DYNAMICS OF INTELLIGENCE DEVELOPMENT IN HIGH SCHOOL STUDENTS

Needs of the rapidly changing world and education system should take into account that the digital world [1] provokes new requirements to human important skills. New technologies raised new challenges giving children more opportunities to realize their abilities and to maintain lifelong learning [2]. Students’ selection for research activity should be provided at the earlier stages at school using all possible resources [3], including social networks [4], and accounting students intelligence [5], as well as requirements to key competences [6]. But despite the successful results of study of the structural and functional characteristics of the intellect [7] and the dynamics of its formation [8], including in teenagers [9], some problems of reliability and comparability of these results remain because of difficulties of the phenomenon of intelligence and its measurement [10].

The goal is to develop the technique and tool to monitor adolescence’s intelligence structure and to compare results of test performance of schoolchildren of math profile and in general.

Methods. Experiments included psychological tests performance by subjects at the computer according to technique developed and validated for the professional selection [12]. They were used tests as follows: modified R. Amthauer test of intelligence structure, assessment skills in the areas of mental activity; color-associated M.Lusher test (paired choice); modified Hilchenko-Makarenko technique; Myers-Briggs Type Indicator (MBTI). They were observed 3596 schoolchildren of 7…11 academic years (K7 … K11).

Results. According to priorities of education in XXI century, one of the key competences is “mathematical competence and basic competences in science and technology” [6]. It is associated with high productivity of decision making, ingenious analytical thinking (based, first of all, on abstract and logical abilities), quick search and information processing, effective communication, team work. According to data published [9], the general intelligence in the school with math classes decreases in high school. But other researchers [5; 8] have found opposite tendency in general schools that coincided with our previous study [12].

To investigate common and specific features of the adolescent intelligence development, they were compared micro-interval dynamics of the general intellect (Fig.1) according to all students data observation (without geographical, gender and profile specific) and data obtained in schools of math profile (Lyceum 157, Kyiv), as well as its verbal and nonverbal components. Data were collected by using the screening method, as in previous research [12]. To ensure correct data set of observation, the starting state of surveyed was checked by indices of the Lusher test performance, as well as controlled by results of the subtest memory.

These results demonstrated that the general intelligence of math students is higher than average intelligence in all schools, but the tendency of its growth has been revealed in all observed classes K8-K11. The comparison of verbal (VI) and non-verbal (NI) intelligence revealed that VI has linear trend from K8 to K11 both in average and in math classes, but NI growths less in math classes from K10 to K11.

The higher level of intellect in Lyceum could be explained by fact that schoolchildren in math lyceum were selected according to their preliminary abilities. It is necessary to highlight that their indices were higher in both nonverbal (it is often called “mathematical and technical”) and verbal components of intellect.

Conclusions. 1. They were revealed features of the transformation of the intellectual qualities’ structure depending on micro-age, profile of training. 2. The results indicated that refinement of the mechanisms of intelligence development require longitudinal studies. 3. Some fruitful results in understanding of the intellect structure changes in micro-age intervals at high school could be expected in relationship of intellect personality features, namely as regards the style of thinking and features of properties of the central nervous system.
The article discusses challenges related to measurement and use of indices of adolescent intelligence structure. Experimental research confirmed data that highlighted significant increase of intelligence indices after 8th and 11th grade. But, in contrast with general (averaged) data for all types of school profiles, it was revealed that intelligence of math class students quickly increases in 9 grade and slowdowns later, but is higher than in general. Experimental results were compared with previous ones (averaged data is captured by more than 3,500 schoolchildren).

**Key words:** intelligence, measurement, experimentation, computer tools.