

Research Article

Alexander Popov*, Mikhail Melnikov, Mikhail Averkov

Socio-Professional Self-Determination of Students: Development of Innovative Approaches

<https://doi.org/10.1515/edu-2025-0070>

received May 30, 2024; accepted March 21, 2025

Abstract: Contemporary challenges facing secondary education graduates highlight their disorientation regarding professional self-orientation. Prospective professionals lack the knowledge and skills for a conscious understanding of their position on the professional platform. Simultaneously, the growing significance of technology in education globally underscores the high necessity for its fundamental integration. The aim of this study is to assess the impact of an innovative model of professional self-determination development on the professional readiness of graduates from Secondary School No. 1536 of the Moscow City Education Department. The approach involved the implementation of an author's program aimed at enhancing professional readiness, based on a theoretical module and practical training, utilizing accompanying innovations such as massive open online courses, social networks, and interactive learning. The results of the intervention were measured through an analysis of indicators of professional readiness before and after program implementation. The data indicate the effectiveness of the developed program in improving professional self-awareness. The intervention group improved their indicator values from 38.82 to 61.9. Analysis of the *F* values indicates a change in experimental values postintervention. The observed changes are confirmed by significant differences in

the *F* value compared to the critical value (more than 27 times).

Keywords: career, career guidance, digital tools, profession, professional self-determination

1 Introduction

Today, youths are confronted with boundless opportunities in choosing their professional paths. Before them unfolds a vast world replete with diverse professional sectors, giving rise to exciting prospects but also unpredictable challenges (Wegemer & Eccles, 2019). Among these factors, one can consider the diversification of large-scale productions and the outsourcing of significant production functions to small firms, a critically significant increase in the share of intellectual developments in value creation, the formation of networked forms of co-organization in both public life and cultural communications, as well as in production activities, and the affirmation of the concept of human rights as a fundamental guide for sociopolitical and overall societal development (Bertrand, Mogstad, & Mountjoy, 2021). These enumerated factors have facilitated the emergence of a contemporary humanistic worldview, within which, in turn, the definitive formulation and widespread dissemination of the category of "self-determination" has occurred.

Self-determination in education inherently involves the construction of a student's position, the development of an individual stance towards activities, and, overall, one's life path; it requires the ability to act in a project-oriented manner (Landersø & Heckman, 2017; Popov, 2016). Professional self-determination, in contrast to the previously accepted approach of professional orientation, inherently involves the conscious construction by learners of their educational position and trajectory of advancement, concurrent with the development of corresponding competencies (Piatushkou, 2019). The youth are confronted with a world of high technologies, space discoveries, and changing economic realities. These possibilities broaden horizons also present a puzzle in decision-making (Averkov, Vishnevskaya, Glukhov, & Popov, 2022; Piesch, Gaspar, Parrisi, Wille, & Nagengast, 2020a).

* Corresponding author: Alexander Popov, Education Research Laboratory, General Academic Department, Russian Presidential Academy of National Economy and Public Administration, Prospekt Vernadskogo, 84, p. 1, Moscow, 119571, Russia; Department of Pedagogical Technologies in Continuous Education, Moscow City Pedagogical University, Moscow, Russia; Department of Sociology and Mass Communications, Faculty of Humanities, Novosibirsk State Technical University, Novosibirsk, Russia, e-mail: a.popov@gmx.com

Mikhail Melnikov: Department of Sociology and Mass Communications, Faculty of Humanities, Novosibirsk State Technical University, Novosibirsk, Russia

Mikhail Averkov: Laboratory of Modern Forms of Work with Highly Motivated Students, Krasnoyarsk Regional Institute of Education Development, Krasnoyarsk, Russia; Education Research Laboratory, General Academic Department, Russian Presidential Academy of National Economy and Public Administration, Moscow, 119571, Russia

The contemporary transformations not only reshape the dynamics of employment but also influence trends in the professional self-determination of today's youth (Birkelund & van de Werfhorst, 2022). The COVID-19 pandemic has defined new trends in work practices. Remote and hybrid work models have become the norm, altering traditional approaches to work organization and team relationships. In this context, the adaptation of career guidance measures and youth support models may not fully align with these challenges (Hite & McDonald, 2020). Instead, there is a shift toward professional self-determination, characterized by the deliberate construction of one's professional trajectory, taking into account the opportunities and constraints shaped by the socio-economic and socio-cultural context (Popov & Ermakov, 2020). Individuals must be prepared for continuous learning and adaptation to technological innovations (Appelbaum, 2023).

The development of digital skills, flexibility, and the ability to adapt are becoming key factors in choosing a professional path. Many young people face challenges in accessing adequate and up-to-date information about various professions and their prospects. This can lead to a limited understanding of opportunities and the selection of a path that does not align with their interests and abilities (von Wachter, 2020). In addition, sociocultural stereotypes complicate the process of professional orientation. Traditional notions of which professions are suitable for women or men, or which fields are prestigious, can restrict the choice and personal development (Numonjonov, 2020). Furthermore, the diversity of paths can lead to indecision and stress. The inadequacy of the previous approach of "professional orientation" and simultaneously the weak methodological and technological support of the current approach to professional self-determination result in significant deficits in the selection of a preferred profession by adolescents and high school students (Afanashev, Kunitsyna, & Nechaev, 2019; Bergmark, Lundström, Manderstedt, & Palo, 2018).

The implementation and management of innovations hold significant potential as a tool, alternative, or means for changes in career guidance (Cruess, Cruess, & Steinert, 2019; Shcherbakova *et al.*, 2024). The establishment of effective mechanisms of informational support, such as online platforms and professional consultations, can ensure access to comprehensive and up-to-date information (Ng *et al.*, 2017). The effective integration of flexible and innovative approaches to career guidance will contribute to minimizing the negative effects of digitization and interaction with digital tools. By encouraging individuals to explore various career paths, a space is created for the development of their potential and a deeper understanding of the specificity of their personality (Levels, Van der Velden, & Di Stasio, 2014).

1.1 Literature Review

Professional self-determination is a process in which an individual selects a profession that aligns with their natural abilities, interests, and values. This definition originates from the conceptual career self-determination model of Holland. Holland's theory of vocational preferences identifies six personality types and the corresponding vocational environments: realistic (R), investigative (I), artistic (A), social (S), enterprising (E), and conventional (C) (Holland, 1997). On the other hand, Donald Edwin Super (Super, 1976) viewed professional self-determination as a process in which an individual develops their professional goals and formulates career plans. The scholar asserted that professional self-determination is not a one-time decision but a lifelong process. He delineated six stages of professional self-determination:

- Identification with adults (0–4 years): The child begins to identify with significant adults in their life, such as parents, teachers, and other family members.
- Imitative play (4–10 years): The child engages in role-playing various professions to understand their preferences and aspirations.
- Early career awareness (11–16 years): The child starts acquainting themselves with different professions and their requirements.
- Career exploration (17–24 years): The young individual begins experimenting with various professions and career paths.
- Establishment of professional identity (25–44 years): The person starts developing their professional identity and making decisions about their career.
- Professional stability and transition (45 years and beyond): The individual continues to develop their professional identity and adapt to changes in the labour market (Lavrentiev, 2022; Super & Kidd, 1979).

Lectorsky (2023) delineates two approaches to defining activity. The activity-oriented approach regards activity as the central category of psychology. Activity is understood as a purposeful, motivated, regulated, and controlled system of interconnected actions directed toward achieving a specific outcome. The cognitive approach, developed within cognitive psychology, views activity as a process of cognition and information processing. Cognitive theorists emphasize the role of cognitive processes, such as memory, thinking, and attention, in regulating activity. Simultaneously, research indicates the interaction of these two approaches for a more accurate vector of professional self-determination (Popova, Nakhabina, Ushakov, & Dolgova, 2022).

There are several approaches to professional self-determination. Baiborodova, Yakovleva, Seroshetko, Bakhtigareeva,

and Kovaleva (2021) examine professional self-determination from three perspectives. The diagnostic approach identifies key personality traits of students for effective professional self-determination. Research indicates that affective self-assessment, rather than cognitive, has the greatest impact on students' readiness for professional choice. The primary emphasis is placed on creating favourable conditions for the development of these traits (Choy & Yeung, 2022). The consultative-pedagogical approach aims to assist students in choosing the teaching profession and developing their professional knowledge, skills, and abilities. Methods such as individual and group consultations, training sessions, workshops, and others are employed for this purpose (Kormakova, Musaelian, & Ruziyeva, 2017). The professionally oriented approach focuses on developing students' professional competencies necessary for successful pedagogical activities. This approach emphasizes the interaction of an individual with real professional opportunities and labour market requirements. Various forms and methods of education are utilized, including project activities, practice in educational institutions, and others (Soboleva, Suvorova, Zenkina, & Bocharov, 2020).

On the other hand, it is worth noting the “relevant intervention method.” It represents a system of pedagogical actions that allows demonstrating to students the significance and prospective nature of specific subjects (such as mathematical disciplines, and natural sciences) and the professional spheres associated with them or in demand by them. For instance, Egorenko (2022) considers the relevant intervention method an effective means of assisting youth in career selection. It enables young individuals to acquire necessary information, understand their interests and abilities, develop a plan for professional development, and enhance self-confidence. However, the methods of “relevant intervention,” while representing a significant advancement from mere “informing” about current professions, do not inherently involve students constructing their positions and engaging in project-organized trial actions (Golsteyn & Stenberg, 2017).

A valuable trend in recent years in international educational practice is the engagement of professionals from the real economic sector in educational activities. The purpose is not only to demonstrate the fundamental methods and models of their activities but also to showcase to students the image of a successful professional, thereby motivating them to pursue a relevant field (Giunipero, 2020). This experience is presented in several scholarly publications, specifically by Birkelund and van de Werfhorst (2022) and Karlsson and Noela (2022). However, there is currently a lack of specific methodologies and, more importantly, didactic principles based on which representatives of the real economic sector could organize their work with students. A key sociomanagerial condition for ensuring professional self-

determination is the establishment of productive collaboration with organizations in the real economic sector, acting simultaneously as clients and co-organizers of students' trial-productive actions (P'yankova, 2021).

1.2 Research Objective and Tasks

The scope of the research encompasses the study of mechanisms and strategies for students' professional self-determination in the context of contemporary challenges in the labour market and education. It is aimed at developing innovative approaches to assist graduates in adapting to rapid changes and effectively integrating into the professional environment. The relevance and appropriateness of the chosen research direction are grounded in several aspects. First, professional self-determination serves as a fundamental cornerstone for personal growth. Second, studying professional self-determination holds an advantage in the context of making effective career choices. Therefore, the aim of the study is to assess the effectiveness of an innovative model for developing professional self-determination to enhance the professional readiness of higher education graduates.

Research Objectives:

1. To assess the level of professional readiness among eleventh-grade students of the State Budget Educational Institution “School No. 1536” in Moscow.
2. To develop an innovative program to enhance the professional self-determination of participants in the experimental group.
3. To determine the impact of the developed program on the level of professional readiness among the participants.

In the context of this study, the following hypotheses were formulated:

H0: The current model for improving professional self-determination will not have an impact on the professional readiness of graduates.

The alternative hypothesis is:

H1: The current model for improving professional self-determination will enhance the professional readiness of graduates.

2 Methods and Materials

2.1 Study Design

The study consisted of several stages. The research was conducted during the academic year 2023–2024. The phased model of the conducted experiment is presented in Figure 1.

During the survey stages, respondents were interviewed regarding their professional readiness and determination in choosing a profession. The methodology by Chernyavskaya (2013) was employed for this purpose. In the context of the current experiment, the questionnaire was chosen because it is relatively new compared to older methods, and reliability measurements demonstrated favourable results. In addition, it is comprehensive, assessing five crucial factors influencing readiness for choosing a profession. The questionnaire consists of 99 questions with dichotomous response forms (yes or no). It is structured into five scales (Figure 2).

Thus, each correct answer was assigned 1 point. The maximum score was 99. The grading of scores into three levels is as follows:

Low level – from 0 to 32 points

Medium level – from 33 to 65 points

High level – from 65 to 99 points

The survey lasted for 1 h and was conducted online using Google Forms.

The advantages of the methodology lie in its ability to provide an in-depth analysis of various aspects of professional readiness, its adaptability to an online format, its clear structure, and its well-defined evaluation criteria. However, the dichotomous response format may fail to capture the nuances of respondents' opinions. In addition, the questionnaire requires a high level of motivation from respondents due to the extensive number of questions. Overall, the methodology facilitates a comprehensive understanding of young people's readiness for professional decision-making and identifies strengths and weaknesses that can be considered when designing development programs.

At the next stage, an original program for professional self-determination was implemented within the experimental group. The program spanned 12 weeks, with 1 h sessions scheduled each week after regular classes. Each session focused on a specific aspect of youth professional self-determination. To develop the program, 20 instructors from Russian universities (educational, psychological, and philological faculties) were engaged. In addition, similar training programs on massive

open online courses (MOOCs) at Coursera were analyzed. The module topics are outlined below:

- Self-perception and skills analysis: Examination of the fundamentals of identifying personal strengths, weaknesses, and skills that may influence the choice of a professional path.
- Exploration of the job market: Investigation of contemporary trends in the labour market, identification of popular and growing industries.
- Educational opportunities: Exploration of various post-school education paths, including higher education, technical schools, and professional courses.
- Professional communities and networks: Introduction to communities and online networks that can support students in their professional development.
- Technology in professions: Examination of the impact of technological innovations on various professional fields and a review of future trends.
- Jobs of the future: Study of new job trends and changes in the nature of work, such as remote work and flexible schedules.
- Practical experience: Acquisition of skills and experience through internships, practice, or work visits.
- University admission preparation: Consideration of requirements for university admission, selection of specialties, and document preparation.
- Psychological preparation: Development of stress management skills, adaptation, and support for mental health in career decision-making.
- Entrepreneurship and business creation: Study of entrepreneurship basics and opportunities for starting one's own business.
- Specialized professional programs: Exploration of existing programs that can help acquire specific professional skills or qualifications.
- Professional self-organization: Development of self-organization, planning, and time management skills to achieve professional goals.

Throughout the sessions, practical training sessions were conducted on the use of specific digital tools. To accomplish

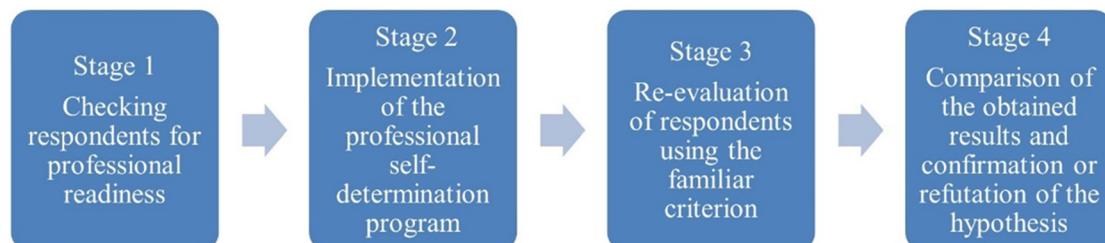


Figure 1: Stages of the conducted research.

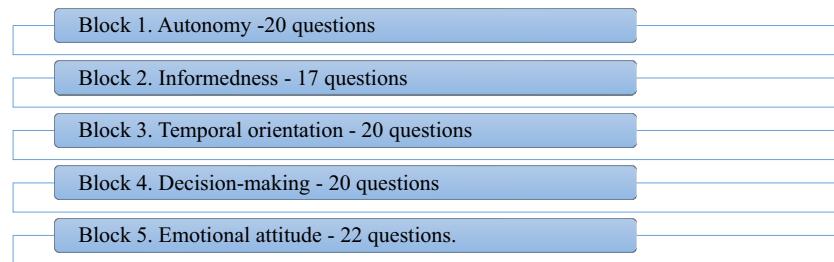


Figure 2: Questionnaire blocks.

these tasks, computer equipment, headphones, and so on were utilized. In addition, the work in modules involved interaction with applications or technologies. Specifically, job search websites, social networks (LinkedIn, etc.), artificial intelligence (ChatGPT, etc.), resume-building applications, Google Classroom, Microsoft tool suite, and MOOCs. The teaching process employed a variety of methods for group interaction, including brainstorming, business games, discussion, quizzes, free associations, colloquia, case studies, testing, brain rings, etc. The acquired tools and methods were tailored to the teaching needs of each proposed topic. Students also had four assignments related to preparing presentations or essays on assigned topics.

2.2 Sampling

To participate in the experiment, eleventh-grade students from the State Budget Educational Institution in Moscow, “School No. 1536,” were invited. In total, all three classes were involved, comprising 27, 32, and 29 students. Thus, the sample of respondents consisted of 88 participants. Gender distribution: 56% male and 44% female. The average age was 17.3 (standard deviation = 13). Among the selected respondents, 78% plan to attend a higher education institution in Russia, while the remaining 10% intend to study abroad. Of the respondents, 58 are entirely confident in their choice of profession. For the experimental conditions, the respondents were divided into two equal groups: experimental and control. An analysis

of the adequacy of the sample ($p = 4.67$) indicates that it is representative of the purposes of the current research.

Table 1 presents a more detailed description of the sample. School No. 1536 is located in an urban area of Moscow, offering access to modern resources necessary for the implementation of the innovative program. The socioeconomic status of the students is categorized as middle class, enabling their families to provide support during career selection. The gender distribution within the sample aligns with the national average for senior grades in Russia (51% male and 49% female). Both the academic performance and socioeconomic status of the students slightly exceed the national averages.

2.3 Study Analysis

The reliability of individual scales of the methodology ranges from 0.670 to 0.839, falling within an acceptable range for this type of instrument. The test-retest reliability ranges from 0.617 to 0.885. The questionnaire's reliability was also assessed using Cronbach's alpha version. After five sequential measurements, the average value was 0.86. Thus, the questionnaire is deemed reliable and optimal for the current research.

2.4 Statistical Tools

Following each stage of evaluation, the obtained results are compared, and a correlation analysis is conducted to

Table 1: Statistical comparison of groups

Parameter	Experimental group	Control group	Overall sample	Russia (national average)
Number of participants	44	44	88	—
Gender distribution (M/F, %)	55/45	57/43	56/44	51/49
Average age	17.2	17.4	17.3	17.5
Socioeconomic level (%)	Average (82%)	Average (78%)	Average (80%)	Average (75%)
Academic performance (average grade)	4.2	4.1	4.15	4.0

examine the relationship between the dependent variables (professional self-determination) and the independent variable (the model for improving career guidance). A unifactorial statistical test, ANOVA (analysis of variance), was performed. The analysis utilized the Pearson correlation coefficient in SPSS 2016.

3 Results and Discussion

The initial survey revealed a sufficiently high level of professional readiness among respondents in both groups (Table 2). Based on the obtained results, it is evident that the mean values for both groups converge within the range of average professional readiness. The majority of unsatisfactory responses from all groups were concentrated on the following items:

- B. 21 I will change jobs until I find what I need – 67%
- B. 30. I am afraid of situations where I have to make decisions on my own – 88%

B. 70. I consciously strive to achieve set goals – 90%.

Specific questions fall under the categories of information, autonomy, and planning. In addition, respondents with a very positive level of responses are categorized under the emotional domain. This suggests that at this stage, students, while having some understanding of their interests and values, are uncertain about their decisions regarding professional activities. After the implementation of the author's program and a subsequent round of measurements, the following results were obtained (Table 3).

The obtained results indicate an improvement in the examined metric within the experimental group (from 38.82 to 61.9). Overall, the least favourable values of the control group and the experimental group became less homogeneous. Representatives of the control group noted unsatisfactory responses in the categories of decision-making and awareness. Meanwhile, the highest number of such responses in the experimental group was observed

Table 3: Correlation analysis of responses (post-program)

	Experimental sample	Control sample
Mean	61.90909	42.43182
Variance	173.8985	26.99524
Observations	44	44
df	43	43
F	6.441821	
P ($F \leq f$) one tail	5.83×10^{-9}	
F critical one tail	1.660744	

at the level of question 12 (it has become a habit for me to think about what happened to me before) – 45% and 55 (emotions play a significant role in my assessment of professions) – 52%. The analysis of F values attests to a significant correlation of results between the two groups, indicating a shift in experimental values after the intervention. It is important to note that such an approach holds substantial relevance, considering that the next stage for graduates will be the selection of a more specialized educational institution, which will determine the trajectory of their future careers. Reinforcing the significance of this issue, it is noteworthy that the theoretical foundation upon which this article is based underscores the keen attention of scholars toward the professional self-determination of youth as one of the most influential factors impacting the professional success of future professionals. van Dorssen-Boog, van Vuuren, de Jong, and Veld (2021) confirm this in their study conducted within the medical field. They note that interconnected aspects of professional readiness determine several other indicators, including levels of self-control, work engagement, stress, and burnout. On the other hand, career identity plays a significant role in determining how career preparation actions influence markers of career progress. A strong belief in a special career calling, known as career calling, mitigates the mediating effect of career identity. This implies that the mediating effect of career identity is stronger for individuals with a strong career calling (Praskova, Creed, & Hood, 2015).

Moreover, it is essential to note that the unique differences among responses regarding components of professional identity highlight the importance of considering individual competencies. Taking a specific field, such as agriculture, into account, research demonstrates that despite analyzing professional self-determination, students with strong professional skills in agriculture are more likely to succeed in a career in this field. In addition, they typically derive more satisfaction from their work, attain higher salary levels, and demonstrate greater productivity (Gilyano & Tkach, 2021). Therefore, when developing interventions,

Table 2: Correlation analysis of responses (pre-program)

	Experimental sample	Control sample
Mean	38.818182	40.61363636
Variance	47.45454545	32.10306554
Observations	44	44
df	43	43
F	1.478193582	
P ($F \leq f$) one tail	0.102047983	
F critical one tail	1.660743744	

targeting higher education should also be considered. Individuals with academic education have a higher likelihood of employment and earning more compared to those with vocational-technical education. However, this gap diminishes with age. Individuals with vocational-technical education are more likely to continue working in middle age compared to those with academic education (Brunello & Rocco, 2017). This suggests the importance of a comprehensive and prolonged approach to self-determination. It might be worthwhile to assess the effectiveness of the current innovative program for long-term engagement. This is also a viable direction for potential research as there is a risk of exacerbating disparities between technological tools or habituation.

Significant shifts in the data of the experimental group are also underscored by the ANOVA (Table 4). The positive dynamics of the dependent variable resulting from the implementation of the model attests to the effectiveness of the current program in the context of developing professional self-determination among the experimental group of students. The observed changes are substantiated by significant differences in the F value compared to the critical value (more than 27 times greater). Thus, we observe the rejection of the null hypothesis within the framework of this study. Consequently, it can be asserted that the current model for improving professional self-determination will enhance the professional readiness of the graduates.

The developed program, in the context of this article, demonstrated positive shifts toward professional self-determination. However, these changes were not universal, as the majority of respondents remained at a high approaching level. There is a range of evidence and factors influencing significant improvement in this indicator, which may be associated with the duration of the course, the specificity of the sample, and the program's structure. These arguments are supported by the research of Andersen and Hjortskov (2022), who, in addition to the course duration, emphasize the importance of controlling social status and friends' opinions on matters of professional self-determination. An independent circle of individuals may push them toward forming subjective opinions conflicting with their inner aspirations. In addition, teenagers may influence their friends' expectations, feeling pressured to choose an education that aligns with their friends' expectations. Furthermore, the familial

environment remains significant in career choice matters. Piesch et al. (2020b) concluded that parental intervention is a promising approach to assisting parents in supporting their children's professional orientation. They suggest that future research should focus on replicating research results and developing interventions effective in improving adolescents' career-planning behaviour. Considering the specifics of this study, it should be noted that a potential limitation is the lack of control over the influence of external factors mentioned above on the expected outcome. This could be a significant area for further research.

Considering the use of innovative methods in professional education, it is noteworthy to mention their demonstrable effectiveness in the broader educational landscape. These methods can be beneficial for professionals in various industries, particularly those working in high-risk or time-constrained environments. The structure of secondary education in Russia comprises three levels: primary (grades 1–4), middle (grades 5–9), and upper (grades 10–11). The eleventh grade serves as the final stage before university admission. In upper grades, significant emphasis is placed on preparing for the Unified State Exam, which is a mandatory requirement for university entry. The implementation of the program demonstrated a positive impact on the development of professional self-determination within the experimental group. The results are significant within the context of School No. 1536 but are limited in generalizability to other schools due to contextual specificities. For instance, this school is a state institution located in the capital and benefits from high resource availability. To assess the program's generalizability, it would be advisable to conduct similar studies in schools from other regions, including rural areas. In the study by Numonjonov (2020), there is a significant potential for the implementation of innovative career guidance training. This particularly applies to blended learning, gamification, simulation-based training, and similar approaches. The developed training within the context of the current study incorporates research and interaction with digital tools such as AI, MOOCs, etc. Testing the alternative hypothesis provides evidence for the effectiveness of using these methods in activating the professional self-determination of high school graduates. However, there is a shortage of similar research, highlighting the substantial potential for further exploration in this field.

Table 4: Unifactorial ANOVA test

	SS	df	MS	F	P-value	F crit
Between groups	8346.011	1	8346.011	83.08881	2.87×10^{-14}	3.951882
Within groups	8638.432	86	100.4469			
Total	16984.44	87				

Furthermore, the analysis of the presented positions indicates insufficient attention from researchers toward this sphere, including considering the high volatility of the labour market in the face of global challenges. Inadequate integration of innovative approaches to professional self-determination contributes to the insufficient awareness of future professionals. In addition, it is worth noting the negative consequences of using certain resources for youth, distorting their perceptions of their skills and professional tendencies (Gilyano & Tkach, 2021). Individuals are motivated to develop their professional self-determination to control their careers, feel competent, and contribute to the world. Developing professional self-determination can lead to greater professional satisfaction, success, and fulfillment (Gilyano & Tkach, 2021). In this regard, the development of an effective program significantly contributes to shaping the professional self-determination of youth, as evidenced by examples in Russian schools (Alexander, 2023; Bodrova *et al.*, 2023).

3.1 Limitations

The study was conducted at a single educational institution in Russia. A single measurement methodology was used in defining readiness. The proprietary program spanned an unspecified period and focused on informing specific aspects of students' professional self-determination.

4 Conclusions

The results of the study enable the identification of the impact of an innovative model for the development of professional self-determination on the professional readiness of senior high school students. Eighty-eight graduates from the General Education Institution in Moscow, School No. 1536, participated in the experiment and were divided into two groups: the control group and the experimental group. Both groups were surveyed regarding their professional readiness using the methodology developed by A.P. Chernyavskaya. The participants in the author's module were a selective group of educators from the experimental group. The findings of this research point to the significant contribution of the innovative model for the development of professional self-determination in enhancing the professional readiness of graduates. The use of digital tools in the experiment underscores the effectiveness of modern technologies in implementing such programs.

These results not only demonstrate a positive dynamic of changes after the implementation of the module but also indicate the potential for further extending the duration of the program or introducing new thematic modules. In particular, it was identified that the enhancement of graduates' professional readiness occurs at the level of critical thinking ($p = 5.83$), highlighting the importance of innovations in the context of developing this aspect.

Among other important findings, it is worth noting the enhancement of the survey's informativeness and decision-making capabilities. It has been established that the model effectively increases students' awareness and facilitates their ability to make informed decisions. This could serve as a basis for further initiatives and the development of corresponding program components to enhance effectiveness and purpose. Overall, the obtained results indicate significant potential and promise in using the innovative model in the development of students' professional self-determination, providing insights into its further development and refinement.

The contribution of this article lies in the comprehensive application of various technological tools aimed at improving students' professional self-awareness. The article provides a substantial basis for similar implementation of the developed model, which has been experimentally proven effective, or for the development of a more tailored course, considering the specific needs of a particular educational institution or region. In addition, the evolution of individual components of self-determination after the program implementation is of interest. Our research expands the scope of influence on professional readiness and adds arguments in favour of integrating technologies into the educational process.

In general, future researchers may find it interesting to determine the correlation between individual technologies and components of professional self-awareness. In addition, exploring working with smaller groups of students on issues of professional self-awareness or investigating external factors and their influence on professional decisions could be fruitful avenues of research. Thus, research could be expanded towards reconstructing fundamental situations of students' professional self-determination or other innovative programs aimed at improving career guidance.

Funding information: The authors state no funding involved.

Author contributions: A.P.: conceptualization, data curation, formal analysis, investigation, and methodology; M.M.: project administration, resources, software, and roles/writing – original draft; M.A.: supervision, validation, visualization, and writing – review and editing.

Conflict of interest: The authors state no conflict of interest.

Ethics approval: The authors declare that the work is written with due consideration of ethical standards. The study was conducted in accordance with the ethical principles approved by the Human Experiments Ethics Committee of Russian Presidential Academy of National Economy and Public Administration (Protocol No. 2 of 22.08.2023). All respondents signed the consent forms.

Ethical standards: Each participant was acquainted with the conditions of the experiment. Before commencement, all participants received consent forms for data processing and participation in the experiment. All respondents signed the consent forms. The stages of the research were approved by the ethical committee of the educational institution.

Data availability statement: All data generated or analysed during this study are included in this published article.

References

Afanasyev, V., Kunitsyna, S., & Nечаев, М. (2019). Formation of the environment of professional self-determination in Russian schools. In *ICDEE 2019: International Conference on the Development of Education in Eurasia* (pp. 86–91). Atlantis Press. doi: 10.2991/icdee-19.2019.16.

Alexander, P. A. (2023). The interplay of knowledge, strategies, and the interest in the development of expertise within professions. In *Professions and proficiency* (pp. 63–88). Cham, Switzerland: Springer International Publishing. doi: 10.1007/978-3-031-24910-5_4.

Andersen, S. C., & Hjortskov, M. (2022). The unnoticed influence of peers on educational preferences. *Behavioral Public Policy*, 6(4), 530–553. doi: 10.1017/bpp.2019.14.

Appelbaum, E. (2023). The labor market. In *A guide to post-Keynesian economics*. Oxfordshire, England, UK: Routledge.

Averkov, M. S., Vishnevskaya, E. A., Glukhov, P. P., & Popov, A. A. (2022). *Atlas of non-formal education practices* (2nd ed.). Russia: Agency for Strategic Initiatives; ANO DPO “Open Education”.

Baiborodova, L. V., Yakovleva, A. N., Seroshetko, N. V., Bakhtigareeva, A. A., & Kovaleva, G. G. (2021). Prospects of pre-professional pedagogical training of schoolchildren in modern conditions. *Research Result, Pedagogy and Psychology of Education*, 7(3), 3–13. doi: 10.18413/2313-89712021-7-3-0-1.

Bergmark, U., Lundström, S., Manderstedt, L., & Palo, A. (2018). Why become a teacher? Student teachers' perceptions of the teaching profession and motives for career choice. *European Journal of Teacher Education*, 41(3), 266–281. doi: 10.1080/02619768.2018.1448784.

Bertrand, M., Mogstad, M., & Mountjoy, J. (2021). Improving educational pathways to social mobility: Evidence from Norway's reform 94. *Journal of Labor Economics*, 39(4), 965–1010. doi: 10.1086/713009.

Birkelund, J. F., & van de Werfhorst, H. G. (2022). Long-term labor market returns to upper secondary school track choice: Leveraging idiosyncratic variation in peers' choices. *Social Science Research*, 102, 102629. doi: 10.1016/j.ssresearch.2021.102629.

Bodrova, I., Chernukha, N., Vasylyeva-Khalatnykova, M., Bakulina, O., Binytska, K., Kostenko, D., & Tarnavská, T. (2023). Research of motivation for the development of professional self-determination. *Revista Romaneasca Pentru Educatie Multidimensională*, 15(2), 229–243. doi: 10.18662/rrem/15.2/731.

Brunello, G., & Rocco, L. (2017). The labor market effects of academic and vocational education over the life cycle: Evidence based on a British cohort. *Journal of Human Capital*, 11(1), 106–166. doi: 10.1086/690234.

Chernyavskaya, A. P. (2013). *Psychological counseling on vocational guidance*. Warsaw, Poland: Vlados-Press.

Choy, M. W., & Yeung, A. S. (2022). Cognitive and affective academic self-concepts: Which predicts vocational education students' career choice? *International Journal of Educational Development Research Online*, 3, 100123. doi: 10.1016/j.ijedro.2022.100123.

Cruess, S. R., Cruess, R. L., & Steinert, Y. (2019). Supporting the development of a professional identity: General principles. *Medical Teacher*, 41(6), 641–649. doi: 10.1080/0142159X.2018.1536260.

Egorenko, T. A. (2022). Methods for activating professional self-determination of an individual at the stage of pre-professional development: Experience of foreign countries. *Modern Foreign Psychology*, 11(3), 61–70. https://psyjournals.ru/journals/jmfp/archive/2022_n3/Egorenko.

Gilyano, A., & Tkach, E. (2021). Formation of professional competencies as a basis of professional self-determination of students of agricultural universities. In *E3S Web of Conferences* (Vol. 258, p. 07024). EDP Sciences. doi: 10.1051/e3sconf/202125807024.

Giunipero, R. (2020). *International trends and innovations in career guidance* (Vol. 1). European Training Foundation. <https://policycommons.net/artifacts/2025529/mezhdunarodnye-tendentii-i-innovatsii-v-prororientatsii-tom-1/2777972/>.

Golsteyn, B. H., & Stenberg, A. (2017). Earnings over the life course: General versus vocational education. *Journal of Human Capital*, 11(2), 167–212. doi: 10.1086/691798.

Hite, L. M., & McDonald, K. S. (2020). Careers after COVID-19: Challenges and changes. *Human Resource Development International*, 23(4), 427–437. doi: 10.1080/13678868.2020.1779576.

Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments*. USA: Psychological Assessment Resources.

Karlsson, P., & Noela, M. (2022). Beliefs influencing students' career choices in Sweden and reasons for not choosing the accounting profession. *Journal of Accounting Education*, 58, 100756. doi: 10.1016/j.jacedu.2021.100756.

Kormakova, V. N., Musaelian, E. N., & Ruziyeva, D. I. (2017). Pedagogical assistance in high school students' professional self-determination. *The Education and Science Journal*, 19(4), 130–145. doi: 10.17853/1994-5639-2017-4-130-145.

Landersø, R., & Heckman, J. J. (2017). The Scandinavian fantasy: The sources of intergenerational mobility in Denmark and the US. *Scandinavian Journal of Economics*, 119(1), 178–230. doi: 10.1111/sjoe.12219.

Lavrentiev, S. Y. (2022). Opportunities for use of digital innovations in education. In *Abstracts & Proceedings of SOCIOINT 2022—9th International Conference on Education and Education of Social Sciences* (pp. 468–474). SOCIOINT. doi: 10.46529/socoint.2022.20.

Lectorsky, V. A. (2023). Psychological theory of activity by A.N. Leontiev and current cognitive studies. *Lomonosov Psychology Journal*, 46(2), 67–83. doi: 10.11621/LPJ-23-16.

Levels, M., Van der Velden, R., & Di Stasio, V. (2014). From school to fitting work: How education-to-job matching of European school leavers is related to educational system characteristics. *Acta Sociologica*, 57(4), 341–361. doi: 10.1177/0001699314552807.

Ng, Y. H., Lai, S. P., Su, Z. P., Yap, J. Y., Teoh, H. Q., & Lee, H. (2017). Factors influencing accounting students' career paths. *Journal of Management Development*, 36(3), 319–329. doi: 10.1108/JMD-11-2015-0169.

Numonjonov, S. U. (2020). Innovative methods of professional training. *Journal of Theoretical and Applied Sciences*, 1(81), 747–750. <https://elibrary.ru/item.asp?id=42658599>.

Piatushkou, A. A. (2019). Professional orientation as a way to improve the efficiency of the labor market of young professionals. In *Pedagogy and modern education: Traditions, experience and innovations* (pp. 22–24). ICNS "Science and Enlightenment". https://elibrary.ru/download/elibrary_39203006_68132455.pdf#page=22.

Piesch, H., Gaspard, H., Parrisius, C., Wille, E., & Nagengast, B. (2020a). How can a relevance intervention in math support students' career choices?. *Journal of Applied Developmental Psychology*, 71, 101185. doi: 10.1016/j.appdev.2020.101185.

Piesch, H., Häfner, I., Gaspard, H., Flunger, B., Nagengast, B., & Harackiewicz, J. M. (2020b). Helping parents support adolescents' career orientation: Effects of a parent-based utility-value intervention. *Unterrichtswissenschaft*, 3(47), 271–293. doi: 10.1108/S1434-105920210003.

Popov, A. A. (2016). *Open education: Philosophy and technology* (3rd ed.). Russia: URSS.

Popov, A. A., & Ermakov, S. V. (2020). *Didactics of open education: Monograph* (3rd ed.). Russia: NCC.

Popova, G., Nakhabina, M., Ushakov, D., & Dolgova, V. (2022). Monitoring of cognitive determinants of professional and personal self-determination of participants in the educational process.

Perspectives and Innovations of Science, 13(18), 25–38. <http://perspectives.pp.ua/index.php/pis/article/download/3097/3112>.

Praskova, A., Creed, P. A., & Hood, M. (2015). Career identity and the complex mediating relationships between career preparatory actions and career progress markers. *Journal of Vocational Behavior*, 87, 145–153. doi: 10.1016/j.jvb.2015.01.001.

P'yankova, L. A. (2021). Analysis of modern foreign concepts of professional self-determination. *Bulletin of the Siberian State Industrial University*, 1(35), 48–53.

Shcherbakova, O. I., Serdakova, K. G., Sorin, A. V., Kiseleva, M. G., Krylova, N. A., & Komissarenko, A. O. (2024). Relationship of conflict resolution culture and personal characteristics of future doctors. *Education and Science*, 26(8), 114–143. doi: 10.17853/1994-5639-2024-7428.

Soboleva, E. V., Suvorova, T. N., Zenkina, S. V., & Bocharov, M. I. (2020). Professional self-determination support for students in the digital educational space. *European Journal of Contemporary Education*, 9(3), 603–620.

Super, D. E. (1976). *Career education and the meanings of work*. USA: The Office of Career Education, US Office of Education.

Super, D. E., & Kidd, J. M. (1979). Vocational maturity in adulthood: Toward turning a model into a measure. *Journal of Vocational Behavior*, 14(3), 255–270. doi: 10.1016/0001-8791(79)90054-X.

van Dorssen-Boog, P., van Vuuren, T., de Jong, J. P., & Veld, M. (2021). Facilitating health care workers' self-determination: The impact of a self-leadership intervention on work engagement, health, and performance. *Journal of Occupational Psychology*, 94(2), 259–281. doi: 10.1111/jopp.12352.

von Wachter, T. (2020). The persistent effects of initial labor market conditions for young adults and their sources. *Journal of Economic Perspectives*, 34(4), 168–194. doi: 10.1257/jep.34.4.168.

Wegemer, C. M., & Eccles, J. S. (2019). Gendered STEM career choices: Altruistic values, beliefs, and identity. *Journal of Vocational Behavior*, 110, 28–42. doi: 10.1016/j.jvb.2018.10.020.