

Socio-Psychological Characteristics of the Improvement of Students' Talents in Technical Fields

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Abstract. The article provides information on the characteristics of talent, which is based on the corresponding type of student activity (technical direction), mainly involving creativity, wit, productivity, technical and intellectual abilities, the need to learn and derive satisfaction from new things, curiosity, developed imagination, creative thinking, vision, and scientific exploration. Furthermore, this article reveals the psychological features of the development of the ability to balance, creative thinking, creativity, and perception, as well as emotional sensitivity in subjective actions, holistic and systematic problem-solving, and social interaction.

1. INTRODUCTION

The analysis of the scientific literature review shows that there is a shortage of generalizing concepts in both theoretical and applied studies devoted to or affecting the problem of talent, which would unambiguously interpret the nature of the phenomenon under study. These circumstances create many obstacles in the way of organizing and conducting a socio-psychological study of talent. In this regard, the urgent need for a thorough consideration of the available modern approaches in order to generalize their results and highlight, on this basis, the main positions of scientists for further study of the phenomenon under study is very actualized.

Therefore, in her study of the problem of talent, A.O. Luchinina focused on solving applied problems of developing appropriate training programs. Under the studied phenomenon, the author explains a higher susceptibility to learning and more pronounced creative manifestations than peers. Also, the author interprets talent as the optimal level of formed unique mental experience that provides the possibility of creative and intellectual activity (I.I. Rakhimova.). With the so-called mental equivalent of talent, the researcher singles out intellectual maturity, which forms a system of individual intellectual resources that affect the features of the cognitive attitude of the

subject to the world and the nature of the reproduction of reality in individual consciousness.

B.A. Vyatkin considers talent as the highest degree of development of abilities, a kind of system of values, self-awareness, and intellectual maturity. The system-forming factors in the development of such a personality are the levels of:

- ☐ spiritual development, i.e. the system of values and meanings;
- ☐ personal development, i.e. the sphere of self-consciousness;
- ☐ intellectual maturity;
- ☐ comprehension of reality.

U.D. Karpov, having analyzed various concepts, came to the conclusion that talent is a systemic quality of the psyche, the core of which consists of two main components:

- ☐ instrumental;
- ☐ motivational.

The first component (instrumental) covers intellectual and creative qualities. They are clearly differentiated as complementary to each other. The second component (motivational) consists of the following components:

- ☐ sensitivity to a certain subject material;
- ☐ interest;

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- ☐ increased cognitive need;
- ☐ willingness to work with paradoxical, contradictory, and uncertain information;
- ☐ high self-criticism;
- ☐ striving for excellence (Kuvandikova G.G. (2021)).

According to A.I. Savenkov, in most of the empirical concepts, talent is considered as a static phenomenon, without taking into account the dynamics, sources, and directions of development of those elements that are included in its structure. To a certain extent, this also explains the fact that there are no special psychogenetic studies of personality characteristics of talent at the empirical stage. If we proceed from the fact that a person is born already with a certain set of qualities that can contribute to (or hinder) the development of talent, then it does not matter when, in fact, these qualities are studied because the main task of working with gifted individuals is limited to simply fixing the presence or absence of these qualities (Savenkov A.I. (2001)).

A.A. Grigoriev argues that the basis of talent is the ability to adapt to new tasks and living conditions in various fields. The researcher suggests evaluating the level of talent based on the ratio of intellectual development and chronological development, concluding that there are two forms of intellectual activity:

- ☐ the first - as a property of age development;
- ☐ the second is determined by the degree of mental development regardless of age (Grigoriev A.A. (2011)).

T.N. Ponamarev points out that the phenomenon of talent is quite multifaceted and is currently not clearly defined. In this regard, in the course of scientific research, it is necessary to apply those achievements that indicate the connection of certain mental phenomena with the object of study. Based on the above analysis, the author adheres to the position reflecting the predetermining relationship of talent with:

- ☐ certain intellectual formations;
- ☐ complex of abilities;
- ☐ certain characteristics of temperament, reflecting and transforming social influences and determining the individual style of life.

The experience of previous researchers shows that the originality of manifestations, a special combination of structural components of talent determines the specifics of the manifestation of the phenomenon under study, one of which is related to the technical-transformative, technical direction of activity, i.e. technical aptitude.

Under this phenomenon, it is considered appropriate to understand a qualitatively peculiar combination of a complex of individual personality traits that provide a high level of the result of the activity of a technical direction, in particular, a technically transformative nature, which is expressed, as a rule, in the creation of new types of equipment and technologies, original ways of solving scientific and technical problems, etc.

According to its content, technical talent covers mainly the predisposition, the student's orientation to the relevant field of activity (technical field), his orientation towards creativity, knowledge, productivity, features of technical and intellectual abilities, the need to learn new things and derive satisfaction from this, activity, curiosity, developed imagination, the ability to think creatively, see and perceive scientific and technical problems holistically, systematically, plasticity in objective activity in social interaction, as well as emotional sensitivity.

2.METHODS

To achieve the goal and implement the formulated tasks, both theoretical and empirical research methods were used:

- Theoretical analysis of scientific literature;
- Document analysis;
- Survey;
- Mathematical and statistical methods of data processing, etc.

During the empirical study, the following psychodiagnostic complex was used:

- Survey of value orientations by M. Rokeach;
- Questionnaire for determining the general emotional orientation of the personality by B.I. Dodonov;
- Questionnaire for assessing professional interests and abilities by I.L. Solomin;
- Test for mechanical intelligence by J.K. Bennett;
- Questionnaire for the study of the creative potential of the individual by E.E. Tunik;
- Test of progressive matrices by J.Raven;
- Prepared questionnaire for expert assessment of the structural components of technical talent of students of higher educational institutions;
- Prepared expert questionnaire for assessing the development of technical talent of students of higher educational institutions.

3.RESULTS AND DISCUSSION

Based on the aim and objectives of this study, an expert assessment was organized and carried out to

clarify the current structure of the technical talent of modern students of higher educational institutions.

All structural components were evaluated on a specially prepared ten-point scale, where:

- A low level of compliance is estimated from 1 to 2 points.
- Below-average level of compliance is estimated from 3 to 4 points.
- The average level of compliance is estimated from 5 to 6 points.
- Above-average level of compliance is estimated from 7 to 8 points.
- A high level of compliance is estimated from 9 to 10 points.

In addition, the prepared questionnaire also allows the expert to independently supplement structural components and evaluate them, which, in their opinion, can characterize the technical talent of students of higher educational institutions.

The experts identified the following as relevant structural components of high significance:

- Student's developed technical abilities - 10 points.
- Student's intellectual abilities - 9.9 points.

- The student's need for learning new things and getting satisfaction from this - 9.9 points.
- Student's orientation to learning new things - 9.8 points.
- Student's ability to think creatively - 9.8 points.
- Student's developed imagination - 9.8 points.
- The student's focus on the activities of the technical direction - 9.8 points.
- Student's activeness - 9.5 points.

Experts attributed the following to the actual structural components above the average level of significance:

- Student's curiosity - 9.4 points.
- Student's orientation to creativity - 8.5 points.
- Student's orientation towards productivity in their activities - 8.2 points.

To facilitate the perception of the actual structure identified based on the results of an expert assessment and to aid in selecting appropriate tools for organizing the psychodiagnostics of technical talent in general, the above components were grouped into the corresponding categories (Figure 1)..

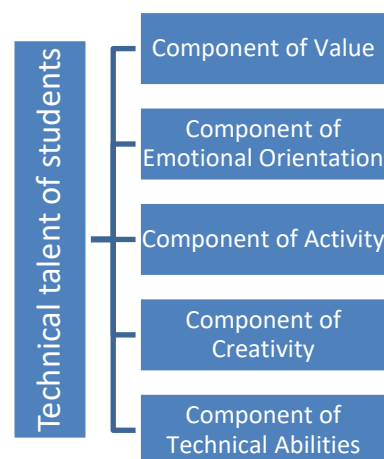


FIGURE 1. Structural components of technical talent of students in higher educational institutions

In accordance with the aim and objectives of this dissertation work, an empirical study was organized and conducted to study the current state of the development of technical talent. The entire sample of the empirical study (n=286) was examined using the previously identified psychodiagnostic complex, which includes the following tools:

- Survey of value orientations by M. Rokeach.
- Questionnaire for determining the general emotional orientation of the personality by B.I. Dodonov.

- Questionnaire for assessing professional interests and abilities by I.L. Solomin.
- Test for mechanical intelligence by J.K. Bennett.
- Questionnaire for the study of the creative potential of the individual by E.E. Tunik.
- Test of progressive matrices by J.Raven.

Most of these tools are based on self-assessment, which is essential for understanding the level of development of technical talent and its changes. Since

a student's technical talent is characterized by the highest level of performance in the relevant activity, it is important to assess its development from the subject's perspective. Additionally, self-esteem serves as an objective measure of the manifestation of personal qualities in older adolescence.

To strengthen the psychodiagnostic procedure, an expert assessment of the technical talent of students was also applied using a pre-prepared questionnaire. Expert teachers (42 people) directly involved in teaching students participated in this assessment.

The results of the expert survey showed a similar distribution of the levels of development of the trait under study. The majority of surveyed students (84.6%, 242 people) were rated with an average level of development of technical talent. A high and above-average level of technical talent was noted in 10.6% (30%) and 3.8% (11 people) of students, respectively. Only 1% (3 people) of students were classified at a lower average level of development.

The identity of the results from the comprehensive psychodiagnostic examination and the expert assessment of the technical talent of students in higher educational institutions was also confirmed statistically using the non-parametric Spearman criterion (Appendix 15). A significant positive correlation ($r = 0.77$ at $p < 0.050$) was found between the indicators of the level of development of technical talent obtained from both the comprehensive psychodiagnostic examination and the expert assessment.

Based on the expert assessment ($n=179$) and a pre-prepared questionnaire, eleven relevant structural components of students' technical talent were identified with high and above-average levels of compliance. These components were further grouped into five interdependent structural components, reflecting the technical talent of students:

- Value component (student's orientation to learning new things) - 9.8 points.
- Student's orientation to creativity - 8.5 points.
- Student's orientation towards productivity in their activities - 8.2 points.
- Emotional orientation component (the student's need for learning new things and getting satisfaction from this - 9.9 points; curiosity of the student - 9.4 points; student activeness - 9.5 points).
- Activity component (student's focus on the activity of the technical direction) - 9.8 points.
- Technical abilities component (developed technical abilities of the student) - 10 points.

- Developed imagination of the student - 9.8 points.
- Creative abilities component (developed intellectual abilities of the student) - 9.9 points.
- Student's ability to think creatively - 9.8 points.

The selected component structure of technical talent, the psychodiagnostic tools used, and the expert questionnaire allowed for a thorough investigation of the current state of development of the phenomenon under study. The results of the comprehensive psychodiagnostic examination ($n=288$) revealed that despite the relatively high level of development of individual relevant structural components, the majority of surveyed students (84.6%, 242 people) have an overall level of technical talent at an average level of development. A small number of students (0.3%, 1 person) were identified at a lower average level, while no respondents were identified at the low level. Furthermore, 10.8% (31 people) and 4.3% (12 people) of the surveyed students were found to have high and above-average levels of development of technical talent, respectively.

4.CONCLUSION

The expert assessment ($n=42$) of technical talent, conducted using a pre-prepared questionnaire, showed an identical distribution of the levels of development of the trait under study among the surveyed students of higher educational institutions. Additionally, the correlation analysis of the results from the comprehensive psychodiagnostic examination and the expert assessment, using the Spearman nonparametric criterion, revealed a positive and statistically significant relationship ($r=0.77$ at $p<0.050$). This finding confirms the relevance of the selected component structure of the phenomenon under study, the chosen psychodiagnostic tools, and the gradation of levels of development of technical talent.

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