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**Use of Statistics in Physical Education**

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**Abstract:-**

Statistics helps to carry out the task of evaluation & measurement obtaining data from different sources. There are different types of techniques of statistics. The present paper focused on the testing relationships & association correlation. Correlation describes the degree of relationship between two variables. The present paper discussed about the different types of calculating correlations. Like Spearman rank difference method, Pearson's product moment method, Biserial, Point biserial, partial tetra choric correlation & phi coefficient.

**Introduction:-**

Statistics not only a body of substantive knowledge, but also a body of method for obtaining knowledge. In other words statistics in the measure of properly of the sample through various methods. Statistics is the science of collecting and analyzing data. In physical Education various types of statistics are used. Statistics are the science of collection, organization, presentation, analysis & interpretation of numerical data.

**Need of the study of Statistics in Physical Education:-**

- 1) To understand evaluate different research articles in the scientific formal, thesis Project.
- 2) To determine the scientific worth of tests. Ex. Reliability, validity, objectivity, & norms.
- 3) To prepare report based on the results. Ex. Annual report, progress report, and research articles, thesis, projects. Etc.
- 4) To discriminate between unsatisfactory evidence in reports containing statistical analysis.
- 5) Statistical method and analysis are necessary part of test construction, also useful to prepare formulate & test the hypothesis & to develop theories in physical education

**Types of Statistical Methods:-**

There are three main types of statistical methods in physical education.

**1) Descriptive statistics:-**

These statistical methods are used for assessing or describing the properties of particular sample using the methods namely measure of following:-

- a) Central tendency
- b) Variability or statistics of dispersion.
- c) Relationship.
- d) Percentage.

## 2) Sampling Statistics:-

These statistics used for inference or sampling statistics use in the descriptive statistics of sample beyond the limits of the later & for a wide group. Fixing simultaneously the amount of error due to the use of random sample.

Ex.- 1) Comparison.

2) "t" test.

3) Analysis of variance test of significance. Etc.

## 3) Regression or prediction statistics:-

These statistics are used to estimate & predict the value of a dependent variable is an individual. Sample from the known value of an independent from the known value of an independent variable (x) is the same individual/sample on the basis of the relationship between the two variables.

Ex.:- Regression co-efficient.

In the broader concept statistical processes are of following five types.

### 1) Descriptive Statistics:-

The characteristics of a single group are described using various methods namely mean standard deviation (SD).

### 2) Comparative statistics:-

The characteristics of two or more groups are contrasted.

Ex.:- 1) "t" test.

2) "f" ratio.

### 3) Relationship statistics:-

The correlations between numerous human trait as possessed by the same. E.g. product moment correlation, partial correlation, multiple correlation, rank order correlation. Etc

### 4) Inferential statistics:-

Population is determined by observed data from a sample are used as a basis for generalizing

about the total population from which the sample was drawn.

**5) Prediction Statistics:-**

Unknown facts about the individuals are predicted on inferred from known measurable qualities.

Ex.:- regression co-efficient.

**Present paper focused on-**

**Relationship statistics:** - correlation It investigates how the variations of a variable are associated or related with the variations of a second or more variables in the same individuals. Correlation analysis attempts to determine the degree of relationship between variables.

Ex.:- Relationship between height weight of M.PEd. Students of SESPEL.

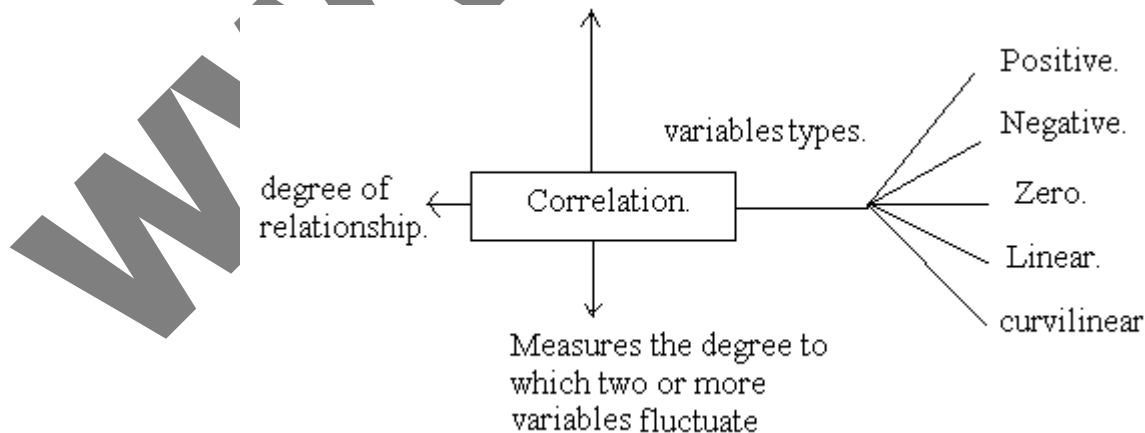
Here, the correlation co-efficient represents the correlation between the variables.

Correlation is vector quantity because it is having magnitude as well as direction i.e. Numerical magnitude with + - sign. The range of correlation of co-efficient is from +1.00 to -1.00.

**Types of Correlation Techniques**



**Describes interdependence between two variables.**



**1) Persons product moment co-efficient of correlation:-** Karl Pearson is inventor.

It is represented as 'r'. It is used for descriptive & relationship statistics to study the linear relationship i.e. rectilinear co-efficient or linear correlation.

$$r = \frac{\sum xy}{\sqrt{\sum x^2 \sum y^2}} \quad \text{paramatic measures.}$$

**2) Spearman's rank difference correlation co-efficient:-**

It is non-parametric correlation between the paired values of two variables in the same individuals & expressed in ranks in order of magnitude.

$$p = 1 - \frac{6 \sum d^2}{N(N^2 - 1)}$$

**3) Biserial correlation:-**

It can be applied when we get continuous variable & dichotomous variable. (Dichotomous means cuts into two parts)

E.g.:- Athletic divided in to athletic & non-athletic. Trained & untrained. Socially adjusted & socially non-adjusted. Etc.

$$r_{bis} = \frac{M_p - M_q}{6} \times \frac{pq}{y}$$

Where p & q = proportions of Ist & IInd group.

Y= height of the ordinate of the normal curve at the point of division between p & q.

**4) Point Biserial correlation:-**

There are continuous attributes which are classified into two categories, which may be change after further treatment.

E.g.:- one is un-trained now; he or she may trained in future.

But in point Biserial correlation, the attribute was a distinct point which cannot be changed.

E.g.:- living & non-living, male & female, rural & urban.

$$r_{pbis} = \frac{M_p - M_q}{6} \times \sqrt{pq}$$

### 5) Partial correlation:-

It is applied to the trivariate situation which includes more than two variables. e.g.:- study the effect of school & home environment on social development of the child. The three variables are closely related. If we want to study the effect of one factor on two factors we can use this this method.

$$r_{123} = \frac{r_{12} - r_{13} \cdot r_{23}}{\sqrt{1 - r_{13}^2} \times \sqrt{1 - r_{23}^2}}$$

$$r_{231} = \frac{r_{23} - r_{12} \cdot r_{13}}{\sqrt{1 - r_{12}^2} \times \sqrt{1 - r_{13}^2}}$$

$$r_{132} = \frac{r_{13} - r_{12} \cdot r_{23}}{\sqrt{1 - r_{12}^2} \times \sqrt{1 - r_{23}^2}}$$

$r_{123}$  :- the correlation between 1<sup>st</sup> & 2<sup>nd</sup> variable by partialing the effect of 3<sup>rd</sup> variable.

$r_{231}$ :- the correlation between 2<sup>nd</sup> & 3<sup>rd</sup> variable by partialing the effect of 1<sup>st</sup> variable.

$r_{132}$ :- the correlation between 1<sup>st</sup> & 3<sup>rd</sup> variable by partialing the effect of 2<sup>nd</sup> variable.

### 6) Tetra choric correlation:-

Biserial & point biserial correlation are applied when one variable is continuous & another is dichotomous. But in some situations there are two variable which again classified into two fold categories. e.g.:- in an achievement test in any skill development who have trained, untrained & results will pass & fail.

	Pass	Fail
Trained.	(A)	(B)
Untrained.	I	(D)

$$it = \cos \left( \frac{180^\circ \times \sqrt{BC}}{\sqrt{AD} + \sqrt{BC}} \right)$$

**7) Phi correlation:-**

When the correlation is wanted or desired between two items of a test which are genuine dichotomous. It can be explained as yes or no, living or dead, true or false, pass or fail, etc.

There will be no intermediate answer.

i) From frequencies:-

$$\phi = \frac{AD-BC}{\sqrt{(A+B)(C+D)(A+C)(B+D)}}$$

ii) From proportions.-

$$\phi = \frac{P_{ij} - P_i P_j}{\sqrt{P_i P_j q_i q_j}}$$

P i= proportion passing item i.

P j= proportion passing item j.

q i= proportion failing item i.

q j= proportion failing item j.

**Conclusion:-**

In the statistical technique correlation is very important. Correlation is useful to determine the reliability & validity of a test. Also to know the relationship between two school subject to determine the relationship between teaching method & achievements of students.

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