



**RESEARCH ARTICLE**

# Relationship Between Students' Performance and Class Attendance in a Programming Language Subject in a Computer Course

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**Abstract**— *In this paper the correlation between class attendance and performance has been analyzed to identify whether attendance is a factor which affects the students' performance in a computers related subject. The data for analysis was taken from two classes of undergraduate students of Computer Application Course at a college in New Delhi India. The correlation was found using Pearson correlation coefficient. The result showed that there is significant positive correlation between the students' performance and their attendance.*

**Key Terms:** - *Students' Performance; Attendance; Correlation; Computer Science course*

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## I. INTRODUCTION

There are many Computer and IT courses being offered by Indian Universities such as B.Tech in Computer Science, Information Technology, Bachelor of Computer Application (BCA), and B.Sc in Computer Science etc. Most of the Indian Universities have the policy of mandatory attendance which varies from 60 to 75% for different Universities. Not fulfilling the attendance criteria, detains the students from appearing in term examination and the student cannot be promoted to next academic year. Considering the importance of attending lectures in the Indian education system it is evident to find out the impact of attendance on the students' performance. If there is no significant impact of attendance, then it is unfair at the part of students to loose the opportunity of appearing in the exams mere on the basis of attendance.

In the course under observation, the students' performance is assessed in a computer programming language subject java for two classes. With the evolution of soft computing techniques like genetic algorithms, fuzzy logic and neural network, it has become evident to explore new methods to assess students' performance in these courses. Before applying these techniques to evaluate students' performance, it is necessary to identify the factors which have direct or indirect impact on the performance of students in IT courses. In this paper impact of students' attendance on their performance has been assessed to evaluate whether attendance is a factor which influences the students' performance. This study will examine following research question:

Is there any significant relationship between the attendance and the students' performance in IT related Courses?

## II. RELATED WORK

Researchers are making efforts to identify ways to improve the students' performance. Many studies have been conducted to find out the factors influencing the performance of the students in exam. A study was conducted to analyze factors affecting students' grades in principles of microeconomics and macroeconomics students from the data collected in two public universities. [1]. Various studies have established that there is a correlation between students' attendance and their academic performance and identified that the attendance has encouraging effect on the performance of students in exams. This was proved for economics class [2-4]. It was also found that as compare to the students who were not attending all lectures, the students who attended the lectures scored 9.4% to 18% better in their exams [3]. The review of literature by other researchers also suggested that Asian students generally have a positive learning attitude that allows them to perform well in different academic settings. A good learning attitude also includes attending the classes regularly and studies have found a positive correlation between class attendance and course performance [5]. In a research it was also found that lab attendance relates to the exam grade which means that when students attend lab, their exam grade is higher [6]. Researchers even also determined an inverse relationship between students' absence and their achievement [7].

In another study, the impact of time commitments by students to various course activities on the students' performance in the given class was measured. The results were encouraging. It was observed that the most important and valuable time commitment in a course was the time actually spent in the classroom. That time was the main determinant of the success of the student and each unit of time spent in the class brought maximum improvement in students' performance, among all the class related activities [8]. In another version of the same statistical test, it was also found that the time spent over the entire term on the ongoing activities of the class i.e. class lectures, discussions and assignments were most significant in explaining student performance in a given course. The results of this test reinforce the idea that the most important learning in a course takes place in the classroom and that students who do a careful job on a daily basis preparing for and participating in class outperform those students who skip class and try to study during exams only. A detailed study was conducted for cohorts of Economics students at a UK university to identify the causal effects of class absence on student performance. In this study the panel properties of the data was also exploited to control for unobserved heterogeneity across students and hence for endogeneity between class absence and academic performance of students stemming from the likely influence of effort and ability on both absence and performance. Among other results it was also found, from a quartile regression specification, that there is a causal effect of absence on performance for students: missing class leads to poorer performance [9]. It has also been examined how attendance may affect performance of international students and, in turn, how perceptions of the importance of attending class shape attendance and performance [10]. They also recognised the need to explore the impact of attendance at critical points in the term, rather than just the total attendance for the term. Their study's findings suggest that students should be actively encouraged to attend classes from the outset if they are to optimise their chances of success.

Examination performance of first-year biological sciences undergraduates was found to be statistically significantly correlated with lecture attendance. This correlation was particularly strong for non-Anglophone and UK ethnic minority students, compared to white UK students and was suggested that lectures are an important contribution to equal opportunities in undergraduate courses [11].

A study at University College Dublin was conducted to establish the levels of attendance at lectures by civil engineering students to ascertain whether lecture attendance influenced the examination performance of these students. Lecture attendance for two classes of civil engineering students was monitored and analysed. The average lecture attendance rate for these students was found to be 68%, which is in line with attendance rates in US studies, but higher than comparable Irish studies in other disciplines. A linear regression analysis of the data showed a strong correlation between lecture attendance and examination performance. Each 10% increase in student attendance at lectures improved examination performance by about 3%. [12] Later similar results were also obtained from a study on the Electrical engineering students. [13] Another study was performed on three courses offered in industrial engineering department at the Hashemite University in Jordan. Study revealed that the grade attained by a student is strongly affected by the attendance percentage and his overall GPA with a value of  $R^2$  of 52.5%. Another model that has been investigated is the relation between the semester GPA and the attendance percentage, the number of credit hours enrolled in at specific semester, and the overall GPA. This model also gave a strong relationship between the semester GPA and attendance percentage and the overall GPA with a value of  $R^2$  of 76.2% [14].

It is evident from various studies in different countries for different courses, that the attendance in the class has an impact in the students' performance. However not many results were found considering the education system of Indian Universities and also computer science or information technology related courses. This study focuses on the impact of attendance on students' performance in a computer based course taught in India.

### III. THE STUDY

The relationship between attendance and the students’ performance has been analysed in this study. The data has been taken from the students’ result of internal assessment in a programming subject JAVA for two sections and overall attendance of a semester has been considered in the same subject. This subject was selected as this is a practical based subject among other subjects of the course and students also attend lab sessions if present in the class which may have direct impact on their performance.

### IV. METHODOLOGY

Data was collected from the fourth semester students of two sections of an undergraduate course in computer application. The instructor was same for both classes. The difference in two classes was only in the timings of the classes. Class 1 was conducted in morning session and Class 2 was conducted in evening session. Data of all the students enrolled for the course was used for analysis except those students who had not appeared in the exam. Class attendance data was collected from the records of students’ actual attendance for the complete course of that subject. Data of students’ performance was collected from the internal assessment of the subject under observation. The spreadsheet containing the values of both variables (attendance and marks) was prepared. To determine the correlation between attendance and students’ performance (marks), the correlation coefficient was calculated using following Pearson’s correlation relation formula

If we have a series of *n* measurements of *x* and *y* written as *x<sub>i</sub>* and *y<sub>i</sub>* where *i* = 1, 2, ..., *n*, then the *sample correlation coefficient* can be used to estimate the population Pearson correlation *r* between *x* and *y*. The sample correlation coefficient is written

$$r_{xy} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{(n - 1) s_x s_y} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \sum_{i=1}^n (y_i - \bar{y})^2}}$$

where  $\bar{x}$  and  $\bar{y}$  are the sample mean of *x* and *y*, and *S<sub>x</sub>* and *S<sub>y</sub>* are the sample standard deviations of *x* and *y*. Table 1 shows the statistical analysis of the data. In this case variable *x* is the attendance and *y* is the students’ marks. *n* is the number of students.

Table 1 Result data

Class	Mean Attendance x	Mean Marks y	Slope	Intercept	Standard deviation Sx	Standard deviation Sy	Correlation coefficient	n
Class 1	64	80.29	0.5831596	42.849567	17.91855728	16.64668721	0.6277153	41
Class 2	76	83.05	0.279428372	61.83544515	16.71794554	10.70222853	0.436494913	37

### V. RESULT

The results of the Pearson correlation coefficients presented in table 1 shows a positive correlation between the attendance and students’ performance in the exam (*r*=.6277153 for Class 1 and *r*=.4364949 for Class 2). However it varies for two classes. Both the classes do not show very strong correlation but Class 1 shows a significant relationship between attendance and the students’ performance. Class 2 shows a weaker correlation than class1 although the instructor was same for both the classes. The main difference in the two classes was the timings of the classes. Class 1 was held in the morning session and Class2 was conducted in evening session. They may be other factors which affect the students’ performance.

## VI. CONCLUSION

The objective of this paper was to establish the extent of relationship between the students' attendance and their performance. The result shows that attendance has a positive influence on the students' performance in the exam. Hence attendance may be considered as a parameter for using soft computing technique for further investigation to analyse and review the mandatory attendance of the students in undergraduate courses in Indian Universities.

## VII. LIMITATIONS

This study has limitations. Here only attendance has been considered as a parameter for students' performance which is a controlled parameter. Although the other uncontrolled parameters such as students' attitude, family background, interest in the subject, influence of instructor etc. may also have impact on the performance. Hence, additional factors may be included. Larger Sample size, other computer based subjects for more than one course may be considered for future studies.

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