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Original Research Paper

Implementation of Ict in Statistics by Using the Open Source Software Geogebra

Mathematics

KEYWORDS :

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ABSTRACT

ICT (Information and communications technology) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications. This Paper includes some useful guidance on selecting, organizing and using ICT tool Geogebra, open source software for the teaching and learning of Mathematics.

Introduction

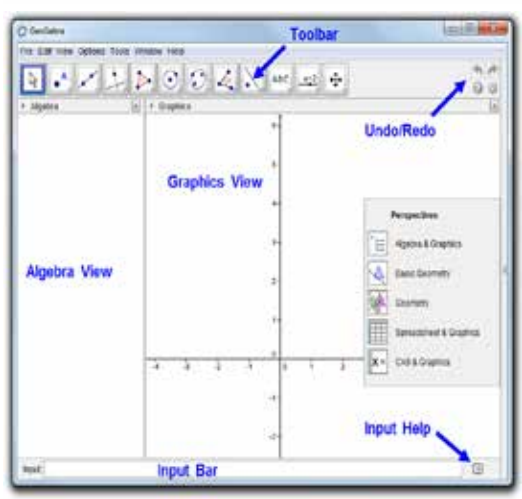
Information and communication technologies (ICT) popularly known, involve in the most general since the use of technology in managing and processing information. More specifically ICT can be defined as the use of all conceivable digital media in managing and processing information. Information is power. "No more that its origin cannot be traced. With knowledge come learning, skills, adaptability, understanding and activism all factors contribute to the growth of an equitable society. ICT offers the means to acquire the power. Since knowledge is vital, it follows that the acquisition of knowledge must be lifelong. Delores Commission (1996) describes learning throughout life as the "heart beat of society" But how does one keep pace with the rapidly changing world? The answer is obvious-through ICT.

ICT provides "anytime, anywhere" access to reliable information It paves the way for construction of knowledge by any individual. In addition ICT universalize education in the truest sense. To quote the National Curriculum Framework (NCF) 2005, "ICT is an important tool for bridging social studies; ICT should be used in such a way that it becomes an opportunity equalizer by providing information communication and computing resources in remake areas".

ICT are only a part of a continuum of technologies, starting with chalk and books, all of which can support and enrich learning, Second, ICT, as any tools, must be considered as such, and used and adapted to serve educational goals. Third, many ethical and legal issues intervene in the widespread use of ICT in education, such as ownership.

Information and Communication Technology is an important instrument, which can transfer the present isolated, teacher-centered, book-centered learning environment into a rich student-centered environment. ICT is a new teaching-learning process, aims at transferring the old traditional paradigm of learning to the new paradigm of learning and of course teaching. ICT stand for Information and Communication Technologies—a "diverse set of technological tools and resources used to communicate, and to create, disseminate, share and manage information "**UNESCO** is giving a high priority to the use of ICT for more equitable and pluralistic development in education, this research work pivoted aiming to expand the knowledge base about the issues pertaining in the implementation of ICT in education which mainly centered on interactive learning environment. A strong literature survey is made which paved a way for our research and indicates an intrinsic gap to be filled in our study.

ICT TOOLS WITH GEOGEBRA



Geogebra is not computer supported rather computer created Mathematics. The problem identification, definitions, thesis and proofs are created with the help of computer. Our aim is to present how experimental Mathematics can be adapted to teaching Mathematics.

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Students will find ICT to be user friendly and interesting Software. Geogebra software is used in statistics to solve Problems involving: Chi-square test, one way Anova method, two way Anova method, correlation, regression solving the Problem.

LITERATURE SURVEY:

A detailed literature survey was made for the implementation of ICT in education particularly in the field of mathematics for various levels and the corresponding findings were listed as below.

- The study of Paul P.K and Mondal N.K (2012) supports that ICT is to be introduced in the classrooms.
- Markus Hohenwarter and Keith Jones (2007) study noted that the exposure in ICT helps gaining knowledge in ICT among the students.
- Himani Verma (2010) study explores that innovative use of ICT in teaching/learning can stimulate dynamic learning environments.
- Sharmila Devi and Mohammad Rizwan (2012) study revealed that the certain important issues related with the effective implementation of ICTs in all levels of education and provides suggestions to address certain challenges that would help in the implementation of ICTs in education and simultaneously increasing Quality of education.

Chi square test

Chi square test is applied in statistics to test the goodness of fit to verify the distribution of observed data with assumed theoretical distribution. Therefore, it is a measure to study the divergence of actual and expected frequencies.

Application of Chi Square test

The chi-square test is intended to test how likely it is that an observed distribution is due to chance. It is also called a "Goodness of fit" statistics, because it measures how well the observed distribution of data fits with the distribution that is expected if the variables are independent.

Charecteristics of Chi Square Test

- Test is based on events or frequencies,
- Where as in theoretical distribution, the test is based on Mean and Standard deviation.
- For every increase in the number of degrees of freedom, a new chi square distribution is formed.
- This test is applied to draw inferences, in particular, testing the hypothesis. But this test is not useful for estimation.
- This test can be used between the entire set of observed and expected frequencies.
- It is a general purpose test and as such is highly useful in research.

Example

The following data persons are not of image of production per day turned out why form randomly chosen operation using 3 million machines.

S.No.	M1	M2	M3
1	150	151	156
2	147	159	155
3	141	146	153
4	154	152	159

Perform analysis of variance and test the hypothesis.

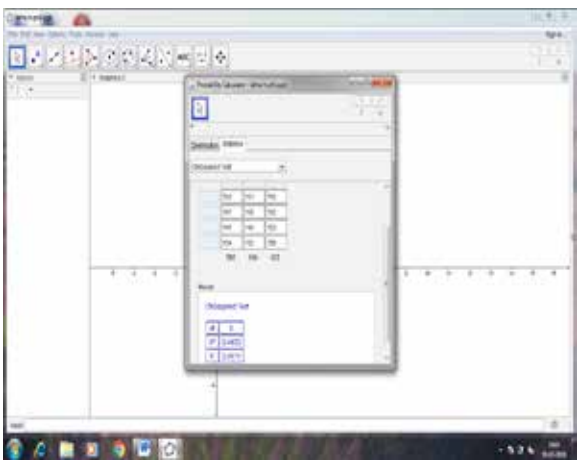


Figure 1.1 Calculation of Chi square test

ONE WAY ANOVA

In statistics, one-way analysis of variance (abbreviated one-way ANOVA) is a technique used to compare means of three or more samples (using the F distribution). This technique can be used only for numerical data.

Application of one way anova

The one-way analysis of variance (ANOVA) is used to determine. Whether there are any significant differences between the means of three or more independent (unrelated) groups. This guide will provide a brief introduction to the one-way ANOVA, including the assumptions of the test and when you should use this test.

Example

A completely randomized design experiment with 10 plots and 3 treatments give the following result.

1	2	3	4	5	6	7	8	9	10
A	B	C	A	C	C	A	B	A	B
5	4	3	7	5	1	3	4	1	7

Analyse the result for treatment effects.

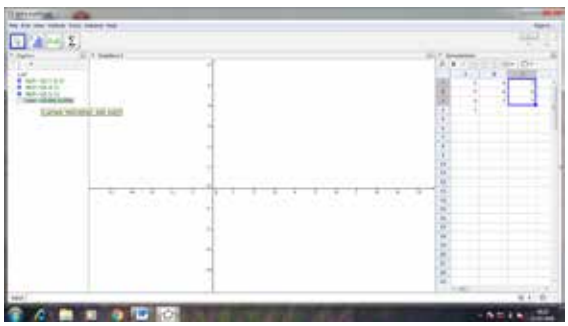


Figure 1.2 calculation of one way Anova

two way anova
A statistical test used to determine the effect of two nominal predictor variables on a continuous outcome variable. A two-way ANOVA test analyses the effect of the independent variables on the expected outcome along with their relationship to the outcome itself.

Application of two way anova
The two-way ANOVA compares the mean difference between groups that have been split on two independent variables (called factors). The primary purpose of a two-way ANOVA is to understand if there is an interaction between the two independent variables on the dependent variable.

Example
Calculation for two way classification, perform the two way Anova for the following data.

	A	B	C	D
1	38	40	41	39
2	45	42	49	36
3	40	38	42	42

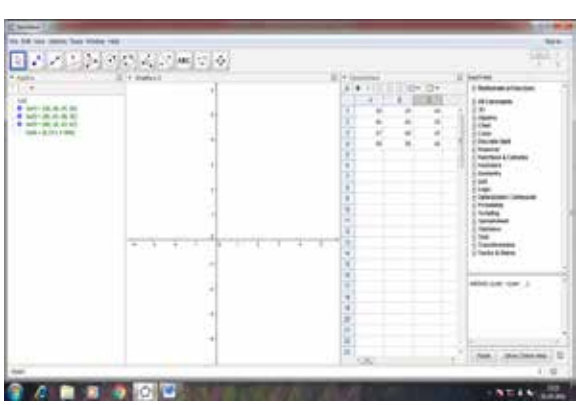


Figure 1.3 Calculation of two way anova

Correlation
According to Ya Lun Chou, "correlation analysis attempts to determine the degree of relationship between variables."

According to W.I.King, "correlation means that between two series or group of data there exists some casual connection.

Application of correlation
In general, correlation tends to be used when there is no identified response variable. It measures the strength (qualitatively) and direction of the linear relationship between two or more variables. The Pearson correlation coefficient measures the strength of the linear association between two variables.

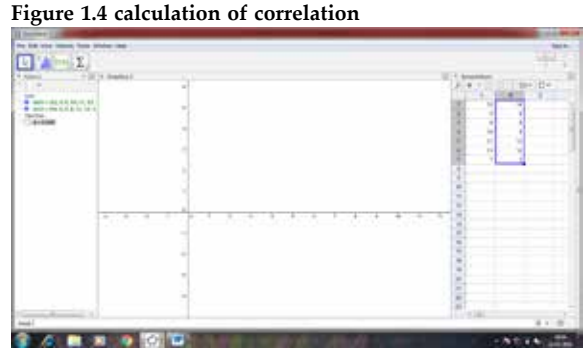
Significance of study correlation
Correlation is useful in physical and social sciences. In this book we can study the uses of correlation in business and economics.

- Correlation is very useful to economists to study the relationship between variables, like price and quantity demanded. To the businessman, it helps to estimate costs, sales, price and other related variables.
- Some variables show some kind of relationship, correlation analysis helps in measuring the degree of relationship between the variables like supply and demand, price and supply, income and expenditure, etc.
- The relation between variables can be verified and tested for significance, with the helf of the correlation analysis. The effect of correlation is to reduce the range of uncertainly of our prediction.
- The coefficient of correlation is a relative measure and we can compare the relationship between variables which are expressed in different units.
- Sampling error can also be calculated.
- Correlation is the basis for the concept of regression and ratio of variation.

Example
Calculate coefficient of correlation from the following data

X	12	9	8	10	11	13	7
Y	14	8	6	9	11	12	3

Figure 1.4 calculation of correlation



Regression
According to Blair, "Regression is the measure of the average relationship between two or more variable in terms of the original units of the data."

According to Taro Yamane, "one of the most frequently used techniques in economics and business research, to find a relation

Between two or more variable that are related equally, is regression analysis."

Application of regression
In statistical modeling, regression analysis is a statistical

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process for estimating the relationships among variables. It includes many techniques for modeling and analyzing several variables. The focus is on the relationship between a dependent variable and one or more independent variables.

Uses of regression analysis

Regression analysis is used in statistics in all those fields where two or more relative variables are having the tendency to go back to the average. It is used more than the correlation analysis in many scientific studies.

Regression analysis predicts the value of dependent variables from the values of independent variables.

The regression analysis is highly useful and the regression line equation helps to estimate the value of dependent variable, when the values of independent variables are used in the equation.

We can calculate coefficient of correlation(r) and coefficient of determination () with the help of regression coefficient.

Regression analysis in statistical estimation like demand curves, supply curves, production function, cost function, consumption function etc., can be predicted.

Example

Linear regression of the following data

1	2	3	4	5	6	7	8	9	10
2	3.4	5	6.7	7	7.1	9	8.5	11	10.2

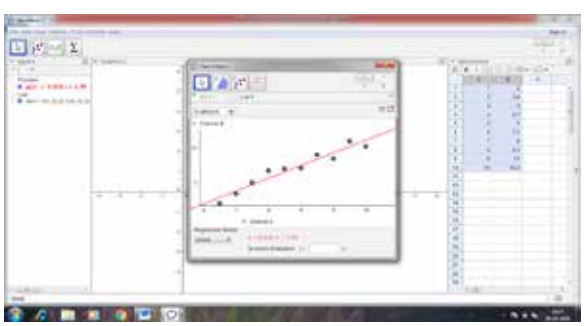

Figure 1.5 calculation of regression

Findings:

The solidity of the program is the spectacular visual impact of the objects in the various dimensions. This makes each novice to have a clear idea of the axis and its rotations.

It initiates the students to feel their own on the subject of the nuances of the projects and motivates them to advance with their own curiosity and to practice it. This motivation makes the entire personage to spotlight in cavernous.

It also helps the students to practice more problems at home. Since students are familiar with the animations/ Graphics, it makes every pupil to earn an interest in it, which in turn makes even the students who could not comprehend Math problems to understand the concept in a better way.

Conclusion

The use of ICT in teaching Mathematics can make the Teaching process more effective as well as enhance the Capability of student in understanding basic concepts. The Geogebra software used by the students help them to solve the problem efficiently and this software saves time.

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