

Development of Information Processing Skills in Sociology Bachelors

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Summary

The article reviews the issue of formation of practical skills in sociology bachelors on sociological information processing in the context of their professional training, based on Bachelor's Standard of Ukrainian Higher Education in the specialty “Sociology”. The main internal / external factors that determine the need for the formation of practical skills in sociology bachelors have been identified. The content of courses taught, where students learn how to process research results, project and model social processes or phenomena using statistic packages, as well as forms and methods of teaching have been disclosed. International experience on development of information processing skills in sociology bachelors has been considered.

Keywords:

bachelor of sociology, information and communication technologies, normative-legal framework, practical skills, professional training.

Introduction

The need to overcome the crisis in socio-political and economic life of Ukrainian society puts forward an increased requirements for sociologists whose professional activities includes collection information, analysis of trends in individual phenomena in various spheres of society life, generalization and evaluation of sociological information, the formation of theoretical and analytical and value-symbolic systems of social identities, which requires critical thinking skills for the rational use of information, ability to creatively and non-standardly solve social problems through integration of sociological knowledge and knowledge from different subject areas, skills to work in the field of global strategies and forecasts [1].

The development of communication and information technologies is one of the main features of modern society. In the context of society global informatization modern information and communication technologies aimed at creating, maintaining and providing optimal ways of presenting information have become one of the most important factors of social development and a means of increasing the effectiveness of all spheres of human life [2], [3].

Nowadays, one of the main tasks of higher education is to form the readiness in graduates to perform professional duties in the information society [4].

The Ministry of Education and Science of Ukraine approved by its Order No 371 the Bachelor's Standard of Ukrainian Higher Education in the specialty “Sociology” on 04.03.2020 [5]. It defines:

- the integral competence of a graduate – the ability to solve complex specialized problems and practical problems in the field of sociology, providing application of basic sociological theories and methods;

- general competencies, with an emphasis on the ability to make use of information and communication technologies;

- profession-specific competencies, emphasising the skills to use information and communication technologies in the process of search, collection and analysis of sociological information.

L.Shinkarenko [6] has conducted the research of the current state of sociological science and training of sociologists in the system of higher education of Ukraine. The conducted analysis of findings allows identifying the following specific contradictions in the professional training of sociologists:

- between the need of society for highly qualified, information educated, principled sociologists and the insufficient focus of professional training of sociologists on the formation of these professional qualities;

- between the traditional forms of organization of educational and cognitive activities of sociologists and the latest innovative, analytical and informational forms of professional activity;

- between the analytical-formal and informative-expert components of sociologist's activity.

The contradictions mentioned above allow to objectively formulate the requirements for the professional training of sociologists at the bachelor level, in particular, graduates are to be able to:

- Conduct sounding and analysis of trends in certain phenomena of various spheres of public life along with gathering of information.

- Generalize and evaluate a variety of information, the formation of theoretical-analytical and value-symbolic systems of social identification.

- Perform activities in the field of global strategies and forecasts.

- Build and logically use models to describe and predict various social phenomena.

Based on our professional activity on the training of sociologists in the system of higher education we add – a graduate bachelor is to be able to accumulate, store and transmit information; to apply and process it purposefully; to learn technology to solve any professional issue based on knowledge, skills and abilities.

Particularly important from the point of view the effectiveness of the training of sociologists is the formation of practical skills of processing sociological information with the help of applied computer programs, work with information networks [7], [8].

This highlights the issues of updating of training in higher education of highly qualified professionals capable to solve effectively the professional tasks in the modern information environment.

The aim of the paper is to introduce the Ukrainian sociological education into the context of practical skills formation on information processing in bachelors of sociology. Research methods applied: analysis and synthesis of scientific literature (to clarify the key concepts of the study), systematization (in order to identify existing scientific approaches to solving the problem), theoretical generalization (to formulate conclusions).

Theoretical Consideration

The Content of Information Culture

The solution of numerous sociological problems requires from sociologists the ability to correctly formulate problems and adequately interpret the results obtained within the social sciences. Thus, the specifics of professional sociological activity leads to the formation and improvement of practical skills to process sociological information by future sociologists, which is an integral part of their professional training in higher education.

Based on the generalization of scientific findings of N.Berman [9], E.Kuchko et al. [4], V.Paniotto and V.Maksymenko [10], we sorted out factors that necessitate the formation of information culture and practical skills of processing sociological information in sociology bachelors:

- External, which are conditioned by society trends: informatization and computerization of society processes; diversification of professional functions performed; the demand to structure the information environment by the professional field of knowledge.

- Internal, which relate the need of solving issues arising directly in the process of training of sociologists: intensification of the learning process; advanced learning in the dynamic world of technology.

Based on the generalization of scientific findings of Yu.Branovskiy [11], R.Gurevych [12] we interpreted the concept of “skills on processing of sociological information” as a component, which included: ability to perceive and analyze information, process the information required to complete a specific task or problem, navigate oneself in the modern information environment; readiness to make use of modern information-communication technologies and the whole arsenal of hard- and software to analyze, project and model social phenomena.

Information culture in a broad sense can be defined as a special social mechanism for the transmission of meaningful information, i.e. as a way of activities aimed at accumulation, preservation and transmission of ideas, knowledge and material and spiritual values. The formation of information culture in a whole generation of people is a social order of the information society.

The information culture of a society can be understood as a set of achievements in the field of its informatization: the degree of satisfaction of people with available information, the level of computer equipment and means of communication, the number of people who use information technology in everyday life.

From this point of view M.Antoncheko [13] considers the human information culture as a systematic formation of an individual that: integrates knowledge of basic information technology methods, ability to use available information to apply problems, personal computer skills and technology communication, the ability to present information in a form understandable to all; focuses on expanding and updating knowledge.

Even from such a narrow and simplified interpretation of information culture, it is clear that it is largely determined by the specifics of information flows used in their professional activities by a specialist in a particular field. An important role in the formation of information culture is played by education, which should form a new specialist in the information society. This specialist needs to develop the following skills and abilities: information retrieval; differentiation of information; highlighting relevant information; development of criteria for evaluating information; obtaining information and its use [14].

Following the scientific research of I.Burganova [15], D.Jonassen et al. [16], M.Zhaldak [17], we defined the content of information culture of a sociologist, as the one consisting of interrelated components of:

- General education (knowledge and skills of effective use of information; knowledge on modern information-communication technologies);

- Knowledge and understanding of information culture in a society and prospects for its development; worldview (understanding the essence of information and information processes, its role in the process of learning; ability to anticipate the consequences of activity);

– Professional (understanding the goals and directions of processing of sociological information and its application; skills and abilities to work with software).

Subjects taught within the curriculum

The findings of P.Allen and K.Bennett [18], M.Biryukova [19], V.Bryzhko et al. [20], N.Bureeva [21], D.George and P.Mallery [22], A.Gorbachyk [23], A.Gorbachyk and S.Salnikova [24], L.Kalashnikova and L.Chernous [25], L.Khyzhnyak [26], O.Markovets et al. [27], A.Sadchikova and M.Rodin [28], O.Vasylenko and I.Sencha [29], V.Verbets [30] have significant implications for the understanding of what the curriculum on training of bachelors of sociology is to cover. In particular, based on analysis of curriculum of leading Ukrainian higher education institutions specialising on training of sociology bachelors, we confirm that the following courses are provided to enrich skills of sociology bachelors on processing the sociological information:

– *Basics of Informatics and Social Informatics* – aimed at forming the operational component of information culture. The course includes themes: Specialized information technologies used in the professional activities of a sociologist; Information and its role in society; Social-cultural development in the informatization era; Homo Informaticus; Informatization of the social sphere.

– *Higher Mathematics* – an important place is given to the development of methods of higher mathematics with the help of spreadsheets. The use of computer technology in combination with other means allows improving the perception, comprehension and memorization of educational information, as well as taking a differentiated approach to students, organizing a person centered learning. This ensures the involvement of all students in the learning process, which, in turn, has a positive effect on the learning motivation.

– *Social Statistics*. Scholars and practitioners are now aware of the need to move from mutual ignorance to cooperation. This is facilitated by the statistical training of sociologists. A statistically knowledgeable sociologist is to know: basic statistical concepts; forms of expression of social statistical indicators; stages and features of statistical research of socio-economic phenomena and processes; principles, rules of application of basic statistical methods in social statistics; features of organization of the national statistical information system and the system of its indicators; main directions of analysis of statistical data and sources of statistical information on the social composition and social structure of society, the level and quality of population life, the development of public service industries, etc. A sociologist is to be able to: compile analytical reports based on social statistics; develop a program of statistical research of social phenomena and processes; calculate average, relative statistical indicators, as well as indicators of variation,

dynamics of social phenomena (processes), etc. Within the course, the theme “SWOT-analysis of the use of social statistics in sociology” is delivered with the purpose to determine the possibilities of using social statistics data in sociological research based on the application of SWOT-analysis; to identify ways to increase the effectiveness of interaction between statistical services and sociologists (sociological centers) in modern Ukraine. The technology of SWOT-analysis in this case is considered as a formal methodology that allows determining the causes of effective or inefficient use of data and methods of social statistics by sociologists. This is a concise analysis of information on the possibilities of social statistics, based on which a conclusion is made on the direction statistics and sociology move to. The sociology students perform the following tasks: characterise the strengths and weaknesses of a particular project; assess opportunities and threats from the external environment; sum up data in one table and carry out the analysis.

At the intersection of opportunities and threats, strengths and weaknesses of the use of data and methods of social statistics in sociology students are to develop possible options for using the strengths of statistics and neutralizing the weaknesses of certain statistical resources in sociological research. The SWOT analysis helps to answer the following questions: What are the potential strengths of statistics in the study of social phenomena? Do sociologists use their advantages in the study of social phenomena compared to statistics? Are the shortcomings of social statistics its vulnerabilities? What favorable opportunities give sociologists a real chance of success when using data and methods of social statistics in sociological research? What threats of statistics application are to be of most concern to a sociologist? What is the specificity of conducting a quality sociological survey using statistical methods and data?

– *Information Security*. Statistics with the system of indicators are an information resource, and as such, they become the object of information security. The information security of the state largely depends on the successful integration of information resources of sociology and social statistics. Moreover, this requires the formation of statistical awareness of sociologists in the process of their training, overcoming myths about statistics. The course aims to develop: conscientious behavior in relation to the threats of the modern information society; knowledge on main cyber threats; the ability to protect personal and business information from cyber threats; media immunity in the professional consciousness. Its overall goal is the mastering knowledge on the formation of information security from the national to the personal level and defining approaches to the protection and development of information environment for the society comprehensive information development. The list of themes covered: e-government and information security:

public administration aspect; regulatory (normative legal) framework for information security and international experience in its formation; information hygiene and the formation of media immunity. According to the learning outcomes, bachelors of sociology are to demonstrate: (i) knowledge on: concepts of e-government and principles of e-government formation; the essence of the state policy of Ukraine in the field of information security; main provisions of the legislation of Ukraine on information security; experience of foreign countries in implementing information security measures; mechanisms and tools to prevent threats in the information environment; principles on formation of media immunity; (ii) skills to: analyze, summarize and disclose the content of major laws and regulations on e-government and information security; apply the norms of current legislation governing the information sphere and information security in practice; use mechanisms and tools to ensure information security in the workplace and in everyday life; (iii) abilities: study the best practices in the formation of information security of other countries and their selection for the implementation in Ukraine; analysis and generalization of information on various aspects (social, economic, criminal, administrative, etc.) of formation of information security; compliance with the rules of safe work on the Internet, taking into account the principles of information security; analysis of the level of protection of information systems; practical application of known software for information protection and cybersecurity.

The formation of skills on the sociological information processing in bachelors also takes place while studying the courses “Methodology and Methods of Sociological Research”, “Mathematical and Statistical Methods of Sociological Research Data Analysis”, “Social-Engineering Activity and Social Forecasting”, within the content of which sociology bachelors learn how to process research results, project and model social processes or phenomena using statistic packages:

– *Content analysis programs*:

(i) Textus Pro 1.0 – one of the simplest word analysis programs, designed to facilitate the work of copywriters, webmasters, SEO specialists. The main objectives of the program are: to calculate the use of keywords, their frequency and density; determining the number of words and signs in the text (with and without spaces); analysis of the text “nausea”, etc.;

(ii) Text Analyst 2.01 – the program is a tool for analyzing the content of texts, meaningful information retrieval, the formation of electronic archives. Options of the program allow to carry out: the analysis of the text with automatic formation of a semantic chain with hyperlinks; meaningful search for fragments of the text by constructing a hierarchical tree of topics; text abstracting; clustering of textual information by constructing a thematic tree that allows to organize the associative

network by keywords or phrases, to select from each topic its subtopics. The formation of hypertext structure and use of means of its navigation simplifies work with the text, establishing the reference between identical concepts;

(iii) Word Stat 1.1 is an utility for the quantitative analysis of text submitted in *.html, *.txt formats. The advantages of this program are the ability to combine similar words, despite changes in word forms, and the accumulation of measurement results, which simplifies working with large arrays of information;

(iv) ContentAnalyzer 0.52 – designed to analyze thematic web-documents on the number of keywords and their word forms, to build an abstract. The program contains an integrated interface that performs weight calculations coefficients required for structural analysis of documents.

– *Liga: Zakon (League: Law)* – the most complete source of systematic and reliable Ukrainian legal information with convenient tools for finding information. It allows tracking and correct interpreting of the most significant legal events, norms, rules and their consequences. Penetration of information and computer technologies and telecommunication networks into all spheres of society creates the danger of unauthorized and uncontrolled use of personal data, the consequences of which may harm an individual or the state as a whole. This requires the use of public administration, i.e. the use of organizational and legal measures to regulate public relations for the implementation of declared human rights. Effective management allows to stabilize the system, maintain its functional certainty, maintain a state of dynamic equilibrium with the environment. Therefore, public administration as a legal mechanism acquires importance of a target area of social development, based on knowledge of its laws and analysis of consequences of their impact. This interpretation of the management process leads to an understanding of the role of information as an important factor in the management of public life, according to which any dynamic system is organically linked to the flow of information that reflects data on people, events, objects, etc. Penetration of information and computer technologies into all spheres of society is accompanied by two aspects. On the one hand, new technologies and means of communication allow to “compress” time and “shorten” distances in terms of achieving the interests of an individual, groups of people, country, region, and world community. On the other hand, the problem of illegal activity by means of e-environment is urgent. Activities on the formation of databases, processing and dissemination of information on people without consent have led to the emergence of a problem of information security and protection of personal data of human, society and the state. The development of international legal, economic, financial, banking, cultural, law enforcement and other forms of cooperation, which

provides for the free movement of information resources on goods, capital and services using information and computer technologies and telecommunications networks, increasing personal data flows and maintaining sovereignty of the state determine the objective need to protect personal data. Information law is a reflection of public information relations and a systemic factor in the information society, which is formed in all developed countries through global information and computer technology and telecommunications networks. Its basis is the national information legislation as a system of normative legal acts aimed at regulating public relations in the information sphere.

– *OCA (Processing of Sociological Questionnaires)*

– technology for social and marketing data processing and analyzing. OCA platform presents the following software technologies:

(i) OCA MakeForm – a data input module from paper questionnaires. To speed up the processing, questionnaires can be entered by several operators at once, after which the results of their work are easily and quickly combined into one common data set. It is possible to enter both closed questions (answer codes chosen by a respondent) and open questions (texts of respondent's answers);

(ii) OCA CATI (Computer Assistant Telephone Interview) – a set of programs that allows using computers for telephone polls. Recently, all over the world, there has been a decrease in the desire of people to make contact with interviewers, to let them into their homes, to answer questionnaires, etc. In such conditions, research carried out by means of the telephone is becoming more and more popular. OCA CATI is one of the implementations of the modern technology. When conducting CATI surveys, each interviewer-operator is at the computer. Receiving a phone number from the program, an interviewer-operator makes a call and, reading questions from the screen, immediately enters the respondent's answers into the computer. This allows not only to save time and resources on printing and then entering questionnaires, but also to control the actions of an interviewer-operator during the interview in order to minimize errors;

(iii) OCA CAPI Android (Computer Assistant Personal Interview) – a set of programs that allows using tablets and smartphones for interviewing. Instead of a paper questionnaire, the answers are entered into a special program. This allows not only to save time and resources on printing, and then entering questionnaires, but also to control the actions of an interviewer during the interview in order to minimize errors. A special server program collects survey results from all devices connected to it in real time;

(iv) OCA MakeFormPsy – a program to conduct a variety of tests. The program supports the ability to pose various types of questions: open and closed, questions

with the ability to select one answer from the list or several, etc. There is the ability to display graphics (pictures, small videos). One can simultaneously test several people, collecting test results into one common database. The collection of test results in a special database is done automatically. Subsequently, the results obtained can be viewed and analyzed by means of OCA New Line. At the same time, in addition to the ability to view the test results of each of the participants, there is the possibility of statistical analysis of test results and answers to specific questions for any target groups;

(v) OCA for Windows – a program designed for statistical analysis of the results of sociological and marketing surveys. The package provides: work with features measured in metric, nominal, ordinal scales, as well as features with compatible alternatives (for questions that allow a respondent to choose several answer options); automatic selection of indicators and analysis methods in accordance with the specified types of attribute scales; automatic processing of missing values for features in various scales; support for graphical data analysis methods (cluster analysis); support for methods of multivariate statistical data analysis (factor analysis); convenient tools for working with high-quality information (open and semi-open questions), encoding answer texts; various methods for calculating additional features, automatic documentation of all calculations; construction of filters for selection of questionnaires by condition and random selection; different methods of combining data files; built-in language for writing syntactic tasks for logical control, recoding, building new features and other data manipulations; construction of tables of one-dimensional distributions (tables of frequencies and percentages), calculation of measures of central tendency and measures of variation for features in various scales; construction of two-dimensional tables of frequencies and percentages, as well as the calculation of indicators of the relationship of attributes; output of the constructed tables in plain text format and the format of the hypertext markup language of HTML documents, output of tables directly to the MS Excel workbook; construction of graphs and histograms; testing statistical hypotheses and building confidence intervals for various indicators; construction of linear regression equations; building a correlation matrix;

(vi) OCA New Line – an advanced shell for projects of different structures (monitoring, tracking, panels, diaries, etc.). It has an ability to generate reports for previously described patterns, supports not only the OCA but also the SPSS data format, and has an option of results display on the interactive index maps.

– *Sociometric survey data processing program – Sociometry Pro 2.3*. Sociometric research aims to: measure the degree of cohesion / disunity in a group; detection of "sociometric positions", i.e. the relative authority of a group members on the grounds likes / dislikes, where at

the extreme poles there are “leaders” and “exiles”; identification of intergroup subsystems, cohesive formations led by informal leaders. The success of the sociometric survey depends entirely on compliance with the following requirements: the study can be conducted only in social groups, who have some experience of joint activities; the size of the studied group of people should be such that provides the possibility of direct communication of all its participants each other; the questions presented in the sociometric form should correspond to the measured indicators, provide the ability to calculate sociometric criteria of group interaction; the content of the question that meets the selected criterion should be clear, unambiguous and understandable to all members without exception groups; it is required to indicate in the instructions for filling out the sociometric form the maximum allowable amount elections that can be made. When the sociometric cards are filled in and collected, the processing phase begins. The simplest methods of quantitative processing are tabular (sociomatrix), graphical (sociogram, ‘target’), and indexological (calculation of sociometric indices). Sociometry Pro 2.3 allows creating a database of sociometric research, to calculate group and individual sociometric indices, to visualize the results in the form of targets and graphs. The form of a socio-matrix is quite convenient for fast data entry, in particular, there is the possibility of simultaneous fixation of both positive and negative choices. The multi-window interface of the program allows comparing the results of different studies. Sociometry Pro 2.3 saves the report in *.html format, compatible with Microsoft application services.

– *SPSS* – a widely used program for statistical analysis in social science. In particular, SPSS provides the following features: analysis of time series, trend building; estimation of the probability of error in conditions of limited sampling; determining the optimal sample size for different methods of statistical method; regression and analysis of variance; automated clustering, i.e. the division of data into separate classes so that the classes differ significantly but with some features; analysis and scaling of categorical data; correlation analysis and detection of private correlations; visual representation of data, construction of diagrams. The platform presents the following software technologies:

(i) IBM SPSS Statistics Base – designed to solve research problems using ad hoc analysis, hypothesis testing, geospatial analysis and predictive analytics. The Base package is featured to carry out the following procedures useful in social research: descriptive procedures such as cross tabulations, frequencies, compare means and correlation, univariate and bivariate distribution analysis; numerical outcomes prediction and groups identification with the help of factor analysis, cluster analysis, linear regression, ordinal regression, discriminant analysis and Nearest Neighbor analysis; applying Monte

Carlo simulation techniques to build better models and assess the risk when inputs are uncertain; statistical inference techniques including parametric and nonparametric criteria for statistical hypotheses testing; multiple-factor dispersion analysis; plural responses frequency analysis; multidimensional scaling; reliability analysis; tables, diagrams, and charts such as scatter plot matrices, histograms, and population pyramids editing; system syntax based automation. High-end charts and graphs make it easy to create and share and interact with compelling visualizations results on a range of platforms and smart devices;

(ii) IBM SPSS Modeler – designed to tap into data assets and modern applications, with complete algorithms and models ready for immediate use;

(iii) IBM SPSS Modeler in Cloud Pak for Data – a containerized data and AI platform that enables to build and run predictive models anywhere – on any cloud and on premises;

(iv) IBM SPSS: Advanced Statistics, Bootstrapping, Categories, Complex Samples, Conjoint, Custom Tables, Data Preparation, Decision Trees, Direct Marketing, Exact Tests, Forecasting, Missing Values, Neural Networks, Regression.

– *Stadia (Statistical Dialogue System)* – the program allows to: carry out a comprehensive analysis of data using a set of modern and effective methods for determining descriptive statistics, criteria for difference, categorical, variance, correlation and regression analysis, etc.; visualize the obtained data by means of scientific graphics (distribution diagrams, multidimensional diagrams, forecasts, graphic archives, etc.); convert and calculate, import / export data.

– *StatPlus, StatPlus 7.0 and StatPlus Pro* – the program allows calculations of basic descriptive statistics (check of normality; comparison of averages, variances; definition of correlation coefficients; analysis of variance, etc.) and nonparametric statistics (analysis of conjugacy tables; rank correlations; regression analysis; etc.). StatPlus spreadsheet provides the use of built-in mathematical, statistical, financial formulas; data processing and generation, in particular random generation numbers, matrix operations.

– *Vortex* – a modular program, based on a module data entry, designed to: develop data collection tools (questionnaire, interview or testing form, etc.) with the possibility of publication in *.doc, *.html, etc.; introduce primary information collected during the study, as well as processing and analysis of this information; present the obtained results of the analysis in the form of tables, texts, graphs and diagrams with the possibility of their transfer in the formats *.doc, *.xls, *.html, etc.; calculate the size of the general population and the marginal error of representativeness for different types of samples; correct the disproportionate stratified sample; determine the actual

sampling error for control variables; support technically the interview process; work on the server of Internet polls; organize exchange of source data with Microsoft Excel, IBM SPSS Statistics, Microsoft Access and other programs via the clipboard or text data files.

– *X7.2009 program* – designed for statistical data processing, in particular calculating of descriptive statistics, checking normalcy distribution, calculation of Pearson and Spearman correlation coefficients, defining of parametric and nonparametric statistical criteria comparison, as well as graphical analysis of data.

Forms and Methods of Teaching

Such form of education as laboratory classes is leading in the process of formation in bachelors of sociology of practical skills on sociological information processing. Laboratory classes provide students with first-hand experience with course concepts and with the opportunity to explore methods used by scientists in their discipline. Leading a laboratory session has particular challenges and opportunities that differ from those in a standard classroom environment. Labs are directly related to other types of educational activities, promote the implementation of interdisciplinary links, the principle of interaction of theory with practice, the development of intellectual and cognitive activity of students. In addition, conducting labs ensures the implementation of the unity of cognitive and practical activities of students in the learning process; contributes to the acceleration of the process of learning, the formation of practical skills, the ability to use research methods.

The acquisition of the necessary skills is carried out in stages, from simple to complex, taking into account logic and sequence. First, sociologu bachelors get acquainted with universal software products and their capabilities in the process of solving professional problems, then – with special, focused on a specific profile of future professional activity.

Independent and individual work of students contributed to the development of skills of independent processing of various sources of information, the ability to independently study software products and master their application in the future professional activity.

The didactic goals of independent students' work are: to teach students to acquire knowledge independently from various sources; to raise the responsibility of students for their training; to develop independence in planning, organizing and performing future job responsibilities; to form professional thinking. Independent work of students in the process of forming of practical skills on sociological information processing can be classified by the levels of cognitive activity in performing educational tasks:

1) Work after a sample, performed on the basis of a known algorithm, using the method of information resources, selection and systematization of material;

2) Reconstructive works, during which the existing experience of solving problems is transformed,

3) Variable cognitive tasks (require a student to analyze an unfamiliar problem situation and obtain the necessary new information).

In the study of software and information technology used in the professional activities of sociologists, training is based on problem-based methods, which includes critical thinking; cognitive activity of students, and the ability: to establish cause-and-effect relationships; to make generalizations; argue judgments; to prove the truth or falsity of certain positions.

It is equally important to teach a student to focus thinking on the implementation of the tasks set.

Addressing International Practice

Similarly to Ukrainian higher education BA in Sociology programmes, offered in Australia [31], [32], Great Britain [33], [34], Europe [35], [36], [37], the USA [38], [39], guarantee that program graduates are well-rounded job candidates who benefit from education that concentrates on contemporary society and social problems, and helps them:

– to develop computer, writing and research skills; to learn an appreciation of ethical consideration;

– to acquire an appreciation of the need for evidence to public policy decision making;

– to interpret and analyze quantitative and qualitative data; to apply sociological concepts creatively in analyzing social phenomena;

– to attain sensitivity to people from various ethnic, religious, racial, economic backgrounds, and sexual identities;

– to understand how prejudice and discrimination are socially-created attitudes and behaviors;

– to critically analyze current events, as well as changes in the global economy and other major social institutions.

Students are taught to identify and analyze social phenomena that impact government institutions, organizations, communities, and businesses while objectively addressing social problems and social issues. They acquire knowledge and analytical skills for highly technical and rapidly changing social sciences professions. BA in Sociology programmes teach how data can be used to understand social, cultural, and political processes and interactions.

The combination of theoretical instruction, computer lab practice, and critical reflection on the social impact and ethical aspects of datafication make graduates skillful in the responsible collection and analysis of different social data structures. Graduates also develop more specialised skills and knowledge that are needed for the social research: devising surveys, collecting data, cleaning data, conducting data analysis using descriptive statistics and document analysis, conducting interviews

and fieldwork including the analysis, interpretation and presentation of the information collected, as well as writing up findings and concluding.

The use of interactive electronic-books in the teaching and application of modern quantitative methods and statistical software in the training of sociologists has received much attention. A good example of it is the e-book developed by W.Browne, Ch.Charlton and E.Washbrook at the School of education of University of Bristol [40]. The end product of what students get is 13 sets of practical exercises (pdfs) with 3 components 1. Takes student through a particular statistical concept in detail, and how to implement it in SPSS, using a specific data example (learning component) 2. A worksheet that asks the student to try out their knowledge by applying the techniques to a second dataset or set of variables (practice component) 3. Solutions to the worksheet (self-evaluation component). Easily accessible and popular are video tutorials [41] and YouTube video tutorials, in particular on SPSS [42].

Sociology graduates report that the most valuable skills they gained from their sociology courses are the following: using computer resources to locate information, learning statistical software, analyzing quantitative and qualitative data and interpreting the results, developing evidence-based arguments, evaluating different research methods, writing clear reports, working with diverse groups, and identifying ethical issues in research [43].

Conclusions

The specifics of sociological research is that researchers have to process large arrays of primary data. Carrying out such full-scale work is time-consuming and requires considerable effort. In conditions of development of modern Ukrainian society, when the demand for national and regional sociological research has significantly increased, clients are interested in timely receipt of operational, reliable, valid sociological information. That is why a sociologist faces the task not only to collect, process information efficiently and quickly, but also to be able to provide it to specialists of different levels and directions.

Equally important is to realize that being a part of of globalization processes, both economic, political and socio-cultural, requires access to and use of sociological data archives, secondary analysis of information to understand global development trends, comparison with the processes taking place in Ukraine.

Accordingly, the formation of practical skills of sociological information processing by means of computer programs, work with information networks is especially important in terms of effective training of sociologists.

References

- [1] Shinkarenko, L.V.: *Features of Professional Training of Future Sociologists*. Pedagogical almanac 11, 258–261 (2011)
- [2] Bartosh, O., Povidaiychuk, O., Kozubovska, I., Shandor, F., Afanasiev, D., Bodnar, O., Katsora, O., Oros, O.: *Leveling up the Information Culture of Social Work Bachelors*. International Journal of Computer Science and Network Security 21 (5), 222–230 (2021)
- [3] Zyazyun, I.A. (ed.): *Modern Information Technologies and Innovative Teaching Methods in Training: Methodology, Theory, Experience, Problems*. Planer LLC, Kyiv – Vinnytsia (2014)
- [4] Kuchko, E.E., Burova, S.N., Filinskaya, L.V.: *Methodology and Methods of Sociological Research*. Belarusian State University, Minsk (2018)
- [5] Bachelor's Standard of Higher Education in the specialty 054 "Sociology". Ministry of Education and Science of Ukraine. March 04, No 371 (2020).
- [6] Shinkarenko, L.V.: *Pedagogical Conditions of Mathematical Competence Formation of Would-be Sociologists in Higher Educational Institutions*. The State Institution "South Ukrainian National Pedagogical University named after K.D.Ushynsky", Odessa (2015)
- [7] Panchenko, L.F. *Training Sociology Students in Computer Analysis of Demographic Processes and Structure*. Information Technologies and Learning Tools 65 (3), 166–183 (2018)
- [8] Swiss Sociological Association. *Methods Training and Formation in Sociology*. Bulletin 150 (2016).
- [9] Berman, N.D.: *Formation of Information Competence of Students*. Contemporary Research on Social Problems 8 (2-2), 28–34 (2017)
- [10] Paniotto, V.I., Maksymenko, V.S.: *Quantitative Methods in Sociological Research*. Naukova Dumka, Kyiv (2003)
- [11] Branovskiy, Yu.S.: *Methodological System of Teaching Subjects in the Field of Computer Science to Students of Non-physical and Mathematical Specialties in the Structure of Multilevel Pedagogical Education*. Moscow State Pedagogical University, Moscow (1996)
- [12] Gurevych, R.S.: *Formation of Information Culture of a Future Specialist*. In: Zyazyun, I.A., Nychkalo, N.G. (eds.) *Pedagogy and Psychology of Vocational Education: Research Results*, pp. 354–360. National Transport University, Kyiv (2003)
- [13] Antonchenko, M.A.: *Information culture as a component of universal culture*. Scientific journal of National Pedagogical University named after

- M.P.Drahomanov. Series: Computer-based learning systems 1 (8), 161–166 (2004)
- [14] Kolomiets, A.M., Lapshina, I.M., Belous, V.S.: *Basics of information culture of a future teacher*. Vinnytsia State Pedagogical University, Vinnytsia (2006)
- [15] Burganova, I.I.: *Theory of Measurements in Sociology: a Textbook for Sociology Bachelors*. Direct Media, Moscow – Berlin (2015)
- [16] Jonassen, D., Davidson, M., Collins, M., Campbell, J., Bannan, B.: *Constructivism and Computer-Mediated Communication in Distance Education*. American Journal of Distance Education 9, 7–26 (1995)
- [17] Zhaldak, M.I.: *Computer-based Learning Systems – Formation and Development*. Scientific Journal of M.Dragomanov National Pedagogical University. Series 2: Computer-based Learning Systems 9 (16), 3–9 (2010)
- [18] Allen, P., Bennett, K.: *SPSS Statistics, Version 22: A Practical Guide*. Cengage Learning, South Melbourne (2014)
- [19] Biryukova, M.V.: *Mathematical and Statistical Methods of Analysis in Sociological Research*. Kharkiv People's Ukrainian Academy, Kharkiv (2003)
- [20] Bryzhko, V.M., Radyanska, A.I., Shvets, M.Ya. *Comparative Legal Study of Compliance of Ukrainian Legislation with EU legislation in the Field of Personal Data*. Triumph, Kyiv (2006)
- [21] Bureeva, N.N.: *Multidimensional Statistical Analysis Using Advanced Analytics Software Package "Statistica"*. Statistics, Nizhny Novgorod (2007)
- [22] George, D., Mallery, P.: *IBM SPSS Statistics 26 Step by Step: a Simple Guide and Reference*. Routledge, New York (2019)
- [23] Gorbachyk, A.P.: *User Guide to the OCA system*. Bureau of Statistical Analysis, Kyiv (2004)
- [24] Gorbachyk, A.P., Salmnikova, S.A.: *Analysis of Sociological Research Data by SPSS*. Vezha, Lutsk (2008)
- [25] Kalashnikova, L.V., Chernous, L.S.: *Analysis and Computer Processing of Sociological Information: Laboratory Workshop*. Petro Mohyla Black Sea National University, Mykolaiv (2020)
- [26] Khyzhnyak, L.M.: *The Myths about Social Statistics, Training of Sociologists and Information Security of the State*. Visnyk of V.N.Karazin Kharkiv National University. Series: Sociological Studies of Contemporary Society: Methodology, Theory, Methods 38, 92–95 (2017)
- [27] Markovets, O.V., Bereznyak, Ye.Yu., Lysyk, B.O., Kravets, R.B.: *Information Model of the System of Sociological Research in the Web Environment*. Bulletin of the National University "Lviv Polytechnic". Series: Information Systems and Networks 854, 274–281 (2016)
- [28] Sadchikova, A.S., Rodin, M.: *The use of applied software for the professional training of students studying humanities*. AIP Conference Proceedings 1797, 030016 (2017)
- [29] Vasylenko, O.A., Sencha, I.A.: *Mathematical and Statistical Methods of Analysis in Applied Research*. Odessa National Academy of Telecommunications named after O.S.Popov, Odesa (2011)
- [30] Verbets, V.V.: *Methods of Organizing and Conducting Sociological Research*. Berezhno (2008)
- [31] Careers and Study. The Australian Sociological Association. URL: https://www.tasa.org.au/content.aspx?page_id=22&club_id=671860&module_id=357878 (2022)
- [32] School of Social Science. URL: <https://social-science.uq.edu.au/undergraduate/sociology> (2022)
- [33] Strategies for Creating Inclusive Programmes of Study. Sociology and Information Processing. URL: https://scips.worc.ac.uk/subjects-and-challenges/sociology-socio_ip (2006)
- [34] Studying Sociology. British Sociological Association. URL: <https://www.britisoc.co.uk/what-is-sociology/studying-sociology> (2022)
- [35] Bachelor Programs in Sociology in Europe 2022. URL: <https://www.bachelorstudies.com/Bachelor/Sociology/Europe> (2022)
- [36] Sociology Degrees in Europe. URL: <https://www.educations.com/search/sociology-europe/c222-d58> (2022)
- [37] Swiss Sociological Association. Methods Training and Formation in Sociology. Bulletin 159 (2021).
- [38] Bachelor Programs in Sociology in the USA 2022. URL: <http://www.bachelorstudies.com/BA/Sociology/USA> (2022)
- [39] 21st Century Careers with an Undergraduate Degree in Sociology. 2nd ed. American Sociological Association, Washington DC (2015)
- [40] Browne, W., Charlton, Ch., Washbrook, E.: *Using Statistical E-books to teach undergraduate students quantitative methods and statistical software*. Centre for Multilevel Modelling, Bristol (2018)
- [41] Videos for Sociology. SAGE Journals. URL: <https://journals.sagepub.com/page/soc/videos> (2022)
- [42] White, P.: *SPSS tutorials*. URL: <https://www.youtube.com/user/patrickkwhite> (2014)
- [43] What career-relevant skills do sociology majors develop? URL: <https://sociology.wisc.edu/undergraduate-program/career-resources-for-undergraduates/what-career-relevant-skills-do-sociology-majors-develop> (2022)



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