ATLANTIS PRESS

Advances in Economics, Business and Management Research, volume 105

1st International Scientific and Practical Conference on Digital Economy (ISCDE 2019)

Computer-network approaches in the occupational guidance of modern teenagers

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***Abstract* — The work is devoted to the analysis of the problems of occupational guidance of teenagers as the most important task of school education. The technology of a computer-network approach for determining professional preferences of schoolchildren and the possibilities of mastering preferred professions is considered. The hypothesis of the work is the suggestion of sufficient effectiveness of independent choice of the desired professions and the possibilities of their mastering on the basis of computer-network self-testing. 102 students of 9th grades of schools in St. Petersburg took part in this work, who successfully passed the self-testing in the computer program "Orientir", created on the basis of the famous test of A.E. Klimov. Preferred professions were found, that did not always correspond to the possibilities of their mastering. The maximum discrepancies were determined in the sector of professions "man-man". Students least often chose the professions “man-technology” and “man-nature”. It was determined, that 20–25 % of schoolchildren are not able to choose a profession, using computer self-testing, they need psychological help to solve this problem.**

Keywords — occupational guidance, local area network, teenagers, self-testing

I. INTRODUCTION

The Internet and computer gadgets are an essential part of life for both adults and teenagers. A stable idea was formed about the positive impact of the use of mobile phones, game consoles, and activity on social networks on the development of children and teenagers [2, 5]. However, not all experts agree with such assessment of the role of modern digital technologies in the development of the younger generation. There are publications, warning about the dangers of uncontrolled interaction of children and teenagers with the Internet and computers [7, 8]. There are researches, showing the irreversibility of the development of various forms of memory in terms of the use of gadgets in the learning process [10, 11, 13]. The negative effect of games with Internet consoles on the formation of cognitive functions of older preschool children is shown [12].

These materials pose a big problem in studying the effects of the interaction of children and information technologies. Our long-term researches in the model of a pseudo-longitudinal experiment showed, that the use of information technologies leads to an increase in the non-verbal visual intelligence, in its modality, in children of the Internet age [9]. At the same time, as shown in the same work, verbal-conceptual intelligence does not have any definite dynamics in the process of the formation of a digital society. It is likely, that the impact of the introduction of digital technologies on the intellectual resource of its carriers will further continue, being essentially a new evolutionary factor, that will determine different development strategies not only of individuals but of entire communities. Not for nothing, that currently the governments of many countries are concerned about the development of new information technologies and their introduction not only into the economy and business but also healthcare and education. The last aspect of our work will be focused on.

Obviously, timely professional self-determination is the most important task of modern education. The practice of social development convincingly demonstrates a significant contribution to the technological progress of intellectual resources and the quality of training of professionals, working not only in the production sphere, but also determining the management system of state structures and business in particular. The effectiveness of managerial activity, which combines both intelligence (social and general) and a system of communicative functions, is determined by the correspondence of the abilities and motivations of managers, their knowledge to the requirements of professional activity, that explicitly or implicitly exist. The more complete this correspondence, the higher the likelihood of sufficient and necessary effectiveness of professional activity in the field of the humanities, including in the management system.

In this regard, the necessary attention is given to the professional diagnosis in education, including school education. It is worth noting, that the determination of the preferred field of activity of students is carried out through interviews with students, taking into account grades in subjects of school cycles, successes in various competitions, Olympiads, as well as visits to various industries and try of labor activity and similar actions. Obviously, the more gifted the student, the more accurately the sphere of interests and abilities is determined in the school, the less likely the wrong professional identification. Students with unexpressed professional interests experience real difficulties with occupational guidance, these teenagers have doubts and hesitations in professional self-identification. In this group, there is a high probability of a mistake in choosing a profession after school graduation, they may have social and professional deviations, psychological burnout and loss of

health. For a relatively accurate forecast of the social and economic consequences of a poor or unsuccessful choice of a professional profile in high school, it is necessary to determine the numerical value of this group of students in the sample of senior high school students.

The importance of this psychological and pedagogical task is connected with the fact, that social, professional activity of a person and his psychological and physical health are associated with an adequate and timely choice of profession. It was determined, that an unsuccessful choice of a profession, that does not coincide with the proclivities and abilities of a person, determines various types of neuropsychiatric diseases, including neurosis and psychosomatic disorders [1, 6].

In this regard, the most important task of a modern school is the timely and reliable determination of students' professional proclivities and abilities for an adequate choice of learning profile for schoolchildren in the 9-10th grades of the school.

The following main tasks of occupational guidance are determined:

1) diagnosis of preferences of schoolchildren;
2) an assessment of their abilities for the mastering certain types of professional activity;
3) consultation on the results of diagnostics.

At the same time, optimizing the cost of schooling determines the incomplete ability of the school to have a sufficient number of psychologists and / or social teachers, specializing in performing psychological testing, processing tests and conducting adequate consultations for children and teachers, in manning table. A possible way out of the situation is associated with the creation of local computer networks, in which the student can independently act by performing tests on-line. The conditions for modern network interaction are, primarily, associated with the creation of a local school network and the availability of tests on it, the formation of access to the local network by students, and the possibility of network counseling. The hypothesis of the work is the suggestion of sufficient effectiveness of independent choice of the desired professions and the possibilities of their mastering on the basis of computer-network self-testing. Practical implementation of this model of occupational guidance was carried out for students of 9th grades of schools in St. Petersburg on the created local network and network interaction of students with texts, posted on the local network.

II. RESEARCH MATERIALS AND METHODS

A research was conducted, using the well-known psychological test "Differential diagnostic questionnaire" (DDQ) by A.E. Klimov ((http://altermed.by/index.php?item=test&pst=ddo), suitable for mass occupational guidance work with students, based on information computer technologies. For this purpose, the computer version of the occupational guidance methodology "Orientir" was selected by the company "Imaton" (St. Petersburg), which allows to conduct simultaneous diagnostic work on a local network, including 10–12 computers. The specified technique had such positive properties as: a convenient database, built in electronic tables, as well as the opportunity to export them, which allows to process the test results for different requests, if necessary. At the same time, it is worth noting the restrictions, that constrict the range of its possible use. The program "Orientir" is developed for Windows software, which constricts the range of users in local networks on other platforms, such as Ubuntu. In addition, there is no arbitrary configuration of work in the local network, which determines the inconvenience of data processing by specialists in the form of the need to download from each computer in the network into a single directory for statistical processing.

Schoolchildren (102 people) independently worked with a computer test. They filled out the proposed 2 blocks of test questionnaires on-line, the questions of which concerned professional preferences in one case, and in the other — self-assessment of their abilities for mastering professions in five main sectors of professional activity: man — nature, man — a sign system, man — an artistic image, man — technology and man — man. In addition, the computer program differentiated the answers of the test participants into 2 systems of professions, the first are professions, related to performing activities, while the second is related to creative activities.

After filling out the questionnaire, students had the opportunity to get important information about their professional proclivities and the abilities of mastering certain specialties in such an interactive mode. Thus, the specified diagnostic technique performed three of the specified tasks of occupational guidance.

However, it is known, that the quality and adequacy of the answers to the questions of the questionnaire depend on the life experience and intelligence of the students, participating in the testing [4]. We can assume the influence of these personality factors on the reliability of the choice of 9th-grade education profiles by schoolchildren. To control these influences, a reflection questionnaire was developed by V.G. Kamenskaya, which was installed on the local school network, allowing students to fill out it at a convenient time for them The questionnaire consisted of questions with answer options, regarding the choice of profile and problems with the computer test "Orientir". The students chose the answers that, in their opinion, corresponded as much as possible to their actions in the computer test, as well as the profile selection process. The reflection questionnaire was created using google services, namely the google form: students are offered a series of questions, the answers are automatically collected in an electronic table, a summary of the answers in the form of diagrams is also done automatically in one click of the “mouse”. The results of the “Orientir” test and the reflective questionnaire were processed using the SPSS-17 statistical software package.

III. THE MAIN RESULTS OF THE RESEARCH AND THEIR DISCUSSION

Processing the answers of the questionnaire by A.E. Klimov to assess professional preferences was carried out in two options. The first one represents the percentage distribution of students' professional preferences for each sector of specialties, as well as assessments of their abilities in

mastering one or another specialty. These results are shown in Table 1.

TABLE I. PERCENTAGE DISTRIBUTION OF STUDENTS, WHO CHOOSE PROFESSIONS BY SECTOR (I WANT) AND ABILITIES OF THEIR MASTERING (I CAN)

Profession sectors	**want**	**can**
man-man	36	50
man - an artistic image	34	19
man-nature	21	4
man - a sign system	2	2
man - technology	2	5
not decided	5	20

Materials in table 1 show, that the professions of the “man-man” sector were most often preferred (36%), the second place was taken by the “man-artistic image” sector (34%), and the specialties of the “man – a sign system” and “man – technology” have minimum preferences (2% of each specialty). A relatively small group of 9th-grade students could not determine desired professions (5%). Self-assessment of ability to master the same list of specialties looks a little different, which is also reflected in Table 1. A significantly larger number of students (50% against 36%) consider themselves able of mastering specialties in the "man-man" sector by reducing the self-assessment of their abilities in mastering other specialties. At the same time, the minimum number of 9th-grade students consider themselves able to mastering specialties in the sectors “man – sign system” (2%) and “man-nature" (4%). The divergence in the number of people wishing to master specialties in the “man-nature” sector (21%) and those, who are able to do this (4%), particularly concern. This divergence is due to the students' uncertainty, which can be corrected in the individual educational routes of these teenagers. The opposite trend was found for specialties of the “man-man” sector, a much smaller percentage of students want to master the specialties of this sector compared to those, who consider themselves able of working in these professional fields. Note, that the number of students, who are not able to confidently assess their abilities in the mastering certain specialties increased (20% compared to 5%), which is also the subject of the work of specialists.

A statistical assessment of average points for groups of selected professions in the same 102 students who participated in the testing is the second option for processing individual testing materials is. A comparison of the averaged by the point groups of choice of professions of the “Orientir” test and self-assessment points of the abilities to master the same professions by students of 9th grades is given in table 2.

TABLE II. THE AVERAGE VALUES OF THE POINTS OF CHOICE OF PROFESSIONS (SCALE "I WANT") AND SELF-ASSESSMENT OF THEIR ABILITIES TO MASTER THESE PROFESSIONS (SCALE "I CAN") BY STUDENTS OF 9TH GRADES

Column 1	**Column 2**	**Column 3**	**Column 4**
Profession sectors		want	can
man-man		5.01	8.17
man - an artistic image		4.99	6.92
man-nature		4.09	4.12
man - a sign system		4.01	6.92
man - technology		2.91	5.67
creative professions		8.15	8.56
performing professions		6	6,2

The reliability of the difference in the point expression of professional preferences and the abilities for their mastering professions of the "man-man" sector and the rest in other sectors were calculated using analysis of variance using the "ANOVA" method. It can be noted, that creative specialties get large points by students both by their choice and by self-assessments of mastering abilities in comparison with performing ones, these differences are significant ($p = 0.02$ and $p = 0.012$, respectively). The students gave the maximum number of points to the specialties of the “man-man” sector by their choice and by self-assessment of their mastering abilities. It was found, that the differences reach a high level of significance between the elections of the "man - man" and "man - technology" sectors ($p = 0.01$), "man-man" and "man-sign" ($p = 0.02$). Significant differences were recorded in the sectors “man-technology” and “man-image” ($p = 0.04$), “man-technology” and “man-nature” ($p = 0.03$). Even more expressive differences were obtained during self-assessments of the abilities to master the specialties of the sector “man-man” and “man-technology” ($p = 0.00$), “man-man” and “man-sign” ($p = 0.04$), “man-man” and “man-nature”($p = 0.00$). It is worth noting, that the specialties of the “man-nature” sector have reliably low self-assessments of the ability to master these specialties when compared with other sectors.

Thus, students of 9th grades are significantly less choose the specialties of the “man-technology” sector and are significantly less assess their ability to master the specialties of the “man-nature” sector. Consequently, the minimum preferences do not coincide with the lowest self-assessments of their abilities of mastering specialties. These discrepancies may be associated with incomplete knowledge of their abilities, that is, insufficiently mature reflection and/or insufficient understanding of the questions of the “Orientir” test questionnaire.

These assumptions are partly confirmed by the results of the questioning of students after passing this computer test. Only 61% of schoolchildren answered positively, 5% of students said that “a lot was incomprehensible” to the question “Did all the provisions of the computer test be understood?”. A negative answer was received in 34% of cases to the question “Did you manage to choose a field of interest in computer testing?”. These students could form a group with unformed preferences and poor quality of self-assessments, i.e.

insufficient reflection. These students form the group with the absence of a specific choice of the sector of specialties (5%) and who failed to assess their abilities in mastering the specialties (20%). Similar results were obtained earlier on another sample of students of 9th grades [3]. Repeated results testify to the general properties of the development of the cognitive model of self-awareness, insufficient knowledge of oneself and one's abilities. Probably, these facts also reflect a shift in emphasis from natural science disciplines to the humanitarian sector of subjects in modern education in Russia.

Obviously, professional self-determination of schoolchildren without clearly expressed abilities cannot be fully provided by digital and informational media due to a lack of awareness of their characteristics and subject areas of the school curriculum. They need psychological consultation and pedagogical support in high school.

IV. CONCLUSION

On-line computer testing was found to be useful for profile selection by 46% of 9th-grade students, 62% of teenagers rated the possibilities of this psychodiagnostic option highly. Thus, despite certain shortcomings of the “Orientir” computer test, students of the 9th grade worked online satisfactorily. Consequently, the idea of the possibility of creating local networks for the individual occupational guidance work of students in it is fully justified. It was possible to determine a certain stratification of the professional interests of students in 9th grades, as well as a relatively adequate self-assessment of the ability of mastering certain specialties. In this sample of students, the specialties of the "man-man" sector are dominant, the specialties of the "man-technology" and "man-nature" sectors are minimum represented. At the same time, this psychodiagnostic work raises a number of issues. In general, when the results of psychodiagnostics were considered satisfactory, certain problems and shortcomings were detected during the independent work of students with a computer test. These problems distort the interpretation of group results and individual interpretations in consultations. Problems may be the result of incomplete awareness of teenagers about their abilities and may be related both to the specifics of the school curriculum and to the personality characteristics of teachers, who teach basic subjects in 9th grade.

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