Physiological and psychological factors assessment in the process of professional self-determination

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Abstract. The article deals with physiological (adaptive potential, resistance to hypoxia and stress stimuli) and psycho physiological (level of sociability) factors that contribute to the formation of the student's personality. As part of presented study, first-year students of Sevastopol State University were diagnosed (28 people, of which: 14 girls and 14 boys) according to the following indicators: level of adaptive potential; human resistance to hypoxia; attention and speed of information processing; resistance of a person to the action of stressful stimuli; level of person’s communication skills. A comparative analysis of the components of the adaptive potential of the individual and the levels of psychological well-being among first-year students of a higher educational institution was carried out. The paper also presents the results of a study of first-year students in terms of their sociability (not sociable, average level of sociability, normal sociability, very sociable, hyperactive. Based on the results of given study, a comprehensive description was given to first-year students (the number of students who underwent diagnostics is 28 people). In conclusion the authors say that a high students’ adaptive potential ensures their successful adaptation to the group and learning activities because of appropriate neuropsychic stability, and developed communication skills.

1 Introduction

Currently science and technology is stated to be the most important factor of social change. On the one hand, there is intense pressure on the human psyche, requiring changes in one’s social thinking, on the other hand, this impact does not have clearly defined, fixed directions that set the vector of successful person’s movement in creating one’s own future. The period of study at a university is the most important for a person in terms of personal growth taking place at this time, the real formation of a person. Professional self-determination of a person is carried out throughout the entire training. Important specific dynamic processes include personal and professional self-determination and the development of professionally significant qualities associated with it; personal self-determination and proper adaptation to learning conditions and the social environment.

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2 Literature review

The first discoveries of physiologists about the central nervous system role as the essential factor of adaptation were made by famous scientists I. P. Pavlov (1955) and I. M. Sechenov (1863) who proved its importance for developing organism’s adaptation. American physiologist W.B. Cannon [6] proposed the similar concepts about the need of a living organism to sustain the internal environment constancy, ‘balancing’ itself in the terms of changes that occurred in its environment. Adaptation and its levels was considered by E. N. Volkova, T. V. Vereitinova, I. V. Volkova, O. S. Mikhalyuk [15], G. D. Volkov, N. B. Okonskaya and others [16].


3 The subjective if the study

This article assesses the physiological and psycho-physiological factors of first-year students of the university. Their studying at the university is one of serious life experiment. First of all the activation of personal adaptation resources is required. Changes that occur in social status, increased requirements for educational activities are stressful factors for students. It can lead to a decrease in their social and psychological adaptation [10].

4 Research methods

As part of presented study, first-year students of Sevastopol State University were diagnosed (28 people, of which: 14 girls and 14 boys) according to the following indicators:
– level of adaptive potential;
– human resistance to hypoxia;
– attention and speed of information processing;
– resistance of a person to the action of stressful stimuli;
– level of person’s communication skills.

Adaptation in a broad sense is understood as the process of adapting individual and personal qualities to changing conditions of existence [8]. Adaptation is characterized by:
– expansion of physiological capabilities;
– growth in the physiological resistance of the body to external influences;
– increase in working capacity, which is provided by:
  1. changes in the sensitivity thresholds of analyzers;
  2. increase the lability of physiological systems;
  3. transition of physiological systems to higher levels of functioning;
  4. expanding the range of physiological reserves;
  5. mobilization of energy resources and protective forces.
Adaptive potential is an indicator of the degree of human adaptation to living conditions that are constantly changing under the influence of climatic, environmental and socio-economic factors.

There are various methods for identifying the adaptive potential of an organism. We can state that the most accessible method is the one first proposed by R.M. Baevsky [2]. The adaptive potential of the body is determined according to the formula 1:

\[
AP = 0.011 \cdot (PR) + 0.014 \cdot (SP) + 0.008 \cdot (DP) + 0.014 \cdot (age) + 0.009 \cdot (weight) - 0.009 \cdot (stature) - 0.27
\] (1)

where \( AP \) is the adaptive potential, \( PR \) is the pulse rate per minute, \( SP \) is the systolic pressure in mm Hg, \( DP \) is the diastolic pressure in mm Hg, weight is taken into account in kilograms, stature in centimeters, age in years.

5 Results

R.M. Baevsky identifies four possible options “before nosological diagnosis”:

1. “Satisfactory adaptation” (indicated in green).
2. “Tension of adaptation mechanisms” (color ‘yellow-1’).
3. “Unsatisfactory adaptation” (color ‘yellow-2’).
4. “Disruption of adaptation” (color ‘red’).

Conditional color coding of diagnosis options allows you to quickly determine the place of the examined person on the scale of the probability of developing the disease.

Students of the “green” group are determined by a low probability of diseases. The probability of the disease is higher in the group “yellow-1”. Students have problems with adaptation. The application of appropriate health measures is required.

Provided preventive measures are not taken the students of group “yellow-2” will have a high probability of developing disease in future.

The “red” group is characterized by the highest probability of the disease. This group includes students with latent forms of diseases or pathological abnormalities. A more detailed medical examination is required.

In a situation of professional self-determination, the “internal conditions” of students should contain properties that have a pronounced adaptive potential, ensure effective psychological adaptation of the individual, are able to regulate the impact of external factors on the human psyche, level negative internal processes that disorganize the mental activity of a person [17, 18]. The effectiveness of a person's professional activity in the future will also depend on their formation at student age. Table 1 presents the results of a study on adaptive potential among first-year students.

Analysis of the results indicates that the adaptive potential of boys is higher than that of girls. This fact is explained by emotional stability, which is “a mechanism for maintaining and restoring personal balance under the influence of adverse environmental conditions” [7].

Table 1. Analysis of the study results on adaptive potential.

<table>
<thead>
<tr>
<th>Girls</th>
<th>Boys</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of adaptation</td>
<td>Number of students</td>
</tr>
<tr>
<td>Satisfactory adaptation</td>
<td>8</td>
</tr>
<tr>
<td>Tension of adaptation mechanisms</td>
<td>3</td>
</tr>
<tr>
<td>Unsatisfactory adaptation</td>
<td>2</td>
</tr>
<tr>
<td>Disruption of adaptation</td>
<td>1</td>
</tr>
</tbody>
</table>
Oxygen is the main source of macroergic compounds. Oxygen starvation or hypoxia is a pathological process that occurs in case of insufficient supply of oxygen to tissues. Under normal conditions, the efficiency of energy oxidative processes conforms to the functional activity of tissues [2].

When assessing the level of hypoxia among students, it was found that the body's resistance to hypoxia under the influence of muscle load in boys is significantly higher than one in girls (Table 2).

<table>
<thead>
<tr>
<th></th>
<th>Girls</th>
<th></th>
<th>Boys</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoxia level</td>
<td>Number of students</td>
<td>Hypoxia level</td>
<td>Number of students</td>
</tr>
<tr>
<td>high</td>
<td>5</td>
<td>high</td>
<td>10</td>
</tr>
<tr>
<td>low</td>
<td>9</td>
<td>low</td>
<td>4</td>
</tr>
</tbody>
</table>

A test of attention and speed of information processing was conducted.

Attention is selective focus of perception on a particular object, increased interest in order to obtain any data.

Processing speed is the speed at which we receive information, comprehend it, and respond. This information can be visual, such as letters and numbers, or auditory, such as spoken language.

The analysis of the results shows that, on average, 50% of the students in the group showed a “good” result, 11% of the group showed “excellent”, 32% – “satisfactory” and 7% – “unsatisfactory” result (Fig. 1).

Emotional experiences are always accompanied by certain physiological changes. Stress is a set of protective physiological reactions that occur in the human body in response to the impact of adverse external factors. It is the conflicts of the body with the environment that keep the biological mechanisms of protection from harmful influences in working condition, train them, because complete freedom from stress means death [3].

The most common causes of stress tension are:

– you often have to do not what you would like, but what relates to your duties;
– you do not have enough time regularly;
– something or someone hurries up you, you are constantly in a hurry somewhere;
– you want to sleep constantly;
– you see too many dreams, especially when you are very tired;
– it begins to seem to you that everyone around you is in internal tension or has stress;
– you don't like almost anything;
– you have constant conflicts at home in the family;
– you feel dissatisfaction with life regularly;
– you get into debt without even knowing how to repay it;
– you have an inferiority complex;
– you have no one to talk to about your problems;
– you do not feel respect for yourself – either at home or at work.
Objective indicators of emotional stress are changes in pulse rate, respiration rate, skin conductivity, etc. [12].

Analysis of the results of the study shows that boys have higher resistance to stress stimuli than girls. Based on the results of a generalized analysis of the test, it was revealed that 61% of students belong to a common group of people in terms of resistance to stress (Table 3).

**Table 3.** Analysis of the results of the study on the resistance of students to the action of stressful stimuli.

<table>
<thead>
<tr>
<th>Number of points</th>
<th>Girls</th>
<th>Boys</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 50 points</td>
<td>1</td>
<td>More than 50 points</td>
</tr>
<tr>
<td>From 12 to 49 points</td>
<td>9</td>
<td>From 12 to 49 points</td>
</tr>
<tr>
<td>11 and less points</td>
<td>4</td>
<td>11 and less points</td>
</tr>
</tbody>
</table>

The psychophysiological factors of ensuring safety include the sociability of a person. The term “sociable” means inclined, capable of communication, establishing contacts and connections. To be sociable is to be proactive in this communication, to be able and willing to speak. Sociable people can organize communication quickly, easily and efficiently [13]. Such people want to become the center of communication. There are people who demonstrate their communicative behavior, support it [9, 14].

Figure 2 presents the results of a study of first-year students in terms of their sociability (not sociable (NS), average level of sociability (ALS), normal sociability (NS), very sociable (VS), hyperactive (HA)).

**Fig. 2.** The results of the study of first-year students by the level of sociability.

As can be seen from Figure 2, girls have a much higher level of sociability than boys. Based on the results of the study, a comprehensive description was given to first-year students (the number of students who underwent diagnostics is 28 people). General indicators are presented in table 4.

**Table 4.** General characteristics of first-year students.

<table>
<thead>
<tr>
<th>Investigated factor</th>
<th>Efficiency, % (satisfactory result)</th>
<th>Common indicator, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Girls</td>
<td>Boys</td>
</tr>
<tr>
<td>Physiological factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptive potential</td>
<td>57</td>
<td>71</td>
</tr>
<tr>
<td>resistance to hypoxia</td>
<td>35</td>
<td>71</td>
</tr>
</tbody>
</table>
6 Conclusion

Professional self-determination of students, its awareness, consistency, stability, harmony is an urgent problem for the modern theory and practice of the pedagogical system of the university. An analysis of scientific research on the problem of professional self-determination gives a possibility to conclude that the basic characteristics of a person in the process of professional self-determination are subjective features.

In the context of given study, the physiological and psychophysiological factors of ensuring safety and the psychological conditions for the development of the adaptive potential of emotional stability in the professional self-determination of students were analyzed and theoretically substantiated.

The authors of the study defined that adaptation was understood as the process of adapting individual and personal qualities to changing conditions of existence and it was characterized by expansion of physiological capabilities; increase in the physiological resistance of the body to external influences and one in working capacity.

The results of given study shows a sufficiently high adaptive potential of students. It ensures person’s successful adaptation to the study group and learning activities due to well-developed communication skills, and high neuropsychic stability.

The basic characteristics of a person in the process of professional self-determination can be tested in further research activity.

References


