THE ROLES OF GRAPHICS, DIAGRAMS AND TECHNOLOGICAL TOOLS IN TEACHING MATHEMATICS

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Abstract: *This article is presented ideas about the use of various pedagogical tools in the teaching of mathematics by students of the Faculty of Humanities.*

Key words: *education ,empirical, faculty, method, research, spheres, technology, tool.*

Аннотация: *В данной статье представлены идеи по использованию различных педагогических инструментов при преподавании математики студентами гуманитарного факультета.*

Ключевые слова: *образование, эмпирическое, факультет, метод, исследование, сферы, технология, инструмент.*

It is said that a student studying in the humanities should make calculations in his work, understand the probabilistic nature of random events, read information presented in the form of graphs, tables. More humanities majors that require a higher level of education involve the use of mathematics. Currently, probabilistic-statistical knowledge is an indispensable condition for creative work in many humanitarian fields. If the objects of study in anthropocentric sciences are the understanding of random events, then the development of these sciences in the future implies the widespread use of mathematical statistical methods. A researcher must deal with a large amount of data, systematize empirical materials, and build his judgments in conditions of uncertainty. Due to the use of mathematical methods, the scientific level of research increases dramatically.

Let's consider the subject and problems of mathematical statistics. We distinguish the following tasks of mathematical statistics: collecting information, showing methods of its processing, determining the existence and strength of relations between characteristics, forming conclusions, forecasting. The assigned tasks and methods of solving them are of practical importance for various spheres of human activity and are very important in psychological, pedagogical, biological, historical, linguistic, socio-economic research.

We will consider general and selective collections. Mathematical statistics make it possible to determine and measure the laws of development of events

and processes, the relationships between them. Knowledge of laws is realized by studying a set of events, not individual events, because laws are fully manifested only in a set of events. Students should know that research is divided into individual and integrated research. The study of a homogeneous set of objects with respect to some characteristic or quantitative quality can be a holistic study, that is, each of the objects in the set is studied. Comprehensive surveys are used, for example, in population censuses, in the collection of data in the form of reports covering enterprises of different forms of ownership, etc.

Let's pay attention to the fact that in the humanities research is usually conducted a sample study: some objects are randomly selected from the whole set and studied, and then the obtained results are generalized to the whole set of objects. A sample set or sample is a subset of randomly selected objects. For example, in the study of pedagogical experience, the general research method is used, and in the study of the teacher's work style on specific topics, the selective research method is used, as a result of which the technique used in working on a given topic is recorded. A general set is the sum of all set units that have a certain property and need to be studied. For example, if 100 students out of 1000 school students are selected for the study, then the total sample size is N=1000, and the sample size is n=100.

In addition, we note that the idea of the selection method, replacing the study of homogeneous objects with their general research and avoiding serious mistakes in conclusions, is a very ancient idea. The selection method was used in the study of economic life processes in Ancient Egypt and Ancient Greece, and in Russia in the 17th and 18th centuries. It has been used, for example, to determine the value of whole harvests and threshing yields on a trial basis. We will draw students' attention to the theoretical foundations of the selection method. The theoretical basis is the law of large numbers. We will show the application of the law of large numbers with the following example. During one sociological study, 500 people were first asked a question, and 54.9% of the participants answered the question in the negative. Then 1000 people participated in the survey. Sociologists received a negative answer from 54.2 percent of all participants, and then from another 5 thousand people, the result is almost the same - 55.4 percent. Finally, when 30,000 people were asked, 55.5% of those asked answered in the negative. We conclude that you don't need to interview all the people to find out that about 54-56% of all people have a negative opinion about the issue, maybe 500 people. We draw students' attention to the fact that the law of large numbers applies only to mass phenomena where each individual element is a random variable value. This

element is not only the result of a general law, but also the result of the influence of many factors independent of this law. Therefore, the selection method based on the law of large numbers cannot be used to study individual objects and events, it can only be used to study general processes based on general observation of facts. Considering the problem of data selection in sampling, we introduce the concepts of repeated and non-repeated samples. The selection is made in two ways: after the object is selected and tests are conducted on it, it can be returned to the general collection or not returned to the general collection. A repeated sample is a sample in which each selected item is returned to the general population after measurement. If a sample is not returned to a non-repeated population, it is called a repeated sample. A random sample with no repetition is usually used in practice. In order to draw conclusions about the characteristics of the general population from the sample, the sample must be a representative sample, that is, it must fully and adequately represent the characteristics of the population. The representativeness of the sample is shown only when the data is selected with impartiality. In part, research objects should be randomly included in the sample - this is a necessary condition for representativeness. A sample is drawn from the total population only in such a way that each object (component) of this population has an equal probability of being selected, and its inclusion or exclusion as a sample should not be affected by any factor other than chance.

It focuses on the following. There are several types of sample research, depending on how the selection of set elements in the sample is carried out:

a) simple random selection;

b) mechanical selection;

c) typical selection;

d) sequential selection.

We describe selected studies belonging to this type. In simple random sampling, the samples for the study are drawn one at a time from the population. The requirement of random selection is achieved in practice using lots, tables of random numbers, numbering. In typical sampling, the sample is divided into typical groups, and then an equal number of samples are selected from each group. In mechanical selection, the total set (or group) is conditionally divided into several groups, and one sample is randomly selected from each group. For example, if we want to select 20% of school students for research, then every fifth student will be selected; if 5% is needed, then every twentieth student is selected. In this case, the mechanism may not ensure the representativeness of the sample. We note the widespread use of mechanical

sampling in Russian statistics. Of great importance were the surveys of the State Statisticians, who, in addition to the survey of permanent households of peasant farms, also surveyed a certain part of mechanically selected farms under the extended program.

In any research, we emphasize that primary data can be obtained through direct observation, working with documents and conducting questionnaires. A distinctive feature of mathematics in the analysis of various processes is the presence of graphics, diagrams and similar qualitative features. Let's look at graphical methods of data presentation. Statistical data can be presented in the form of graphs if the goal is to emphasize some feature of the data, to compare them. Graphical comparisons can complement statistical tables, but are often used on their own. The graphic method is the most effective form of data perception. With the help of graphs, it is possible to see the relationship of events, to compare them. Statistical graphs are conventional representations of numerical values and their ratios in the form of lines, geometric shapes, drawings. Graphical comparisons can complement statistical tables, but are often used independently. The graphic method is the most effective form of data perception. With the help of graphs, the interaction of events is shown and compared visually. Statistical graphs are conditional representations of numerical values and their representation in the form of lines, geometric shapes and drawings.

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