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**STUDENT'S ATTITUDE TOWARDS APPLICATION OF STATISTICS: A STUDY OF UNIVERSITY OF JAMMU**

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**ABSTRACT**

*Today statistics has been widely employed in government, business, and all the different fields of sciences. With the emergence of science and technology the focus of the researchers is towards the applicability of the work to be done in their related fields. Statistics is not an exception; rather it is one of the most important analytical activities which have the wider applicability in all the fields. The present paper is an attempt to investigate the attitude of the post-graduate students of University of Jammu towards the use and application of statistics in their respective fields. A comparative study of the use of statistics has been done in different post-graduate departments having different disciplines.*

**KEYWORDS**

Statistics, Science and Technology and Analytical activities.

**INTRODUCTION**

Today statistics has been widely employed in government, business, and all the different fields of sciences and technology. Statistical science is concerned with the planning of studies, especially with the design of randomized experiments and with the planning of surveys using random sampling. The history of statistics can be said to start around 1749 although, over time, there have been changes to the interpretation of what the word *statistics* means. In early times, the meaning was restricted to information about states. This was later extended to include all collections of information of all types, and later still it was extended to include the analysis and interpretation of such data. In modern terms, "statistics" means both sets of collected information, as in national accounts and temperature records, and analytical work which require statistical inference. A number of statistical concepts have an important impact on a wide range of sciences. These include the design of experiments and approaches to statistical inference such as Bayesian inference, each of which can be considered to have their own sequence in the development of the ideas underlying modern statistics.

Thus, Statistics is the mathematical science that involves the collection, analysis and interpretation of data. A number of specialties have evolved to apply statistical theory and methods to various disciplines. Statistics plays a vital role in every fields of human activity. Statistics has important role in determining the existing position of per capita income, unemployment, population growth rate, housing, schooling medical facilities etc. in a country. Now statistics holds a central position in almost every field like Industry, Commerce, Trade, Physics, Chemistry, Economics, Mathematics, Biology, Botany, Psychology, Astronomy etc., so application of statistics is very wide. The various disciplines where Statistics plays a significant role are: Actuarial science (discipline that applies mathematical and statistical methods to assess risk in the insurance and finance industries), Biostatistics (studies biological phenomena and observations by means of statistical analysis, and includes medical statistics), Business Analytics (developing business process that applies statistical methods to data sets to develop new insights and understanding of business performance & opportunities), Demography (statistical study of all populations), Econometrics (branch of economics that applies statistical methods to the empirical study of economic theories and relationships), Environmental statistics (application of statistical methods to environmental science. Weather, climate, air and water quality are included, as are studies of plant and animal populations), Epidemiology (study of factors affecting the health and illness of populations, and serves as the foundation and logic of interventions made in the interest of public health and preventive medicine), Geostatistics (branch of geography that deals with the analysis of data from disciplines such as petroleum geology, hydrogeology, hydrology, meteorology, oceanography, geochemistry, geography), Operations research (an interdisciplinary branch of applied mathematics and formal science that uses methods such as mathematical modeling, statistics, and algorithms to arrive at optimal or near optimal solutions to complex problems), Psychometrics (theory and technique of educational and psychological measurement of knowledge, abilities, attitudes, and personality traits), Quality control (reviews the factors involved in manufacturing and production; it can make use of statistical sampling of product items to aid decisions in process control or in accepting deliveries), Statistical mechanics (application of probability theory, which includes mathematical tools for dealing with large populations, to the field of mechanics, which is concerned with the motion of particles or objects when subjected to a force) etc.

Thus, it has been seen that the statistics has been used in different disciplines and different areas and the present paper is an extension to it and an attempt has been made to study the attitude of post-graduate students towards applicability of statistics in different fields. For this a study has been done on the use and application of statistics by students in different departments of the University of Jammu.

**SCOPE OF THE STUDY**

The focus of the study is to determine the attitude of students towards applicability of statistics in different disciplines. The study has been conducted in the University of Jammu, Jammu region of the state Jammu and Kashmir. The respondents of the research study comprise the students of the Post-Graduate department of Commerce and Education, University of Jammu, Jammu.

**OBJECTIVES**

The objectives of the study are as follows:

1. To study the attitude of Post-Graduate students towards application of Statistics of the select institution.
2. To compare the attitude of students towards application of Statistics on discipline basis.

**REVIEW OF LITERATURE**

An extensive literature has been done and it has been seen from the previous studies that the attitudes toward statistics are related to previous math experience (Brown and Brown, 1995; Schau, 2003), level of statistics course (Waters *et al.*, 1989) and previous statistics experience (Sutarso, 1992 cited in Mills, 2004) cited in Awan and Ullah (2011) research paper. The ultimate goal of statistics education is to produce individuals who appropriately use statistical thinking. Most college students take only one statistics course, the introductory course. This course, then, is where we, as statistics instructors, do or do not

motivate students to apply the statistics that they have learned in their jobs and in their lives (Schau, 2003). It has been found that about 61% of Augsburg students saw more value in statistics after their course than before; this difference was not statistically significant. These students had a statistically significant increase in their feeling of cognitive competence after their course even though they found it more difficult than expected (Schield and Schield, 2008).

Macnaughton (2004) argues that the primary goal of an introductory statistics course should be to give students "a lasting appreciation for the value of statistics." It has been also revealed from the study (Nooriafshar and Maraseni, 2004), that the perceptions of the university students, from two different parts of the world (University of Southern Queensland, Australia and Apex College, Kathmandu) when compared found that there were very minor differences in numbers to the perception between the two groups of students. Testing the statistical validity, has confirmed that there are no statistically significant differences in perceptions between two groups of students. Further analysis and investigation into the research findings of the high school students from two different parts of the world (Iran and Australia) and the university students' study has revealed that as the level of education goes higher the percentage of students regarding mathematics/statistics 'an enjoyable subject' with high practical and relevance to the future profession also increases. Secondly, as we move from the high school level towards the university level the more homogenous the perception between two counterparts (respective groups) of students becomes. Also, it has been found that regardless of country or cultural background students have a preference for visual features in learning.

Suanpang et. al. in the given study, showed that there is highly significant differences in students' attitudes towards learning statistics online and using a traditional approach. It has been also found that there is no significant difference between attitudes of students studying on campus and those studying by distance. In all four subscales the patterns shown from before to after, from online to traditional, were essentially the same for the distance students as for the campus-based students. Thus, based upon the existing literature, the present paper is an attempt to study the attitude of the post-graduate students of the University of Jammu, Jammu towards the application of Statistics in their respective fields. Also, a comparative study of students of different post-graduate departments of University of Jammu has been done.

## RESEARCH METHODOLOGY

The present study has been conducted among the students of the Post-Graduate department of University of Jammu, Jammu region of the state Jammu and Kashmir. This sector has been chosen for the study, as it is one of the biggest service organizations which deal with the common people and frequently use statistics in their course curriculum. Also, this study will be helpful in evaluating the attitude of students of the select University towards applicability of Statistics in their respective fields. For the purpose of the given study primary as well as secondary data has been used. The Secondary data has been collected from various books, journals, published research papers and websites etc. The primary data has been collected by means of a standard questionnaire (Source: Awan, A.I. and Ullah, A. (2011), "Attitude of Students towards Statistics in Teacher Education Institutions". *International Journal of Academic Research*, Vol. 3. No. 6). Copies of the questionnaire were given personally to respondents in different Post-graduate departments of Commerce and Education, University of Jammu. The questionnaire contained a total of 28 items with 5-point Likert scale ranging from 1-strongly disagreed to 5-strongly agreed. The sample was randomly selected and 200 respondents were personally collected to give their responses.

## DATA ANALYSIS AND INTERPRETATION

The study deals with the analysis of the attitude of students towards the application of statistics and makes comparison between different post-graduate students in terms of their discipline. The data collected from the respondents has been first subjected to simple percentage method and mean score method has been used in order to know the attitude of students towards the application of statistics in the select university.

### DEMOGRAPHIC PROFILE

For studying about the demographic profile of the students, simple percentage method has been used. A total of 200 respondents were randomly selected, 100 from each department i.e. Commerce and Education. The result shows that more than half of the respondents are females (52%) and males (48%). In terms of age majority of respondents (71%) are between 20-22 years, 18% are between 22-25 years and 11% students have their age above 25 years. More than half (57.1%) of the students are graduate, 25.7% are under graduate and 11.4% are post-graduate. It has been also found that 35% respondents have their family income above Rs.35,000 per month, 52.6% have family income ranging Rs. 15,000 to 25,000 and 12.4% family income below Rs. 15,000 per month.

### AFFECT

The factor *Affect* has 6 items measuring positive and negative feeling concerning statistics. This section deals with the items which show that how students felt about statistics, enjoyed the course, or were stressed by and scared of statistics.

TABLE 1- AFFECT

	Affect	Commerce	Education
1.	I like statistics	3.57	3.13
2.	Feel insecure to do statistics problems	2.90	3.93
3.	Frustrated over using statistics tests	3.07	3.20
4.	Under stress during statistic class	3.00	3.17
5.	Enjoy taking statistics courses	4.23	3.40
6.	Afraid of learning statistics	2.83	3.13

Table-1 given above shows the factor *Affect* among the Commerce and Education discipline students. The table consisted of six items on which mean scores were calculated for comparing the attitude of students of Commerce and Education discipline. As revealed by the table, the Commerce students enjoy taking statistics courses (4.23) has maximum mean score followed by I like statistics (3.57), Frustrated over using statistics tests (3.07), Under stress during statistic class (3.00), Feel insecure to do statistics problems (2.90) and Afraid of learning statistics (2.83) has minimum mean score. While the students of Education stream, Feel insecure to do statistics problems (3.93) has maximum mean followed by Enjoy taking statistics courses (3.40), Frustrated over using statistics tests (3.20), Under stress during statistic class (3.17) and both the items, I like statistics and Afraid of learning statistics (3.13) has same mean score. Since, the item no. 2,3,4 and 6 are negative statements, the lower mean scores in case of commerce students than education students shows that the commerce students has comparatively positive attitude towards use and application of statistics.

### COGNITIVE COMPETENCE

The factor *Cognitive Competence* has 6 items measuring attitudes about intellectual knowledge and skills when applied to statistics. Cognitive Competence has been associated with their understanding of statistics, their methods of learning such as solving equations, skill in problem solving and ability to learn.

TABLE 2- COGNITIVE COMPETENCE

	Cognitive Competence	Commerce	Education
7.	Trouble in understanding statistics	3.19	3.20
8.	No idea of what's going on in statistics	2.17	3.07
9.	Makes lot of math errors in statistics	3.50	3.50
10.	I can learn statistics	3.93	3.50
11.	I understand statistics equations	3.87	3.60
12.	Find difficult to understand statistics concepts	3.17	3.20

Table-2 given above shows the *Cognitive Competence* among the students of Commerce and Education discipline. The table consisted of six items on which mean scores were calculated for comparing the attitude of students of Commerce and Education discipline. As revealed by the table, I can learn statistics (3.93) maximum mean score followed by I understand statistics equations (3.87), Makes lot of math errors in statistics (3.50), Trouble in understanding statistics (3.19),



Find difficult to understand statistics concepts (3.17), and least in case of the item no idea of what's going on in statistics (2.17). While the students of Education stream, I understand statistics equations (3.60), Makes lot of math errors in statistics and I can learn statistics has same mean scores (3.50), followed by Trouble in understanding statistics and Find difficult to understand statistics concepts (3.20) and No idea of what's going on in statistics (3.07). Since, the item no. 7,8,9 and 12 are negative statements, the lower mean scores in case of commerce students than education students shows that the commerce students has comparatively positive attitude towards use and application of statistics.

#### VALUE

The factor *Value* has 9 items measuring attitudes about the use, relevance and worth of statistics in personal and professional life. *Value* was associated with the importance of statistics that related to their daily life, future work, and professional job.

TABLE 3-VALUE

	Value	Commerce	Education
13.	Statistics is worthless	2.63	2.80
14.	Statistics as a part of my professional training	4.00	3.03
15.	Statistical skills will be more employable	3.30	3.00
16.	Statistics is not useful to the typical professional	2.37	3.33
17.	Statistical thinking is not applicable outside job	2.33	2.77
18.	Use statistics in everyday life	3.37	2.90
19.	Statistics conclusions are rarely presented	3.67	3.80
20.	No application for statistics in my profession	2.40	2.80
21.	Statistics is irrelevant in my life	1.53	3.00

Table-3 given above shows the Value of statistics among the students of Commerce and Education discipline. The table consisted of nine items on which mean scores were calculated for comparing the attitude of students of Commerce and Education discipline. As revealed by the table, Statistics as a part of my professional training (4.00) has maximum mean score followed by Statistics conclusions are rarely presented (3.67), Use statistics in everyday life (3.37), Statistical skills will be more employable (3.30), Statistics is worthless (2.63), No application for statistics in my profession (2.40), Statistics is not useful to the typical professional (2.37), Statistical thinking is not applicable outside job (2.33) and Statistics is irrelevant in my life (1.53). While the students of Education stream, Statistics is not useful to the typical professional (3.33) has maximum mean score, Statistics as a part of my professional training (3.03), Statistical skills will be more employable and Statistics is irrelevant in my life (3.00), Use statistics in everyday life (2.90), Statistics is worthless, Statistics conclusions are rarely presented and No application for statistics in my profession (2.80) has same mean scores, followed by Statistical thinking is not applicable outside job (2.77) has least mean score. Since, the item no. 13,16,17, 19, 20 and 21 are negative statements, the lower mean scores in case of Commerce students than education students shows that the Commerce students has comparatively positive attitude towards use and application of statistics.

#### EASINESS

The factor *Easiness* had 7 items measuring attitudes about the ease or difficulty of the statistics subject. *Easiness* measured how easy they found it to study and learn statistics and to apply the results of their studies to computation skills, and ways of thinking in statistics.

TABLE 4- EASINESS

	Easiness	Commerce	Education
22.	Statistics formulas are easy to understand	3.57	3.30
23.	Statistics is a complicated subject	3.31	3.47
24.	Statistics is quickly learned by most people	3.35	3.12
25.	Learning requires a great deal of discipline	3.18	3.20
26.	Statistics involves massive computations	3.45	3.60
27.	Statistics is highly technical	3.23	3.30
28.	Learn a new way of thinking to do statistics	3.50	2.93

Table-4 given above shows the Easiness among the students of Commerce and Education discipline. The table consisted of seven items on which mean scores were calculated for comparing the attitude of students of Commerce and Education discipline. As revealed by the table, Statistics formulas are easy to understand (3.57) has maximum mean score followed by Learn a new way of thinking to do statistics (3.50), Statistics involves massive computations (3.45), Statistics is quickly learned by most people (3.35), Statistics is a complicated subject (3.31), Statistics is highly technical (3.23), and Learning requires a great deal of discipline (3.18) has least mean scores. While the students of Education stream, Statistics involves massive computations (3.60) has maximum mean score followed by Statistics is a complicated subject (3.47), Statistics formulas are easy to understand and Statistics is highly technical (3.30), followed by Learning requires a great deal of discipline (3.20), Statistics is quickly learned by most people (3.12) and Learn a new way of thinking to do statistics (2.93) has minimum mean score. Since, the item no. 23,25,26, 27 and 28 are negative statements, the lower mean scores in case of Commerce students than education students again shows that the commerce students has comparatively positive attitude towards use and application of statistics.

#### CONCLUSION

Thus, it can be concluded that the use and applicability of the statistics has been widely employed in different fields including Commerce and Education as in the present scenario. The present paper investigated that the post-graduate students of University of Jammu exhibits positive attitude towards the use and application of statistics in their respective fields. It has been found that all the four factors *Affect*, *Cognitive competence*, *Value* and *Easiness* has positive attitude towards use of statistics. A comparative study of the use of statistics in commerce and education department has been done which shows that the commerce students feel comparatively more at ease, they value the worthiness of subject, understand easily and shows positive attitude towards use and application of statistics in their respective field.

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