

STATISTICAL LITERACY: TODAY'S NECESSITY

*M. Yu. Potapova,
PhD. (Economic), Associate Professor,
Department of Statistics Theory,
National Academy of Statistics, Accounting and Audit,*

For over 40 years now, on September 8 UNESCO has celebrated the International Literacy Day by reminding the international community that literacy is a human right and the foundation of all learning. This year the International Literacy Day was devoted to literacies for the 21 century.

According to the words of Irina Bokova, the UNESCO Director General, literacy is much more than an educational priority – it is the ultimate investment in the future and the first step towards all the forms of literacy required in the twenty-first century [1].

Literacy represents the basic foundation on which the main aspects of development of a person as an individual are built. Nowadays, the subject of literacy went far beyond the simple ability to write and read. According to today's development of society, modern person needs to be more literate to survive in present conditions. But if the skills to write and to read are really recognized as very important, other requirements are not so important in curricula of different specialists. Good computer skills are necessary for programmers and IT-specialists, literacy and successful usage of floods of information are necessary to librarians, statisticians, analysts and so on. However, the development of modern society demands new approaches to standards of education and modifications of curricula. Surely, the reaction of system of education cannot be very fast, but graduates must satisfy the needs of market and employers. And it is evident that at present time the concept of literacy must include more skills than in the past.

What did the concept of literacy involve earlier? In the past to be literate was enough to write and read. Moreover, the concept of semi-literacy is used for some of countries for person, who is only able to write or read.

Literacy is a foundation upon which to build further improvement of a person. The history of literacy begins with the history of alphabet. The moment came, when to understand letters became necessary to learn them. It should be noted that in ancient time no every pleb was able to be literate. Mostly it was a privilege of aristocrats and priesthood. The fundamental changes took a place in time of the Reformation. Thanks to typography, the books became more available and thus contributed the literacy of grass roots.

Literacy depends on economic conditions: if these conditions are too severe, the need to earn living leaves no time for training. It is proved that distribution of land ownership in the country, distribution of taxes and so on affect the literacy. Any inequality in that aspect affects the welfare, badly influences the development of literacy of people, and then significant factors are needed to compensate this damage. Political system of the state has a powerful influence on dissemination of literacy. French economist, historian and geographer Pierre Emile Levasseur noted, that, *ceteris paribus*, in countries where people take some part in governance we meet more care as for distribution of education and so literacy. Governments make a prominent contribution in the dissemination of literacy. However, intervention of government in education not always results in the spread of literacy. Disharmony of government initiatives and needs of society, misunderstanding of the demands of population, impossibility to fulfill the government regulations and so on even had a reverse effect sometimes [2].

Is it necessary to be literate? Why do people need literacy skills? How much do culture, history, language, religion and social and economic factors affect literacy? How does the technological advancement influence literacy? Is it possible to determine the minimum set of basic literacy skills? There are many questions to discuss and investigate.

The youth needs the new knowledge, new skills to be in demand in labour market and to achieve success, to study different languages, to realize the variety of cultures, to learn during all life. Literacy is the key to acquisition of knowledge, ability to be formed, obtaining of skills and ability to live in society. In the XXI century, literacy became a foundation of a stable peace and development.

However the new kinds of understanding of the literacy have appeared. They cover different educational needs of people in the context of knowledge communities and globalized societies [1].

Every stage of the development of society demands new knowledge from usual person to react for changes. And at present time, emergence of new kinds of literacies became unavoidable. So, nowadays different scientists suggest using the following: information, data, statistical, ecological, fine arts, social and technical literacies and others.

The phrase “statistical literacy” has a long history. In 1979, “Statistical Literacy” was the title of a textbook. In 2002, “Developing a statistically literate society” was the theme of the International Conference on Teaching Statistics (ICOTS-6). In 2006, statistical literacy was adopted as a goal by the American Statistical Association [3].

In the early part of the nineteenth century statistical literacy was a privilege of the educated minority (e.g., statesmen, Lords, economists, high ranking military officers, clergy) who were able to debate and tabulated results. In the first quarter of the XIX century there was a growing political concern that society might be

“deteriorating” and this instigated the need for more statistical information. In 1833 the statistical section of the British Association for the Advancement of Science was set up, regular meetings were held and in 1834 the statistical section founded the Statistical Society of London. In the 1830s this led to the formation of a series of statistical societies in major industrial towns. The Statistical Society of London focused on social issues, especially those that were of concern to the government. In these studies statistical literacy was demonstrated as the ability to describe and communicate about tabulated statistical information. Major technological advances after the Second World War and improved quality and content of statistical information collected by the UK national census led to the wider adoption of the new statistical methods by social researchers [4].

Scientists summarize the features of statistical literacy in the XIX century in this manner:

- statistical literacy is crucial for understanding the world around us;
- statistical thinking helps to shape social reform;
- self-directed learning stimulates an inquiring mind;
- real-world problems promote the development of new methods of enquiry;
- statistical reasoning is the cornerstone of evidence-based research [4].

Statistical literacy requires many abilities, the most important of which are mathematical and statistical skills, the competency to understand the figures correctly and to distinguish between valid and misrepresented data.

To deal with information is a connecting link for information, statistical and data literacy. That is why all three literacies are inter-related. Information literacy is a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and effectively use the needed information. Statistical literacy studies the use of statistics as evidence in arguments. Also, students need to understand a wide variety of tools for accessing, converting and manipulating data. All three literacies are tied together by a common set of problems and a similar level of approach. And all three literacies can be useful to students of any major and should be core elements in a college education. Information literacy is a set of abilities requiring individuals to “recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information”. Data literacy means ability to obtain and manipulate data: understanding structured query language, relational databases, data manipulation techniques, statistical software (e.g., SPSS, Minitab and MS Excel) and data presentation software (e.g., MS Excel and MS PowerPoint). Statistical literacy is an essential component of information literacy. According to the perspective from what we consider relation between the three literacies, their importance can be different. For example, from the perspective of critical thinking the first is information literacy, the second – statistical literacy and the third – data literacy [5].

Reliable statistical information is essential for describing social phenomena and development. Thus, statistical information is widely used in social, political and economic planning and decision-making. Information cannot be used if it is not made publicly available. Increases in scientific literacy and scientific understanding are supported by a number of different arguments. The practice argument states that citizens need information in order to be able to act in a modern, increasingly technical and scientific society. The democracy argument emphasizes the importance of the ability to understand complicated problems and phenomena, and their scientific and technical backgrounds in order to be able to make sensible decisions. According to the economy or professional argument, human resources with adequate basic education and readiness to read scientific information are the main force contributing to economic development [6].

Statistics permeates our everyday life. Different information resources use statistical terms, which must be clear for everybody. According to the results of the study of foreign scientists, the percentage of young workers (18-25) in business who use a particular statistics topic was the next (frequency of use, %): 60 - draw up tables of data; 54 - read and interpret tables of data; 53 - write reports based on data for others; 52 - decide what data to collect; 51 - calculate the mean; 40 - detect and estimate trends; 37 - make decisions using data; 19 - calculate variance or standard deviation and so on [7].

College-level students pursuing majors that don't require a quantitative course still need a statistical literacy course that helps them develop the skills to evaluate arguments that use statistics as evidence. The W. M. Keck Statistical Literacy Project was realized at Augsburg College. After studying statistical literacy, 43 percent of students strongly agreed that the course helped them develop critical thinking skills and 18 percent strongly agreed that successful completion of the course should become requirement for graduation [7].

A necessary condition for the effective management is availability of information on quantitative characteristics of control objects combined with quality content and especially with the trends of development influenced by factors of internal and external environment. Therefore, the specialists emphasize the importance of the statistical method of analysis of economic processes, which should be based on the principles of a systems approach.

In this regard, modern society needs analysts, statisticians, experts and consultants of high quality who are able:

- to collect statistical information on social and economic development at the macro-, meso- and microlevels, systematize and classify it;
- to work out and use the methods of processing, generalization and analysis of economic information;
- to use creatively information and results of analysis, make conclusions on this basis and justify management decisions;

- to evaluate the effects of management decisions taken;
- to use effectively the information resources and the latest advances in computer technology [8].

The purpose of statistical inquiry is to learn more about a real situation by unlocking the stories in the data. Some scientists view statistical literacy as about reasoning and thinking. The focus for National Statistics Offices is primarily on making data products including statistical indicators. For example, Statistics New Zealand has a number of products designed to support statistical learning, and a larger number designed for public and/or professional audience. Some of Statistics New Zealand's methodology staff have a high school or tertiary teaching background and, in general, these staff retain both their interest and some of their networks in statistical education. The department has a strong relationship with leading New Zealand academics in statistics education and jointly with Ministry of Education provides funding for the CensusAtAchool project. Statistics New Zealand provides support for teachers via conferences and teacher workshops and publications [9].

Many years ago futuristic writer H.G.Wells predicted that for an educated citizenship in a modern democracy statistical thinking would be as necessary as reading and writing. In his book *Mankind in the Making* he wrote, that "...the time may not be very remote when it will be understood that for complete initiation as an efficient citizen..., it is an necessary to be able to compute, to think in averages and maxima and minima, as it is now to be able to read and write" [10]. Humankind tries to achieve this goal up till now.

References

1. International Literacy Day. Literacies for the 21st Century [Electronic resource]. Available at: <http://www.unesco.org/new/en/unesco/events/prizes-and-celebrations/celebrations/international-days/literacy-day/>
2. Literacy [Electronic resource]. Available at: <http://en.wikipedia.org/wiki/Literacy>
3. Schield M. Statistical Literacy: A New Mission for Data Producers [Electronic resource]. Available at: <http://www.statlit.org/pdf/2011SchieldSJAOS.pdf>
4. Gillian A. Lancaster. How Statistical Literacy, Official Statistics and Self-Directed Learning Shaped Social Enquiry in the 19th and Early 20th Centuries [Electronic resource]. Available at: <http://iospress.metapress.com/content/0045102050757076/fulltext.pdf>
5. Schield M. Information Literacy, Statistical Literacy and Data Literacy [Electronic resource]. Available at: http://www.iassistdata.org/downloads/iqvoL282_3shields.pdf
6. Helenius, R. and Mikkela, H. Statistical Literacy and Awareness as Strategic Success of a National Statistic Office – the Case of Statistics Finland [Electronic resource]. Available at: <http://iospress.metapress.com/content/rp5178620w170m4l/fulltext.pdf>
7. Schield M. Statistical Literacy Curriculum Design [Electronic resource]. Available at: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.144.8102&rep=rep1&type=pdf>
8. Головач А.В., Захожай В.Б., Головач Н.А. Статистичне забезпечення управління економікою: прикладна статистика: Навч. посібн. – К.: КНЕУ, 2005, 333 с.

9. Forbes S., Camden M., Pihama N., Bucknall P., Pfamnkuch M. Official Statistics and Statistical Literacy: They Need Each Other [Electronic resource]. Available at: <http://iospress.metapress.com/content/p4k3645850105n06/fulltext.pdf>
10. Schafer D. Preface for Instructors. An introduction to Statistical Thinking [Electronic resource]. Available at: <http://www.science.oregonstate.edu/~schafer/ist/Schafer%20Preface%202007%2005%2008.pdf>

Summary

The paper deals with the evolution of literacy of population. The historical aspects of statistical literacy in various countries and the need to improve it are investigated.

Keywords: literacy, statistical literacy, teaching of statistics.

Анотація

В роботі розглянуто питання еволюції грамотності населення. Досліджуються історичні аспекти вивчення статистичної грамотності в різних країнах та необхідності її покращання.

Ключові слова: грамотність, статистична грамотність, вивчення статистики.

Аннотация

В работе рассматривается вопрос эволюции грамотности населения. Исследуются исторические аспекты изучения статистической грамотности в разных странах и необходимости ее улучшения.

Ключевые слова: грамотность, статистическая грамотность, изучение статистики.

