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Model of the Early Professional Orientation for Individualization of the Educational Process

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ABSTRACT

The aim of the article is to analyze peculiarities of the professional orientation taking into account such methodological peculiarities as: psycho-physiological features of the audience, structure of the proforientation methods, statistical approaches to classify survey results and ways of presenting data when developing students' profiles. Analysis of the problem field of research shows that at the federal, regional and local level the urgent task is to develop, integrate and implement a professional orientation system, which would include complex versions of diagnostic tests, an educational cloud space and, in particular, a digital platform (Learning Management System) for storage and processing of statistical data, as well as staff modernization programs with the aim of developing tutoring support system. The novelty of the work lies in describing the experience of implementing an early professional orientation model in a private school, taking into account peculiarities of educational process organization. Research methodology and methods: in writing article methods of induction and deduction, methods of comparative analysis and synthesis of information were used, the analysis of various forms of questionnaire survey was carried out.

Keywords: pedagogical technologies, tutor, mentoring, vocational guidance methods.

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INTRODUCTION

Constantly changing demands of the labor market and profiles of the future professionals are forcing parents to plan their children's education now. Transition to the digital society is reflected in most spheres of activity: digitalization is actively taking place in industry; federal projects are being implemented in high schools and higher education, such as "Digital Educational Environment," "Modern School," as well as proforientation guidance federal projects aimed at supporting professional self-determination programs for young people "Young Professionals" (increasing the competitiveness of professional education), "Social Lifts for Everyone." Changes in the requirements of the labor market led to changes in the portrait of a future specialist, and consequently, in the portraits of graduates of higher education institutions (universities) and colleges. Both according to the requirements of the federal state educational standards and the concepts of the International Baccalaureate system, a graduate's portrait is characterized by a list of universal and/or professional competences. When the competences of future professionals are discussed, such characteristics as multilingualism, ability to work under uncertainty, stress-resistance, readiness for dialogue and teamwork are often mentioned. The aim of this paper is to systematically analyze how early proforientation models can be implemented in primary, middle and high schools. The key tasks of this publication include following statements:

1) Studying specifics of individual characteristics of proforientation methodic.
2) Analysis of specific features of organizing

proforientation activities for different age groups;
3) Comparing the structure of proforientation programs in middle, high schools, and higher education in order to create a unified concept of seamless development of universal and professional competencies.

Research methodology and methods. In order to assess the experience of integrating different proforientation models, a comparative literature and educational programs analysis was conducted. Such methods were used as: comparative analysis of the problem of the digital literacy formation, as well as methods of survey and pedagogical observation.

RESULTS AND DISCUSSION

Areas of implementation of proforientation activities at school can be different and include several directions:

1) In-depth study of individual disciplines with subject profilization classes at primary and middle year schools.
2) Organization of study tours and internships at academic and industrial partners.
3) Organizing proforientation tests and discussions with representatives of universities and industrial companies.

Over the last few years, proforientation activities have been actively developed through the launch of thematic federal and regional projects.

Since 2012, ASI (Agency for Strategic Initiatives) project has been launched, which aims to support and develop various technological, economic and social initiatives. Among the most significant areas are following:

1) A project aimed at identifying leaders in various fields.
2) A project for the development of urban communities.
3) International promotion of Russian projects (GoGlobal).

Partnership between universities and Agency for Strategic Initiatives allows for competent positioning of the university at the regional and federal levels, increasing extra-budgetary income through the commercialization of the results of intellectual activity, as well as obtaining status of the Agency's expert and participating in round tables and discussions for representatives of universities.

Another striking example is all-Russian proforientation project Ticket to the Future, which involves proforientation activities for students in the 6^{th}-11^{th} grades and is part of the federal project «Success for each child», and a national project called «Education». An online digital platform has been developed for this project. By 2022, all Russian regions had been connected to the project; more than 1 million proforientation tests have been conducted on the system. Questions in the tests are aimed to estimate level of the development of universal and professional competencies:

Stage 1 – introduction sessions in an interactive form, outlining the main trends in various professional areas.

Stage 2 – online diagnostics followed by internships and development of professional competencies in one of Moscow colleges.

Stage 3 – activities at professional platforms that allow you to make a choice of a particular professional field. Also, at the level of higher education institutions, a new proforientation guidance project "ProfStories" was launched as part of Russian development programme, which involves school pupils as well as students. Project's aim is to provide an opportunity to learn about main professional areas.

A promising project that aims to provide a preliminary introduction to the world of professions, including cross-disciplinary areas, is Atlas of future professions. Russian method of forecasting future professions has been officially adopted by the International Labor Organization and this method is presented in the Atlas. Atlas of future professions contains descriptions of professions from over 28 sectors covering about 85% of Russian labor market. Developed as a navigator for students and their parents, Atlas has become a platform for developing cooperation between different types of target audiences: higher education institutions, companies as well as schools can provide all necessary information about their approaches of realizing proforientation models. At the moment, more than 2000 schools and 4000 experts have registrated in the project (Dzhandzhugazova, 2016).

There are several career guidance methods that target different age groups (Table I).

TABLE I: PROFORIENTATION METHODICS

Types of tests	Description of the methodics
Differential Diagnostic Questionnaire E.A. Klimova	The target audience is teenagers and adults. An indicator of the classification of outcomes is the division of all existing professions into five work areas, based on the subject matter with which the person will interact during his or her work
J. Holland's vocational self-determination methodology	The methodology of the questionnaire is that success in professional activities depends on the correspondence between the condition of the personality type and the type of professional environment. According to J. Holland's methodology, there are six types: -realistic or practical. -intellectual or exploratory. -social. -conventional or standard. -entrepreneurial. -artistic.
"Map of interests" (methodology A.E. Golomshtok)	The questionnaire makes it possible to relate intellectual ability to different professions The survey is designed to explore the interests and aptitudes of high school students in different areas of activity on a scale of one to five: the activities themselves are classified into several areas: agricultural, natural science, medical, art and design, and architecture

Analysis of E.A. Klimov's differential diagnostic questionnaire (Dzhandzhugazova, 2016; Kononova *et al.*, 2020) allows to make correlations between spheres of professional activity of a person with the features of the subject with which he/she will interact in the process of working activity (Table II).

Subsequently, E.A. Klimov's Differential Diagnostic Questionnaire was modified by adding secondary scales (areas of profile training) and transformed into the test "Proforientation Guidance" (Fig. 1) (Dzhandzhugazova, 2016; Kononova *et al.*, 2020). Modern versions of computerized proforientation diagnostics allow the test scores of the old protocols to be converted to S-scales (modern versions have integrated scales).

TABLE II: EXPLANATION OF E.A. KLIMOV'S QUESTIONNAIRE (DZHANDZHUGAZOVA, 2016; KONONOVA *ET AL.*, 2020).

Types	Universal Competences	Required Recommendations for Individual Educational Pathway/Subject Choice
"Nature-man" People in this profession are characterized by careful behavior towards nature, environment, plants and animals. At the same time, they are able to carry out their work duties systematically and regularly. Calmness and stress tolerance are important.	1. Research competences 2. Critical and analytical thinking Stages of research: 1. Identification of the problem (What is the problem that is formulated in the question? What do you already know about the topic?) 2. Formulating a hypothesis (How can you justify your point of view and the choice of hypothesis?) 3. Develop a plan (What are dependent and independent variables? Are there any external factors that can influence the result? What equipment and materials are needed to plan and carry out the study?) 4. Conduct the experiment. 5. Analyzing and presenting data 6. Adjustment of the initial plan	In-depth study of natural science disciplines, chemical-biological, physical-chemical or medical profile, selection of elective disciplines aimed at the early development of professional competences; project activities; active participation in subject conferences
"Man-technician" People in this profession have a technical imagination, the ability to mentally design and match various objects from parts. A person in this profession must be able to work accurately and extensively with drawings, different data presentation formats	Communication skills, empathy and emotional intelligence • Critical and analytical thinking • Creativity • Algorithmic thinking as well as imaginative and symbolic perception	Advanced studies in physics, mathematics (algebra and geometry), computer science and programming *Fields of study*: physics and mathematics, engineering, engineering, and information technology
"Human-sign system" People in this line of work a lot with numbers, tables and formulas. Workers have to be attentive, diligent, hardworking	• Analytical thinking • Symbolic perception • Stress tolerance • Abstracts thinking • Time management	Fields of study: Physics and Mathematics, Economics In-depth study of physics, mathematics (algebra and geometry), programming languages Emphasis on participation in project activities, various technological initiatives, elective courses in technopreneurship
"Human Art" Workers in this area realize themselves in visual, musical, literary-artistic, acting and scenic activities	• Creativity • Creative ability • Personal and symbolic perception • Communication and teamwork skills	Studying elective courses in arts, architecture and design with further education in art schools or architecture colleges, or at universities of applied sciences
"Human-to-human" Various activities in the professions in this area are realized with the involvement and interaction between people. It is important that workers have knowledge of the basics of time management, well-developed organizational skills, stress-resistance, and the ability to find compromise solutions in negotiations	• Communication and teamwork skills • Empathy and emotional intelligence • Leadership skills	Profile areas: linguistic, socio-humanitarian In-depth study of Russian language and literature, history, elective study of one or more foreign languages

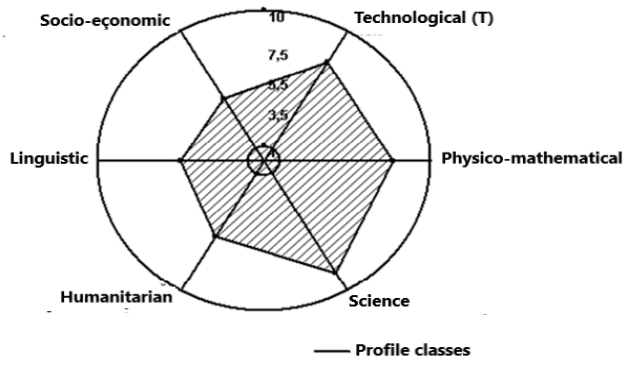

Fig. 1. Example of a real-world profile of a particular student based on test data and recommended study directions (Kononova *et al*., 2020).

If we analyze principles of organizing proforientation activities, it is necessary to take into account psycho-age characteristics of the respondents (Kurbatova *et al*., 2020; Parinova *et al.*, 2017; Hilko *et al.*, 2020; Savkina *et al*., 2018, Nikolsky *et al.*, 2018). A number of factors that influence students' decision at the stage of professional self-determination can be distinguished:

1) Awareness of professional trends and new professions.
2) Personal characteristics: interests, values, development level of universal and professional competences.
3) Level of emotional intelligence development.

4) Correlation of the direction of professional activity with academic performance and level of developing cognitive ability.

These factors determine a number of principles that underlie the choice of future professions (Kurbatova *et al.*, 2020; Parinova *et al.*, 2017; Hilko *et al.*, 2020; Savkina *et al.*, 2018, Nikolsky *et al.*, 2018):

1) The principle of conscientiousness, which manifests pursuit of the social good.
2) Principle of corresponding field of professional activity with interests and values.
3) Principle of activity, which relates to the optimum way of acquiring knowledge as well as the pace and way of life.
4) Principle of development, which implies consideration of the goals and areas of personal development.

By looking at the general principles of proforientation activities, it is necessary to analyze experience of early proforientation model, which is implemented in schools and kindergartens as part of "garden-school-university" seamless education concept. Already in the kindergartens, pupils are introduced to the types of professions and professional fields. Learning process is organized using socio-play technology as well as interactive learning formats. From the age of 3, bilingual programs enable pupils to expand their passive vocabulary and learn about phonetics in playful formats. The active expansion of passive vocabulary in the kindergarten and Primary year school allows to speak fluent English in high school.

In Primary grades, full-day education system offers the opportunity to study several elective modules in addition to the core curriculum (Table III).

TABLE III: TYPES OF MODULES IN THE SUPPLEMENTARY EDUCATION SYSTEM AIMED AT EARLY VOCATIONAL GUIDANCE

Types of modules	Disciplines
Technic Skills	3D modelling, Python programming, robotics
Art Skills	Architecture and design, art, painting
Mind Skills	Logic and Combinatorics, TRIZ
Health Skills	Taekwondo, psychology course "The Way to Success," health classes in the swimming pool, introduction to the principles of healthy lifestyle in the International Program
Language Skills	German, French, foreign literature
Social Skills	Basics of Financial Literacy, Social Sciences (in Eng)
Science Skills	Basics of Science, Biology (in Eng), Chemistry (in Eng)

In the second part of the day pupils can participate in the various activities and choose one of the elective modules. At the same time, if we compare basic and secondary general education with higher education, each module is similar to a major (a set of disciplines in undergraduate and graduate curricula that aim to develop certain professional competences). Each elective module includes several profile disciplines, the study of which involves an initial introduction to the professional field and the formation of a real positive or negative attitude to this field of activity, as well as the development of professional and universal competencies. Systematic study of the modules in primary grades helps to make the choice of profilization in the 5th–9th grades with selecting disciplines for in-depth study.

Comprehensive assessment of the quality of proforientation program consists of both the analysis of statistical data from student and parent surveys and consideration of the characteristics of class teachers, psychologists and tutors.

In middle school pupils are assigned to one of three profilizations (socio-humanitarian, medico-scientific or mathematical) with an in-depth study of individual disciplines. The organization of educational process in middle school is aimed at the development of universal competences according to 5C model: critical thinking, communication, collaboration, courage and creativity. In the 5th–7th grades, the emphasis is on developing the ability to work in a team, to follow timelines and to allocate and change roles competently depending on the tasks of the project. From the 5th year pupils take part in social projects in which they either work to solve ecological problem or help a social group: veterans, old people or children from hospices. From the 8th grade students take part in performing individual projects, and after the 9th grade undertake internships in the labs and departments of academic or industrial partners. In addition, 9th and 10th grades can develop their professional skills during summer internships at universities and companies.

Few words which were written above about project model correlate with the necessity of pupils to develop their professional skills and make their professional choice. For further modernization of the project model, it is useful to take into account the experience of project activities in higher education institution, it helps to get a more complex vision of the possible professional development path. At Moscow Polytechnic university (Nikolsky *et al.*, 2018), project activities are implemented with a focus on enhancing university-business interaction. In the traditional view collaboration between schools and universities are realized through the excursions or participating in the public lecture. In the innovative project model, which can be transferred from the universities to schools' excursions and mentoring by company representatives are stages of the project implementation (Fig. 2).

Implementation of the project, supervised by a teacher from the school and a company representative, allows pupils to deeply understand specifics of the work.

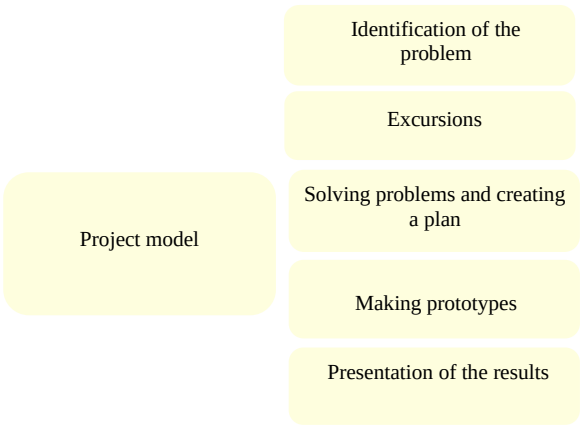

Fig. 2. Innovative approach in implementing the project model (Nikolsky *et al.*, 2018).

A separate description should be made of the system of vocational diagnostics which is already used during the entrance examinations. At the time of enrolment, parents participate in a questionnaire which allows them to create an individual map of their child's abilities using Haan and Kaffa methods. Pupils of the 7th and 8th grades participate in proforientation tests using Digital Human methodology (Kiselev *et al*., 2020). Digital Human methodology was developed by a team of authors (Kiselev *et al*., 2020) and allows to diagnose level of developing universal competencies, as well as cognitive functions, and to provide recommendations for creating educational route taking into account interests, values and preferred education types.

Proforientation test is organized with 3 steps:

1) Brief introduction into the peculiarities of proforientation test.
2) Performing proforientation test.
3) Discussion of the results.

There are 2 parts in the proforientation tests: in the first part all individual universal competences are estimated according to 1–100 relative scale. The competence matrix allows teachers to create an individual educational route taking into account those competences that require to be more developed.

At the moment, there are a lot of various proforientation models which are realized in schools and universities though it is possible to identify several unsolved problems: the problem of creating universal digital platforms as well as upgrading qualification of the teachers and tutors in the field of career guidance (Novikova *et al*., 2017; Mineev *et al*., 2018; Antonova *et al*., 2018; Blinov *et al*., 2015; Parinova *et al*., 2017). A system of tutoring and mentoring has been recently started in some organizations. At the university level, interest in this area has also increased in the last 3–4 years due to the emphasis on the development of individual educational tracks, as well as attempts to integrate the competency-based approach in the educational process. At the level of schools and colleges tutoring system is aimed at helping to determine the range of interests in a particular professional area, and the tutor does not act as an adviser, but helps to conduct a deep self-reflection with the help of questions (Ovsyannikov *et al*., 1999; Golerova *et al*., 2012). At the level of reorganization of staff politics, the task of training specialists as well as specialists with interdisciplinary knowledge in different professional fields and in project activities is relevant. The issues of organizing proforientation activities, as well as the criterion system for successful implementation of the set tasks should be adjusted for each region, taking into account territorial features and staffing needs.

Conclusions

The article analyses the most frequently used approaches for realization of the proforientation model in schools and universities. The real experience of the integration of the proforientation model in private school (Funscool) has been described. Within the system of additional education in the second part of the day, elective modules are implemented and include several disciplines which are aimed at forming an initial idea about certain professional areas, as well as at developing relevant universal and professional competencies. Among the tasks that need to be solved further are the tasks of raising qualifications of teaching staff in order to develop a mentoring service or improve tutoring support normalizing to the needs of the regions or other local areas.

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