

Class Attendance and Performance, which comes first?

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***Abstract:** In a newly introduced elective course of Wind Engineering, an analysis was carried out to investigate the relationship between students' class attendance and their likely performance before and after the course. During the study, class attendance was not mandatory and its records were noted without the knowledge of the students. Course material contents were uploaded online for students' access, of which the statistics of the access frequency were also track recorded. Results have indicated that students with likely high performance before the course are associated with higher class attendance. They would not access online course materials as much as the low attendance group, but they generally would achieve better performance afterwards. For the group who come to class less often, they are seen to attain relatively lower grades in academic performance. However, their performance is shown to improve with their frequency to access lecture materials online.*

Introduction

The advancement of technology, using computer network to record lectures and to upload course contents on a university-wide support site, has facilitated students in higher education an online learning environment to access material and to repeat classroom experience after class or even without attending class. Concern for improvements in student learning has attracted a large amount of literature in search for the correlation of class attendance and student performance, particularly in the present time when almost everything is accessible online.

The majority of these studies show that students attending classes would, one way or another, perform better on assessment than those skipping lectures. Class attendance has been repeatedly shown to be correlated with grades across a wide range of disciplines. Marburger (2001) investigated in a Principles of Microeconomics course and found that students were more likely to answer incorrectly to multiple choice test questions relating to material covered when they were absent in class. Moore (2003) studied two sections of an introductory Biology course, in one of which the value of class attendance was stressed while the other was not. The section in which attendance was stressed was found to have a higher rate of attendance as well as higher average grades in comparison to the section in which attendance was not stressed. Ajiboye and Tella (2006) also found in a social studies course that there was a significant influence of students' level of attendance on their academic performance. Ledman and Kamuche (2002) found further that students with better attendance not only scored higher test performance but also demonstrated more knowledge, at least of the course material, in learning. In a subsequent study, Marburger (2006) reported a mandatory attendance policy which confirmed significant reduction in absenteeism and improvement in examination performance.

Similar correlations between class attendance and student performance were found in more recent studies in Engineering Education. Purcell (2007) has shown that, in the 2nd and 3rd year Civil Engineering programme, every 10% increase in class attendance was seen to improve examination performance by about 3%. Naher, Brabazon and Looney (2008) also found that students with higher attendance achieved better performance in the 2nd, 3rd and 4th year in the School of Mechanical and Manufacturing Engineering. However, they pointed out that the course content delivery including blended learning and access to the latest technology is important to achieve improved learning. These methods of course content delivery would encourage and often require class attendance.

appeared to be low. 16 of the 25 male students recorded above average attendance and 10 of those above average ones showed very high level of attendance.

There were 13 students with Asian background (coloured light brown), as shown in the third row in Figure 1. Also, as seen in the last row, there were 4 postgraduate students (coloured dark green) and 11 students with their student numbers dating back over 4 years (coloured dark brown), who had more likely been deferred or struggling for more than the normal four or five years in the university before they reached their final year in this class. It is interesting to see that all postgraduate students have been recorded with very high level of attendance and more than half of the deferred or long time associated students (7 out of 11) often did not turn up to class, noting that this is a new course and no student had studied the course material before. Another interesting point to note is that students with Asian background, except the five very high attendance ones, are shown to skip lectures often and there is none in the second high category (coloured blue) of attendance within this group.

It may be reasonable to assume that all postgraduate students in the class are high performance students, as they must have attained a certain level of competence in their first degree before they can be admitted into their postgraduate course. On the other hand, those students who have been deferred or long time associated with the University may be assumed to have relatively lower performance in previous years. The trend so far is that high performance students show high level of attendance in class while low performance students skip lectures more often, regardless whether they have learnt the subject before or not. Thus, the present observations are suggestive that high performance associates with high class attendance. Also, at the end of the study, one of the two non-Asian deferred male students who attended class often were seen to have scored high in class performance. While this may indicate that high attendance may induce students' performance, it is necessary to conduct further research to substantiate this conclusion due to the very limited observation at present. On another hand, two Asian deferred male students were seen to have achieved relatively high performance despite of their low class attendance. It was identified later that they had supplemented their study with high access to on-line materials as discussed in the next section.

Effect of online accessibility on class attendance and performance

A further analysis was made to correlate the statistics recording the number of student access to the online course material with respect to the assessment grades of each of the student with different category of level of class attendance.

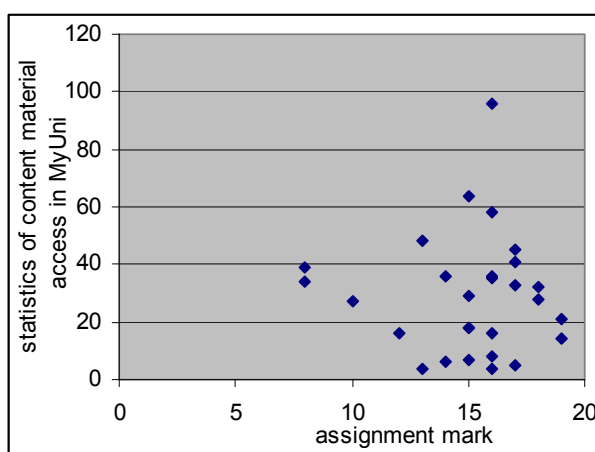


Figure 2: number of on-line access as a function of performance

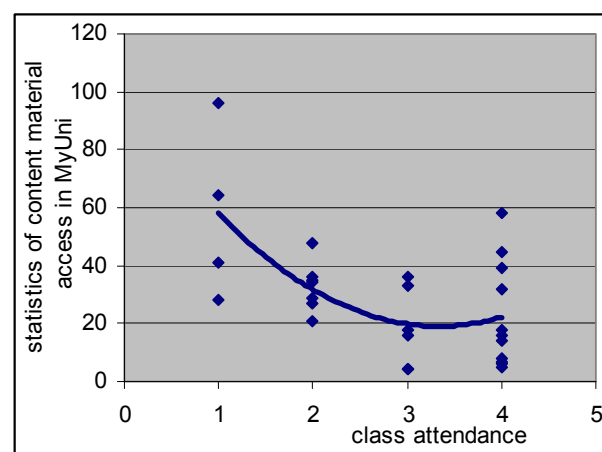


Figure 3: number of on-line access as a function of class attendance

Figure 2 is plotted with the number of online access statistics as a function of the assessment grades. Initially, it does not appear to have any correlation between the access statistics of the online material and the students' performance. However, as shown in Figure 3 for the plot of the online access

statistics as a function of class attendance category, there is an obvious overall trend that students who mostly attended class had not accessed online material as much as those who did not attend class. On average, those students who did not attend class are shown to have accessed online materials three times as much as those who attended class.

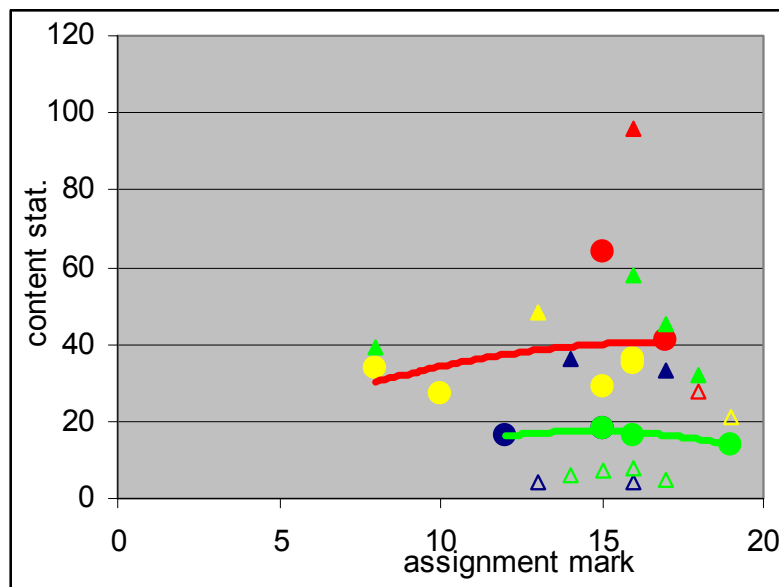


Figure 4: On-line access as a function of Performance with extreme outliers (triangular symbol) removed

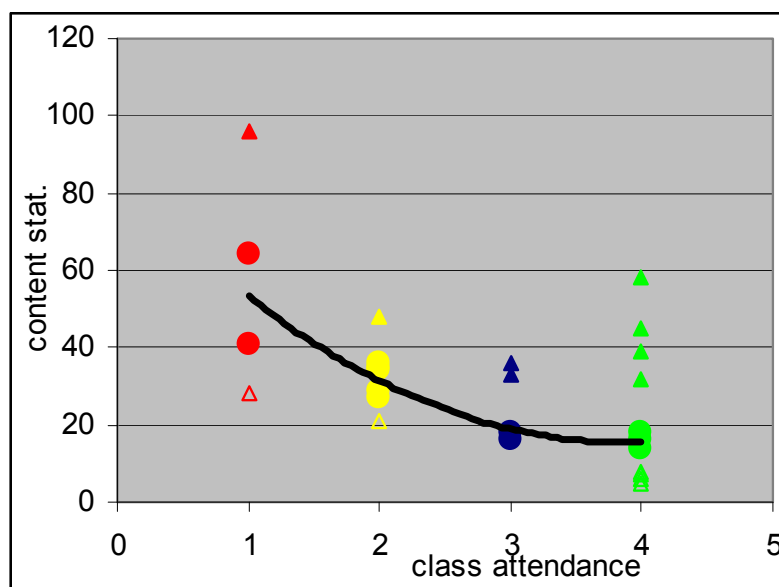


Figure 5: On-line access as a function of Class Attendance with extreme outliers (triangular symbol) removed

Figures 4 and 5 are re-plots of Figures 2 and 3 with each data point coloured according to the Category level of class attendance (red, yellow, blue and green). Also, after the extreme peak outlying data (i.e. the maxima represented by closed triangular symbols and the minima represented by open triangular symbols) are removed, trend lines are fitted to the remaining data. Figure 5 clearly shows a similar trend as in Figure 3 indicating that students who did not attend class as much would have accessed online materials three times more often than those who attended class regularly.

As shown in Figure 4, a red trend line is fitted to all data of low attendance (Categories 1 and 2, coloured red and yellow). A green trend line is fitted to all data of high attendance (Categories 3 and 4, coloured blue and green). The assignment marks are seen to range from 8 to 17 for the low attendance group (Categories 1 and 2) and from 12 to 19 for the high attendance group (Categories 3 and 4). We may conclude that students of the low attendance group are shown to achieve 10 to 30% lower in assignment marks than their high attendance students in class. Also, from the content access statistics, students of the low attendance group are seen to have accessed online course material at least twice as much as those of the high attendance group. For the low attendance group, Categories 1 (red) and 2 (yellow), there appears to have a slight increase in performance as the number of online access increases. However, there is no apparent change in the number of online access or its effect on the student performance for the high attendance group, Categories 3 (blue) and 4 (green).

Another interesting observation is that the very low attendance group, Category 1 (red), generally accesses online material more often and achieves higher assignment performance as compared with the low attendance group, Category 2 (yellow). This may indicate that studying on-line could be another alternative way to enable student's learning without attending class. But, the very high attendance group, Category 4 (green), has about the same online access statistics as the high attendance group, Category 3 (blue), yet generally with much higher performance. This may also indicate that class attendance became essential when on-line materials are not available. The group, with both low online access statistics and low attendance in class, is seen to score 50% or below in their assignments.

Conclusion

From the observations and analysis of the present study, students of high performance are likely those associated with high attendance in class. However, the study has shown that half of the high performance students did not score above 65 (credit) at the end of course even though they attended class regularly. This seems to indicate that performance comes first and class attendance will follow, but it may not necessarily happen vice versa.

A limited analysis from students of high attendance has also suggested that class attendance may induce performance. Seven out of eleven students of high attendance have achieved credit or above in their final score. In particular, two of the low performance students who scored high in the end were shown to have attended class regularly. Although the results have also shown that another two students of low performance who also scored high in the end even with poor class attendance, these two students were seen to have accessed to on-line course materials very often. But more extensive research in this respect may be necessary, especially in terms of supporting evidence from student feedback or comments.

Further study has substantiated this correlation and revealed that online access statistics are also associated with class attendance and are shown to improve performance, particularly for those with poor class attendance. Therefore, it may prove to be more effective to motivate students for high performance first, including by accessing on-line materials, rather than just encouraging class attendance which apparently follows. After all, high academic performance is the ultimate objective to indicate students' total learning experience in higher education.

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