APPLICATION OF DIFFERENT STATISTICAL TESTS IN EDUCATIONAL RESEARCH: AN OVERVIEW

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ABSTRACT:

Statistics is a branch of science that deals with the collection, organization, and analysis of data and drawing of inferences from the samples to the whole population. The subject Statistics is widely used in almost all fields like Biology, Botany, Commerce, Medicine, Education, Physics, Chemistry, Bio-Technology, Psychology, Zoology etc. While doing research in the above fields, the researchers should have some awareness in using the statistical tools which helps them in drawing rigorous and good conclusions. Major objectives of the present study was to know application of different statistical test in educational research, to identify basic statistical test used in educational research like t-test, z-test, ANOVA, MANOVA, ANCOVA, Chi-square test, Kolmogorov-Smirnov test, Mann-Whitney test, Wilcoxon signed rank sum test, Kruskal-Wallis test, Jonckheere test and Friedman test and to know the different statistical software used in educational research like Statistical Package for the Social Science, Statistical Analysis System, Econometric Views, MINITAB, STATA, MS-Excel, PSPP, EPI-INFO etc. Secondary data has been used for this study. Data have been collected from the existing research papers, websites, books and various online journals for this study. Based on different review of literature it was found that the use of appropriate statistical techniques is a critical requirement for effective conduct of social and behavioural research. Lastly in this paper researchers concluded that skill of selecting appropriate statistical test is very essential for making good and specific conclusion and use of statistical software becomes a more important part of data analysis. Thus in educational research statistics plays an important role for making research successfully.

KEYWORDS: Basic statistical test, Educational research, Statistical software usage

INTRODUCTION:

Educational research is systematic application of scientific method for solving educational problems, regarding students and teachers as well. It attempts to organize data quantitatively and qualitatively to arrive at statistical inferences. Now a day there is continuously growing demand of the researchers for the statistical data analysis, their need for statistical methods to be applied in statistical data processing. The subject Statistics is widely used in almost all fields like Biology, Botany, Commerce, Medicine, Education, Physics, Chemistry, Bio-Technology, Psychology, Zoology etc. While doing research in the above fields, the researchers should have some awareness in using the statistical tools which helps them in drawing rigorous and good conclusions. The most well known Statistical tools are the mean, the arithmetical average of numbers, median and mode, Range, dispersion, standard deviation, inter quartile range, coefficient of variation, etc. (Begum, Ahmed 2015).

The works of many scholars are dedicated to the statistical methods (Glantz, 1998; Glass and Stanley, 1976; Cochran 1976; Urbach, 1975; Hollender, 1983). These methods are one of the major, generic methods of modern science, which are applied in various subject areas. Various tests of significance are usually selected by researchers for analyzing data in social and behavioural research (Cohen and M anion, 1989; Oppenhelm, 1992).

Besides manual statistical test application of statistical software (SS) becomes a more crucial part of data analysis. Researchers are experiencing a transition from manual analysis with paper to more efficient digital/electronic analysis with statistical software (SS) (Matthew, Sunday 2014). The emergence of statistical software has undoubtedly contributed enormously to the development in research studies in this 21st century. The high premium placed on ICT by human beings, researchers and organizations has undoubtedly made it a major drive of every nation (Eshasrenan, 2006: Akindutire 2013). Statistical Software (SS) is a vital tool for research analysis, data validation and findings.

At the present day, all kinds of statistical methods are used in various academic fields, depending on the experimental data and the tasks that the researcher has to solve. In educational psychology, there are the following areas of statistical methods application: 1) descriptive statistics, including the grouping, tabulation, graphical representation and a quantitative description of the data; 2) the theory of statistical inference used in psychological research to predict the results of the samples survey (inductive statistics); 3) the experimental design theory serves to detect and verify the causal relationships between variables (analytical statistics) (Khusainova, Shilova, Curteva 2016).

According to Adeyemi (2009), the use of appropriate statistical techniques is a critical requirement for effective conduct of social and behavioural research. Regarding the role of statistical software in data analysis Mattew & Sunday (2014) found that

some analysis such as post hoc, complex analysis in time series, regression and variance analysis cannot be calculated manually effectively without statistical software package. They also stated that statistical software has contributed immensely to social research especially in the area of demographic and data analysis.

OBJECTIVES OF THE STUDY:

The objectives of the present study are:

- To know application of statistical tests in educational research.
- To explain basic statistical tests used in educational research & data analysis.
- To know the different statistical software used in educational research & data analysis.

RESEARCH METHODOLOGY:

This study is based on secondary data & Data have been collected from the existing research papers, websites, books and various online journals for this study.

IMPORTANCE OF STATISTICAL TESTS IN EDUCATIONAL RESEARCH:

Statistics is a branch of mathematics that deals with probabilities and the concept of relative certainty. Statistics are extremely important because, when calculated properly and reported accurately, they can give a very good estimate of the likelihood of a particular outcome and whether or not this outcome could be due to chance. Statistics is the science of collection, analysis, interpretation or explanation, and presentation of data. It has wide usage in the field of educational research. In fact all the data collection and interpretation techniques used in educational research are part of statistics. The subject called research statistics & statistics is very important in research because that is the backbone of our research.

Importances of Statistics in educational research are:

- To make data simple and conceivable
- Helpful in drawing simple conclusion
- Helpful in forecasting
- Helpful in observation formulation
- Helpful in sorting the problems
- To find out course effect
- To make comparisons to find similarities and differences
- To draw conclusions about populations based only on sample results.

BASIC STATISTICAL TESTS USED IN EDUCATIONAL RESEARCH & DATA ANALYSIS:

Statistics is a branch of science that deals with the collection, organization, and analysis of data and drawing of inferences from the samples to the whole population.

GRAPHIC REPRESNTATION OF DATA:

- ✓ **Histogram or Column Diagram:** A histogram or column diagram is a graph in which class intervals are represented along the horizontal axis called x-axis and their corresponding frequencies are represented by areas in the form of rectangular bars drawn on the intervals.
- **Application:** When we are unsure what to do with a large set of measurements presented in a table, we can use a Histogram to organize and display the data in a more user-friendly format. A Histogram will make it easy to see where the majority of values fall in a measurement scale, and how much variation there is.
- ✓ **Cumulative percentage or Ogive:** An Ogive (*oh-jive*), sometimes called a cumulative frequency polygon, is a type of frequency polygon that shows cumulative frequencies. In other words, the cumulative percents are added on the graph from left to right. An Ogive graph plots cumulative frequency on the y-axis and class boundaries along the x-axis. It's very similar to a histogram, only instead of rectangles, an Ogive has a single point marking where the top right of the rectangle would be. It is usually easier to create this kind of graph from a frequency table.
- **Application:** Percentage and percentile ranks are determined quickly and fairly accurately from the Ogive when the curve is carefully drawn and the scale divisions are precisely marked.

  There are also some another types of representation like Pie, Line, Picto etc generally used in educational research.

THERE ARE TWO SUBDIVISIONS OF STATISTICAL METHOD:

- **DESCRIPTIVE STATISTICS:** Descriptive statistics try to describe the relationship between variables in a sample or population. Descriptive statistical measures are used to describe the characteristics of the sample or population in totality. They limit generalization to the particular group of individuals observed or studied. No conclusions are extended beyond this group (L. Kaul, 2009). It provides a summary of data in form of mean, median and mode (Satake EB, 2015).

➢ **Central Tendency:** When we work with numerical data, it seem apparent that is most set of data there is a tendency for the observed values to group themselves about some interior values; some central values seems to be characteristics of the data. The phenomenon is referred to as central tendency. The measures of central tendency are mean, median and mode.

➢ **Arithmetic Mean:** The arithmetic population mean, or simply called mean, is obtained by adding together all of the measurement and dividing by the total number of measurements taken. The mean is useful in determining the overall trend of a data set or providing a rapid snapshot of our data.

- Mean for ungrouped data: $\boldsymbol{M} = \frac{\sum \boldsymbol{X}}{\boldsymbol{N}}$ [M=mean, ∑=sum of, X=scores in a distribution, N=total number of scores.
- Mean for grouped data: $\boldsymbol{M} = \boldsymbol{A}.\boldsymbol{M}.+ \frac{\sum \boldsymbol{fx'}}{\boldsymbol{N}} \times \boldsymbol{i}$ [M=mean, A.M= assumed mean, ∑=sum of, *f*=frequency of the class interval, x′= deviation of the score from the assumed mean divided by length of the class interval, i=length of the class interval, N=total number of scores.

➢ **Median:** Median is defined as the middle item of all given observations arranged in order. For ungrouped data, the data is obvious. In case of the measurement is even, the median is obtained by taking the average of the middle.

➢ **Mode:** Mode is the values which occur most frequently. The mode may not exist, and even if it does, it may not be unique.

➢ **Standard Deviation:** The standard deviation, often represented with the Greek letter sigma, is the measure of a spread of data around the mean. A high standard deviation signifies that data is spread more widely from the mean, where a low standard deviation signals that more data align with the mean. In a portfolio of data analysis methods, the standard deviation is useful for quickly determining dispersion of data points (Begum, Ahmed 2015).

- For ungrouped data: $\boldsymbol{SD} = \sqrt{\frac{\sum x2}{\boldsymbol{N}}}$ [x=deviation of the raw score from the mean, N=number of score measures]
- For grouped data: $\boldsymbol{SD} = \frac{\boldsymbol{i}}{\boldsymbol{N}} \sqrt{\boldsymbol{N}\sum \boldsymbol{fx'^2} - (\sum \boldsymbol{fx'})^2}$ [i=length of the class interval, N= total number of scores, f=frequency of the class interval, x'= deviation of the raw score from the assumed mean divided by the length of class interval.

➢ **Scatter gram/ Scatter diagram:** A scatter diagram is a tool for analyzing relationship between two variables. One variable is plotted on the horizontal axis and the other is plotted on the vertical axis. The pattern of their interesting points can graphically show relationship patterns (L.chow et.al.)

- **INFERENTIAL STATISTICS:** Inferential statistics involve the use of statistical techniques in the testing of the hypotheses and drawing inferences from the findings of a study (Baddie and Halley, 1995; Kolawole, 2001).

➢ In inferential statistics, the term 'null hypothesis' denotes that there is no relationship (difference) between the population variables. (Nickerson 2000)
➢ Alternative hypothesis (*H*1 and *H*a) denotes that a statement between the variables is expected to be true (Nickerson 2000).
➢ The *P* value (or the calculated probability) is the probability of the event occurring by chance if the null hypothesis is true. The *P* value is a numerical between 0 and 1 and is interpreted by researchers in deciding whether to reject or retain the null hypothesis (Ali, Bhaskar 2016).

p-values with interpretation		
p	**result**	**Null-hypothesis**
<0.01	Result is highly significant	Reject null hypothesis
≥0.01 but ≤0.05	Result is significant	Reject null hypothesis
Value ≥0.05	Result is not significant	Do not reject null hypothesis

Inferential statistical techniques are of two major types. These are the parametric tests and the non-parametric test.

PARAMETRIC TEST: Parametric tests are the most powerful tests for testing the significance or trustworthiness of the computed sample statistics. The parametric tests assume that the variables described are expressed in interval or ratio scale and not in nominal or ordinal scales of measurement. The samples have the same variance (homogeneity of variances). The population values are normally distributed. The samples are randomly drawn from the population, and the observations within a group are independent of each other. The commonly used parametric tests are the t-test, z-test and analysis of variance (ANOVA).

t-test:

The t- test is a parametric test used to test the significant difference between two means. It is a statistical test of significance suitable for interval or ratio data (Norusis/ SPSS, 1993). It is also used to test the trend and the significance of correlation. It could be computed as a t-test of difference between two means or a t-test of related samples.

The formula provided by Fisher for testing a difference between means computed from uncorrelated samples is:

$$t = \frac{M_1 - M_2}{\sqrt{\left(\frac{\sum x^2{}_1 + \sum x^2{}_2}{N_1 + N_2 - 2}\right)\left(\frac{N_1 + N_2}{N_1 N_2}\right)}}$$

In which- M_1 and M_2 = means of two samples, $\sum x^2{}_1$ and $x^2{}_2$= sums of squares of the deviations from the means in the two samples. N_1 and N_2= number of cases in the two samples.

The appropriate t-critical value for acceptance or rejection of the null hypothesis would be found for $N_1 + N_2$ -2 degree of freedom, using t-table.

Assumptions of the t- test:

1. Data should be at interval level of measurement.
2. The population should be normally distributed

Advantages of the t - test:

1. When the N is less than 30, the t- test is appropriate.
2. The t-test is a realistic test as it assumes that the Standard deviation is unknown (Adeyemi, 2009).

Disadvantages of t- test: For single sample test, as the N increases, the sampling distribution tends to approach a normal distribution and the Z test would be an appropriate tool to apply (Adeyemi, 2009).

Z-test:

The next test, which is very similar to the Student t-test, is the z-test. However, with the z-test, the variance of the standard population, rather than the standard deviation of the study groups, is used to obtain the z-test statistic. Using the z-chart, like the t-table, we see what percentage of standard population is outside the mean of the sample population. If, like the t-test, greater than 95% of the standard population is on one side of the mean, the p-value is less than 0.05 and statistical significance is achieved. As some assumption of sample size exists in the calculation of z-test, it should not be used if sample size is less than 30. If both the n and the standard deviation of both groups are known, a two sample t-test is best (Neideen, Brasel 2007).

Analysis of Variance (ANOVA):

The Student's t-test cannot be used for comparison of three or more groups. The purpose of ANOVA is to test if there is any significant difference between the means of two or more groups.

In ANOVA, we study two variances – (a) between group variability and (b) within group variability. The within group variability (error variance) is the variation that cannot be accounted for in the study design. It is based on random differences present in our samples.

However, the between group (or effect variance) is the result of our treatment. These two estimates of variances are compared using the F-test.

A simplified formula for the *F* statistic is: $\boldsymbol{F = \frac{MS_b}{MS_W}}$

Where *MSb* is the mean squares between the groups and *MSw* is the mean squares within groups. Some basic assumptions of ANOVA are population distribution should be normal, samples are choosing randomly, subgroups should have same variability.

To determine the critical or table F value: At a specified level of significance, say 0.05 level, check the F tables for the point where the degree of freedom intersects the 0.05 level of significance. The value at the point of intersection is the critical or table F value (Adeyemi, 2009).

Interpretation: If the calculated or computed F is greater than the table or critical F, reject the null hypothesis. But if the calculated or computed F is less than the critical F, then accept the null hypothesis (Adeyemi, 2009).

Advantages of the Analysis of variance

- The analysis of variance has one major advantage over the t test. It could be used with more than two groups or samples.
- With more than 2 samples, the difference between the mean scores of all the samples examined say 3 or 4 or 5 could be determined in a single test. This procedure is more convenient than conducting separate t test for each pair of samples.

Disadvantages: One disadvantage of the analysis of variance is that it cannot identify where a difference lies between the means being examined.

One-way ANOVA: A one-way analysis of variance is used when we have a categorical independent variable (with two or more categories) and a normally distributed interval dependent variable and we wish to test for differences in the mean of the dependent variable broken down by the levels of the independent variable (Begum & Ahmed 2015).

Limitation: A one-way ANOVA will tell us that at least two groups were different from each other. But it won't tell us what groups were different. If our test returns a significant f-statistics, we may need to run an ad hoc test to identify exactly which groups had a difference in means.

Two-way ANOVA: A two way ANOVA is an extension of the one-way ANOVA. With one way ANOVA, we have one independent variable affecting a dependent variable. With a two way ANOVA, there are two independent variables. Use a two way ANOVA when we have one measurement variable (i.e. quantitative variable) and two nominal variables. In other words if our experiment has a quantitative outcome and we have two categorical explanatory variables, a two way ANOVA is appropriate.

MANOVA: Multivariate Analysis of Variance is simply an ANOVA with several dependent variables. That is to say, ANOVA tests for the difference in means between two or more groups, while MANOVA tests for the difference in two or more vectors of means (French et.al.). It's similar to many other tests and experiments to find out if the response variable (i.e. dependent variable) is changed by manipulating the independent variable.

ANCOVA: Analysis of Covariance (ANCOVA) an extension of ANOVA that provides a way of statistically controlling the (linear) effect of variables one does not want to examine in a study. These extraneous variables are called covariates, or control variables. (Covariates should be measured on an interval or ratio scale.) ANCOVA allows us to remove covariates from the list of possible explanations of variance in the dependent variable. ANCOVA does this by using statistical techniques (such as regression to partial out the effects of covariates) rather than direct experimental methods to control extraneous variables. ANCOVA is used in experimental studies when researchers want to remove the effects of some antecedent variable. For example, pretest scores are used as covariates in pretest- posttest experimental designs. ANCOVA is also used in non-experimental research, such as surveys or nonrandom samples, or in quasi-experiments when subjects cannot be assigned randomly to control and experimental groups. Although fairly common, the use of ANCOVA for non-experimental research is controversial (Vogt, 1999).

Correlation Coefficient:

The term 'correlation' is the degree of relationship between two variables while a correlation coefficient is an index of relationship between the two variables. It is a numerical statement that draws inference concerning the relationship between two variables. Thus, a measure of association shows that two variables might co-vary in a pattern. When one is high, the other is systematically higher or lower. If the coefficient is high, it is considered to reflect a close relationship. Therefore, correlation enables a researcher to identify with some degree of accuracy how the values of one variable are co-related to the values of another variable (Gay, 1996).

The Pearson r Product-Moment Correlation Coefficient:

The Pearson r Product-Moment Correlation Coefficient is one of the most popular interval level parametric measures of association used to determine the relationship between two variables (Best, 1981). Apart from having interval level data, the researcher must satisfy certain assumptions before he or she could use and interpret the Pearson r.

- **Positive Correlation:** Variables are positively correlated if an increase in one variable is accompanied with a corresponding increase in the other variable. This is positive correlation (+1). If one value decreases with the other value at the same time, the correlation is also positive.
- **Negative Correlation:** When two variables are perfectly negatively correlated, an inverse relationship exists such that a high score on one variable is associated with a lower score on the other variable. The two variables are said to be negatively correlated. If the value of one variable increases while the value of the other variable decreases then, the correlation would be tending towards –1.
- **Zero Correlation:** This occurs when there is no correlation or relationship between two variables.

Assumptions for using the Pearson r:

According to T.O.Adeyemi (2009) some assumptions for using the Pearson r are: In order to meaningfully use the r, the data must be at the interval level of measurement and the association between the two variables should be linear.

Advantages of Pearson r:

According to T.O.Adeyemi (2009) advantages of Pearson r are: If the assumptions for using the r are met, Pearson r is probably the best coefficient of correlation to apply in educational research and Statisticians and researchers are very conversant with the r and as such, much has been done to develop its interpretation than for other measures of association.

Disadvantages of Pearson r:

According to T.O.Adeyemi (2009) major disadvantage of the r is in the stringent assumptions and the assumptions are sometimes very complex in their application.

NON-PARAMETRIC TEST:

Nonparametric tests are distribution-free tests used when the nature of the population distribution from which samples are drawn is assumed not to be normal (Champion, 1970). They also used when data are in the nominal level of measurement. They are always in groups or categories and represented by frequency counts. Nonparametric tests are tests that do not require any estimation. They are used when scores are not normally distributed but largely skewed. This is because they do not make any assumption about the shape of the distribution. A typical example is the Chi-square test which is distribution-free as it tests the equality of the entire distribution of frequencies. Other examples of nonparametric tests include the Spearman Rank Coefficient, Kolmogorov – Smirnov test, Mann-Whitney U test, Sign test, Wilcoxon matched-Pairs Signed–ranks test and the Lambda symmetrical/ asymmetrical test (Berenison, & Levine, 1979). Others non-parametric test are Kruskal-Wallis test, Jonckheere test, Friedman test.

Chi-Square Test:

The chi-square test is a nominal level non-parametric test of significance that could be used to test the differences or relationship between two variables. It applies only to discrete data that are counted rather than data with measured values (Kinnear, & Gray, (1994). As a nonparametric test useful when data are in the form of frequency counts, the chi-square occurs in two or more mutually exclusive categories and it is denoted by the following formula: $\boldsymbol{x^2} = \sum[\frac{(\boldsymbol{O-E})^2}{\boldsymbol{E}}]$

Where x^2 = Chi – square; O = Observed frequency; E = Expected Frequency.

Assumptions for the Chi-square Test:

- There are some restrictions with respect to the sample size. No cell should have an expected frequency of less than 5 (Champion, 1970). If however, cell frequencies are less than 5, the resulting Chi-square value would be grossly inflated and would not reveal a true picture of the ways the variables are distributed. However, categories might be collapsed in order to raise the expected frequencies above 5 (Adeyemi, 2009).
- It is also assumed that the researcher must obtain a sample of independent observations (Adeyemi, 2009).

Advantages of the Chi- square test:

According to Adeyemi, 2009 advantages of the chi-square test are:

- The Chi-square test is the most flexible statistical technique for determining whether one's observations differ from what is expected by chance.
- Tables are usually provided which allow the researcher to determine the significance of any given Chi-square value with the appropriate number of degrees of freedom.
- Because few assumptions exist with Chi –square, it is possible to apply the Chi- square to virtually every analysis where data are in categories.

Disadvantages:

- One major disadvantage for using the Chi square test is with small N.
- When N is less than 5, the C hi- square test should not be applied.

Spearman Rank Coefficient:

Like the Pearson product correlation coefficient, the Spearman rank coefficient is calculated to determine how well 2 variables for individual data points can predict each other. The difference is that the data need not be linear. To start, it is easiest to graph all the data points and find the x and y values. Then rank each x and y value in order of occurrence. Similar to the Pearson correlation coefficient, the test statistic is from -1 to 1, with -1 being a negative correlation and 1 a perfect positive correlation (Neideen & Brasel 2007).

Kolmogorov –Smirnov test:

The two-sample Kolmogorov-Smirnov (KS) test was designed as a generic method to test whether two random samples are drawn from the same distribution. The null hypothesis of the KS test is that both distributions are identical. The statistic of the KS test is a distance between the two empirical distributions, computed as the maximum absolute difference between their cumulative curves (Ali & Bhaskar 2016).

Mann-Whitney test:

It is used to test the null hypothesis that two samples have the same median or, alternatively, whether observations in one sample tend to be larger than observations in the other (Ali & Bhaskar 2016).

Wilcoxon signed rank sum test:

The Wilcoxon signed rank sum test is the non-parametric version of a paired samples t-test. We use the Wilcoxon signed rank sum test when we do not wish to assume that the difference between the two variables is interval and normally distributed (but we do assume the difference is ordinal) (Begum & Ahmed 2015).

Kruskal Wallis test:

The Kruskal–Wallis test is a non-parametric test to analyse the variance. It analyses if there is any difference in the median values of three or more independent samples. The data values are ranked in an increasing order, and the rank sums calculated followed by calculation of the test statistic (Ali & Bhaskar 2016).

Jonckheere test:

In statistics, Jonckheere test is a test for and ordered alternative hypothesis within an independent samples design. It is similar to the Kruskal-Wallis test in that the null hypothesis is that several independent samples are from the same population. However, with the Kruskal–Wallis test, there is no a priori ordering of the populations from which the samples are drawn. When there is an a priori ordering, the Jonckheere test has more statistical power than the Kruskal–Wallis test (Wikipedia).

Friedman test:

The Friedman test is a non-parametric test for testing the difference between several related samples. The Friedman test is an alternative for repeated measures ANOVAs which is used when the same parameter has been measured under different conditions on the same subjects (Altman & Bland 2009).

DIFFERENT STATISTICAL SOFTWARE USED IN EDUCATIONAL RESEARCH & DATA ANALYSIS:

As quantitative research grows, application of statistical software (SS) becomes a more crucial part of data analysis. Researchers are experiencing a transition from manual analysis with paper to more efficient digital/electronic analysis with statistical software (SS) (Mattew, Sunday 2014). Numerous statistical software systems are available currently like-

- **Statistical Package for the Social Sciences (SPSS):**

  SPSS (Statistical Package for the Social Sciences now Statistical products and Solution services) is most widely used in social science disciplines and courses. SPSS assists the user in describing data, testing hypotheses and looking for a correlation or relationship between one or more variables. SPSS is very suitable for most regression analysis and different kinds of ANOVA (regression, logistic regression, survival analysis, analysis of variance, factor analysis, multivariate analysis but not suitable for time series analysis and multilevel regression analysis)-Wikipedia (2014).

- **Statistical Analysis System (SAS):**

  SAS performs most general statistical analyses (regression, logistic regression, survival analysis, analysis of variance, factor analysis, multivariate analysis). The greatest strengths of SAS are probably in its ANOVA, mixed model analysis and multivariate analysis, while it is probably weakest in ordinal and multinomial logistic regression (because these commands are especially difficult), and robust methods (it is difficult to perform robust regression, or other kinds of robust methods)-ATS Ucla Edu(2014).

- **Econometric Views (EViews):**

  EViews is a statistical package for window, used mainly for time-series oriented econometrics analysis. EViews can be used for general statistical analysis and econometric analyses, such as cross-section and panel data analysis and time series estimation and forecasting (Mattew, Sunday 2014).

- **MINITAB:**

  MINITAB is statistical software used by educators, students, scientists, business associates and researchers to provide statistical software in a multitude of areas. MINITAB performs most general statistical analyses (regression, logistic regression, survival analysis, analysis of variance, factor analysis, but has its weaknesses in general linear model (GLM) and Multilevel regression) (Mattew, Sunday 2014).

- **STATA**:

  STATA is a powerful statistical package with smart data-management facilities, a wide array of up-to-date statistical techniques, and an excellent system for producing publication-quality graphs. STATA performs most general statistical analyses (regression, logistic regression, survival analysis, analysis of variance, factor analysis, multivariate analysis and time series analysis) (Mattew, Sunday 2014).

- **R & MATLAB:**

  R & MATLAB – Stanford (2014**)** identified R and MATLAB as the richest statistical systems by far. They contain an impressive amount of libraries, which is growing each day. MATLAB and R perform most general statistical analyses

(regression, logistic regression, survival analysis, analysis of variance, factor analysis, multivariate analysis). The greatest strengths of both are probably in its ANOVA, mixed model analysis and users creative freedom in analysis (Mattew, Sunday 2014).

- **MS-EXCEL:**

  MS-EXCEL -Microsoft Excel 2010 is one of the most popular software applications worldwide and is part of the Microsoft Office 2010 productivity suite. We can use Excel to analyze data, for example, in accounts, budgets, billing and many other areas. Performs most general statistical analyses but weak in regression, logistic regression, survival analysis, analysis of variance, factor analysis, multivariate analysis (Mattew, Sunday 2014).

- **PSPP:**

  PSPP - This software provides a basic set of capabilities: frequencies, cross-tabs comparison of means (t-test and one way ANOVA); linear regression, logistic regression, reliability (Cronbach's Alpha, not failure or Weibull), and re-ordering data, non-parametric tests, factor analysis, cluster analysis, principal components analysis, chi-square analysis and more (Mattew, Sunday 2014).

- **EPI-INFO:**

  Epi Info is public domain statistical software for epidemiology developed by Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia (USA). The program allows for electronic survey creation, data entry, and analysis. Within the analysis module, analytic routines include t-tests, ANOVA, nonparametric statistics, cross tabulations and stratification with estimates of odds ratios, risk ratios, and risk differences, logistic regression (conditional and unconditional), survival analysis (Kaplan Meier and Cox proportional hazard), and analysis of complex survey data (Mattew, Sunday 2014).

CONCLUSION:

In this paper, different types of statistical tests were explained for the purpose of educational research. From different review of literature researchers was concluded that skill of selecting appropriate statistical test is very essential for making good and specific conclusion. It was also concluded that some statistical software becomes a more important part of data analysis. Thus in educational research statistics plays an important role for making research successfully.

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