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## **GRT** ASSESSMENT OF CONCEPTUAL UNDERSTANDING OF BASIC MATHEMATICS AND STATISTICS OF UNDERGRADUATE COMMERCE STUDENTS.

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**Abstract:**-The nature of workforce has changed dramatically in the past several decades, due to large part to the infusion of rapidly changing technology. This trend resulted in an increased need for students with greater mathematical and statistical skills. We found that the knowledge necessary for successfully pursuing college-level programs depends on a good foundation in mathematics and statistics that focuses on conceptual understanding, procedural fluency, and the ability to solve problems. This assessment can be used to track student progress, identify particular difficulties. Survey was taken on undergraduate commerce students of University of Mumbai and relevant background factors like gender, medium of instruction, subject opted for HSC, performance at SSC, preparation, were acknowledged to find some correlation. This work reports on some key relationship between these factors and in particular the importance of understanding of basic Mathematical and Statistical concepts.

**Keywords:** foundation of mathematics and statistics, ability to solve problems, identify difficulties, assessment etc.

### INTRODUCTION

Each year, hundreds of students enrol in F.Y.B.COM., some by choice, many as a compulsory component of a chosen program. Over past many years, the study of Mathematics and Statistics has received increasing emphasis at the school level. Many components such as basic numeracy, mathematical inclinations, attitude towards this subject and self efficacy may also impact on student's performance. Hence to better understand the development of students at the interface of secondary and tertiary education, we need first to determine and understand their relevant background factors and preparation, which may need to be acknowledged or adjusted before they can successfully progress. Objective of the study were to observe the effect of gender, medium of instruction at school level, subject opted at HSC, entry level performance on conceptual understanding of each student in mathematics and statistics separately and together, with respect to the curriculum of undergraduate commerce students. Research in the areas of statistical education, and mathematics education is reviewed and the results applied to the teaching of college-level mathematics and statistics courses. The argument is made that mathematics and statistics educators need to determine what they really want their students to learn, to modify their teaching according to suggestions from the research literature, and to use assessment to determine if their teaching is effective and if students are developing mathematical and statistical understanding and competence. Many teachers are involved in teaching mathematics and statistics formally in a college classroom, regardless of the setting, a major concern of those who teach mathematics and statistics is how to ensure that the students understand mathematical and statistical ideas and are able to apply what they learn to real-world situations. Although teachers of mathematics and statistics often express frustration about difficulties students have in learning and applying course material, In this paper, I assess the student's basic understanding of mathematical and statistical concepts so to apply it specifically to improve teaching and learning outcomes in college-level mathematics and statistics courses.

**METHODOLOGY**

Students involved in this study were enrolled at the University of Mumbai in F.Y.B.COM during the first semester of 2014-2015. The study involved 157 students. In this survey the students filled two types of forms. Firstly the basic information form and secondly a multiple choice questionnaire consisting of 20 questions. With the help of basic information form, the information like gender, medium of instructions at school level, entry level performance, subject opted at HSC etc. was obtained. This information was useful in forming correlations between these parameters with the conceptual understanding of basic mathematics and statistics. In the conceptual test, questions were developed and selected to reflect the understanding of basic mathematics and statistics, considered appropriate at the school/ tertiary interface and necessary for development in a wide range of disciplines. student's numeracy was assessed by a questionnaire, designed around those aspects of numeracy commonly use and understanding of fractions, decimals and percentages, substitution of numerical values to evaluate simple expressions, and rearranging simple equations and inequalities. The test particularly checks their knowledge, comprehension ability of applying knowledge, analysing ability, ability to solve problems, capacity of evaluation of a certain basic concepts etc. To find the correlations, 'marks obtained in the test of mathematics', 'marks obtained in the test of statistics', 'gender', 'entry level performance' are some of the variables were considered. The attempt was made for finding reasons for the poor response obtained by students at undergraduate level. Since basic mathematics and statistics are some of the important subjects, the test on it was selected as a probe to checks the understanding of basic concepts in these areas. The results were then compared with the gender, medium of instruction, subject opt at HSC, their learning style etc. descriptive statistics, testing of hypothesis, percentage analysis used as the tools for data analysis.

**RESULTS AND DISCUSSION**

It was test of objective types of questions. There were 20 such questions each having four options and only one option was correct. Each correct answer was given one marks. As a result the max marks that can be obtained in this test were 20. The total number of undergraduate students were 157 in which there were 66 girls and 91 boys.

**CONCEPTUAL PROFILE:-**

Marks vs no. of students was as follows

<b>Marks</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>Number of students</b>	0	0	4	7	10	13	20	25	17	20	18
<b>Marks</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	
<b>Number of students</b>	10	5	1	3	3	0	1	0	0	0	

Average marks of the students is 7.7197. It was observed that the overall performance of the students in the test was poor. 73% of students got marks less than or equal to 10.

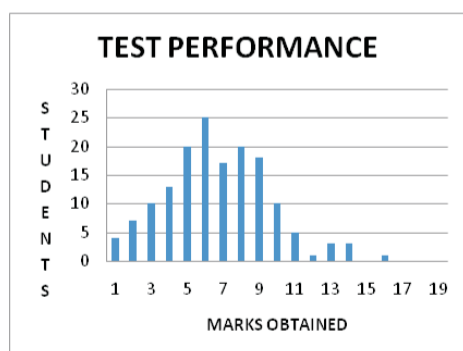
Number of students received marks less than 7/20 = 54/157

Number of students received marks between 7 and 14/20 = 96/157

Number of students received marks above 14/20 = 7/157

Number of students having English as their language of instruction at school level = 46

Number of students having some other language of instruction at school level = 112



Marks obtained	No. of students
0-4	11
4-7	43
7-10	62
10-14	34
14-20	7

Response obtained from students with respect to gender, entry level performance and medium of instruction was found to be poor, Also T test showed that there was no significant difference in the marks obtained with respect to gender, entry level performance, medium of instruction as shown.

PARAMETERS	AVG MARKS OBTAINED/20	T TEST	CONCLUSION
Gender	Female= 7.773973 Male= 7.923077	T=0.31799	No significant difference in the marks obtained
Entry level performance	I CLASS= 8.109091 II/ III CLASS= 7.509804	T=0.67056	No significant difference in the marks obtained
Medium of instruction	English= 7.478261 Non-english= 7.81982	T=1.23753	No significant difference in the marks obtained

Since from above table  $t_{cal} < t_{critical}$  in all the cases we conclude that there is no significant difference in the marks obtained by male and female, and marks obtained by I class and II/III class students at entry level and also we conclude that understanding of basic concepts in mathematics and statistics is not depend upon the medium of instructions upto school level.

The average performance in mathematics is 4.0764 and that of the statistics is 3.6433 hence, it is observed that students find both topics difficult and need help to deal with. The average performance in the test of the students who opted secretarial practice as an optional subject is same as that of who opted mathematics and statistics at HSC. Also the average performance in the test is almost same for the students who found mathematics and statistics is an interesting subject and those who had anxiety of these subjects. 56% Students said that they simply learn basic techniques, 73% students kept some part of the syllabus as an option, 63% said that they practice maximum problems, 59% said that they analyse the techniques. In spite of all these we found that there is null effect of conceptual understanding of basic concepts in mathematics and statistics.

### CONCLUSIONS

As students had basic foundation curriculum in geometry, trigonometry, algebra I and II and some basic statistics, our study emphasize that the basic aspects has null effect on conceptual understanding of above subject. Among 157 undergraduate students, 91 are males and remaining 66 are females. Their conceptual understanding in mathematics and statistics were analysed using T test it was found that there is no significant difference in the marks of conceptual test. This indicates that the conceptual understanding of these subjects is gender insensitive. The effect of medium of instruction, entry level performance also not affecting the conceptual understanding of mathematics and statistics. The overall performance was poor. The maximum number of students got marks below 14 and very few got above 14 out of twenty. This showed that one has to revise the teaching methodology to improve the conceptual understanding of students, and provide activities designed to develop the performance of students. They should be encouraged to assess their own learning as well as their notions of how they learn.

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