

SPECIALIZED EDUCATION AS A NEW STAGE IN THE IMPROVEMENT OF MODERN EDUCATION

^aGIZATULLA IMASHEV, ^bBAYAN KUANBAYEVA,
^cMAIRAGUL RAKHMETOVA, ^dZHADYRA
SALYKBAYEVA, ^eAIGUL TULEGENOVA, ^fASSET
TURKMENBAYEV, ^gELMIRA ABDYKERIMOVA,
^hLYAILYA MARDANOVA

^{a-e}Kh. Dosmukhamedov Atyrau State University, 060011, 212
Studenchesky Ave., Atyrau, Kazakhstan

^{f,g}Yessenov Caspian State University of Technology and
Engineering, 130000, 32 Microdistrict, Aktau, Kazakhstan

^hAtyrau Oil and Gas University named after Safi Utebayev,
060000, 45A Baimukhanov Str., Atyrau, Kazakhstan

email: ^a77gz5ag@mail.ru, ^bbayan_kuanbaeva@mail.ru,
^cmaira_12_05@mail.ru, ^djsk_88@mail.ru,
^eTulegenova1979@mail.ru, ^fasset.turkmenbaev@yu.edu.kz,
^gAbdykerimova_el@mail.ru, ^hmard_lal@mail.ru

Abstract: The article deals with the problems of specialized education relevant to modern school as a condition for professional training of schoolchildren. The paper defines the problems of specialized education at secondary school according to modern educational objectives in the context of innovative technologies. The article discloses specialized education as one of the ways of development of professional self-determination of pupils and some features of the organization of specialized education in modern secondary schools. In view of the scientific and pedagogical analysis of relevant literature and regulatory documentation on the problem under study, the paper revealed and justified the didactic stages and areas of modernization of specialized education in Kazakhstan. The important place of technological fundamentals and industrial processes in the content of specialized education was defined according to requirements of scientific and technological progress. The experience in organizing high school students' specialized training in the comprehensive schools in Atyrau city was analyzed. The article describes the role of a variation component in the educational process. This component determines the nature of schoolchildren's development and implies their personal characteristics, interests, and inclinations.

Keywords: specialized education, innovative approaches, specialty-based differentiation, individualization, variation component, teaching methods, professional training.

1 Introduction

One of the main goals of the planned changes in education is to meet the needs of both societies as a whole and individuals in accordance with their characteristics and abilities, as well as to ensure State guarantees of access and equal opportunities to receive a full education. Another form of educational organization is needed in order to take full account of the aptitudes, interests, and abilities of students. Specialty-based differentiation in education is such a form of organization. The ideas of specialized high schools and learning resource centers are considered in this paper from different points of view but in a general context by moving towards to a better provision of education for all students in Kazakhstan. (1, 2) When raising the topic of a "specialized school", the opportunities of an in-depth study of subjects at lyceums, gymnasiums, and language schools are usually considered. The specifics of such institutions are that not every child who has received basic general education can study there. Therefore, it is proposed to organize specialized education in each school. This is a different kind of education, differentiated according to the place of residence, profession, material wealth of the parents and peculiarities of organization of cultural life.

Psychologists, didactologists, and methodologists (3, 4) have studied the problem of differentiated instruction in depth. The individual features of children and their manifestations in school education were considered in the works of B.G. Ananyev, D.N. Bogoyavlensky, N.Y. Bolshunov, E.A. Golubeva, S.A. Izyumova, and E.N. Kabanova-Meller, M.K. Kabardov, E.A. Klimova, G.S. Kostyuk, A.I. Krupnov, O.M. Leontyev, M.A. Matova, V.D. Nebylitsin, A.V. Petrovsky, S.L. Rubinstein, B.M. Teplov, I.E. Unt and others. The problem of differentiated instruction was put forward and developed in the pedagogy of many countries of the world. In the context of Kazakhstan, this problem was disclosed in the scientific works based on the

traditions of national pedagogy. The differentiated instruction is especially relevant now when the center of attention of a pedagogical science is the questions of the shaping of a harmonious personality and the development of children's abilities and individuality. (1, 5)

When analyzing different understandings of the differentiated instruction in the educational process and noting the fruitfulness of the idea of internal and external differentiation, we consider a deeper and more productive concept of classifying the educational process on the principle of level-based and specialty-based differentiation.

The experience of many countries shows that within the framework of differentiated instruction, it is possible to achieve an optimal combination of requirements for the unity of general educational institutions aimed at achieving educational equivalence in accordance with individual characteristics of students. (6, 7)

In Kazakh schools, there is already the experience in the specialty-based differentiated instruction of schoolchildren. However, these educational institutions face the following problems in the course of their work:

Unsolved issues of choice of specialty, educational and methodological support of specialized education, lack of criteria for assessing knowledge;

- Lack of measurers for the admission of students to specialized classes (schools);
- Insufficient logistics capacity;
- Lack of teachers trained to teach specialty-based subjects and elective courses;
- Lack of interaction between specialized school education and primary vocational education institutions.

The idea of specialized teaching of subjects is not new. It has been practiced long and successfully in many Western countries. (2, 8)

All over the world, especially in the last decade, attempts have been made to link the development of economics, technology, science and society with the tasks of restructuring the content of school education. Therefore, education, as the main factor of intellectual potential formation as well as a new quality of economy and society, is given a key role.

1.1 Purpose of the Research

Specialized education is a system of specialized training in the upper grades of a comprehensive school focused on the individualization of training and socialization of students in view of the real and perspective needs of the labor market of the country. The aim of the work is to study the specialized education peculiarities in a modern secondary school. In order to achieve the goal, it is necessary to solve the following tasks: to study the experience of educational specialization profiling in the country and abroad; to consider the main tasks of specialized education; to distinguish specialized educational models. Specialized education requires the development and practical implementation of a flexible system of specialties and the cooperation (close interaction) of high school with institutions of primary, secondary and higher professional education.

The conditions for achieving this goal are

- Ensuring that schools have the right to differentiate the education of schoolchildren in various areas of general and vocational training;
- Providing students with the freedom to choose an educational specialization that optimizes the combination of individual and social interests;

- Ensuring that the new content contains an optimal ratio of time for theoretical, applied and practical training of students, ensuring that graduates of specialized classes have special qualities for their chosen specialty. (9, 10)

We consider specialized education as a very productive means of realization of practical knowledge and skills in the educational process of comprehensive schools. Indeed, specialized education provides knowledge of the scientific basis of a particular industry and thus equips students with practical labor-related and special skills. Because of a specific basic system of knowledge about a particular industry, students obtain practical skills that allow them to orientate themselves in other areas of practical activities. In this case, specialized education serves as a means to avoid the danger of acquiring abstract verbal knowledge. (2, 11)

Thus, in its essence, specialized education orients comprehensive schools to the optimal combination of general education, polytechnic and professional training, and excludes craftsmanship and unilateralism in the activities of educational institutions.

2 Materials and Methods

One of the priorities of the concept of modernization of education was the development of a specialized education system in the upper grades of secondary schools. Specialized education should provide in-depth training of high school students in the subjects they have chosen and to a reasonable extent reduce the amount of learning time devoted to non-core subjects. This form of education should take into account the best interests, aptitudes, and abilities of older students. Specialized classes should provide students with plenty of opportunities to realize their own desires. Specialized education is implemented in high school. By specialized education in secondary school, we mean special educational system, which has the following distinctive features:

- Core academic subjects have a sufficiently clear professional orientation;
- The curriculum includes special subjects and electives that reveal the content of a particular professional activity;
- Professional training is organized and delivered under the patronage of a specific special educational institution, which, together with the school, has full responsibility for the quality of the professional training. (4, 12)

The developers of the social and pedagogical system of specialized education have the following tasks:

- 1) To substantiate a set of provisions constituting the theoretical and methodological basis for professional training; to substantiate specific methods and means of specialized education theoretically and experimentally.
- 2) To propose and theoretically substantiate the technologies of designing educational systems that implement in practice the idea of the optimal combination of general, polytechnic and professional education. (9, 13)

Teaching methods at the specialized school should facilitate the mastery not only of knowledge and general learning skills but also various ways of acting. Learners should be able to develop their intellectual abilities, especially when mastering more complex (as compared to what is provided for in an educational standard) content. The following information equipment is also needed: educational videos, electronic texts, use of the Internet. It is very important to conduct creative contests, heuristic tests, rating evaluations of the specialized training success, excursions to the enterprises and specialized exhibitions, training workshops at the educational and working places in the enterprises according to the specialty. (14, 15) It is necessary to provide specialized schools with audio-visual tools to the full extent. The use of such tools will intensify the educational activities of students at the lesson, to shape a stronger and deeper knowledge of the topic. The use of the Internet in specialized schools will be productive and will require the information preparedness of a

teacher and students. A fundamentally new idea of specialized education is being implemented into the practice of general and professional education of young people, which should lead to the convergence of general education and vocational schools in the future. An indisputable effective method of education is the organization of research and project-based activities of students, which allows teaching children to think independently, find and solve problems by involving knowledge from different areas for this purpose. (11, 16)

3 Results and Discussion

One of the most pressing problems now is the transition of secondary schools to specialized education of students in high school. The specialization is understood as a type of differentiated education, through which it is possible to take into account the educational interests of students as much as possible and to create conditions for the satisfaction of their intentions for subsequent life activities.

The scientific novelty is as follows:

1. The organizational and pedagogical ways and means of optimizing specialized education in modern conditions are revealed.
2. The problem-oriented analysis for the implementation of pre-specialized training and specialized education has been conducted.

The quality and efficiency of practical training of students for the purpose of the development of specialized education at the present stage have been determined.

The practical importance of work consists in:

- The definition of the importance of the content of specialized education at the present stage in accordance with the requirements of scientific and technical progress;
- Working out of the methodical system for a problem of modernization of specialized education and enhancing specialized training of pupils when studying the basics of the main areas of scientific and technical progress;
- The substantiation of a way of realization of the idea of specialized education at the high-school level of general education. The transition to specialized education pursues the following main objectives:
 - To provide an in-depth study of individual subjects in the program of full general education;
 - To create conditions for significant differentiation of the content of high school students' education with wide and flexible possibilities of building individual educational programs;
 - To promote equal access to full education for different categories of students according to their abilities, individual aptitudes, and needs;
 - To expand opportunities for students' socialization, ensure continuity between general and vocational education, and better prepare school leavers for higher professional education programs. (17, 18)

Many aspects of this transition are not yet clear and raise several questions. In the concept of specialized education, it is noted that the implementation of the idea of such an education at the high-school level puts a school leaver in front of the need for responsible choice (preliminary self-determination) of the specialty of their own activities. (19, 20) The mission of a specialized school is to ensure access to high-quality education for students in the final and pre-leaving grades. This is made possible by concentrating the most qualified teaching staff, technological tools, information, and other resources. Under these conditions, the possibility of entering such a school, a wide range of specialties, as well as the possibility of extensive contacts in a rich educational environment focused on achieving significant progress, will be available to hundreds of high school students.

By using the accumulated theoretical and practical knowledge about this problem, as well as the experience of the authors, it is possible to build an effective system of specialty-based differentiated instruction that allows meeting the country's need for specialists with a high-qualification level. (21, 22)

The research of the scientists of the CIS countries in the field of specialty-based differentiation have formed the basis for 3-level programs for natural sciences subjects:

- General cultural orientation courses (I);
- Courses of applied science (II);
- Advanced level courses (III).

These programs make it possible to implement the idea of the specialty-based differentiation of school subjects. A priority area of functional activities in upper secondary education is the implementation of specialized training to provide in-depth pre-professional training for students. A fundamentally new approach to the construction of upper secondary education is that it is based on the differentiation, integration, and professionalization of educational content. (23, 24)

Pupils at the third level can choose the forms and methods of education and individual educational programs, where creativity and the creation of conditions for the development of individual abilities of students are given a special place.

The main objectives of specialized education are:

- Work-related education of students;
- Preparing students for life in modern society;
- Preparing students for professional activities in the industrial and service sectors.

One of the most promising forms of organizing the training of high school students for working life is specialized classes created and operated with the assistance of universities. The main task of these classes is to complete the polytechnic education of schoolchildren and provide them with the opportunity to obtain a profession. (25, 26)

When providing specialized education, it is essential to increase the use of such methods as:

- a) Lectures;
- b) Seminars, interviews, and debates;
- c) Laboratory instruction and laboratory practical studies;
- d) Independent study of basic and additional literature related to various specialties;
- e) Development and defense of projects, etc.

The problem of accessibility, quality, and efficiency of education cannot be solved without taking into account the world experience of creating specialized high schools and without careful consideration of the possibilities of creating educational centers, complexes, and schools specifically designed to address the problems of ensuring the rights of students in the field of education.

On the basis of research data (questionnaires, the study of experience, conversations with students and teachers, etc.), we developed and applied general criteria for evaluating the levels of specialized education. (27) These criteria have been experimentally tested in schools of the Atyrau region.

4 Conclusion

The following specific conclusions were reached in the present study:

The role and place of specialized education in improving the training of schoolchildren for a conscious choice of their professional path at the present stage has been identified.

Ways of development of the content and methods of the organization of the educational classes aimed at developing

applied knowledge and skills of pupils when studying school disciplines are defined. (23, 25)

Specialized education will ensure that graduates of classes (schools) with specialty-based differentiated instruction aimed at developing personality-related physical, mental, intellectual, social, and business qualities corresponding to the conceptual model of graduate and contributing to a graduate's less painful adaptation to the conditions of market relations in the economy.

Specialized training provides graduates of specialized schools with a broad general secondary but specifically oriented education that meets their interests and requirements of scientific and technological progress. In the future, the work on research of specialized education at the present stage can be conducted in the following areas:

- The development (possibly improvement) of programs for in-depth study of subjects (for schools and classes with advanced studies of physics, chemistry, biology, mathematics, languages, etc.), as well as writing textbooks for these programs on a competitive basis.
- The enhancement of the articulation between school subjects and the productive work of schoolchildren.

Literature:

1. Artyukhova IS. The problem of choosing the profile of education in high school. *Pedagogy*. 2004; 2:28-33.
2. Imashev G. *The development of technical and technological knowledge in the school physics course*. Almaty: Otan; 2019.
3. Dzyatkovskaya EN. Taking into account the individual characteristics of schoolchildren in preparation for profile training. *Profile school*. 2003; 2:24-26.
4. Imashev GI. *Politeknicheskoye obrazovaniye uchashchikhsya v protsesse obucheniya fizike v sredney shkole* [Polytechnic education of students in the process of teaching physics in secondary school]. Atyrau; 2006.
5. Dugarova DP. The program "Pre-profile preparation." *Head teacher*. 2006; 6:63-72.
6. Imashev G. *Innovative technologies of training in physics at high school*. LAP LAMBERT Academic Publishing; 2015.
7. Atutov PR. *Politeknicheskoye obrazovaniye shkol'nikov: sblizheniye obshcheobrazovatelnoy i professionalnoy shkoly* [Polytechnic education of schoolchildren: the convergence of secondary and vocational schools]. Moscow; 1986.
8. Oporkin IY. *Polytechnic education - realities and prospects*. St. Petersburg; 2005.
9. Imashev G. Profile education - a new stage in the improvement of polytechnic education in high school (Vol. 6). Series: Pedagogical sciences. Dnepropetrovsk: Science and Education; 2007.
10. Ladnushkina NM. Pre-profile preparation of graduates of the basic school. *School technologies*. 2005; 1:71-84.
11. Imashev G. *Development of knowledge in the physics course*. Germany: Palmary Academic Publishing; 2012.
12. Bugayev AI. *Methodology of Physics Teaching at High School*. Moscow: Prosveshcheniye; 2012.
13. Imashev G, Barsay B, Abykanova B, Kuanbayeva B, Bekova G, Shimakova Z. Variable component of a course of electrodynamics. *Life Science Journal*. 2014; 1(7s):286-289.
14. Nemova NV. Profile orientation of ninth-graders: elective courses and "Educational information cards." *School Director*. 2005; 6:57-63.
15. Imashev G, Rakhmetova MT. *The development of ecologic knowledge and skills in the process of teaching physics to Mauritius*. Globe Edit; 2019.
16. Pavlova TL. *Career guidance for high school students: diagnosis and development of professional maturity*. Moscow: Sphere; 2006.
17. Imashev G. *Innovative technologies of training in physics at high school*. Almaty: Otan; 2019.
18. Yutkin II. *Polytechnic education in technology*. Moscow; 2005.
19. Imashev G, Barsay B, Syrbayeva S, Jumamukhambetov J, Muftakh N, Zhazylybayva N, Salykbayeva Z. The "New

Materials in Technology" elective course. Life Science Journal. 2014; 11(8s):73-75.

20. Rieffel E, Polak W. *Quantum Computing: A Gentle Introduction*. New York: The MIT Press; 2011.

21. Imashev G, Kuanbayeva BO, Rakhmetova MT, Salykbayeva Z, Turkmenbayev AB, Issatayeva Z, Murynov B, Gainieva A. Development of modern polytechnic education at physics classes. Ad Alta Journal of Interdisciplinary Research. 2019; Special Issue (09/01-VII.):25-30.

22. Polat ES. *Modern pedagogical and information technologies in the education system*. Moscow: Academy; 2007.

23. Imashev G. *Innovative approaches in the development of polytechnic education in the process of teaching physics in high school*. Almaty: Otan; 2019.

24. Davydov VV. *Polytechnic problems in school*. Moscow; 2005.

25. Imashev G. Theory and practice of polytechnic education in the process of teaching physics in secondary schools of Kazakhstan [dissertation]. [Kiev]; 2007.

26. Jain VK, Verma A. *Physics of Semiconductor Devices: 17th International Workshop on the Physics of Semiconductor Devices 2013*. New York: Springer; 2014.

27. Imashev G, Rakhmetova MT. Innovative approaches in the development of polytechnic education in the process of teaching physics in high school. Electronic textbook. Atyrau; 2019.

Primary Paper Section: A

Secondary Paper Section: AM, AO