

Non-attendance-proof blended teaching Structures & Construction Technology A

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Abstract

Teaching in higher education is a challenge for many reasons including the lack of attendance. In this 21st century, the technology disruption and the Covid-19 pandemic profoundly impacted how we teach, and students learn. All these changes must be tackled to maintain student engagement, retention, progression, satisfaction, and many other targets. In the last academic year 2021/22, we have been back on campus after the pandemic but with students that could be self-isolated at any time due to Covid-19, or not attending due to illness, personal issues, visas extensions, strikes, etc. preventing their attendance on campus. The lack of attendance hurts the student's performance. This paper presents a case study of how a module is designed and implemented to be non-attendance-proof using a blended approach.

Keywords: Covid-19, resiliency, student satisfaction, engaging, progression, retention, blended teaching.

1. Introduction

In 2019/20, many academics in higher education institutions were forced to move from traditional face-to-face teaching to a variety of online teaching due to the Covid-19 pandemic (Morin, 2022). This was a very complex situation since the feeling of the students and academics regarding working online instead of on campus during the pandemic was extremely variable. Most of the universities in the world decided to move to an online approach with students spread all around the world.

During the pandemic, the UK government established different measures to keep social distance, enforcing the use of masks, and sanitising buildings to reduce the spread of the virus. Even during the peak of the pandemic, some students requested to attend onsite sessions since they felt they needed physical contact with lecturers and classmates to learn. Others preferred to stay at home, even overseas, to study in isolation feeling they were safer against the virus and closer to their relatives.

The underlying health conditions of students and their families as well as the lack of knowledge about the virus played an important role in those feelings (Yao Zhang, 2020).

Academics felt as well in a variety of ways. Some preferred to work at the university because they did not feel comfortable working from home and preferred to take some risks working on campus than staying at home. Others preferred to stay in isolation since this made them feel they were safer, especially those who have underlying health conditions that make them more vulnerable in the event of contracting the virus (Sanja Budimira, 2021).

Due to the online approach derived from the above situation, technology to teach and learn online was used and now it is relatively easy to set lectures, tutorials, and online demonstrations. Today, the pandemic is under control but still an issue since there is still a need for self-isolation when contracting the virus. Other illnesses and health treatments keep some students at home worsening a threat that is not new, lack of attendance.

Since the pandemic, the best approach that higher education institutions have found to keep courses in good health is to provide a blended approach (Jitendra Singh, 2021). In this way, academics can set classes on campus but with recordings or pre-recordings as a backup for students to catch up when unable to attend. Laboratories activities can follow strict protocols to ensure safety when necessary but can as well be recorded or pre-recorded. New tools that are now standard like VLE Moodle, MS Teams, YouTube, and others allow academics to teach using blended approaches. This can potentially keep or improve the quality of the teaching experience in comparison with traditional face-to-face teaching.

For the academic year 2021/22, in many universities, it was decided to go back to campus keeping a hybrid approach (face-to-face + Online). Other institutions remained to deliver exclusively online.

When back to campus, IT issues, late enrolments, and some limited infrastructure, among other academic limitations, have hurt the NSS across the sector. In some universities, all the mentioned issues tend to be endemic for several reasons beyond this paper's scope. Low attendance in higher education is unfortunately an endemic issue (Büchele, 2021).

The module presented in this paper has about 55-60% of attendance (for the full-time cohort) once the course has run for a few weeks. The attendance for apprentices is better and around 80-90%.

This academic year 2022/23, the challenge for every module leader is to set a resilience module that tackles several possible problems and keep a good progression while avoiding disadvantages to students who must stay at home due to Covid-19, illness, transport strikes, late enrolments, personal issues, and many others.

Structures & Construction Technology A is a module at level 4, for the BEng full-time/part-time course and the BEng apprenticeship part-time course.

This paper presents a case study of how a module is designed and implemented to be non-attendance-proof blended (onsite and/or online).

2. Methods

Setting

Structures & Construction Technology A is used as an example for setting a resilient module. It is part of the curriculum for the full-time BEng (Hons) Civil Engineering course (18 modules, 3 years) and the part-time BEng (Hons) Civil Engineering - TAC Design Apprenticeship (18 modules, 5 years) courses.

Design

This paper presents the design of the module based on several years of experience as a module leader in the UK, Spain, and Argentina. The improvements and changes in the design of this module were made to adapt it to endemic university threats as well as the Covid-19 pandemic and an IT outage.

Procedure and measure

Some data from the module as the number of students, progression, and average marks is used to extract conclusions regarding the performance of students in the module.

Analysis

Qualitative analysis: Study of NSS surveys including comments, MEQs and Mid-semester surveys.

Quantitative analysis: evaluation of the assessment results of the cohort.

3. Problem description

This paper presents the implementation of a module to tackle challenges during the academic year

Some challenges a module leader must tackle during an academic year

- Lack of attendance and engagement in class
- Academic misconduct
- Misbehaviour
- Late enrolments
- Overcrowded rooms
- Managing big cohorts
- IT and space limitations
- Module shared by courses of different natures (full-timers and apprenticeship)
- Transition from onsite to online or online to onsite teaching
- Transition to blended approaches

Strategies

- Resilient non-attendance-proof blended (onsite and/or online) approach.
- Using tools that are accessible to anyone (YouTube and emails) to shield students from organisational and IT threats.

Technology tools

This module uses VLE Moodle, MS Teams, a YouTube channel with videos created for the module, electronic and hard copy notes, PowerPoint presentations, and online/onsite demonstrations.

4. Organisation of the Module

Structures & Construction Technology A is delivered in semesters one and two. Each semester has thirteen weeks of teaching. Eleven weeks are planned to be onsite, and two weeks are planned to be online delivering the lecture in MS Teams. The assessment of the module is made by two tests about statics in the first semester (weeks 8 and 12), one quiz for construction technology in the second semester (week 10) and a final written exam in May that includes Statics and Strength of Materials. All the assessments have a resit in August.

The Moodle site is organised into four folders. This organisation was agreed in the division of civil and building services engineering to achieve consistency across our modules and courses.

- **Module Administration** - Module orientation, module guide, contact details, and the Module Evaluation Questionnaire.
- **Learning and Teaching Activities and Resources** - This section includes lecture notes, presentation slides, YouTube video lessons, resolved exams from previous years, and reference materials.
- **Assessment and Feedback** - This section provides all the information required for you to complete your module assessment(s).
- **Learner Support** - This section should help you to complete the module and includes some useful links, and a discussion forum where you can post questions or start discussions.

5. Discussion

As can be seen in Figure 1, the teaching strategy includes three revision sessions in the first semester and two revision sessions in the second semester to ensure the students are ready for the assessments. Some variations in the structure of the module are introduced every academic year depending on the needs of the cohort in terms of topic reviews. Moreover, the online weeks (two per semester) allow

students to choose topics to be reviewed and discussed in a very effective virtual environment that allows recording and interactions.

Based on the students' preferences (comments on NSS, MEQs and Mid-semester surveys), the best way to organise the contents of a module is week by week. Students like this organisation because it is easy to see what are the contents that need to be reviewed if attendance was not possible by using recorded material and notes. On the other hand, this organisation is effective to plan a module from an academic perspective and is commonly used in online platforms (edx.org, coursera.org, etc.).

The booklet of the module is organised by chapters and provides theory and problems that have links to videos where the theory is introduced, and the practical problems are demonstrated and explained in connection with the theory. In Figure 1, the organisation of the folder **Learning and Teaching Activities and Resources** is shown. This folder includes the reading list link, the organisation, the notes, pre-recorded/recorded videos, and the previous year's exams with solutions. The contents of the module are covered in pre-recorded videos, however, some recorded videos made during the year in the online sessions are shared with the students. In this way, if a student is unable to attend the class for a week/s, there is a backup to catch up by themselves when is more convenient for them. The review sessions allow students who could not attend some lectures to catch up. Support by answering questions is available during the whole academic year via Teams, email, surgery hours, etc.

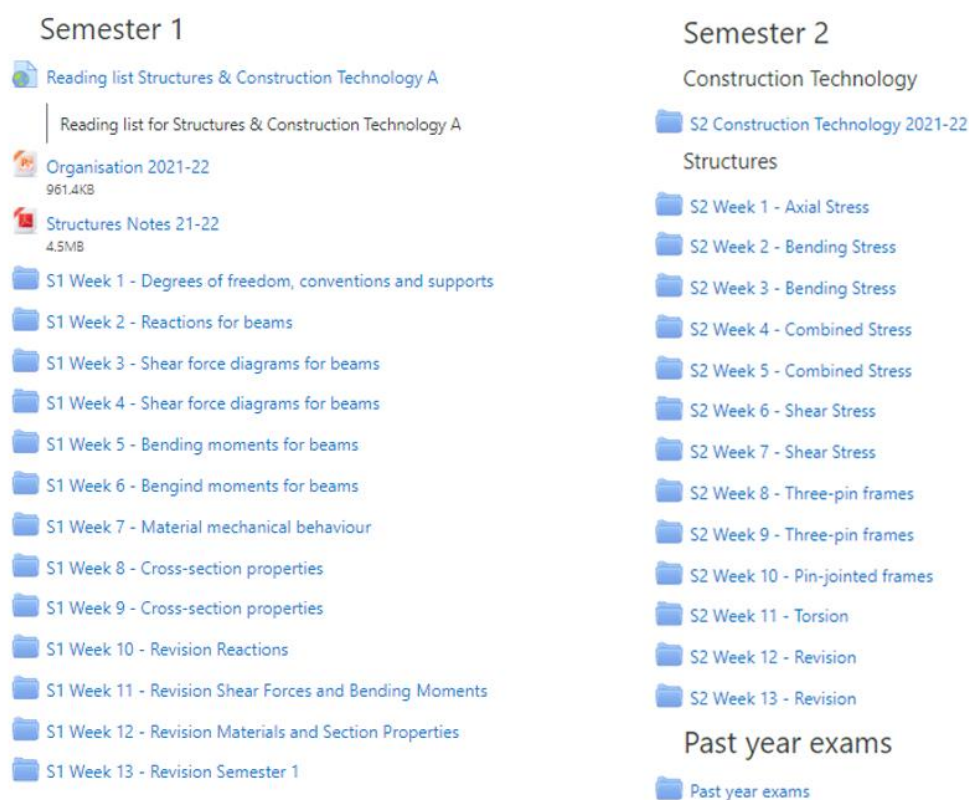


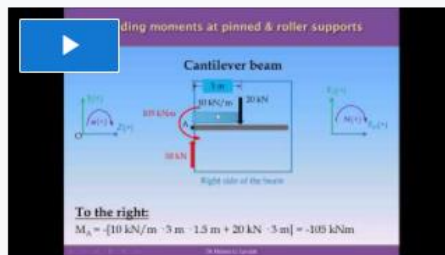
Figure 1 – Organisation of the module week by week

S1 Week 5 - Bending moments for beams

Bending moment diagrams for a simply supported beam



Bending moment diagrams for a Cantilever beam



- 04 Bending Moment Diagrams - Beams.pdf
- 04 Week 5 - Lesson 4 - BDM for Simply Supported Beam.pdf
- 06 Week 5 - Lesson 6 - BDM for Cantilever Beams.pdf

Figure 2 – Written and video material of a week

REACTIONS FOR BEAMS

<https://www.youtube.com/watch?v=oOjvJ3h2qeE>

RESOLUTION OF INCLINED FORCES

An inclined force can be resolved into two perpendicular directions by knowing the angle of inclination. Usually, the resolved directions chosen are the horizontal and vertical directions.

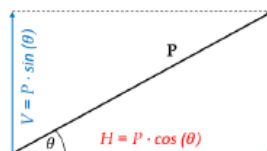


Figure 2.1 - Inclined force **P** resolved in horizontal, **H**, and vertical, **V**, components

STATIC EQUILIBRIUM

For the analysis of plane rigid static structures (that is in the two-dimensional space), there are three static equilibrium equations:

Figure 3 – A chapter in the notes that provide a link to the video lesson on YouTube

In Figure 2, a folder for a typical week of teaching and learning is shown. Students have access to the chapter of the notes corresponding to the week and the videos to catch up. Notes and videos are linked to facilitate the study of the topic. Review lectures are planned at the end of both semesters, but reviews can be made at other stages of the semester depending on the needs of the cohort.

In Figure 3, a page on the notes is shown. For every chapter, there are links to videos that cover those topics to facilitate students' learning of the topic presented.

This module offers two weeks of online teaching per semester where students can shape the sessions by sending questions to the lecturers and proposing the topics to be reviewed. The online platform offered by MS Teams allows the lecturer to interact with the students in an effective way and record the sessions for the students who need more time to process the information discussed there. The pre-recording and recordings allow students to catch up and be better prepared to face the online sessions and later the assessments.

In Figure 4, some figures of the module are shown from the last three academic years. As can be seen, the number of students in this module has grown from 95 in 18/19 to 195 in 22/23. This is 105% more students which shows the success of the module and course in attracting students. In 19/20, some inflation is noticed in the average marks during times of pandemic. In 20/21, it is noticed the pandemic has affected the progression but not too much considering the big number of students. The progression was more affected in the last academic year 21/22 when we were back to normal on campus. The most probably is that the drop in progression is due to the poor background of students who completed their level 3 studies during the pandemic in online environments that were set as an emergency instead of being planned properly due to the pandemic. Improvements are expected this year in terms of progression and performance.

If we compare the year 18/19, traditional face-to-face teaching with no video material vs 21/22 with the current blended approach, the average mark has declined but the number of students doubled. Historically, the success of the course and this module has been mainly due to the personalised approach. With an increased number of students and almost half of them being part-timers who only attend once a week, it is difficult to set an effective personalised approach. On the other hand, there is an issue with the student-academic ratio of the department, which is over 30 due to the considerable increment in the number of students, a fact noticed by professional institutions who have recommended a ratio of about 15 instead.

This academic year 2022/23 the module has 6 part-time students, 60 apprentices and 129 full-time students (a total of students: 195 students), so, more students than ever before. The performance of the students in this module will be monitored this academic year to see the effectiveness of the approach proposed. The hope of the module leader, lecturers and academic teams is that the approach will be

able to cope with the increased number of students and the issues every year negatively affect the performance of the students.

The idea of the design of this module is to support the students against personal, health, organisational and infrastructure threats. For whatever reason a student cannot attend a lecture for one or more weeks (late enrolment, changes of courses, access to systems, adaptation to the teaching environment, disability, poor background, university issues, investigation for misconduct, misbehaviour, etc.), they have a backup in form of notes and videos to catch up. The videos are accessible independently of any IT issues at the university since they are YouTube videos.

If the student does not have access to Moodle, the links to the videos can be found in MS Teams.

If the student does not have access to MS Teams, the links to the videos can be found in the electronic notes for the whole module or in the hard copies distributed at the beginning of the academic year.

If the student is studying remotely and dealing with visa issues, the module leader can send the link to the YouTube channel and a copy of the electronic notes by email.

Since the module presented in this paper is shared by two courses (BEng classic full-time/part-time and BEng apprenticeship part-time) and the number of students is 195 this academic year, the teaching is split into full-timers and part-timers.

In any case, the backup material in form of notes and pre-recorded and/or recorded videos are useful for any of the students of any of the groups.

Having recordings for all the topics of a module, stimulate nonattendance in some students that prefer to self-study and make overconfident other that simply do not like to attend their classes. To avoid worsening attendance, it is more important than ever to design and deliver attractive classes onsite that attract students and keep a good attendance ratio.

| Year | Number of Students | Progression | Average Mark |
|----------------|---------------------------|--------------------|---------------------|
| 18/19 | 95 | 77% | 58.77 |
| 19/20 | 138 | 91% | 62.08 |
| 20/21 | 175 | 83% | 57.5 |
| 21/22 | 159 | 65% | 51.8 |
| 22/23 | 195 | | |
| Average | 152 | 79% | 57.54 |

Figure 4 – Number, progression, and performance of the students in the module

6. Conclusions

During the pandemic, we learnt that we need to be ready to deliver online teaching at any time. So, in the design of our modules, we must take into consideration this possibility. The blended approach can be implemented in onsite and/or online teaching keeping all the advantages of using multimedia to teach and learn. Leading modules in higher education is a complex task since the education sector is suffering changes without precedent. University management has a complexity that produces many issues during the academic year as low attendance, late enrolments, overcrowded rooms, misbehaviour, misconduct, big cohorts, IT and space limitations, administrative issues, etc.

One way of tackling these issues and having resilient modules and courses is the implementation of a non-attendance-proof blended approach using tools that shield students from the most common threats during the academic year including the endemic lack of attendance.

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Link to the YouTube channel

[Introduction to Structures by Dr Héctor U. Levatti](#)

References

- Büchele, S., 2021. Evaluating the link between attendance and performance in higher education: the role of classroom engagement dimensions. *Assessments & evaluation in higher education*, 46(1), pp. 132-150.
- Jitendra Singh, K. S. L. S., 2021. Combining the Best of Online and Face-to-Face Learning: Hybrid and Blended Learning Approach for COVID-19, Post Vaccine, & Post-Pandemic World. 50(2), pp. 140-171.
- Morin, D., 2022. The transition from Face-to-Face Teaching to Online Teaching in Times of Pandemic. *International Journal of Information and Education Technology*, 12(3), pp. 246-251.
- Sanja Budimira, T. P. C. P., 2021. Coping strategies and mental health during COVID-19 lockdown. *JOURNAL OF MENTAL HEALTH*, pp. 156-163.
- Yao Zhang, H. Z. X. M. Q. D., 2020. Mental Health Problems during the COVID-19 Pandemics and the Mitigation Exercise: A Longitudinal Study of College Students in China. *International Journal of Environmental Research and Public Health*, Volume 17.

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- Lecturer for Structures & Construction Technology A part-time and apprenticeship.
- Module leader/lecturer of Geotechnical Design, Geotechnical Engineering and Soil-structure Engineering modules
- Former member of the Internationalisation and the NSS/PTES Sub-committee at BEA, LSBU
- Researcher at the Centre for Civil and Building Services Engineering (LSBU)
- Independent reviewer & chair for PhD students reviews LSBU
- EPSRC Peer Review College Member | EPSRC Engineering Early Career Forum Member
- Former ethics reviewer for PhD/MSc student's dissertations at LSBU
- Representative for Health & Safety in CBSE, BEA, LSBU
- External moderator for the British University of Egypt
- Certified external moderator in Advance HE.
- Reviewer for international conferences and journals
- PhD External examiner at UPC-BARCELONATECH | Internal examiner at LSBU
- Personal tutor for 49 UG students at LSBU
- Dr Levatti is an active researcher in the areas of Education in Civil Engineering, Numerical Methods in Civil Engineering, Robotics and Artificial Intelligence in construction and Geotechnical Engineering.