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Teaching and Learning for Computing and Engineering Students at the University of West London during COVID-19

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Abstract: This paper presents a comprehensive examination of the University of West London's (UWL) pedagogical response to the COVID-19 pandemic, with a particular emphasis on practical subject areas within the Schools of Computing and Engineering. While the shift to online teaching has been extensively documented across higher education, its specific impact on technical disciplines — where hands-on learning and applied instruction are central — has remained comparatively underexplored. To address this critical gap, the study undertakes a robust quantitative analysis of student satisfaction,

drawing on Module Evaluation Survey (MES) data collected over four consecutive academic years (2019–2022). A total of 6,923 anonymised responses from level 3 (foundation year) modules were analysed using descriptive statistics and inferential hypothesis testing. The findings indicate no statistically significant difference in student satisfaction between pre-pandemic and pandemic cohorts ($p > 0.05$), suggesting that the rapid transition to online learning at UWL did not compromise the quality of student experience in these technical fields. This outcome highlights the effectiveness of the university's adaptive strategies, particularly the implementation of the UWLFlex model—a blended learning framework designed to ensure pedagogical continuity and flexibility during periods of disruption. The paper further examines the range of academic and pastoral support mechanisms implemented to address the challenges presented by remote learning. These included enhanced digital infrastructure, targeted staff training, and proactive student engagement initiatives. Collectively, these measures contributed to sustaining high levels of student satisfaction and academic performance, reinforcing the model's relevance for future curriculum design in times of uncertainty. The study offers valuable insights into resilient educational practices and underscores the importance of agile, student-centered approaches in safeguarding learning outcomes during global crises.

Keywords: Higher Education, Students' Engagement, Students' Achievement, Teaching, Online Learning, Computing and Engineering, Student Evaluations of Teaching, Assessment, Covid, Pandemic.

Introduction

Traditionally, teaching within the computing and engineering sector has been face-to-face, typically in the form of lectures followed by supervised seminar sessions/laboratories. This two-step process delivers key content and provides students with hands-on, practical experience.

During face-to-face learning, teachers and students meet and have a class together. Most of the time, these classes are group classes, where students interact with the teacher and one another. This provides students with the opportunity to interact with classmates from diverse backgrounds, become better acquainted with the teacher, and receive motivation by competing with their peers.

Good teaching aims to set activities for the students to achieve the intended learning outcomes. Ideally, student activities should take place both inside and outside the classroom environment.

Effect of COVID-19 on the Education Process

In March 2020, the World Health Organisation (WHO) identified COVID-19 as a pandemic affecting countries worldwide. This forced people to change their everyday habits, including work, recreational activities, and education. Social distancing, wearing face masks, and adhering to good hygiene habits, such as thoroughly washing hands with soap and water and regularly sanitising them, became essential to minimise the spread of the virus.

Almost 1.6 billion learners in more than 190 countries worldwide were affected by the pandemic. Such a disruption was unprecedented. Ninety-four per cent of the world's student population was impacted by the closure of schools and other learning spaces (Carlsen and Bruggemann, 2021). Some teachers found themselves in an entirely new territory, and those who had previously used online learning faced the difficulties of interacting with their students in an exclusively online environment. Additionally, the lockdown restricted access to laboratories and physical resources, which teachers had previously used. According to Shevchenko et al. (2021), the transition from face-to-face to online learning was not smooth, as both professor-tutors and students have been put at an unfair disadvantage.

Online teaching is an educational experience that involves a separation in time and space between the teacher and students. Unlike traditional education, students are expected to achieve an academic credential where they interact with the teacher over live streaming video and/or audio for both synchronous and nonsynchronous purposes (Drysdale and McBeath, 2018). It is identified as a promising mechanism that offers the educational opportunity to students who cannot attend university in person (Arbaugh & Hwang, 2013). It is established in pedagogy research that teaching context influences educators' approach to teaching; the process is not straightforward but rather 'fluid' and influenced by the educator's practices, the student's perceptions and the institution's context in which the offering is delivered, Goumaa et al. (2019). Teachers found themselves searching for and adapting novel ways to communicate with their students during the confinement of being inside their homes. The approaches adopted were not a planned transition towards online teaching and learning. Still, they were at best described as Emergency Remote Teaching (Bozkurt & Sharma, 2020) or Emergency Forced Remote Education (Afip et al., 2020).

Teaching and Learning: Transition from Face to Face to Remote

Closing universities and cancelling face-to-face activities became an inevitable reality all over the world. Most higher education establishments have taken steps towards digital transformation and implemented a range of remote teaching, learning, and assessment approaches (Apker, 2022).

The rapid adaptation of e-learning under the remote delivery mode worked well for knowledge building by delivering content and overseeing some processes, but had limitations in developing students' practical laboratory skills, especially within the Computing and Engineering subject areas. For example, if working in a laboratory setting, students would often encounter extensive and specialised instruments and machines. Operating under a distance learning mode denied valuable hands-on exposure to such facilities in a laboratory environment, Buonsenso et al. (2021).

Positive aspects of online education during the COVID period were time management, class recordings, and not having to travel to university. Studies have shown that for most non-technical subject areas, students have valued the use of technological tools, such as chats, emotions, video calls, and debate activities, to communicate during their online teaching activities with fellow students (Matli and Phurutsi, 2023).

There is evidence to suggest that teaching contexts influence teachers' delivery and approach and eventually students' learning and progression (Goumaa et al., 2019). In parallel, a critique of online teaching persists, highlighting the need for educators to be trained on relevant changes in their delivery modes and personas (Arbaugh & Hwang, 2013; Drysdale & McBeath, 2018). From the students' perspective, many felt largely unprepared for the rapid shift to online-only learning and struggled to adjust, while simultaneously encountering a lack of coping resources (e.g., reduced access to instructors and classmates, a lack of counselling and social networks; Kaufmann and Vallade, 2022). Instructor-led social support was found to be an essential resource for students struggling with the difficulties brought forth by COVID-19. For instance, Kaufmann and Vallade (2022) examined the memorable messages that students received from instructors at the beginning of the COVID-19 pandemic. Results show that messages of emotional, instrumental, and informational support motivated students, boosted their confidence, and enhanced their coping strategies in response to pandemic uncertainty. In fact, Abumandour (2022) believed a professor during e-learning should act as a mentor, facilitator and/or a coach. A similar view was shared by Alexa et al. (2022), who noted that the professor's role has changed during COVID-19. Not only were they instructors, but also mentors during a time of crisis.

Students gain more from their higher education experience where greater use of educational technology is made. It is equally important to use the appropriate technology to enhance teaching and learning, rather than seeking to migrate to the most advanced platform in every case. Higher education institutions, which have radically stepped up online learning provision through this crisis, need to think strategically about how to utilise educational technology in the future (Neves & Hewitt, 2020). Indeed, Xiong et al. (2024) reported that online teaching had a positive effect on student learning and achievement, especially for engineering, medicine and natural sciences.

Despite the challenges, universities launched initiatives to deliver education remotely. Educational institutions were unsure whether these initiatives would resolve the challenges they posed, but they were the only alternatives available at that time. There are several international studies to support student global satisfaction with learning during COVID-19 (e.g., Konecki (2020); Anwar and Wahid (2021); and Lemay et al. (2021)). On the contrary, there are reports indicating students' dissatisfaction with online learning as it deprived them of hands-on laboratory work and practical facilities (e.g. Hettiarachchi et al. (2021); Wilczewski et al. (2022); Sáiz-Manzanares et al. (2022); and Li et al. (2023)). There is a need for institutions to collect feedback from their students to assess their performance during the pandemic.

Research Problem

The COVID-19 pandemic significantly disrupted traditional teaching models, compelling universities worldwide to adopt emergency online learning measures. However, in technical disciplines such as Computing and Engineering, where hands-on activities are essential, the transition posed unique challenges. As higher education institutions transition to hybrid and flexible learning post-pandemic, it is crucial to assess the long-term effectiveness of these adaptations now to inform sustainable pedagogical strategies and future preparedness.

This research directly informs strategies that promote educational equity, digital inclusion, and learner resilience, particularly for marginalised students who may be disproportionately affected by disruptions. Evaluating how satisfaction and engagement are sustained during crisis conditions offers actionable insights to support more inclusive and adaptable education systems that benefit learners across diverse socio-economic backgrounds.

The study fills a distinct gap in educational research by providing a quantitative analysis of student satisfaction in practical subject disciplines over a four-year period. It enhances empirical understanding of blended learning efficacy through the lens of the UWLFlex model, offering a rare data-driven perspective that intersects pedagogical innovation with real-world implementation. The statistical methods employed also strengthen the rigour and reproducibility of the findings.

While the broader topic of online teaching has been widely explored, its nuanced impacts in computing and engineering remain insufficiently studied. The existing literature largely overlooks longitudinal comparisons within technical subjects, making this investigation a valuable and underrepresented contribution.

The research reveals that sustained student satisfaction is achievable in practical disciplines, even during systemic disruption, if supported by well-structured hybrid models. It uncovers specific features of UWLFlex that helped mitigate the pandemic's educational impact, offering evidence-based recommendations for curriculum designers and policymakers. Additionally, the analysis opens new avenues for exploring how learning models can adapt to evolving technological and societal needs.

Research Focus

The focus of this study was to investigate whether the online learning and assessment systems implemented to cover the practical teaching aspects during the pandemic for computing and engineering students at the University of West London contributed to student success and overall satisfaction.

Research Aim and Questions

This paper aims to share how the School of Computing and Engineering at the University of West London introduced online teaching during the COVID-19 period. It also shares the approaches taken to achieve the learning outcomes whilst maintaining a high-quality educational experience. The study examines the responses of engineering and computing students at the University of West London, spanning the years 2019-2022, to determine whether the student population was satisfied with the implemented online teaching system. It aims to answer the following question.

1. Was there a significant difference in student responses across the academic years 2019 to 2022?

2. Did the online learning and assessment systems implemented to cover the practical teaching aspects during the pandemic for computing and engineering students contribute to student success and overall satisfaction?

Literature Review

The effect of COVID-19 on university education has been studied thoroughly. Many publications focused on the challenges encountered by lecturers teaching specific subjects or disciplines (e.g. Surendran et al., 2021 for Biosciences; Elberkawi et al., 2022 for Medicine; Moustakas and Robrade, 2022 for Physical Education; Hammad et al., 2025 for Mathematics). Most research focused on the challenges faced by students during online learning, especially in developing countries due to internet connectivity/IT home facilities (e.g. Muthuprasad et al., 2021; Pokhrel and Chhetri, 2021; Mathrani et al., 2021; Zarei and Mohammadi, 2022) or student mental health issues (e.g. Conceição et al., 2021; Pelucio et al., 2022; Xu and Wang, 2023; Sharifi Far and Hunt, 2023; Neamhom and Chumprasittichok, 2024; Allen et al., 2025).

The authors cited several studies detailing students' perceptions of online learning during COVID-19 in various disciplines. This includes that of Kim et al. (2022) for Nursing students in Korea; Anwar and Wahid (2021) for students learning English in Indonesia; Selco and Habbak (2021) for students at a Polytechnic University in the USA, not only engineering students; Mohd Satar et al. (2020) for ICT, business management and Humanities/social sciences at undergraduate and postgraduate levels in Malaysia; Maqbool et al. (2022) for medical students in Pakistan and Iran and finally the research conducted on students from various faculties enrolled in King's College London by Dinu et al. (2022). Moreover, a paper by Konecki (2020) examined the impact of distance learning during COVID-19 on motivation and success rate for first-year students in a programming module. Another study by Akuratiya and Meddage (2020) focused on how IT first- and second-year students viewed online learning during the COVID-19 pandemic in Sri Lanka.

However, many of these studies were not specifically dedicated to engineering and computing students, and none provided a detailed description of the online learning and assessment systems implemented to address the practical teaching aspects during the pandemic. In addition, all published

research did not compare the satisfaction of students during the pandemic year with that recorded in previous and following academic years.

Description of the measures taken by UWL to deliver education during the pandemic

In 2020, the University of West London developed a model of learning called UWLFlex, which enabled lecturers to accommodate online learning during the pandemic. The model draws on traditional academic pedagogical practices of preparation, in-class activities, and homework. Student learning was supported outside of in-person sessions through access to online resources, activities, and opportunities to revisit and review module content. The online environment offered a variety of tools, including Blackboard Ultra and Collaborate and enabled students to personalise their learning experience.

Weekly learning materials for each of the modules delivered to students were organised on the university's eLearning platform 'Blackboard' within 3 sub-folders: Investigate, Apply and Consolidate. The Investigate folder contained materials to allow students to review the weekly content before the lecture, so that they would have some awareness of what was to be taught to them.

The lecture content was delivered online using Blackboard Collaborate. The student would log onto Blackboard and access the webinar. Details of the lecture presentations were uploaded within the Apply folder on Blackboard. Following the lecture webinar, students were directed to the Consolidate folder to complete activities that support and reinforce their learning. The model is further illustrated in Tables 1 and 2.

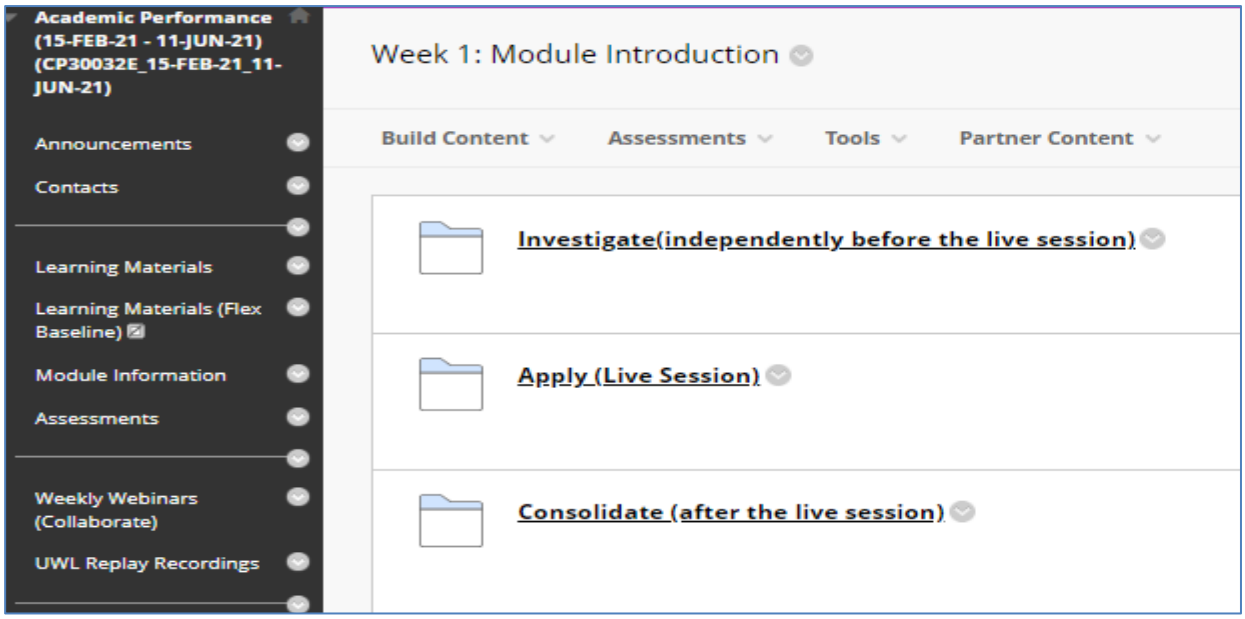
Table 1

UWL Flex pedagogy

INVESTIGATE	APPLY	CONSOLIDATE
Introduce	**Engage**	**Practice**
Watch short lectures, presentations or complete a short task to assess conceptual understanding of weekly topic	Webinar with the tutor Recap of key content	Follow-up tests/tasks, reading and discussion forums
Mini lectures with Q&A for student engagement	Use of case studies, problem-based task, demonstration of application, links to professional practice	Extend learning with research, extra study or by producing an artefact
ASYNCHRONOUS	***SYNCHRONOUS***	***ASYNCHRONOUS***

Figure 1

Blackboard Structure



Academics within the School of Computing and Engineering at the university adapted extremely well by introducing a range of innovative ideas to simulate practical hands-on tasks. Some examples included the use of online scenario-based simulations. These live demonstrations of several tools demonstrated how lecture theories were applied, along with laboratory experiments conducted using a virtual laboratory and recorded videos.

To facilitate simulated hands-on tasks and encourage peer-to-peer interaction, small-group collaboration was implemented using the Blackboard Breakout Groups. These groups, independent of one another, had their own audio, video, whiteboard, application-sharing, and chat features. This allowed students in an allocated group to share files, whiteboard, their screen, applications, and chat with the rest of their group.

Exams were redesigned to accommodate the purely online mode in a way that would not affect the quality of students' assessment. Academics designed innovative modes of assessment, such as the focus on real-world situations that would not have a right or wrong answer. All assessment details and requirements were clearly discussed during the online session with the students, and were carefully signposted on Blackboard for learners to review later at their own pace.

The use of online marking rubrics gave tutors an easy way to provide students with feedback. Modules with only a summative exam or one coursework at the end of the semester lacked oversight and made it difficult for tutors to see if students were keeping up with the lecture contents. Thus, particularly during the pandemic, formative weekly quizzes using online tools helped students self-regulate their learning by assessing themselves and receiving instant feedback.

Instructor-led social support was implemented in the form of surgery hours using the Microsoft Teams facility. Students were encouraged to make a booking with their instructors during the surgery hours, and appropriate support was offered to alleviate any issues, concerns, or distress that students encountered. Regular exchange of email communication was also in place to address all kinds of academic and pastoral issues. In addition, university-wide online support was offered in groups and/or one-on-one to address issues such as study support, numeracy, general welfare, anxiety, finance, and other concerns. In general, the university took all necessary measures to display availability,

understanding, and a willingness to help alleviate students' stress related to the abrupt transition to online remote learning.

To promote student/employer engagement, weekly industry insight talks and other related CPD events were arranged for the students to put theory/ideas into practice.

Finally, considerations were made of the policies implemented by educational and other agencies to support universities in upholding quality assurance procedures during online delivery of teaching. At UWL, the Emergency Academic Regulation relating to student assessment, progression, and classification of awards was invoked and implemented for the University and its Academic Partners. Examination timetables were revised and replaced with alternatives, ensuring that these alternatives met the Learning Outcomes (LOs) and the requirements of Professional Statutory and Regulatory Bodies (PSRBs). Some examples of alternative assessments included the use of timed online tests to replace in-person examinations, as well as demonstrations of artefacts and oral discussions, which were replaced with recorded video clips. Laboratory set assignments were conducted in a simulated environment. The Quality Office processes for approving and recording changes to assessment methods were firmly in place and robustly actioned.

Research Methodology

The year 2019 was a pre-COVID year with whole face-to-face teaching. Lockdown measures were set in place during 2020. In 2021, the university gradually returned to hybrid teaching and eventually, to fully face-to-face teaching in 2022. It was essential to evaluate the online systems that were implemented. This was achieved by using Module Evaluation Survey (MES) results for four modules at the Level 3 foundation year for students in Computing and Engineering disciplines. Data was collected and analysed for the academic years 2019 to 2022.

A total of 6923 responses were gathered for the years 2019 to 2022, as seen in Table 3. These results reflect an extensive number of student responses compared to other studies such as that of Lemay et al. (2021), who only collected the response from 149 students at a pre university science programme; Selco and Habbak (2021) who studied 268 responses from engineering students as part of an institution exhaustive study; and Matlia and Phurutsi (2023) who had only 49 respondents to their survey for ICT students.

Table 2

Number of student responses

2019	2020	2021	2022
1288	2428	1532	1675

MES questions were based on the five key themes listed below.

A. Assessment and Feedback

B. Engagement and Student Voice

C. Overall

D. Resources

E. Teaching Quality & Learning Opportunities

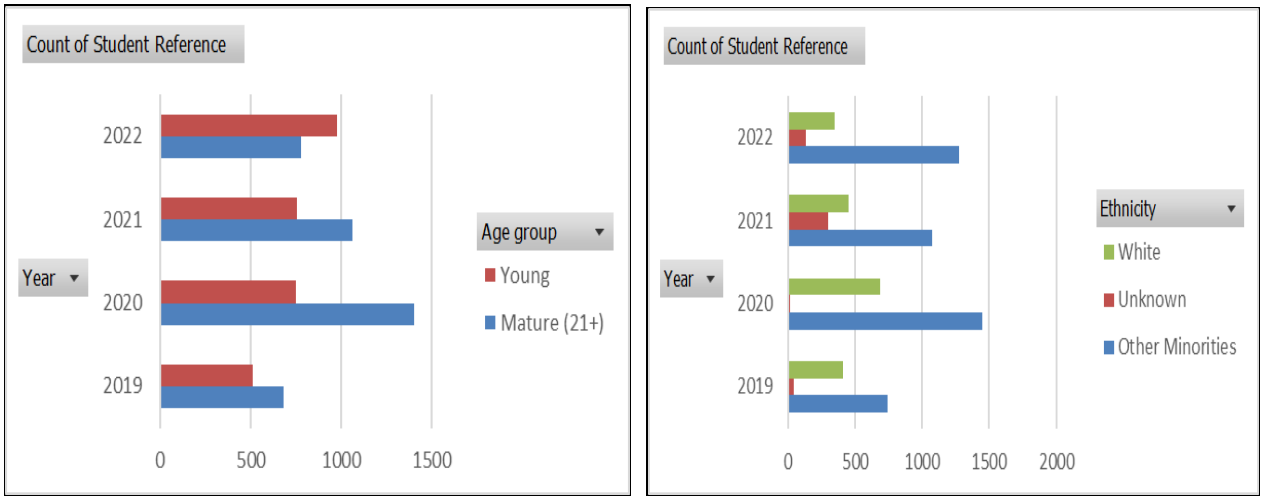
MES results were analysed with the aim of determining if student responses to questions within the five themes were affected by the changes made during the pandemic.

Sample and Participants

The analysis draws on 6,923 anonymised student responses collected via official Module Evaluation Surveys (MES) across Level 3 Computing and Engineering modules between 2019 and 2022. Respondents ranged from 18 to over 21 years of age, with a near-equal gender distribution. Those students who were over 21 years of age were classed as Mature students. Student ethnicities were classified as White, Other Minorities, or Unknown, as shown in the charts below. Inclusion criteria required surveys to be submitted through institutional channels with at least 50% completion. Surveys with missing responses, duplicate submissions, or low engagement were excluded to uphold analytical integrity. The sample represents approximately 87% of enrolled students during the academic years 2019-2022, offering a robust and representative snapshot of student experiences in the context of online learning transitions.

Figure 2

Count of Student Reference



Results

For the results obtained from the MES responses, students responded on a scale of 1 to 5, where 1 was 'strongly disagree' and 5 was 'strongly agree'. One question from each of the five themes was chosen, and the results are shown in Table 3.

Table 3

Results of the MES responses

Assessment and Feedback	**1**	**2**	**3**	**4**	**5**
It is clear what is expected of me in my assessment(s)					
2019	1%	2%	4%	46%	46%
2020	1%	3%	8%	47%	41%
2021	0%	6%	6%	42%	46%
2022	6%	14%	3%	40%	37%

Engagement and Student Voice	**1**	**2**	**3**	**4**	**5**

How clear is it that students' feedback is acted up on?					
2019	2%	5%	14%	44%	35%
2020	2%	6%	16%	46%	30%
2021	0%	4%	8%	52%	37%
2022	6%	19%	5%	37%	33%

Overall	**1**	**2**	**3**	**4**	**5**
Overall, I am satisfied with the quality of the module					
2019	3%	2%	9%	46%	40%
2020	2%	4%	10%	43%	41%
2021	3%	3%	7%	48%	39%
2022	8%	14%	3%	42%	33%

Resources	**1**	**2**	**3**	**4**	**5**
The blackboard site for this module is good					
2019	1%	4%	9%	42%	44%
2020	1%	3%	11%	45%	39%
2021	0%	1%	4%	58%	38%
2022	3%	8%	5%	42%	39%

Teaching Quality & Learning Opportunities	**1**	**2**	**3**	**4**	**5**
The teaching sessions help me learn about the subject by bringing ideas and information together from different topics					
2019	2%	8%	11%	44%	35%
2020	2%	1%	9%	46%	42%
2021	2%	7%	3%	45%	43%
2022	7%	15%	6%	41%	31%

Analysis of Results

To assess year-over-year changes in student satisfaction from 2019 to 2022, we used non-parametric statistical tests with 5% significance level appropriate for ordinal (Likert scale) data. Specifically:

- Kruskal–Wallis H test was applied to compare responses across four academic years.
- Mann–Whitney U tests with Bonferroni correction were used as post-hoc pairwise comparisons when the Kruskal–Wallis test indicated statistical significance.

We also computed the effect size (ε^2) for the Kruskal–Wallis tests. This metric represents the proportion of variance in the dependent variable that is explained by the independent grouping variable (year).

The effect size is interpreted as follows:

- $\varepsilon^2 < 0.01$: Minimal effect
- $\leq \varepsilon^2 < 0.06$: Small effect
- $0.06 \leq \varepsilon^2 < 0.14$: Medium effect
- $\varepsilon^2 \geq 0.14$: Large effect

Key Hypotheses

1. Null Hypothesis (H_0): There is no significant difference in student responses across the years (i.e., the pandemic did not affect satisfaction).
2. Alternative Hypothesis (H_1): There is a significant difference in student responses across the years (i.e., the pandemic did affect satisfaction).

Statistical Tests

The two tests below were employed to analyse the results, as the data is ordinal (Likert scale) and a comparison over multiple years is required.

Kruskal-Wallis test: Non-parametric alternative to ANOVA to determine if there are statistically significant differences between the years.

Post-hoc pairwise comparisons (Mann-Whitney U test with Bonferroni correction): Applied when Kruskal-Wallis indicated significant differences to identify which years differed.

The data in Table 4, initially shown as percentage distributions, have been converted into absolute frequencies based on the total number of responses. Tables 4 to 5 show the statistical analysis of the response data in Table 3.

Table 4

Assessment and Feedback

It is clear what is expected of me in my assessment(s)	**1**	**2**	**3**	**4**	**5**
2019	13	26	52	592	592
2020	24	73	194	1141	996
2021	0	92	92	643	705
2022	101	235	50	670	619

Kruskal-Wallis Test: H = 45.2, p< 0.001 (significant difference), $\epsilon^2 = 0.0058 < 0.01$

Post-hoc analysis:

2020 vs. 2019: p = 0.12 (NS)

2020 vs. 2021: p = 0.03 (slight decline)

2020 vs. 2022: p < 0.001 (significant decline)

Findings: No significant drop in 2020 compared to 2019, but a significant decline in 2022.

Table 6

Engagement and Student Voice

How clear is it that students' feedback is acted up on?	**1**	**2**	**3**	**4**	**5**
2019	26	64	180	566	452

2020	49	146	388	1,117	728
2021	0	61	123	796	552
2022	101	318	84	620	552

Kruskal-Wallis Test: H = 38.7, p < 0.001, $\epsilon^2 = 0.0049 < 0.01$

Post-hoc analysis:

2020 vs. 2019: p = 0.08 (NS)

2020 vs. 2021: p = 0.04 (slight improvement)

2020 vs. 2022: p < 0.001 (decline)

Findings: No significant drop in 2020 but a decline in 2022.

Table 7

Overall

Overall, I am satisfied with the quality of the module	**1**	**2**	**3**	**4**	**5**
2019	39	26	116	592	515
2020	49	97	243	1,044	995
2021	46	46	107	735	598
2022	134	235	50	704	552

Kruskal-Wallis Test: $H = 32.1$, $p < 0.001$, $\epsilon^2 = 0.0040 < 0.01$

Post-hoc analysis:

2020 vs. 2019: p = 0.15 (NS)

2020 vs. 2021: p = 0.07 (NS)

2020 vs. 2022: p < 0.001 (significant decline)

Findings: No significant drop in 2020, but a decline in 2022

Table 8

Resources

The blackboard site for this module is good	**1**	**2**	**3**	**4**	**5**
2019	13	52	116	541	566
2020	24	73	267	1,093	971
2021	0	15	61	888	582
2022	50	134	84	704	703

Kruskal-Wallis Test: H = 28.5, p < 0.001, $\epsilon^2 = 0.0035 < 0.01$

Post-hoc analysis:

2020 vs. 2019: p = 0.10 (NS)

2020 vs. 2021: p = 0.02 (slight improvement)

2020 vs. 2022: p = 0.003 (significant decline)

Findings: Resources maintained during pandemic, with 2021 showing slight improvement but 2022 showing significant decline.

Table 9

Teaching Quality & Learning Opportunities

The teaching sessions help me learn about the subject by bringing ideas and information together from different topics	**1**	**2**	**3**	**4**	**5**
2019	26	103	142	566	452
2020	49	24	218	1,117	1,020
2021	31	107	46	689	659
2022	117	251	101	687	519

Kruskal-Wallis Test: $H = 41.3$, $p < 0.001$, $\epsilon^2 = 0.0053 < 0.01$

Post-hoc analysis:

2020 vs. 2019: p = 0.06 (NS)

2020 vs. 2021: p = 0.04 (slight improvement)

2020 vs. 2022: p < 0.001 (significant decline)

Findings: Teaching quality was maintained during the pandemic (2020), with a notable decline observed in 2022 post-pandemic.

Discussions of Results

The transition to remote learning brought both opportunities and challenges. Students benefited from increased flexibility, enabling them to customise their study schedules, access recorded lectures, and engage with learning materials independently. However, this autonomy came at the cost of reduced classroom interaction and collaboration. The widespread adoption of non-invigilated, open-book assessments helped alleviate exam stress, yet it also altered students' preparation methods and expectations regarding academic rigour.

Similarly, research at the University of Sharjah (Mushtaha et al., 2022) revealed that the implementation of e learning had both positive and negative impacts. The primary benefit was flexibility in place and time, with 77.2% of users providing positive feedback. In general, one of the most important opportunities of virtual teaching is the ability to upload the teaching material in the electronic system, because it enables the students to receive and use the material as many times as they need to; this will eventually result in improvement of learning quality (Ghanavatizadeh et al, 2024). Engineering students with a lower-than-average GPA can benefit from this. For example, Nazempour et al. (2022) reported that students with GPAs below 2.40 performed better after a blended transitional semester disrupted by the pandemic in comparison with face-to-face and online synchronous semesters.

The detailed analysis of the MES results shows that, during the pandemic year 2020, student responses were not significantly different from those in pre-COVID and COVID years for the five themes considered. Still, there has been a decline in 2022 (post-COVID).

Research by Tribal Group (2020) collected responses from 22908 students enrolled in 40 education institutions within the UK and globally to find out about their experience during COVID-19. This report showed that the UK institutions fell behind worldwide education providers in achieving student satisfaction. For example, only 60% of UK students were satisfied with their institution's response to COVID-19 compared to 69% globally. The National Student Survey, Insight 10 (2021), by the Office for Students, also found a decline in student satisfaction compared to pre-pandemic years, after analysing the responses of 332,500 students from across the UK's higher education providers.

The results of the current study indicate that the University of West London was at the forefront of responding to the COVID-19 challenge and had implemented a system that created high satisfaction amongst its students.

However, the transition from remote learning back to face-to-face (F2F) instruction in the post-pandemic period posed challenges for students, as detailed analysis of the results revealed a decline in satisfaction. During the COVID-19 pandemic, many students adjusted their lifestyles by taking on employment, assuming that flexible study arrangements would persist. The reinstatement of structured face-to-face timetables created difficulties for these students, who now had to balance their academic commitments with external responsibilities. This can also be attributed to various factors, such as shifts in assessment formats, changes in student lifestyle, and the need to adjust to a hybrid teaching mode, among others.

Similarly, Upadhyaya et al. (2025) conducted a study on engineering students in North India and reported that students had mixed feelings about returning to physical modes of learning after the pandemic. While some expressed excitement about the prospect of resuming face-to-face education, others had become accustomed to online learning and may not readily abandon the habit. Mehta et al. (2024) conducted a study on UK students, from different disciplines, and reported that a large proportion of students did not select the face-to-face mode as their 1st choice for learning mode. They argued that the reasons could include travel costs incurred when attending in-person sessions, travel distance (time) to university, work commitments, etc. In addition, considering the total number of contact hours scheduled on the same day, a student may not wish to attend all of these sessions in person. In addition, Almendingen et al. (2021) deduced that, although some students found online learning challenging in the beginning, they quickly adapted to it. Therefore, after the COVID-19 pandemic, they preferred to learn from the comfort of their homes.

Conducted a post-COVID study on students in computer science-related disciplines. The students asserted the importance of having recorded demonstrations, even when live synchronous demonstrations are provided. They believe that the recordings not only complement live demonstrations but also serve as a persistent resource for students, enhancing flexibility and self-paced learning. Arif and Shafiullah (2022) reviewed published research on engineering education during COVID-19 from different countries and researched their experience in Australia. They recommended that the updated teaching and learning philosophy and practices during the pandemic have set new expectations and changed students' mindsets. Therefore, students are now welcoming the online learning approach beyond the COVID-19 pandemic period.

Recognising these challenges, UWL implemented targeted interventions to support students during the transition back to traditional learning. These included strengthening academic support,

refining assessment strategies, and enhancing student engagement and well-being. By addressing these critical factors, the university continues to focus on improving the overall student experience in an evolving educational landscape.

Conclusion

COVID-19 has fundamentally reshaped higher education, most visibly through the rapid shift from in-person instruction to fully online modalities. Institutions were compelled to expand digital infrastructure, while educators developed new competencies to sustain teaching effectiveness in virtual environments.

At the University of West London (UWL), the deployment of the UWL Flex model, the use of virtual practical labs, and targeted student support services proved instrumental in helping learners adapt successfully to the challenges posed by the pandemic. Despite dramatic changes in delivery format, students' overall satisfaction during the COVID-19 pandemic remained consistent with that of pre-pandemic face-to-face instruction. This suggests that the early measures taken were proactive, well-considered, and responsive to the evolving context.

Findings from this study show that both synchronous and asynchronous modes of course delivery were effective in enabling students to achieve their intended learning outcomes. UWL's rapid interventions safeguarded not only the academic integrity of its programmes but also preserved key aspects of the student experience.

A modest decline in satisfaction was observed in the post-pandemic phase, which can be attributed to evolving expectations, emotional fatigue, and shifting engagement patterns. In response, UWL initiated several improvements, including well-being initiatives, curriculum refinements, and enhanced communication strategies to support re-engagement.

Specific Recommendations

To build upon the lessons of this transitional period and foster continued improvement, the following strategies are proposed:

- Implement routine collection and analysis of student feedback to guide agile adjustments in teaching and support services.
- Develop scalable hybrid classrooms and digital toolkits to facilitate flexible, inclusive delivery models.
- Offer structured training in inclusive teaching methods, digital pedagogy, and student well-being support.
- Facilitate peer interaction and create collaborative learning spaces to rebuild academic communities and counter virtual fatigue.

Research Limitations

- This study was limited to students enrolled in Computing and Engineering programmes at UWL; results may not generalise across disciplines or institutions.
- Data was drawn primarily from internal satisfaction surveys, which are subject to response bias and may not capture longitudinal trends.
- The analysis leaned toward institutional performance metrics; future studies could benefit from richer qualitative perspectives to balance the findings.

Suggestions for Future Research

To expand on the insights presented here and support evidence-informed transformation across higher education, future studies should consider:

- Monitor long-term trends in student satisfaction and outcomes as hybrid models become standard practice.
- Use interviews, focus groups, and student narratives to reveal experiential dimensions of learning during and after the pandemic.
- Examine variations across universities to identify effective strategies and contextual factors influencing success and resilience.

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Conflict of Interest

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