Scientific Underpinnings of Vocational Guidance for Secondary School Pupils

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Abstract This study explores the multi-dimensional landscape of career guidance, dissecting its socio-economic, technological, medical, psychological, and pedagogical dimensions. Investigating how these facets converge to prepare young individuals for informed career choices, the research delves into the psychological underpinnings pivotal for efficient vocational selection. Emphasizing the significance of polytechnic education, it examines how diverse academic subjects offer insights into a spectrum of professions, cultivating a versatile skill set. Anchored in B.F. Lomov's motive-driven activity theory, the study scrutinizes how internal motives steer career decisions. It highlights the role of vocational advisors in refining neuropathic tendencies and details profession-specific requirements through professiograms. The study advocates for student engagement and self-observation to facilitate well-informed career pathways.

1 INTRODUCTION

Career guidance comprises a system of socio-economic, technological, medical, psychological, and pedagogical activities designed to ready young individuals for a conscious selection of their profession and speciality. The socio-economic element of vocational guidance assesses the labour requirement in a country or region, whilst the technological aspect determines the physical and moral-psychological qualities necessary for the professional; medical and psychological elements diagnose the level and unique characteristics of physical and mental development of the professional applicant and correct and further develop the psychophysiological traits of students requiring specialisation in pedagogy. Consequently, the crux of active and effective vocational guidance resides in the psychological and pedagogical activity of education and correction. The human element serves as the primary subject of educational influence at all stages of career guidance work within schools.

The psychological framework of career-oriented activity involves the constant formation of the individual traits of the student, their needs, interests, beliefs, life experience, neurodynamic qualities and personality traits, mental processes and relationships, which form the foundation of professional work efficiency and the conscious selection of profession and specialisation.

A systematic exploration of vocational guidance issues is particularly significant in polytechnic education. Each academic subject is 'engaged' in some manner in professional labour activity, justifying or disclosing in its own way (mathematically, physically, biologically, etc.) the technology or economics of labour, its hygienic, aesthetic, and humanistic aspects, and prospects for development in relation to scientific, technical, and social progress. Polytechnic education will contribute to the development of students' professional skills and interests provided each academic subject equips the student with specific knowledge, and discloses the commonalities in professions, which, when integrated into the structure of other types of professional activity, makes the student a well-rounded individual, thus creating the conditions for their readiness for an array of professional activities – a 'jack of all trades'. This forms one of the most

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important theoretical foundations for the development of poly-professionalism in young people, enabling a seamless transition of existing interests to the required speciality, as observed in regions with a limited range of professions and specialities or in the presence of contraindications to the preferred profession.

2 THE MAIN FINDINGS AND RESULTS

Human activity is invariably influenced by an individual's internal qualities, knowledge, experiences, and perspectives. Paramount among these is the motivational mindset. A motive represents an internal driving force, forming the basis of psychological preparation for work in general, and for work within a specific professional field in particular. A motive guides the conscious selection of a profession. B.F. Lomov contends that activity is driven by one motive or another and is targeted towards achieving a specific goal. The 'motive-goal' vector functions as a central core, organising the entirety of mental processes and states engaged within this activity. At the initial stages of career guidance, external stimuli (such as imitation, command, external appeal of an activity, etc.) that do not influence the need aspect, which internally stimulates activity, can act as a catalyst for the execution of professional tasks. The role of a career advisor is to transition external stimuli to internal stimuli through suitable pedagogical influence and personal impact. To this end, professional information should be emotionally charged, eliciting in students not only cognitive but also moral and aesthetic responses. The emotional element in vocational guidance interactions with students, as is known, stimulates volitional activity. The cognitive aspect in professional actions, along with positive emotional experiences when performing them, are the primary components of interest, which serve as a significant stimulus for a person's mental and physical activity.

Every professional activity, every labour, is an expenditure of human labour power, as the founders of Marxism underscored. Labour activity, regardless of its type, represents the expenditure of the human brain, muscles, nerves, arms, and so on. For the human labour power to be spent productively, it needs to be more or less developed. Naturally, the educational and vocational advisory work of the school should aim at developing certain aspects and qualities of a person (physical and mental) and re-educating others. This necessitates a comprehensive understanding of the student on the part of the professional advisor.

In professional leadership and career choice, it is primarily essential to consider the individual characteristics of the person – innate anatomical and physiological, and chiefly the customary, characteristic qualities acquired during the educational process. Congenital typological traits of the nervous system, exhibited in labour activity through various variations of strength, mobility, and balance of nervous processes, and in a person's temperament, should be closely scrutinised by a vocational guidance counsellor for refinement. Psychologists – such as B.M. Teplova, V.D. Nebylytsyna, and others – have proven that significantly different characters can be formed based on the same properties of higher nervous activity in people, and that similar characters can be formed based on different properties of the nervous system.

The same should be recognised concerning introversion (directed inward, towards oneself) and extroversion (directed outward, towards objects and phenomena of the surrounding reality) of the personality. In vocational guidance work, some neuropathic and psychopathic inclinations – excessive excitability and introversion, suspicion, aggressiveness, etc., which are manifested to one degree or another in individual boys and girls – should be taken into account. When observing these phenomena and planning methods and means of overcoming them, attention should be paid to their genesis (to discern their root: functional disorders triggered by adverse living conditions and upbringing, or some congenital pathogenic circumstances – alcoholism, nervous diseases of the parents). Nevertheless, in all such cases, a delicate pedagogical approach should be employed, with tactfully given recommendations, educational and labour tests taking into account the student's interests, aimed, along with re-education, at choosing such labour activity that will not provoke neuropathic manifestations in behaviour.

During the processes of vocational information provision and vocational consultation, a career guidance counsellor should base their decisions on the psychograms and physiograms of an individual's personality, in addition to professiograms. It's vital to consider the overall health of young men and women, the state of their sensory organs - vision, hearing,

tactile, olfactory, and gustatory sensitivity - as well as their mental activity. This includes observation and curiosity, creative tendencies in drawing and sketching, an ability to perceive beauty, a sense for novelty, a predisposition towards performing or creative design activities, characteristics of motor reactions such as speed, mobility or rigidity, rapidity in acquiring skills and abilities, as well as the stability or variability of moods, interests, and other personal qualities of students. In all these aspects, the career counsellor should base their decisions not on empirical observations, but on scientifically sound data.

As previously mentioned, it's important for a career counsellor to be aware of any contraindications to specific professions. It's known that colour blindness, which is found in 5-7% of men (and 1-1.5% of women), is contraindicated for the professions of drivers and fabric sellers. For many professions, a decrease in visual acuity, hearing (drivers, radio operators, operators, etc.), smell and taste (food workers, chemists), as well as disorders of the respiratory and cardiovascular systems are contraindicated. Currently, health authorities have available a comprehensive list of scientifically substantiated contraindications for many professions. For instance, contraindications for a radiotelegraph operator include decreased hearing, poor auditory memory, a low level of performance, and fatigue.

In all levels of vocational guidance (including vocational information provision, vocational consultation, and drafting of a student's profile and recommendations), the focus should be on the professiogram of the profession, which should detail the following:

1. General characteristics of the profession and its individual specialties; skill levels in the profession and its specialties.
2. Description of labour processes, types of work performed.
3. Working conditions (labour, primarily physical or mental; place of work - production premises or natural conditions; collective or individual; hygienic working conditions, potential occupational hazards).
4. Requirements for an individual’s specialty - their mental and physical sphere, load on the nervous system, emotional-volitional sphere.
5. The necessary knowledge for successful execution of labour processes.
6. Skills - mental, physical.
7. The dynamics of the development of the profession and specialty in connection with scientific and technological progress.
8. Potential accidents, flawed work due to a person's moral and psychological qualities.
9. The economy of the profession, its significance and distribution in the regions of the country.
10. Where to acquire training for the profession.

Presently, there are approximately 1500 specialties. As it's naturally impossible for a single career counsellor to cover all professions and specialties, they must resort to classifying them according to the subjects (objects) of labour, the goals of labour, working conditions, the tools of labour used, and the leading knowledge with which labour activity is carried out.

Regarding the subject of labour (according to E.A. Klimov):
1. Human - nature (land, water, plants, animals, nature conservation).
2. Human - technology (machines, mechanisms, their manufacture, use in labour).
3. Human - human (work with people, collective work, relationships with people, management of people's work).
4. Human - symbol system (mathematical, graphic, speech).
5. Human - artistic representation (literature, art).

By labour goals:
1. Gnostic activity (educational, cognitive, feature recognition).
2. Transforming (scientific work, art, visual, rationalisation activities).
3. Prospecting (geology, exploration of mineral wealth, route mapping).

By the tools used:
1. Machine labour (turner, milling machine operator, weaver, electric locomotive driver, driver, pilot, tractor driver, combine operator).
2. Manual labour (locksmith, carpenter, fitter, equipment regulator, mechanical assembly work, drawing work).
3. Hardware labour (refinery operator, steelmaker, thermistor technician, physicist, chemist).
4. Operator (control panel, tracking, working with computers).

According to the leading knowledge:

1. Physical and mathematical knowledge (engineering and technical work, astronomy, astronautics).
2. Biological and chemical knowledge (medicine, agronomy, pharmacology, chemical production).
3. Humanities (history, literature, art, linguistics, pedagogy).

By working conditions:
1. Labour in different geographical latitudes (north, southern regions, surface reliefs, water areas).
2. Hygienic conditions (work in conditions of occupational health, day and night work, work of drivers, long-term travel, various conditions of food and rest).
3. Labour in enclosed spaces, in nature (factory production labour, agricultural labour).

The provided information regarding the classification of types of labour ought to be supplemented and adjusted in accordance with scientific and technological progress, as well as changes in working conditions. When aiming at professional orientation with the provided classifications of activity types, it is necessary to distinguish common elements within professions and specialties. This is important not only in vocational counselling work and in the preliminary determination of students' professional aptitude, but also when they 'try on' professions, so as to provide a broader perspective on the professional capabilities of each boy and girl and facilitate a conscious choice of professional direction.

As an example, we provide a professional analysis of individual professions, which can be utilised in all aspects of vocational guidance for students, particularly when determining the requirements of a profession for a specialist.

The professions listed below have the following requirements for a specialist:

Table 1: Requirements for specialists.

Profession, activity	Requirements
1	2
Pedagogical (teacher, educator)	Consciousness and conviction. High literacy, knowledge of one's subject, erudition, and the desire for constant learning, accompanied by intellectual and emotional activity. A high level of mental and behavioural culture, tact, humanity, optimism, and sociability.
Engineering and technical specialties	Physical and mathematical knowledge. A capacity for spatial understanding and imagination; orientation in space. Constructive and technical creativity, analytical thinking; an inclination towards design; a predilection for technical activity; an interest in a specific engineering and technical speciality; keen observation (visual, auditory, etc.), and an ability to predict outcomes.
Driving professions	Excellent visual acuity and hearing; proficient colour perception; swift reaction times; constructive and technical thinking, quick-wittedness, consistent attention, and the ability to distribute attention effectively; spatial orientation; knowledge in the field of physics; and a high standard of communication skills.

Medical specialties (doctor, paramedic, nurse), veterinary medicine	Thorough knowledge of biology, anatomy, and physiology; excellent understanding of human psychology, especially that of patients; compassion; auditory and visual observation skills; the ability to perform manipulations. Good knowledge of electrical engineering, physics, and chemistry; patience when dealing with patients; optimism; an inclination towards interacting with patients; excellent memory for different types of diseases and their symptoms, as well as for remedies; understanding of animal behaviour.
Economic professions (planner, economist, materials scientist, accountant, etc.)	Strong knowledge of fundamental sciences, particularly computing; a tendency towards thrift and efficiency; a clear understanding of industry development; economic thinking; the ability to incorporate future development prospects into planning; accuracy in calculations; understanding of the country's economy; politeness and a cultivated manner of communication.

The outlined requirements for professions are general and should be specified when constructing a specialist's professiogram, for example: maths teacher or primary school teacher; civil engineer or mechanical engineer; general practitioner or surgeon, etc.

Career paths are numerous: cinema, television programmes, excursions, reading fiction, scientific and technical literature, conversations with specialists, etc. However, the primary ones are technical and labour training, classes in special circles.

All subjects within the general education curriculum provide opportunities for revealing certain aspects of the labour professions of human activity. By studying academic subjects, students grasp the role of science in the technological process, the creation of working conditions, the aesthetics of labour activity, and the process of overcoming difficulties specific to their chosen profession and its requirements. The role of polytechnic teaching through academic subjects cannot be overestimated. Therefore, a career counsellor, when conducting labour education of young people, must continuously liaise with subject teachers and educators.

In career guidance work, considerable attention should be given to identifying the interests, inclinations, and abilities of boys and girls.

There are numerous ways to identify an individual's qualities and their suitability for a particular job. These include medical, physiological, pedagogical, and psychological research. Specialised laboratories and institutes engage in the theory and practice of professional selection. The most accessible ways to identify personality traits include:

a). Observing students during their general and labour education and assessing the level of development of diligence, attention, discipline, consciousness, interest in academic subjects, and the speed of mastering skills, etc. The conclusions from these observations will be reliable if they are carried out purposefully, over a long time, and not just by one person, but by all teachers, labour instructors, and other competent individuals. Based on the results of these observations, characteristics of the students are compiled, which should reflect what is essential in their personality, especially what pertains to their work interests and goals;

b). Conversations with students about their interests and inclinations, successes and difficulties in assimilating educational knowledge, abilities, and skills, and their success in labour training. For students to be able to assess their successes and qualities accurately, they need to be taught self-observation, the ability to monitor the development of their abilities and their alignment with the requirements of their chosen profession, and realistically evaluate the sustainability of their interests and opportunities in mastering a speciality;

c). Medical indicators such as the state of health, vision and hearing, the nervous system, and motor function. When determining professional suitability for more responsible professions, for example, a pilot, an electric locomotive driver, a driver, an operator, etc., it's necessary to inquire about more in-depth psychophysiological characteristics and potential psychopathic traits of the individual.

3 CONCLUSION

Patient and calm observation of students is the most effective way to identify their individual capabilities.

In all instances, it's essential for a career counsellor to seek advice from their teachers and, particularly, a labour instructor (teacher), from a knowledgeable representative of the industry that the student is interested in. Only after that should professional reorientation be considered. Crucial in all cases is a test of the student's resolve and verification of the stability of their interest in the speciality, even under challenging and less favourable conditions.

The role of young men and women in career guidance should not be passive. Self-observation is the path to self-understanding. It's recommended that you answer the following questions:

1. What holds the greatest interest? What kind of work is done willingly, without much fatigue, and doesn't become tedious?
2. In which activity (labour, educational) are the greatest successes achieved? Which types of work, or educational subjects, come easily and quickly, and mastering which brings satisfaction?
3. For which activity (profession) are the best (theoretical and practical) knowledge and skills possessed?
4. Where and in what jobs (easy, difficult) have you tried your hand at the vice activity of interest?
5. How did those who observed your work assess your tests of resilience?
6. Why do you believe that you can achieve good results in the profession that interests you?
7. What are the pros and cons of choosing your profession?

Based on the results of the vocational guidance work, characteristics-recommendations are compiled. These reflect the individual psychophysical attributes of a student who is graduating from school. The characteristic should be optimistically oriented towards the further development of the moral-psychological and physical qualities of a professional in the field where the applicant will end up (industry, institution, special educational institution) after graduation.

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