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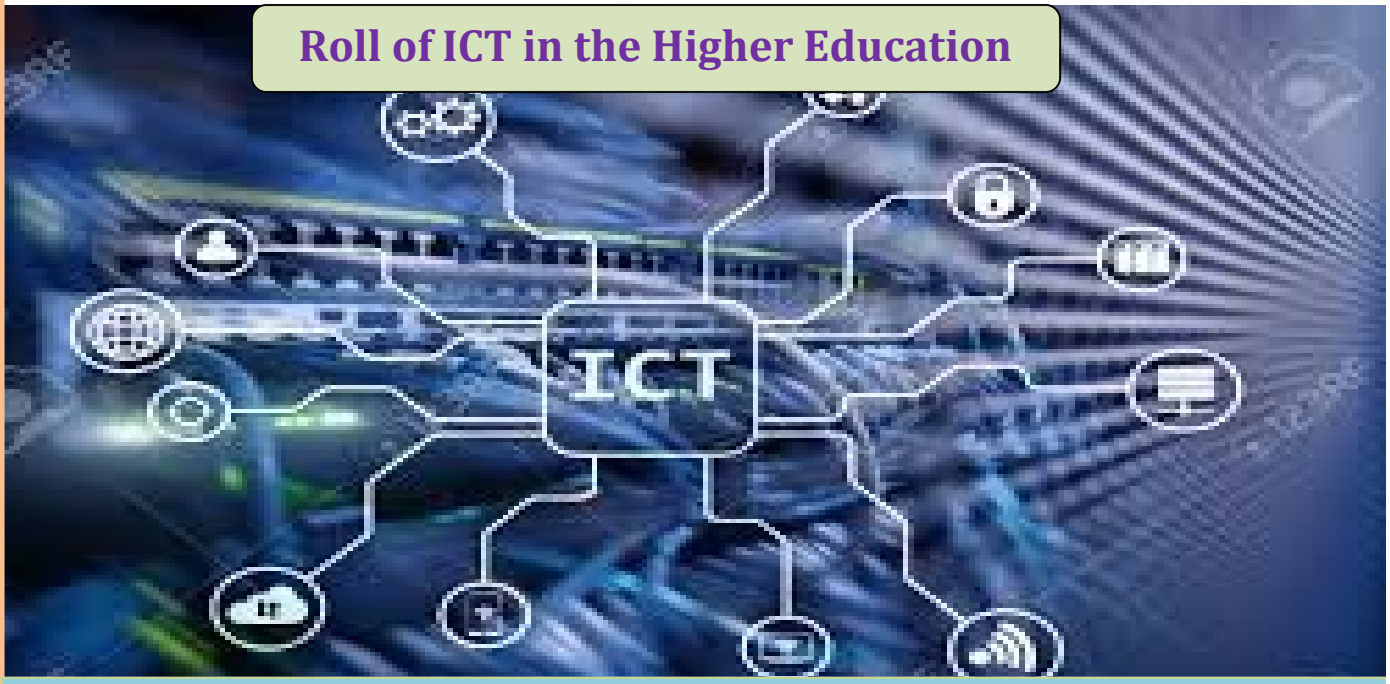

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The Role of Computer in Research

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Introduction:

Every researcher faced and looks at many problems in our society and his not only look at problem but also solved it is trying level best because problem solving is an age old activity. The development of electronic devices, specially the computers, has given added impetus to this activity. Problems which could not be solved earlier due to sheer amount of computations involved can now are tackled with the aid of computers accurately and rapidly. Computer is certainly one of the most versatile and ingenious developments of the modern rapidly. Computer is certainly one of the most versatile and ingenious developments of the modern technological age. Today people use computers in almost every walk of life. No longer are they just big boxes with flashing lights whose sole purpose is to do arithmetic at high speed but they make use of studies in philosophy, psychology, mathematics and linguistics to produce output that mimics the human mind. The sophistication in computer technology has reached the stage that it will not be longer before it is impossible to tell whether you are talking to man or machine. Indeed, the advancement in computers is astonishing.

To the researcher, the use of computer to analyze complex data has made complicated research designs practical. Electronic computers have by now become an indispensable part of research students in the physical and behavioral sciences as well as in the humanities. The research student, in this age of computer technology, must be exposed to the methods and use of computers. A basic understanding of the manner in which a computer works helps a person to appreciate the utility of this powerful tool. In this article researcher focus on how to important role of computer and fruitful in research, how does it help in analyzing data and important characteristics of compute in research.

Computer and Researches:

Performing calculations almost at the speed of light, the computer has become one of the most useful research tools in modern times. Computers are ideally suited for data analysis concerning large research projects. Researchers are essentially concerned with huge storage of data, their faster retrieval when required and processing of data with the aid of various techniques. In all these operations, computers are of great help. Their use, apart expediting the research work, has reduced human drudgery and added to the quality of research activity.

Research in economics and other social sciences have found, by now, electronic computers to constitute an indispensable part of their research equipment. The computers can perform many statistical calculations easily and quickly. Computation of means, standard deviations, correlation coefficients, 't' tests, analysis of variance, analysis of covariance, multiple regression, factor analysis and various nonparametric analyses are just a few of the programs and subprograms that are available at almost all computer centers. Similarly, canned programs for linear programming, multivariate analysis, Monte carol simulation etc. are also available in the

market. In brief, software packages are readily available for the various simple and complicated analytical and quantitative techniques of which researchers generally make use of. The only work a researcher has to do is to feed in the data he/she gathered after loading the operating system and particular software package on the computer. The output, or to say the result, will be ready within seconds or minutes depending upon the quantum of work.

Techniques involving trial and error process are quite frequently employed in research methodology. This involves lot of calculations and work of repetitive nature. Computer is best suited for such techniques, thus reducing the drudgery of researchers on the one hand and producing the final result rapidly on the other. Thus, different scenarios are made available to researchers by computers in no time which otherwise might have taken days or even moths. The storage facility which the computers provide is of immense help to a researcher for he can make use of stored up data whenever he requires doing so.

System of data analyzing:

Researchers interested in developing skills in computer data analysis, which consulting the computer centers and reading the relevant literature, must be aware of the following step:

(I) data organization and coding;
(ii) storing the data in the computer;
(iii) selection of appropriate statistical measures / techniques;
(iv) selection of appropriate software package;
(v) execution of the computer program.

A brief mention about of the above steps in appropriate and can be stated as under; First of all, researcher must pay attention toward data organization and coding prior to the input stage of data analysis. If data are not properly organized, the researcher may face difficulty which analysis their meaning later on. For this purpose the data must be coded. Categorical data need to be given a number to represent them. For instance, regarding sex, we way give number 1 for male and 2 for female; regarding occupation ,numbers 1,2, and 3 may number 1 for male and 2 for female; regarding occupation, number 1,2, and 3 may represent Farmer, Service and Professional respectively. The researcher may as well code interval or ratio data. For instance, I.Q. Level with marks 120 and above may be given number 1, 90-119 number 2,60-89 number 3, 30,-59 number 4 and 29 and below number 5. Similarly, the income data classified in class intervals such as Rs. 4000 and above, Rs. 3000-39000, Rs. 2000-2999 and below Rs. 2000 may respectively be represented or coded as 1, 2, 3 and 4. The coded data are to be put in coding forms (most systems) call for a maximum of 80 columns per line in such forms) at the appropriate space meant for each variable. Once the researcher knows how many spaces each variable will occupy, the variables can be assigned to their column numbers (for 1 to 80). If more than 80 spaces are required for each subject, then two or more lines will need to be assigned. The first few columns are generally devoted for subject identity number. Remaining columns are used for variables. When large number of variables are used in a study, separating the variables with spaces make the data easier to comprehend and easier for use with other programs.

Once the data is coded, it is ready to be stored in the computer. Input devices may used for the purpose. After this, the researcher must decide the appropriate statistical measure(s) he will use to analyze the data. He will also have to select the appropriate program to be used. Most researchers prefer one of the canned programs easily available but other may manage to develop

it with the help of some specialized agency. Finally, the computer may be operated to execute instructions.

The above description indicates clearly the usefulness of computers to researchers in data analysis. Researchers, using computers, can carry on their task at faster speed and with greater reliability. The developments now taking place in computer technology with further enhance and facilitate the use of computers for researchers. Programming knowledge would no longer remain an obstacle in the use of a computer.

In spite of all this sophistication we should not forget that basically computers are machines that only compute, they do not think. The human brain remains supreme and will continue to be so for all times. As such, researchers should be fully aware about the following limitations of computer-based analysis:

1. Computerized analysis requires setting up of an elaborate system of monitoring, collection and feeding of data. All these require time, effort and money. Hence, computer based analysis may not prove economical in case of small projects.
2. Various items of detail which are not being specifically fed to computer may get lost sight of.
3. The computer does not think; it can only execute the instruction of a thinking person. If poor data or faulty programs are introduced into the computer, the data analysis would not be worthwhile. The expression "garbage in, garbage out" describes this limitation very well.

Important Characteristics of computer in research:

The following characteristics of computers in research:

(i) Speed: Computers can perform calculations in just a few seconds that human beings would need weeks to do by hand. This has led to many scientific projects which were previously impossible.

(ii) Diligence: Being a machine, a computer does not suffer from the human traits of tiredness and lack of concentration. If two million calculations have to be performed, it will perform the two millionths with exactly the same accuracy and speed as the first.

(iii) Storage : Although the storage capacity of the present day computer is much more than its earlier counterpart but even then the internal memory of the CPU is only large enough to retain a certain amount of information just as the human brain selects and retains what it feels to be important and relegates unimportant details to the back of the mind or just as the human brain selects and retains what it feels to be important and relegates unimportant details to the back of the mind or just forgets them. Hence, it is impossible to store all types of information inside the computer records. If need be, all unimportant information/data can be stored in auxiliary storage devices and the same may be brought into the main internal memory of the computer, as and when required for processing.

(iv) Accuracy: The computer's accuracy is consistently high. Errors in the machinery can occur but, due to increased efficiency in error-detecting techniques, these seldom lead to false results. Almost without exception, the errors in computing are due to human rather than to technological weaknesses, i.e. due to imprecise thinking by the programmer or due to inaccurate data or due to poorly designed systems.

(v) Automation: Once a program is in the computer's memory, all that is needed is the individual instructions to it which are transferred one after the other, to the control unit for execution. The CPU following these instructions until it meets a last instruction which says 'stop program execution'.

(vi) Binary digits: Computers use only the binary number system (a system in which all the numbers are represented by a combination of two digits – one and zero) and thus operates to the base of two, compared to the ordinary decimal arithmetic which operates on a base of ten. (Binary system has been described in further details under separate heading in this chapter.) Computers use binary system because the electrical devices can understand only 'on' (1) or 'off' (0).

Conclusion:

Computers do facilitate the research work. Innumerable data can be processed and analyzed with greater ease and speed. Moreover, the results obtained are generally correct and reliable. Not only this, even the design, pictorial graphing and report are being developed with the help of computers. Hence, researchers should be given computer education and be trained in the line so that they can use computers for their research work.

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