

# Modern Information and Communication Technologies in Professional Training of Sociology Students: The Mainstreaming of the Needs and Significance

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**Abstract:** The article presents an overview of the main possibilities of using information and communication technologies in applied sociology, as well as the urgent need and importance of computer training of the students. Filed the results of comparative analysis of universal, semi-universal statistical packages of computer processing of sociological information and professionally focused software products on the market today. Outlining the advantages and disadvantages of their use in empirical sociology to describe the quantitative and qualitative characteristics of objects of study, explanations of causality, forecasting of social processes. Characterized by modern information technology used for collecting and storing social data. It is proved that the leading component of the computer literacy specialist-sociologist is the formation, the development of algorithmic thinking, the ability to make the right choice in favor of a software package that satisfies all the requirements, and that would efficiently and professionally perform all the tasks of an applied nature.

## 1 INTRODUCTION

Training specialists in humanities in Ukraine, in particular sociologists, given the growing need for sociological interpretation of contemporary problems and events, requires significant improvement of the educational process of their training in institutions of higher education. In accordance with the standard of higher education in Ukraine training of bachelors of sociology in the field of knowledge 05 “Social and Behavioral Sciences”, specialty 054 “Sociology” (MON, 2020) should be based on social sciences and humanities. However, the mathematical component of voca-

tional training is no less important.

The process of studying complex mass socio-economic, socio-political, socio-cultural phenomena and processes can not be limited to theorizing. It involves mathematical formalization, modelling of social reality to formulate accurate, well-grounded conclusions about the situation. Undoubtedly, various mathematical procedures are necessary, on the one hand, due to the current stage of social processes development, the dynamics of social transformation. On the other hand, implementation of social management, forecasting is impossible without deep knowledge of gathering, processing and analysis of sociological information. These are mathematical methods that already have a wide range of applications. In this regard, actualized the need of introduction of modern information and communication technologies in the process of professional training of future sociologists.

The use of mathematical methods in sociology began long before the computer age. In the second half

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of the twentieth century, the possibilities of the mathematical apparatus expanded dramatically due to the development of information and communication technologies. Today, there are software products aimed at solving sociological problems, but they are not fully used by sociologists-practitioners. They simply do not like mathematics. On the other hand, not all software products available for use a wide range of users, proceeding from their high cost, the system requirements for their installation, the need for special skills, knowledge of the language of the interface. Tatarova (Tatarova, 2018) spoke very aptly about the problem of teaching quantitative methods for sociology students, noting that “they are allergic to formulas and graphs”. However, there is an urgent need to form digital literacy due to the fact that modern sociologist can not do without mathematical formalization, without computers in the use of not only quantitative but also qualitative methodology and techniques of collecting empirical sociological material.

The formation of digital literacy is a continuous process that begins with the study of such disciplines as “Fundamentals of Informatics”, “Mathematical and Statistical Methods in Sociology”, “Social Statistics”, “Selective Method in Sociology”, “Methodology of Sociological research” and logically continues during the course “Analysis and computer processing of sociological information”. This type of functional literacy should be understood as the level of students awareness about the possibilities of using computer software to solve standard professional problems. Based on the content of the latter, all information technologies used in applied sociology should be divided according to their functional purpose into three groups: programs for processing sociological data, collection, storage and presentation of the results.

Tatarova (Tatarova, 2018), Tolstova (Tolstova, 2015) studied the problems of mathematical and digital competencies formation of future sociologists in their works. The use of information and communication technologies in applied sociology is shown in (Borovikov, 2003; Bühl and Zöfel, 2002; Filipova, 2001; Gorbachik, 2004; Mayer, 2015; Panchenko et al., 2020, 2021; Tsy-pin and Sorokin, 2016; Tsyuhai, 2010). However, in most works, the researchers focused on the features of only one or more of the software products. Today, in the literature on sociology there are almost no publications that would contain a comprehensive review of existing software packages outlining their leading advantages and disadvantages. It would make it easier for a sociologist-practitioner to choose a program at one stage of empirical sociological research according to

the research objectives. Therefore, this article aims to review the main opportunities of information and communication technologies in applied sociology at the stages of collection, processing and storage of sociological data, as well as to determine the actual needs and importance of the digital component in the training of sociology students. The main criteria for the selection of software products for further analysis were the availability (presence or functionally free demos) and Ukrainian/Russian interface.

## 2 INFORMATION TECHNOLOGIES FOR COLLECTING SOCIOLOGICAL INFORMATION

Regarding modern information technologies for collecting sociological data and their capabilities, we note that there are at least ten most common services for empirical sociological research: e-mail; placement of text questionnaires in newsgroups; internet forums, teleconferences (bulletin boards); web-pages of polls; online focus groups; CAWI (Computer Assisted Web Interface) – online survey using web-resources without the participation of a researcher; TAPI (Tablet Assisted Personal Interviewing) – tablet survey; CATI (Computer Assisted Telephone Interviewing) – automated telephone survey system; CAPI (Computer Assisted Personal Interviewing) – electronic questionnaire via email services or sites with the participation of the researcher. For author’s research it is enough to use such services as Survio (survio.com), SurveyMonkey, Simpoll (<https://simpoll.ru/>), Multi-platform Social Media Surveys (<https://www.twtpoll.com/>), Google Forms, Microsoft Office (Excel) and others (Geger et al., 2015).

E-mail survey is a rapid and easy way to work with the target audience of informants, for example during expert evaluations. In the vast majority of cases, this information and communication service is used to send invitations to participate in Internet forums, teleconferences or focused group interviews. The main problem is the inability to record the reluctance of potential respondents to participate in the study, as well as the reasons for their refusal (Filipova, 2001).

However, online research in newsgroups is more attractive. It is an interactive or autonomous survey of people united by common interests on specific issues of social life. Internet forums and teleconferences can be considered as varieties of such a survey. Their ad-

vantage is the ability to use open-ended questions, unstructured or semi-structured questionnaires.

Web-pages of surveys are ordinary questionnaires in HTML-format, which are posted on the WWW. Their widespread use is complicated by the lack of technical skills, as the construction of such questionnaires is made with the help of a scripting language (GGI) which automatically processes all the data obtained (Filipova, 2001).

All modern information platforms for conducting online surveys Survio (<https://www.survio.com/en/>), SurveyMonkey (<https://www.surveymonkey.com/>), Simpoll (<https://simpoll.ru/>), Multi-platform Social Media Surveys (<https://www.twtpoll.com/>), Google Forms (<https://www.google.com/forms/about/>), Microsoft Excel (<https://office.live.com/start/excel.aspx>) differ in functionality in terms of the number of questions types, the availability of directory service, ways to attract respondents, services for automatic results processing, graphical representation of reports, feedback from the researcher to respondents, and the availability of paid/free services.

Empirical research conducted via the Internet has a number of obvious advantages: technical parameters (savings in resources compared to traditional forms of population surveys); large sample size (low level of material costs per respondent allows you to maximize the sample size, thereby reducing the amount of random measurement error); the speed of the survey (a large-scale, global online survey of several thousand people around the world can be conducted in a few days); the possibility of rapid response (combination of laboratory and field stages, making adjustments to the tools); wide coverage of both the research audience and study topics; relevance (when conducting online surveys, the effect of the interviewer is completely excluded); organizational flexibility (the respondent chooses a convenient time and place for filling out the tools); automatic data recording and their initial analysis, etc. However, such shortcomings and limitations as lack of representativeness (online research data cannot be extended to the entire general population, but only to network users, in addition, due to the rapidity of informatization processes, the general totality of users is constantly changing); spontaneity of the sample (as a rule, only willing users answer the questions of the tools posted on the network. It is a “self-selection method” which further complicates the ability to control the compliance of the sample and the general totality); lack of possibility to establish the fact of unique participation provided anonymity, in particular multiple participation; the difficulty of verifying the accuracy of the data obtained; technical restric-

tions on the number of questions, their length; lack of possibility to provide supporting information, explanations in case of incorrect interpretation of the questionnaire by the respondents, control of omissions of certain questions, etc.

### **3 UNIVERSAL/SEMI-UNIVERSAL SOFTWARE PRODUCTS FOR THE SOCIAL DATA PROCESSING AND THEIR SIGNIFICANCE IN THE FORMATION OF COMPUTER COMPETENCE OF FUTURE SOCIOLOGISTS**

While conducting empirical sample studies, sociologists have to process large arrays of primary data. Carrying out such full-scale works takes a lot of time and requires considerable effort. Probabilistic-statistical methods and models are applied to general totality in order to extrapolate the conclusions obtained during the study of a sample of social objects. According to Tatarova (Tatarova, 2018), the main condition for their use is the assumption of at least approximate observance of the properties of the so-called statistical ensemble: the possibility of repeated observations under the same conditions; the presence of a large number of random factors that characterize the conditions of observations, which do not allow to make deterministic conclusions about whether or not will occur as a result of these experiments.

Speaking of application program packages designed for processing sociological data, we note that there are universal/semi-universal (in terms of their functional purpose, applicability and technology of calculations almost does not depend on the subject area of research) and professionally oriented (aimed at processing sociological information that allows to identify patterns against the background of coincidences; to make sound conclusions, forecasts and assess the probability of their validity). Until the 1990s, most domestic sociologists carried out empirical research and used mostly questionnaire methods to collect data. Computer programs developed up to that time were based on the statistical approach. However, the wide interest in the use of quality methods necessitated the development of adequate specialized analytical software for their processing. Currently, available software products can also be classified based on data they process (or data obtained using traditional

Table 1: The comparative analysis of online services for surveys.

Features / Services	Survio	Survey Monkey	Simpoll	Multi-platform Social Media Surveys	Google Forms	Microsoft Office (Excel)
The base of respondents	+	-	-	+	-	-
Services automatic processing of the obtained results	+	+	+	+	+	-
Graphics	+	+	+	+	+	+
Changing the settings, design	-	+	+	+	+	+
Service support	-	-	-	+	+	+
The possibility of using mobile devices	+	+	-	+	+	+
Availability (free version, demo version)	-	+	+	-	+	+

quantitative or qualitative methods of collecting sociological information). However, since there is no clear distinction between the latter in applied sociology and taking into account that any qualitative information can be digitized, this classification is less successful. As for the classification by functional purpose, the first group includes software products such as OCA, Vortex 10.7, IBM SPSS Statistics 26, Stadia 8.0, Statistica 13.3, StatPlus 5.0, DA-System 5.0 and others, the second group – SociometryPro 2.3, ContentAnalyzer 0.52, TextusPro 1.0, TextAnalyst 2.01, WordStat 1.1 etc. We will consider each of them in detail separately.

To find answers to relevant research questions, the sociologist is faced with the task of choosing an optimal statistical package from the available universal or semi-universal ones. The best option is one that combines the necessary functionality, high-quality work and a reasonable price. When choosing an application package, it is necessary to take into account, first of all, its conformity with the tasks to be solved, the amount of processed data, the requirements for the available computer equipment.

Most of the statistical packages presented on the market today have a flexible modular structure that can be supplemented and expanded by user modules, which are additionally purchased or available for free access on the Internet. Such flexibility allows you to adapt most packages to the needs of a particular sociologist.

A sociologist who organizes the applied research must determine the list of tasks and agree them with a client before choosing a package of applications to process sociological data of. In research practice, the main three types of such tasks are most common:

- 1) description of the object (collection of quantitative and qualitative characteristics), which allows you to form a general idea of the object of study, to compare two or more objects. It is a statisti-

cal analysis of data. To implement this research task, the following statistical indicators are used: arithmetic mean, mode, median, deviation, standard deviation, dispersion, measures of variation (range, maximum, minimum, average linear deviation, standard deviation, oscillation coefficients, relative linear deviation), etc. The procedure of statistical analysis is key to clarify statistical patterns, test hypotheses about the presence and nature of dependencies;

- 2) explanation of causal relationships – correlation, regression, factor, variance, latent and other types of analysis, construction of one-, two-dimensional tables of data distribution;
- 3) forecasting of socio-economic processes – the processing of time series, construction of regression equations, trend calculations (patterns of development), modelling, extrapolation, etc.

The most universal data processing program is SPSS (the software name originally stood for Statistical Package for the Social Sciences, reflecting the original market, then later changed to Statistical Product and Service Solutions) has been developed in 1968 by three PhD students at the University of Stanford (Norman H. Nie, C. Hadlai (Tex) Hull and Dale H. Bent). The latest version of IBM SPSS Statistics 28 was released in May 2021. Its main advantages are a developed apparatus of statistical analysis, versatility, a wide range of graphical procedures, reporting tools, high computing speed, simple and user-friendly multilingual interface, detailed context-oriented help system. Disadvantages of the program include high computer requirements (1.56 GB of RAM, 1.11 GB of hard disk memory and a processor with a frequency of 1 GHz and above) and pricing policy compared to statistical packages of the same level (Bühl and Zöfel, 2002).

In Ukraine, the first application package (“OCA” – processing of sociological questionnaires) was devel-

oped in 1989 by A. Gorbachyk with the support of the Institute of Sociology of the National Academy of Sciences of Ukraine. It is designed to organize the introduction and statistical analysis of the results of various sociological surveys (Gorbachik, 2004).

A new updated version of OCA for Windows appeared in 2001, in 2004 – OCA New Line, and in 2019 – OCA CATI Android. The package provides all basic operations with numerical data sets, in particular, input of questionnaires, logical control of entered information, construction of filters for selection of questionnaires under a certain condition or random selection, tables of one-, two-dimensional distribution, calculation of central trend measures, variations and indicators of connections, calculation of sampling and error, testing of statistical hypotheses, implementation of factor and cluster analysis, construction of linear regression equations, etc. The main advantages of this Ukrainian software product are the conciseness of the interface, relative cheapness, while the main disadvantage is the limited functionality.

D. Shkurin (Ural Federal University named after A. M. Gorky) created the first version of the Vortex program in 1994. The latest updated version of the program appeared in 2013 (Shkurin, 2016). It is a modular program based on a data entry module. There are different versions of the program which differ in functionality: basic (data entry module, basic functions); professional (data entry module, basic functions, professional functions); full (data entry module, basic functions, professional and additional functions); student, academic and version for educational institutions. There may be separate subprograms such as the module for conducting personal interviews, FTP-server for conducting surveys, the master of digitization of the territory map, the module of pasting files, etc. Additional features of the Vortex program include the ability to process data collected during surveys by the following means: CAWI (Computer Assisted Web Interface); CATI (Computer Assisted Telephone Interviewing); TAPI (Tablet Assisted Personal Interviewing); CAPI (Computer Assisted Personal Interviewing). Unlike other software products, it has the option of developing data collection tools (questionnaire, interview or testing form, etc.).

The Stadia (Statistical Dialogue System) program was developed by A. Kulaichev in 1985 (Kulaichev, 2013). The program provides comprehensive data analysis using a set of modern and effective methods for determining descriptive statistics, criteria for difference, categorical, variance, correlation and regression analysis, to visualize the data by means of business and scientific graphics. Its main drawback is the

inability to process data presented in nominal scales with compatible alternatives, as well as the option to export / import data with other statistical packages of applied programs.

Universal statistical package Statistica was developed by StatSoftInc in 1991 (Borovikov, 2003). Its latest 14th version was released in 2020. In addition to the generally defined statistical and graphical tools, the system has specialized modules, for example, for sociological or biomedical research, for solving technical and industrial problems as construction of quality control maps, process analysis modules and experiment planning. Similar to Stadia, this software product does not have the ability to process sociological variables on a nominal scale with compatible alternatives. The advantages of the package include: the ability to exchange data with MS Windows applications, analysis results can be displayed in the form of graphs, tables and text files, macro recording to automate the same tasks, the ability to process a database of 32,000 variables and almost unlimited observations, the ability to build 2D, 3D and 4D graphs, matrices, icons.

The StatPlus application package was developed by AnalystSoft in 2006 and the latest version appeared in 2016. It allows the calculation of basic descriptive and non-parametric statistics; it is possible to import/export documents in Microsoft Excel, StatSoft, SPSS, etc. However, its options are very limited for the main tasks of empirical sociological research compared to other software packages (Tsyuhai, 2010).

The DA Standard 5.0 (determination analysis of data) was developed in 2011 by Context Media to process the results of marketing and sociological research, financial data of the company's activities, etc. The system software contains two programs – DICT (provides data preparation for processing, input of variables vocabulary and data, export/import of data) and DA (designed for data analysis, linear and even distributions, multidimensional determination tables, subsample formation, construction of new variables, etc.). The program is built as a traditional database (there are tables for storing information and query system, which is intellectually built into the arrays of tables) (Context Media, 2011). Its advantages are adaptability to marketing problems, simple interface, low technical requirements. However, it works only on the basis of Windows 95, 2000, NT, XP; it has a special format for data storage, the lack of ability to export/import data with other statistical packages.

Summarizing, we note that the universal versatility of the packages enables the analysis of different data types using a wide range of statistical meth-

ods. Most of the existing software products have some built-in statistical procedures and are competing against each other. Their main difference are the ways in the interface.

The software packages are almost identical in their function, the amount of input data is limited by the capacity of computer memory that allows you to use them to conduct large-scale sociological studies. Compared to other Vortex has the advantage regarding the possibility of the formation of research tools and automatically create a dictionary of variables for further input and analysis of the array data. But OCA unlike other software has the ability to process data presented in a nominal scale with compatible alternatives. SPSS is the only one among the presented software has capabilities of rendering 3D graphical images. All the packages are paid and have trial versions available to download on official sites.

Next, consider a professionally-oriented (specialized) packages.

So, the program SociometryPro 2.3 has a special purpose. It is created by the specialists of LeDiS Group (Moscow, Russia) to simplify the processing of sociometric survey data (LeDis Group, 2017). There is a Ukrainian analogue of the program. It is called "Sociometry" developed by the Academy of Information Technology. This software product allows you to create a database of sociometric research, calculate group and individual sociometric indices, to visualize the results in the form of targets and graphs.

We will focus on a few available text analyzers that have the ability to implement the quantitative component of content analysis of text documents. Textus Pro 1.0 is one of the simplest text analysis programs created by D. Kaplunov and D. Abramov. The main objectives of the program are: to calculate the use of keywords, their frequency and density; determining the number of words and symbols in the text (with spaces and without); analysis of the "nausea" of the text; calculation of the cost of the text based on the initial price per 1000 symbols of text analysis specified by the user (Chernyatinskiy, 2020).

The program TextAnalyst 2.01 is a tool for analyzing the content of texts, meaningful search for information, the formation of electronic archives. It was developed in 1991 by the specialists from the innovation center "Microsystems". The program options allow text analysis with automatic formation of a semantic chain with hyperlinks, meaningful search of text fragments by constructing a hierarchical tree of topics, text abstracting, clustering of text information by constructing a thematic tree, forming a hypertext structure.

WordStat2.0 is a free utility software for quantitative

analysis of text submitted in html and txt formats. It was developed by O. Dubinskyi in 2001. The advantages of this program are the ability to combine similar words, despite changes in word forms, as well as the accumulation of measurement results. As a result it simplifies work with large arrays of information (Dubinskyi, 2019).

ContentAnalyzer 0.52 was developed in 2005 by the specialists from the Elibriz Software company. It is aimed at analyzing thematic web-documents on the number of keywords and their word forms and creating an abstract. The program contains an integrated interface, calculates the coefficient required for structural analysis of documents (Mayer, 2015).

In conclusion, we note that the main feature of specialized packages is the presence of functional limitations relative to the analysis of the data associated with the specific method of collection of primary sociological information. The use of this type of product requires the user knowledge of the list of statistical procedures characteristic for a specific method, which, of course, becomes an obstacle to their mass usage.

#### **4 INFORMATIZATION OF THE PROCESS OF PRESERVING SOCIOLOGICAL INFORMATION: EUROPEAN AND UKRAINIAN EXPERIENCE**

Another area of using information and communication technologies in applied sociology is the preservation of data in the format of archives, information banks (big data). Their main functions are quite clearly defined: the development of methods and means of accumulating sociological information; standardization of methods; information and reference support for sociologists; coordination of sociological research; exchange of primary empirical data; creating conditions for secondary and comparative analysis of data; carrying out settlement and computing operations at the request of users.

The ultimate goal of working on the sociological archive and sociological information bank is to transform it into a transnational center for the exchange of social information to attract a wide range of specialists (scientists, politicians, journalists, NGO activists, government officials) to in-depth systematic analysis of various aspects of society. Due to the constant replenishment of the archive, it is advisable to introduce a special bulletin. There will be along with informa-

Table 2: The comparative analysis of universal/semi-universal statistical packages.

Features / Program	SPSS	OCA	Vortex	Stadia	Statistica	StatPlus	DA Standard
Forming tools	-	-	+	-	-	-	-
Basic statistical methods	+	+	+	+	+	+	+
Filter data	+	+	+	-	-	-	+
Linear modeling	+	+	+	+	+	+	-
Multidimensional modeling	+	-	+	-	+	+	-
Nonparametric methods	+	+	+	+	+	+	-
Correlation analysis	+	+	+	+	+	+	+
Factor analysis	+	+	+	+	+	+	+
Cluster analysis	+	+	+	+	+	+	-
Verification of statistical hypotheses	+	+	+	-	-	+	-
Scaling	+	-	+	+	-	-	-
Calculate the sample	-	+	+	-	-	-	-
Graphical representation of the data	+	+	+	-	+	+	-

tion about new receipts to the archive, comparative materials of surveys of different years and trends in social change.

The Council of European Social Science Data Archives (CESSDA) was established in 1976. It is an informal association of European national data archives of about 70,000 studies in the social sciences and humanities. The main task of this organization is to ensure the functioning of a full-fledged sustainable research infrastructure. This association helps the scientific community to conduct high-quality research in the social sciences to form effective solutions to the main challenges facing society today and to facilitate teaching and learning in social sciences. CESSDA must fulfill its mission by participating in the development and coordination of standards, protocols and the dissemination of best training practices.

The history of national archives began in 1985 when the first large-scale database of sociological research at the Institute of Social Research of the USSR Academy of Sciences was created.

In December 2014, the National Sociological Data Bank "Kyiv Archive" was established at the initiative of the Kyiv International Institute of Sociology and Center "Social Indicators" in cooperation with the Kyiv-Mohyla Academy under a grant from the International Renaissance Foundation ([ukraine.survey-archive.com](http://ukraine.survey-archive.com), 2014).

The directory contains a list of sociological research, available for download from the website of the National Bank research (<https://ukraine.survey-archive.com>). While the website contains only part of the available data, and the archive continues to grow. Registered users have the ability to download survey data directly through the website. Downloadable materials include an array (SPSS / OCA), questionnaires, survey description, descrip-

tion of the methodology, supporting materials.

The monitoring study presented at the Bank in the format of a coherent set of files. The archive search is by keywords, and indexing subjects of research for their name, the name of the author of the study, date collection, and other parameters that characterize research in General. The purpose of the search in this part of the archive is to receive the data file and accompanying documentation for further secondary analysis. Storage unit in the archive is determined by a separate research question.

Nowadays, the number of organizations that transmit information to the National Bank of Sociological Data includes Kyiv International Institute of Sociology, TNS, Institute of Sociology of NASU, Taras Shevchenko National University of Kyiv, Ukrainian Center for Economic and Political Studies named after O. Razumkov, Ilko Kucheriv Democratic Initiatives Foundation, Ukrainian Institute for Social Research named after O. Yaremenko, Kyiv Center for Political Research and Conflict Studies, Center for Social and Marketing Research "SOCIS" ([ukraine.survey-archive.com](http://ukraine.survey-archive.com), 2014).

Since the professional activity of sociologists-empiricists is mass, the archives of sociological data as an institutional entity will be used productively in the case of their active cultivation at the level of both individual and collective social practices. Such transnational archives are user-friendly means of solving research problems. They are characterized by mobility, accessibility for understanding, represent a high level of professionalism of scientists, without exaggeration is a more convenient modern form of research not only in sociology but also in related sciences.

The final stage of any empirical sociological study involves the preparation of a final document (informa-

tion, press release, information note, analytical note, report). Its choice is determined by the type of study and the wishes of the customer. MS Windows applications or alternative services available to the researcher are used to make the report and prepare for the presentation of the research results.

## 5 RESULTS AND DISCUSSION

As the study of scientific literature and personal practical experience, professional training of specialists-sociologists in higher education, has wide opportunities to use information and communication technologies, without which no full-fledged implementation of empirical sociological research. The variety of information technologies, as well as their capabilities, is impressive. However, we should not forget that the most important component of digital literacy of a sociologist is the formation and development of algorithmic thinking. It is a set of specific ideas, skills and abilities related to the concept of the algorithm, methods of its development, use and recording. Mastering a rich arsenal of application packages of computer programs, cloud technologies for the collection and processing of sociological data is an important component of the training of future sociologists.

Each of the above-mentioned software products has its characteristics of use in applied sociology, primarily related to their functional purpose, compatibility with alternative programs, pricing and technical conditions of use. The modern statistical package must meet the following minimum set of requirements: modularity; use of simple problem-oriented language to formulate user's tasks; automatic organization of data processing; introduction of a data bank and compiling reports on the results of the analysis; dialogue mode of work of the user with a package; compatibility with other software. The developers of most statistical packages often claim that the program they have developed is the best for data processing. Given the variety of proposals, it is difficult to make the right choice in favor of a particular package of applications. However, if a sociologist does not have sufficient knowledge and competencies, then even the most advanced software product will not allow making quality collection and analysis of sociological data. At the same time, an incorrectly selected software package that does not have the proper technical characteristics can slow down the work of even an experienced analyst, making it difficult to identify the necessary patterns and obtain the results of data analysis.

However, it is important to emphasize the fact that

in connection with the computerization of companies the new demands put forward in relation to the teaching staff of higher educational institutions, which imparts training to students. Their level of informational knowledge requires a significant increase in that is one of the promising areas of research.

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