Ilkogretim Online - Elementary Education Online, Year; Vol 20 (Issue 5): pp. 1360-1368
http://ilkogretim-online.org
doi: 10.17051/ilkonline.2021.05.150

Formation of a conscious choice of a career in medicine in school children and junior medical university students

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Abstract- The important challenge facing modern higher medical education is to ensure its continuity at all learning stages: school, university, postgraduate course. A conscious choice of a career is formed gradually, with active contribution from both – the individual under consideration and the immediate circle. Therefore, relying on self-motivation in students in view of the knowledge acquisition, it is necessary to create favorable external conditions to make an earlier decision as regards the career choice of becoming a doctor. The relevance of this research study is determined by the demand of pedagogics and higher professional education for further development and improvement in theoretical and methodological understanding of the substance and scope of the modern medical education, the system and model of its implementation, as well as the need for the new type of doctors as regards their qualities to practice clinical medicine. This paper presents and discusses the summary of results of the anonymous and voluntary survey conducted among the schoolchildren of grades 7 through 11 (151 people) and students of year 1 and 2 studying at Department of Medicine at St. Petersburg State University (118 people) in order to identify to what extent the awareness of attitudes towards the choice of a career in medicine changes among the students of different levels, and to analyse their keen, motivated and effective attitude towards the decision-making in view of choosing their future profession. The impartial assessment of aspirations and opportunities represents, in fact, the first and most important stage in the development of a young person as a future specialist. This study shows that the academic competitions for schoolchildren in medicine as one of the learning forms plays an important role in stimulating cognitive activity and awareness of choosing this profession. It is proved, that the design of higher medical education metasystem in course of the learning process at university includes the elaboration of the initial stage of medical education, i.e. at the pre-university stage.

Keywords: Medical Students, schoolchildren, motivation, career in Medicine, career guidance

I. INTRODUCTION

Modern higher education in general and medical in particular demands a keen interest in students towards their future career (Goodyear, 2009; Hassanet al., 2020; Kuriakoseet al., 2015). In 2017, the Russian Federation adopted the policy in the area of continuing medical and pharmacy education development. Among its fundamental principles lies the continuity and consistency across educational levels and stages to ensure the development of competence from the theoretical basis to the skill mastery and hands-on experience, and from the demonstration of self-esteem in professional activities to the evolution of the work-related acumen (Order of the Ministry of Health of the Russian Federation No.926, 2017).

Education, as it is known, renders two main functions: for one part, it responds to the social need of the state and nation, and for the other part, it corresponds to the aims, interests and aptitudes of any particular individual. Only the orchestration of these functions can contribute to the refinement of education. Enhancement of the professional education is not only a challenge for colleges and universities. Continuing medical education can and should start with mainstream schools by building up personal cognitive activity in students. Formation of the systemic and holistic knowledge of world and man in school graduates represents, in fact, initial but the most important stage in the process of medical education.

The new approach to organization of the higher medical education calls for the creation of mechanisms to implement purposeful search, career guidance and continuing training of personnel even at the pre-university stage. Ways to provide substantial assistance in passing this stage for the schoolchildren

oriented towards the field of biomedical sciences can be accomplished through diverse directions: by improving school education in natural sciences; by opening schools and preparatory medical courses designed for a career in biomedical sciences; by involving students into the research carried out by higher educational establishments or research institutes; by holding academic competitions (Petrovet al., 2007). Thus, for instance, the main objectives of various competitions for schoolchildren held by St. Petersburg State University are to identify and develop creative abilities in gifted children, and promote their interest in research activities. The university is interested in shortlisting bright, motivated, talented and non-standard categories of applicants.

In general, and for obvious reasons, it is not particularly difficult for schoolchildren to reveal their abilities and capabilities in the Russian language and literature, mathematics, physics, biology, chemistry, history and other subjects, i.e. these subjects are standard in the school curriculum. Nonetheless, an aptitude for any particular school subject is regarded a profession-oriented interest.

However, the decision to devote oneself to medicine is often associated with the motives beyond traditional school education. Among them, there is an abstract desire to help people; the influence from the adults who are authoritative for a teenager (relatives, acquaintances); a serious or incurable disease of close relatives causing an understandable need to learn how to overcome it and, at least in the distant future, to help the sick; or sometimes triggered by an odd situation like some favorite TV series about practicing doctors.

Applicants should realize correctness of their choice of career in medicine and seriousness of their motivation not at the stage of submitting documents to the admission committee at any particular higher educational establishment, but well in advance during their school years. The relatively high dropout rate of students during their studies at medical universities apparently proves not only the initial inability in such students to master the academic curriculum. In addition, the cause of failure can be that after a year or two of studying at the medical department students understand that they made a wrong choice, and the interest in learning is lost.

Thus, it is possible to assume that creating conditions for a conscious and motivated choice of the doctor's qualification is best possible with the continuity and succession of education at all stages: school, university, postgraduate course. The conscious choice of the career is formed gradually, with active participation of both the individual in question (their motivation), and the immediate circle. Motivation is one of the centerpiece issues of the personality psychology and the learning psychology. One of their functions is to motivate and direct activity, and represents the result of analysis and assessment of alternatives, choice and decision-making (Leontiev, 2005; Wouterset al., 2017). At each stage, it is possible to influence the formation of motivation to master further the insights into a career in medicine.

Objectives

The purpose of this research paper is to assess and analyze how the awareness of attitudes towards the choice of the career of a doctor changes among the schoolchildren and junior students at Department of Medicine (St. Petersburg State University). Inasmuch, the formation among students of different levels of a dynamic, engaged and impactful attitude towards the choice of their future profession, and objective assessment of their desires and aptitudes, becomes, in fact, the first and most important stage in the development of a young person as a future specialist.

II. MATERIALS AND METHODS

The methodological framework of the research comprised the studies of cross-subject and integrated lines of approach to the solution of learning and upbringing problems and coping with the challenges of secondary and higher professional education. We used the achievements in the field of research methodology of the modern integrated pedagogical problems revealing the specifics of systemic, personalized, acmeological kinds of approach to deal with general problems of the present-day medical education.

This research employed the psychological verbal communicative method by means of which a purposefully designed survey was introduced to gather information from the participants, i.e. the questionnaire to assess the principles of choosing a career in medicine in general and a particular medical specialty, in part among senior schoolchildren and junior students. The self-prepared questionnaire included 8-10 categorical questions with multiple-choice responses.

A cross-sectional study (survey) was conducted on the schoolchildren of grades 7 through 11 (151 individuals), the participants of the academic competition for schoolchildren The Road to Medicine held by St. Petersburg State University, and those who attended the Doors Open Day of Department of Medicine at St. Petersburg State University. They answered the paper questionnaire during and after the

events. For students of years 1 (at the end of their 2nd semester) and 2 (at the end of their 4th semester) of Department of Medicine at St. Petersburg State University (61 and 57 people respectively), paper questionnaires were distributed after seminars. The survey was administered in 2018/2019 years and was conducted anonymously, and on a voluntary basis. Informed consent from the students and schoolchildren were obtained. In the case of this study the ethical approval was not required. All data are summarized as percentages and are illustrated in the figures and tables.We also analyzed students' comments when answering the questionnaire.

III. RESULTS

The results of the survey covering the questions common to all participants are given in Table 1. When asked about the choice of medical education, the majority of the surveyed schoolchildren answered that this career would allow them to take part in solving the major problems of humanity (grades 7 through 9: 43.8%; grade 10: 51.8%; grade 11: 68.4%). In the own-answer option, the schoolchildren of grades 7 through 9 specified that they were interested in this profession; among the schoolchildren of grades 10 and 11, the leading answer was the desire to help people. Some schoolchildren of grade 11 expressed their hope for self-empowerment. The students of year 1 and 2 also prioritized the opportunity to participate in managing the most important issues of humankind (49.2% and 45.6% respectively). Nonetheless, there is certain awareness of demand for the career under consideration, increase in motivation for one's own choice that is explicit through the variety of proposed answer options (31.1% for year 1, and 43.8% for year 2).

Table 1. Survey results

Answer options		**Total of participants (%)**				
		grade 7-9	grade 10	grade 11	year 1	year 2
Why did you decide to pursue a career in medicine?						
I believe that acquiring the medical background will allow me to take part in solving the most important and relevant issues of humankind		43.8	51.8	68.4	49.2	45.6
I keep up the family tradition		25.0	24.1	7.8	16.4	7.0
My friends are studying towards a career in medicine; there was a medicine major class at school		0.0	0.0	1.4	3.3	3.6
Own answer		31.2	24.1	22.4	31.1	43.8
Which medical specialty is most attractive for you?						
Surgeon		62.5	55.2	39.5	34.4	26.3
General practitioner		0.0	10.4	13.2	6.6	12.3
Dentist		6.3	17.2	3.9	0.0	0.0
Other/I don't know		31.2/ 0.0	17.2/ 0.0	43.4/ 0.0	11.6/ 0.0	48.6/ 15.8
How willing are you to communicate with a sick person?						
Are you squeamish	Yes	12.5	20.7	13.0	21.3	19.2
	No	87.5	79.3	87.0	78.7	80.8
Are you able to listen to a patient attentively	Yes	100.0	100.0	97.0	95.1	96.5
	No	0.0	0.0	3.0	4.9	3.5
Are you ready for a physical examination of a patient (palpation, etc.)	Yes	100.0	96.5	99.0	95.1	86.0
	No	0.0	3.5	1.0	4.9	14.0
Are you ready support a patient psychologically	Yes	100.0	100.0	92.0	95.1	80.7
	No	0.0	0.0	8.0	4.9	19.3

The matter of choice as regards the medical specialty demonstrated the extended knowledge of this field in schoolchildren. Thus, in grades 7 through 9 the choice of becoming a surgeon was 62.5%, 55.2% in grade 10, 39.5% in grade 11. At the same time, the list of specialties offered by the schoolchildren increased from 5 to 15. In senior grades, the schoolchildren already demonstrated awareness of the

specialties as follows: psychiatrist, neurologist, dermatologist, neonatologist, infectious-disease specialist, obstetrician-gynecologist, oncologist, endocrinologist, ophthalmologist, cardiologist, and fertility specialist.

During their professional training at the state clinical hospitals of St. Petersburg, the students work in various departments (therapeutics, surgery, neurology, cardiology, urology, traumatology, etc.). This allows them to get a deeper insight into their future profession. This increases their motivation to choose a medical specialty. The students consciously approach the solution of this matter. Therefore, the interest of becoming a surgeon naturally decreases (34.4% in year 1 and 26.3% in year 2); and the answer 'I do not know' appears (15.8% among the students of year 2) alongside a firm decision of becoming a doctor. The 'I do not know' answer may have to do with a variety of choices.

Unfortunately, the specialty of a general practitioner is not popular among the schoolchildren, regardless of the fact that this doctor is most familiar to them. The junior students are also not interested in pursuing a general practitioner career: no more than 13% choose it. In the questionnaires, no one suggest the category of a family doctor specialty, which can be explained by low awareness or unwillingness to choose this specialty. It is possible that due to the fact that in their circle as patients or from their relatives they constantly hear criticism towards local general practitioners.

The schoolchildren's answers, regardless of their age, to the question of their willingness to communicate with a patient were positive. The undergraduate students are also ready to communicate with the sick; still the perception of a sick person changes with experience. Likewise, confidence in choosing a future career also changes, with a positive answer given by 75.4% of year 1 students decreasing to 61.4% among the students of year 2. The response rate as regards the answer 'I will see how it goes' increases (19.7% and 28.0% respectively). The vast amount of the academic medical training at medical university in junior years does not yet allow the students to work in hospitals simultaneously, and this to some extent reduces the chances for them to expand their perception of a practicing clinical doctor.

Studying at the university contributes to better understanding of the challenges of medical profession, and the amount of the required knowledge and skills. All that is expressed in a more judgmental appraisal of one's readiness to work independently. While 59% of year 1 students consider themselves ready to work as a doctor, 71.9% among the students of year 2 have doubts or admit they are not ready for an independent work. This answer is predictable since they are not yet familiar with clinical specialties, and this represents an increased motivation to acquire professional knowledge.

The choice to pursue a career in medicine among the schoolchildren gets more complicated because of the lack the real-to-life concepts thereof. However, according to the survey, the most familiar specialty of a general practitioner does not appeal to the schoolchildren.

The survey also proved that participation in the academic competitions in medicine contributes significantly to the formation of motivation in the schoolchildren in view of their career choice.

The survey results show that the main objective among the participants of the academic competitions for schoolchildren The Road to Medicine was to assess the depth of knowledge and competence (68.8% for grades 7 through 9, 55.2% for grade 10, and 71.1% for grade 11) (Figure 1).

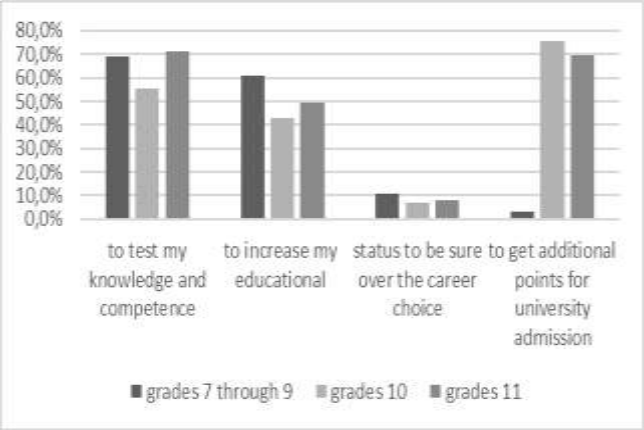
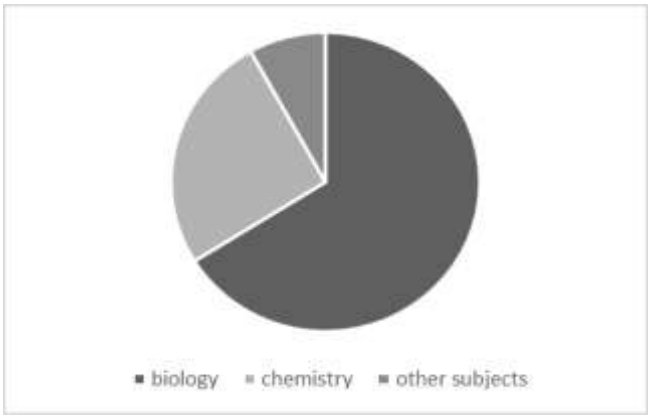


FIGURE 1. Total of answers to the question: For what reason did you take part in our academic competition?

In addition, the senior schoolchildren stated that their important objective was to get additional points for admission to a medical university (75.8% for grade 10, and 69.7% for grade 11). Most often, the schoolchildren interested in natural sciences take part in the academic competitions in biology and chemistry at various levels. Figure 2 shows the level of participation in academic competitions in these subjects among those who took part in The Road to Medicine competition.

FIGURE 2. Involvement of the schoolchildren who took part in The Road to Medicine competition in other academic



competitions

Among the schoolchildren, who took part in our survey and who attended the Doors Open Day of Department of Medicine at St. Petersburg State University, only 23% took part in the academic competitions in medicine (Figure 3).

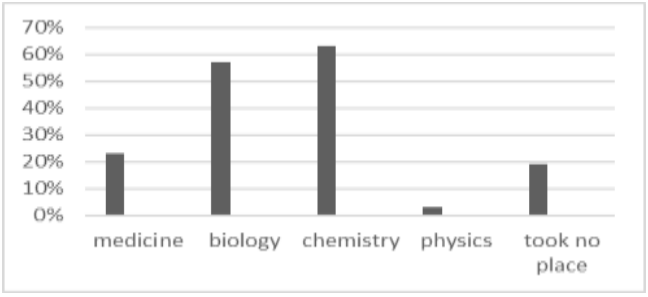


FIGURE 3. Involvement of the schoolchildren who took part in The Road to Medicine competition in other academic competitions

Among the students of junior years at Department of Medicine at St. Petersburg State University, 56.7% took part in the academic competition for schoolchildren in biology, and 30.5% in medicine prior to their admission to university.

IV. DISCUSSION

It is noteworthy that the conscious choice in view of medical education is a problem relevant not only for our country, as discussed in the research papers by foreign scholars (Al-Hemiaryet al., 2017; Gąsiorowskiet al., 2015; Kusurkaret al., 2013; Kusurkaret al., 2011; Millanet al., 2005). Goel S. et al. (2018) point to the importance of identifying factors that motivate students to choose medical education, since as per the World Health Organization (WHO) there is a shortage of health specialists in all countries. The problem of the dearth of doctors, including the Russian Federation, is the subject of topical discussion in the research sources (Artiukhov et al., 2017; Girasek et al., 2011; Rozsnyai et al., 2018). The choice of medical education depends on many aspects, and it is not only a desire to help others, but also good job opportunities (Hassanet al., 2020). In the past decade, the significant progress was achieved in various fields of medical science: from preventive and patient care to treatment of serious diseases and palliative medicine. The development of state-of-art technologies in medicine requires training of high-level specialists (Goel et al., 2018).

Shankar N. et al. highlight that today the professional burnout is a significant and growing issue among healthcare specialists indicating that enthusiasm gets replaced, somewhere along the way, by pessimism (Shankar et al., 2013). Their research showed that the majority of the surveyed year 1 students came to the decision to pursue a medical career during their school study before grade 10 (final school year), and, at the same time, revealed a low awareness in schoolchildren of the curriculum at a medical educational establishment alongside the complexity of mastering this profession, and unrealistic perception of medical practice at the later stage. This gap between expectations and reality can lead to disappointment in the chosen career (Shankar et al., 2013). The authors emphasize the need to provide extensive advice to the schoolchildren before they make a critical decision to pursue a career in medicine. Bugaj T.J. et al. (2020) analyzed the psychosocial burden and relevant prevention strategies for GPs with a special emphasis on GP trainees. Regardless of the specialty, burnout is more prevalent among medical trainees and so-called 'early career' physicians than among the age-matched population.

Our research also proves that the decision to choose a medical profession does not occur in the final school year. Children are getting ready to choose this professional field as early as at secondary school (grades 7 and 8). Holding academic competitions also contributes to the decision-making. Studying for the competition allows achieving several goals, which, unfortunately, is not always given enough consideration at school. First, we state that the major attention in the school curriculum is paid to presentation of the vast amount of information without proper generalization in a systematic way (the main aim of today's senior schoolchildren is to pass exams successfully). In the meanwhile, the participants in academic competitions are required not only to possess compulsory knowledge in any particular subject, but also to be able to demonstrate high level of reasoning, understanding of integrity, correlation and affinity of the living world. It is noteworthy that academic competitions provide students with the opportunity to test their knowledge and competence in relevant fields. This allows participants to gain confidence in their abilities (or, the other way round, to conclude that medicine is 'not my department').

The organizers of academic competitions in biology at different universities draw attention to insufficient training of schoolchildren in such scientific fields as human physiology, genetics, cytology, molecular biology, etc. (Efimova et al., 2019; Voloshina, 2010). The difference of the academic competitions in medicine is that, based on the school curriculum proficiency, they comprise additional scope of fundamental subjects that will be further studied at a medical university (Bakovetskaya et al., 2018).

In order to train the schoolchildren for each stage of academic competitions, the teachers at St. Petersburg State University annually offer online lectures with a detailed analysis of a variety of tasks. The textbooks Medicine from the series Academic competitions at St. Petersburg State University offer a selection of self-study tasks for any level of students (Astratenkovaet al., 2019). This type of activity develops educational and cognitive activity in schoolchildren. The creative tasks help participants to train skills in analysis and generalization of phenomena and facts, to establish cause-and-effect relations in the structure and functionality of cells, tissues, organs and organisms, and their correlation with each other and with the ambient conditions.

The academic competition in medicine at St. Petersburg State University is designed for participation of the schoolchildren starting from grade 7. That contributes to consistent expansion of specific medical knowledge and increased motivation in choosing the profession of a doctor. It is very important, in the authors' opinion, that according to the schoolchildren (regardless of age group), the main goal of taking part in the academic competitions held at St. Petersburg State University represents the 'increase in interest in pursuing the career in medicine' along with 'advancement in educational background' and 'expansion of the reasoning capacity'. The academic competition in medicine comprises tasks focusing on medicine; they are designed in consideration of the cases that the practicing doctors deal with; and the easily understood medical terms are used. All that allows the schoolchildren to comprehend their future profession.

The participants of academic competitions possess the better-developed cognitive motivation, which is self-motivation. In final school years, the external motivation also contributes to the choice of a career in medicine: strong determination to enter a medical university; therefore, the schoolchildren expand their knowledge willingly, which is facilitated by taking part in academic competitions. Successful participation in academic competition forms additional positive external motivation, which further stimulates the desire to study better and acquire professional skills. Another significant aspect of taking part in such events is the reduction of excessive unwanted emotional reactions (psychological stress, excitement, stress, etc.). Among the main differences that exist between the mainstream schools and higher education establishment lies insufficiency in development of independent management of own activities in students. In the meanwhile, the higher education specifics is, indeed, the independent activity of students. Formation of the persistent cognitive need in students is inextricably linked with the independent work.

The academic competitions offer an excellent opportunity to fill the existing gap as regards personal growth in students.

When studying at a medical university, students are incorporated into the curriculum activities related to their future profession: student scientific communities, inter-university academic competitions in clinical subjects, scientific conferences, master classes, etc. (Azami-Aghdashet al., 2016; Balakhonovet al., 2017; Hoenig, 2015). Therefore, their motivation to master professional competencies grows naturally. In the process of learning activities, there is a significant expansion of the amount of needs for knowledge in students and, consequently, the development of their motivational sphere (internal motivation). Discussing the problems of success in the learning process, Agranovich N.V. and Knyshova S.S. (2015) draw attention to various motivational factors: for some, it is the desire to master professional skills and abilities, and for others, it is the desire to obtain a diploma in higher education in order to satisfy their own ambitions. Therefore, the authors emphasize the need for formation of cognitive interest in the chosen caree, a combination of educational and hands-on training activities to prepare medical students for their future independent work. In our research study, the number of students who consider themselves unprepared for independent work rises in year 2 if compared to year 1. Moreover, this definitely can be justified, for one part, by the added knowledge, but also, for the other part, just as by its insufficiency. This situation stimulates the need of medical students for further education. Changes in employment conditions for the graduates from medical universities, i.e. 3 years of work in a healthcare organization providing primary health care after which the graduates have the opportunity to continue their professional activities as medical specialists, boosted interest in research on readiness of the senior students to work independently. In the aftermath of questioning the graduates of eleven medical universities in the country, V.O. Korsak and co-authors (2018) note that 62.9% of the respondents do not consider themselves sufficiently prepared for independent work. The research carried out by the authors revealed that the reason for low assessment of one's professional capacities is associated with the level of intrinsic motivation. Graduates who consider themselves ready for independent professional practice in healthcare are actively engaged in self-education (they attend conferences, student scientific communities, study specialized literature, and consult the Internet resources). Thus, the internal motivation in students to acquire knowledge is compulsory when it comes to improving their professional level.

V. CONCLUSIONS

Our analysis of the trends in formation of a conscious, keen and impactful attitude towards the choice of the future career in medicine in the schoolchildren and junior students showed how the impartial assessment of desires and opportunities in development of a young person as a future specialist changes, and how the answer about choosing a medical specialty varies with age.

It is demonstrative, in the authors' opinion, that the significant part of schoolchildren is ready to answer the question 'For what reason did you take part in our academic competition' not only from a purely practical standpoint, but also to demonstrate the ambition to test their knowledge and competence, raise their educational level, and be sure to make the right career choice. This assumption is supported by the opinion of schoolchildren, i.e. they see the ultimate goal when taking part in the academic competition in medicine in the direction of self-development. Again, we would like to highlight, that participation in the academic competitions contributes to disclosure of individual abilities and creative potential in young people, and to formation of skills to take independent decisions. Therefore, these academic competitions serve as a good springboard for significant expansion of the range of knowledge needed for the students-to-be and, therefore, for development of their motivation to learn. This, in fact, acmeological approach in education focuses on development of internal reserves and mechanisms of human self-improvement in learning activities: motivation towards making achievements, self-development, creativity, and visualization of professional practices.

Referring to our long-term teaching experience at Department of Medicine at St. Petersburg State University and the survey's results, we believe that in the changing world of today, the schoolchildren interested in medicine should take part in academic competitions in this subject matter as early as possible, starting from grades 7 or 8. In such a case, upon graduation from grade 11, they will possess considerable motivation and specific knowledge to build confidence in making the right career choice.

The obtained results highlight the importance of continuity of the pre-university and university training for the doctors-to-be. Emphasizing the scope and subject-matter for the purposes of the continuing educational process as regards the provision of optimum conditions for students to develop the forward-looking, flexible and systemic thinking towards natural science and clinical practice intensifies active contribution on the part of the young people themselves, being subjects of the educational activity, and

their self-development. In doing so, particular organizational and pedagogical conditions are outlined to ensure continuity of the medical education at the school-university levels, which represents the modern aspect as regards the improvement in professional training quality.

The research data and its outcome can be used in the context of further empirical and applied research to design the organizational and curriculum models as regards the career guidance activities for schoolchildren, and the educational process in the present-day medical universities, implementation of the pedagogical support for career guidance aiming at developing the concept of quality advancement in medical university training.

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