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A STUDY OF NEW TRENDS IN POST-COVID CLASS ENGAGEMENT – DOES LAST MINUTE REVISION MAKE SENSE?

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Abstract

In this study, we analyse 'last-minute' study habits and their correlation with examination success in a large first-year undergraduate computer science class of over 400 students, using data from CANVAS virtual learning environment (VLE), Microsoft (MS) Stream, and MS Teams. The findings indicate that less than half of the students attended synchronous online lectures regularly, with approximately 50% viewing the revision lecture only a day before the examination. This group scored 6% below the class average, suggesting the ineffectiveness of 'last-minute' revision. In contrast, students who attended the synchronous revision lecture were twice as likely to achieve first-class honours and 1.5 times more likely to secure an upper second-class honours grade. Moreover, those with consistent VLE page views across the course emerged as top performers, indicating that sustained engagement, rather than 'last-minute' effort, yields better examination results.

Keywords: academic performance, online education, virtual learning environment, student attendance, online engagement, online higher education

1 INTRODUCTION

Blended learning, now commonplace in higher education [1], incorporates a considerable amount of online content. This approach has the potential to alter students' study habits, notably through the availability of lecture recordings [2]. Despite the surge in online content usage, many academics still anticipate that students' study habits for blended learning would largely mirror those of traditional lecture formats, where no additional online material is provided. However, this is proving not to be the case. The primary focus of this paper is to explore how blended learning alters students' study habits, particularly in regard to "last-minute" revision. Within virtual learning environments (VLEs) and video streaming platforms, there now exists the ability to analyse a student's online engagement comprehensively. It's possible to clearly discern whether students are consistently engaging with course material throughout the term or only accessing it a few days before an examination. The ambition of the individual student also has a significant impact on the relationship between study habits, attendance and performance. It is generally expected that good study habits will lead to higher grades [3-6].

There is considerable evidence that last minute study habits can affect overall grades, although this data was obtained before detailed VLE engagement data became available. One study [7] concludes that students who submit assignments late are likely to experience a 5% drop in grade. Another study examined the impact of “test anxiety” on students, finding that those with poor study habits could experience heightened anxiety, potentially leading to lower grades [8]. Other studies rely on questionnaires to assess student’s study habits, with one such study [9] reporting that “poorer academic performance was associated with a poor time management approach to studying”. One commonality among previous studies is that they lacked access to data on student engagement with VLEs and streaming platforms, compared to what is available now. This paper aims to investigate students' study habits by analysing the following parameters:

1. Viewing statistics of lecture and revision videos.
2. VLE page views.
3. Access reports of revision material on the VLE.
4. Asynchronous online lecture attendance.

All four aforementioned factors will be correlated with students' final examination results.

Blended learning generally affords students the flexibility to access teaching materials at any time that suits them, including outside of scheduled class times when the instructor is not present. Such asynchronous teaching methods profoundly expands the potential to explore the relationship between engagement and attainment, reshaping the norms for measuring engagement and its correlation to
performance in assessments. While the initial setup for blended learning can be more time-consuming for instructors [10], [11], the potential benefits for students often outweigh the extended preparation time. The flexibility it grants students, such as the ability to choose a convenient time and appropriate location for study, is particularly beneficial to students who may have other commitments such as caring responsibilities, living in remote areas, or those unable to attend in-person lectures due to health reasons [12-14].

2 METHODOLOGY

The detailed study was conducted on a sizable first-year undergraduate computer science class comprising over 400 students. This class, which is the focus of the analysis, features lectures delivered online, supplemented by in-person practical sessions to reinforce the concepts taught in the virtual environment. The students’ overall grade was computed from three assessments namely a class test, a project, and a final examination (Table 1). For this research, our primary emphasis is on students’ revision patterns for the final examination, especially determining whether ‘last-minute’ revision leads to favourable examination outcomes. Consequently, our analysis centres on the examination result component, as detailed in Table 1, rather than the students’ overall grade. To ascertain students’ study habits leading up to the examination, we utilized analytics data from the CANVAS Virtual Learning Environment (VLE), video analytics from Microsoft (MS) Stream, and MS Teams’ synchronous lecture attendance.

Table 1 Assessment breakdown for year 1 computer science module

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Month</th>
<th>Percentage Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class test</td>
<td>March</td>
<td>30%</td>
</tr>
<tr>
<td>Project</td>
<td>April</td>
<td>30%</td>
</tr>
<tr>
<td>Final Examination</td>
<td>May</td>
<td>40%</td>
</tr>
<tr>
<td>(Timed examination on computer, closed book)</td>
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</tbody>
</table>

This study begins by analysing the frequency of revision video views and access patterns of lecture notes to understand students’ study habits, particularly seeking evidence of last-minute study habits characterized by a surge in material access shortly before the examination.

Subsequently, we correlated the dates students accessed the revision materials with their examination results to determine whether last-minute access influenced performance positively or negatively compared to their peers who engaged with the materials earlier.

In addition to analysing online asynchronous viewing habits, we examined the students’ attendance at synchronous online lectures, focusing particularly on the performance of those who attended the final revision sessions.

Finally, we examined VLE page views to ascertain whether there was a correlation with students’ examination grades, aiming to verify the consistency of our findings with those presented at ICERI2022 [15]. The earlier research found that the majority of first-class honours grades were awarded to students with mid-range page views. Confirming this trend in another cohort would further substantiate this hypothesis.

3 RESULTS

3.1 Student viewing habits for revision video and lecture notes

The MS Stream viewing data for the Revision Video is shown in Figure 1. These results indicate a significant spike in ‘Revision Lecture’ views on the day preceding the examination, with 400 views originating from approximately 185 students, or roughly 50% of the class. A similar trend was observed with access to the ‘revision.pdf’ notes on the VLE; 165 students accessed this material the day before
the examination, as depicted by a notable spike in Figure 2. The similarities between the trends shown in Figure 1 and Figure 2 are significant, especially considering that the data from Figure 2, sourced from the CANVAS VLE, allows for a correlation between the timing of material access and the subsequent examination results. Unfortunately, correlating the video viewing data from MS Stream with examination results was not feasible due to the anonymity of the user data, although this limitation presents an opportunity for future research utilising other streaming platforms that can provide user identification.

**Figure 1. Number of views of revision video.**

**Figure 2. Number of students who accessed the revision notes ‘Revision.pdf’.**
3.2 Correlation between ‘last-minute’ revision notes access and examination result

Next, we sought to evaluate the examination performance of students who engaged in 'last-minute' study habits (that is, by accessing revision materials just prior to the examination).

Figure 3 shows the percentage deviation from the examination class average, grouped by students who accessed the revision notes on a particular date. Looking at the day before the examination (10\textsuperscript{th} May), we note from Fig. 2 that 165 students accessed this material. Fig. 3 confirms that, following the linear trendline, students who engaged in "last-minute" study were likely to score around 6\% below the class average.

Conversely, students who accessed the materials well ahead of time, specifically on the 23\textsuperscript{rd} April (18 days in advance), tended to score 4\% above the class average. This analysis, evidenced by a discernible downward slope in the linear trendline, clearly shows that students who engage in last-minute revision are likely to see a reduction in their examination results.

Figure 4 further examines the student performance, relative to the date they accessed the revision material, now looking at how many of these students obtained a first-class honours examination result (>70\%). Following the linear trendline, the students who accessed the revision material in the few days prior to the examination had only a 5\% likelihood of obtaining a first-class honours examination result. In quantitative terms, this translates to a concerning trend: of the 165 students who accessed the revision material on the day before the examination, a mere 8 students (or 5\% of the 165) were projected to achieve a first-class honours examination result. This stark data clearly illustrates a significant correlation where last-minute study habits are adversely impacting the students' performance on the examination.

![Exam Performance Variance: Analysis of Students Accessing 'revision.pdf' Based on Different Dates](image)

*Figure 3. Exam performance variance: analysis of students accessing 'revision.pdf' based on different dates.*
3.3 Correlation between date of synchronous lecture attendance and exam result

Now we turn our attention to another metric: synchronous lecture attendance, aiming to discern its correlation with examination performance and its potential association with last-minute study habits.

In this online module, 'synchronous lecture attendance' refers to students who attended the lecture on the scheduled date, rather than watching it at a later time. We noted an intriguing trend: aside from the evident 'last-minute cramming' before the examination, there was little indication that a significant number of students engaged with the lectures at a later date. This suggests that, while students may have the best intentions to review the material, it often doesn't transpire in reality.

Figure 5 illustrates the trend in synchronous attendance at live online lectures throughout the course. While attendance peaked at approximately 170 students during the initial lecture, it experienced a gradual decline, culminating in fewer than 80 students participating in the crucial final revision lectures. While this represents a low turnout, with less than half of the over 400 students in the class attending the synchronous sessions at live online lectures, it aligns with our findings from the ICERI2022 study [15], which indicated only a weak correlation between synchronous lecture attendance and overall grade performance.
Rather than examining the correlation between the overall number of synchronous lectures attended and the final results, this analysis aims to scrutinize the subset of students who consistently attended lectures up until the final revision sessions. This is done in Figure 6 where the student attainment is shown, grouped by the students who attended the synchronous lectures on a particular date. It is evident from the data that amongst the students who attended the final course lecture (a total of 76 students, as depicted in Figure 5), 64% achieved a grade above 2.1, with 21% securing a first-class grade. The group of students who attended the revision lecture also performed quite well, with 48% of these students obtaining a grade above 2.1. In comparison, the larger group of students who attended the initial lectures (for instance, on 23rd Feb) demonstrated significantly lower attainment, with only about 20% securing a grade above 2.1.
The comprehensive analysis suggests that students who consistently attend synchronous lectures, especially up to the final sessions, are approximately three times more likely to achieve a honours level above 2.1 in the final examination. We can assume that the group of students who attend the final lectures are less likely to engage in last-minute ‘cramming’ by accessing revision material just before the examination. This likely correlates with the individual student’s ambition, which significantly influences the relationship between study habits, attendance, and performance [3-6].

3.4 Correlation between VLE page views and examination result

In this study involving a large class of 400 students, the final aspect we explored was the relationship between VLE page views and student attainment. Our previous research presented at ICERI2022 [15] revealed that students with mid-range VLE page view counts tended to be the highest performers. The goal here is to replicate the study with a different cohort, reinforcing that the previous findings were not merely a one-time occurrence. In this study, we are focusing exclusively on the examination component, not the overall grade. We have established a 2.1 honours examination result as the grade threshold. The histogram depicted in Figure 7 illustrates that the highest performing group of students predominantly falls within the midrange of page views, corroborating the concept that this range represents “healthy” study habits. This observation aligns with the findings we presented at ICERI2022 [15].

![Figure 7. Histogram of students obtaining honours grade 2.1 and above grouped by VLE page views.](image)

4 CONCLUSIONS

This paper has unequivocally demonstrated a strong correlation between last-minute study habits and reduced performance in final examination results, as measured across various metrics of online engagement.

A pivotal finding from our study is that students who accessed revision materials at the last minute scored between 6% below the class examination average, illustrating the ineffectiveness of cramming as a preparation strategy for examinations. Moreover, the data showed a noticeable decline in
synchronous lecture attendance over time; from an initial peak of 172 students, the numbers dwindled to just 80 students attending the final revision lecture. However, it is noteworthy that these 80 students exhibited strong performance, with 64% securing an examination grade above 2.1 and 21% achieving a first-class result.

The MS Stream data further underscored the pitfalls of last-minute study habits, revealing that nearly 50% of the class (or 185 students) viewed the revision lecture solely on the eve of the examination, a strategy that did not correlate with better examination results.

In addition, our analysis of the VLE page view data for the entire cohort of 400 students demonstrated that those maintaining a moderate engagement level throughout the course emerged as the top performers. This not only reinforces the findings of our previous studies but also champions the importance of sustained engagement over the duration of the module delivery for achieving optimum results.

In conclusion, the research unequivocally illustrates that last-minute engagement correlates with poorer student attainment. There seems to be no substitute for a consistent and balanced approach to study, affirming that steady engagement throughout the module is instrumental in achieving the best results.

REFERENCES


