personnel meeting modern requirements to the quality of specialists with higher education for self-employment in a particular specialty”<sup>4</sup>.

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<sup>3</sup> State Program for the Development of Education and Science of the Republic of Kazakhstan for 2016-2019/. <http://adilet.zan.kz/rus/docs/U1600000205>.

<sup>4</sup> The state obligatory standard of education of higher educational institutions. Annex 4 to the Resolution of the Government of the Republic of Kazakhstan dated May 13, 2016 No. 292 Approved by the Resolution of the Government of the Republic of Kazakhstan dated August 23, 2012 No. 1080.

Currently, the provision of training of qualified personnel meeting modern requirements of secondary schools to the quality of teachers is relevant. Constant and rapid change requires continuous training and retraining, lifelong learning, and continuous upgrading and deepening of previously obtained professional knowledge, improving business skills, abilities, and hence corresponding changes in the nature of professional qualifications and competencies.

Reform of the education system in the Republic of Kazakhstan that took place in the last decade was carried out with a view to its integration into the world educational space and the further development of the entire education system in the country. The teacher of the new formation is a spiritually-moral, socially responsible, actively-creative, environmentally educated, and creative person with the capacity for reflection, a desire for self-development and self-realization, characterized by a high level of development of methodological, research, didactic-methodological, socially-personal, communicative, informational, and other types of competencies.

The educational system of the country needs further integration into the world educational space.

To implement this priority, Kazakhstan has joined the main international agreements in the field of higher education, including the Lisbon “Agreement on the Recognition of Qualifications Concerning Higher education” (1997) and the Bologna Declaration (1999). In turn, the inclusion of Kazakhstan into the Bologna process (2007) demanded reform of the education system as a whole. In July 2012 at the Third Conference of Ministers of Education of countries participating in the Bologna process, Kazakhstan joined the Bucharest Communiqué of 3 April, 2012 and has made a commitment to improve the skills of high school graduates to 4th level of the European qualifications framework. According to the national qualifications framework of Kazakhstan, completed Kazakhstan secondary education corresponds to Level 3 qualifications. Thus, a compulsory condition for the realization of the Bologna process and the success of Kazakhstan in the international arena is to update the content of secondary education<sup>5</sup>.

State educational standards of primary, basic secondary, and general secondary education of the updated content are focused on the best international experience for the development of a wide range of skills, which together provide functional literacy. In 2016, training programs of the updated content of education were first developed. The review of secondary education in Kazakhstan conducted by the Organization for Economic Cooperation and Development (OECD) in 2014 concluded that the academic subjects are taught with emphasis on theory without due attention to their possible practical application, which results in that students are not capable enough to effectively apply and use the obtained knowledge in unusual situations.

In connection with this, the president has given instructions for the transfer of experience of Nazarbayev Intellectual schools, which for several years have implemented the best international experience in the field of educational innovation. Innovative training programs of updated content of education are the transition from a knowledge paradigm to activity. The learning process is characterized by active work of the students. For the first time education is based not on the content to learn where in the standard and the programs content of subjects was first designated subject to obligatory assimilation, but expected learning outcomes.

For many years the educational process has been focused on knowledge paradigm. Today, instead of the unified, organizational, and meaningful regulation of the education system, there is a new system that seeks to

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<sup>5</sup> Updating the content of secondary education based on the experience of Nazarbayev Intellectual Schools. Methodical recommendations (p. 56). Astana: National Academy of Education named after I. Altynsarina, 2014.

meet the interests and needs reforming the society and the individual. Today the problem of contingency, the continuity of the educational standards of the school and university, is getting actual, because in the educational space it is planned the overall focus of training specialists, the similarity of general professional training peculiar to the peer group specialties, and common general professional and special training performed in the general disciplines and elements of the training programs of disciplines (Okulova, 2006).

### Conclusion

Socio-economic impact of expected results is that the results of the study will enable to generalize and systematize scientific achievements in the field of continuity of education and for the first time they will offer a theoretical and methodological basis of the continuity of natural and mathematical education in the system “school-university” in the conditions of updating the content of education for Kazakhstan’s education system. Developed methodological recommendations on subjects to make changes in the curricula of higher education institutions, carrying out the preparation of pedagogical staff taking into account the updates of the content of school education, will help to provide higher education institutions in training highly skilled pedagogical staff. The results of this research should become the basis for the formation of a unified educational space, as a partnership of secondary educational institutions and the university is primarily determined by their participation in solving the problems of continuity and succession of education with regard to the target, substantive and methodological differences in their activities. This continuity of school and higher education concerns not only education content but also the forms, methods, and means of education, including socio-psychological conditions of moral development and psycho-pedagogical conditions of formation of creative personality, the objectivity of evaluation of quality of knowledge of graduates of secondary educational institutions, as well as compatibility of school and university textbooks<sup>6</sup>.

### References

- Popov, A. A. (2015). The essence of the problem of continuity of the content of vocational education in the “school-university” system. *Izvestiya of the Samara Scientific Center of the Russian Academy of Sciences*, 1(2).
- Raikina, M. A. (2012). *Theoretical bases of maintenance of continuity of social education in the conditions of a complex “school-high school”*. Retrieved from <https://cyberleninka.ru/article/n/teoreticheskie-osnovy-obespecheniya-preemstvennosti-sotsialnogo-vospitaniya-v-usloviyah-kompleksa-shkola-vuz>
- Godnik, C. M. (1990). *Continuity of school and university education in Russia (on the basis of standards)*. Retrieved from <http://school-vuz.narod.ru/Str22.htm>
- Okulova, L. P. (2006). *Consistency of educational programs as a condition for the continuity of educational standards in the “school-university” system*. Retrieved from <http://www.dslib.net/obw-pedagogika/soglasovannost-obrazovatelnyh-programm-kak-uslovie-preemstvennosti.html>

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<sup>6</sup> The state compulsory standard of primary education. Annex to the Resolution of the Government of the Republic of Kazakhstan dated April 25, 2015 No. 327 Approved by the Resolution of the Government of the Republic of Kazakhstan dated August 23, 2012 No. 1080.