

# EVALUATING STUDENT LEARNING GAIN: A STUDY TO CONSIDER HOW TEACHING ONLINE DURING THE COVID-19 PANDEMIC AFFECTED STUDENT LEARNING

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**Abstract:** Due to the Covid-19 pandemic, and the resulting enforced national lockdowns, universities have had to replace in-person teaching with online alternatives. With the ongoing marketization of Higher Education, it is important to understand how this change in delivery may have impacted upon student learning. To assess student learning, this paper used a model for evaluating learning gain which considered student learning in the form of explicit knowledge gained (distance travelled) which relates to codifiable models and theories, and tacit understanding (journey travelled) which relates to practical skills and know-how. Self-reflective surveys were used to collect learning gain data from final year students studying an organisational leadership module as part of an undergraduate business studies degree course at a UK university. The research collected data in 2019 (before the Covid-19 pandemic) for a cohort of students, and again in 2021 (during the Covid-19 pandemic) for the subsequent cohort of students. Through an analysis of both sets of data, a comparison has been possible between how students perceived their learning to have changed due to the alternative online educational delivery method being offered. Whereas a decrease in reported learning was expected from the online teaching, this was not always the case, and predominantly females appear to have particularly valued the educational experience offered by the online learning delivery.

**Keywords:** marketisation; assessment; feedback, learning gain; higher education; staff-student partnerships.

## 1 Introduction

The marketization of Higher Education has been an ongoing process, and this modification to the relationship between student and university has previously been discussed in an array of related articles (Bristow & Schneider, 2002; Molesworth *et al.*, 2010; Nedbalova *et al.*, 2014; Banwait, 2017; Bendixen & Jacobsen, 2017; Nixon *et al.*, 2018, Polkinghorne *et al.*, 2017a). As a direct result of this marketisation, students have become concerned about the 'value for

money' that they are receiving from their university education (Chapleo & O'Sullivan, 2017; Roohr *et al.*, 2017; Howson 2021). Value for money, in this sense, relates both to *what* students are taught, and also to *how* they are taught. It is true that the value for money discussion does expand into the usefulness (or otherwise) of the university education received by students. This relates to Skelton's (2005) dominant and alternative conceptualizations regarding the purpose of Higher Education, i.e. is it for training the workforce which a country requires, or for developing critical thinkers who can contribute to society. For the purposes of this study, the focus is upon the intrinsic provision of a university education, as opposed to any subsequent downstream results for the individual's employment, which may be due to having a university education.

With the arrival of the Covid-19 pandemic in 2020, universities were forced to close their campuses and move to online teaching delivery. This change was necessary to enable students to continue with their education, and universities worked hard to minimize the resulting disruption that this caused. However, debate has reverberated regarding how this worked in practice, and whether the online teaching provision was the same standard when compared to the previously delivered in-person on-campus teaching for which students had pre-paid (Azionya and Nhedzi, 2021; Díez-Gutiérrez and Gajardo Espinoza, 2021; Yatigamma and Wijayarathna, 2021). At the time of writing, the global pandemic has not ended, although university teaching provision in the UK is largely classroom based again. However, the lessons that can be learnt from the experience of delivering online teaching during this period need to be captured to enable the Higher Education sector to be better placed to respond to any similar events in the future, or to any evolutions in the current pandemic.

To support this agenda, this paper reports on a unique study which considers whether university teaching delivered online during the Covid-19 pandemic actually generated any change in the learning which students perceived that they had received. The subject taught which is considered in this study is based upon an Organisational Leadership module delivered as part of a final year Business Studies undergraduate degree course at a UK university, and the study uses student learning gain to determine any perceived change in learning which may have occurred.

Previous studies (McGrath *et al.*, 2015; Polkinghorne *et al.*, 2017b) have reviewed different approaches for evaluating student learning gain. Many learning gain approaches have been tested in large scale projects with a variety of results being reported (Howson, 2019; Jones-Devitt, 2019), and the understanding of how, and when, these can each be applied is growing continuously (Howson and Buckley, 2020). For those wishing to know more, a review of the application of learning gain within the Higher Education sector can be found in the work by Tight (2021).

The research described in this study has used a learning gain model to collect student data which enables a comparison between the learning being reported by two student cohorts; one from before and the other during the Covid-19 pandemic teaching practices. Firstly, the research approach will be detailed and then this paper will discuss the nature of the organisational leadership subject being taught, to provide context for this research study. This will then be followed by the presentation of the results, with an associated discussion regarding how the findings can be interpreted. Finally, conclusions will be drawn from this research, with the limitations of the study being acknowledged. The original contribution of this paper is the unique perspective which has been obtained by comparing the learning gain of the students before and during the Covid-19 period of university campus closure. This has resulted in a rare insight into the potential differences in learning between face to face and online university teaching, and was only possible because the initial data had already been collected prior to the pandemic.

## 2 Research Approach and Method

For this study, data was collected from students studying an Organization Leadership module as part of their final year of a Business Studies undergraduate degree course at a UK university. The degree programme is accredited by the Chartered Management Institute (CMI), and the Association to Advance Collegiate Business Schools (AACSB), and the teaching therefore has both to satisfy academic requirements, and fulfil the criteria set by these Professional, Statutory and Regulatory bodies (PRSBs).

By chance, learning gain data had already been collected from a cohort of students in the 2019-20 academic year when teaching was being delivered in-person and on-campus. When the Covid-19 pandemic arrived in 2020, universities were forced to move their teaching online due to the introduction of mandatory national lockdowns and restrictions.

The online teaching was based upon the same curriculum, intended learning outcomes, and learning materials, and same lecture delivery pattern. The seminar delivery differed in that seminars in 2019-20 were delivered by a male member of staff. Seminars in 2020-21 were delivered by an all-female teaching team. The only other substantive difference caused by this change in educational delivery was the need for students to access live lectures and pre-recorded materials from their homes or student accommodation. The teaching was delivered using the University's institutional licence for the Zoom platform, and recordings and other learning materials were made available via the University's virtual learning environment 'Brightspace'.

Given this change to online teaching, in the academic year 2020-21, the opportunity for collecting comparative data was identified. This data was collected from the next cohort of final year Business Studies undergraduate degree course students at the same UK university and studying the same Organisational Leadership module. In both cases, students were selected using a non-probability volunteer-based sampling method. This study followed Bournemouth University's research ethics protocols.

Students in both cohorts were asked to respond to a series of questions, with their responses being ranked using the following linguistic labels 0) No Change; 1) Minor Improvement; 2) Moderate Improvement; 3) Significant Improvement; and 4) Exceptional Improvement. Using these options, students were asked to consider how their understanding of the Organisational Leadership subject area had changed due studying the module. Analysis undertaken focussed upon any 'high-levels' of reported learning, and in this context high-level relates to responses which are either 3) Significant Improvement or 4) Exceptional Improvement.

For this study, the actual questions asked were based upon a learning gain module first proposed by Polkinghorne *et al.* (2017c) and subsequently developed by Polkinghorne *et al.* (2021b). The model has also been successfully applied in a range of previous studies including the consideration of the learning reported by marketing students (Polkinghorne *et al.* 2021a). As seen in Table 1, the learning gain model formulates questions based upon the intended learning outcomes for the module being considered and separates them into those questions which relate to improvements in a student's explicit knowledge (codifiable data) and those relating to an improvement in a student's tacit knowledge (practical abilities).

The intended learning outcomes for this Organisational Leadership module which underpinned the question formulation were based upon the following themes:

1. The nature of leadership and management.
2. The major theoretical approaches to leadership.
3. The practical aspects of leadership in different contexts.
4. The implications for future leadership practices.

Analysis of the data was undertaken using a frequency method to determine the number of students who considered that their learning had improved significantly or exceptionally. By undertaking a comparison of these frequency results across the two cohorts of students, it was possible to review how the perceived student learning had changed due to the introduction of the online teaching. In total, data was collected from 27 students in the academic year 2019-20 (14 males; 13 females) and from 46 students in academic year 2020-21 (24 males; 22 females).

**Table 1: Questions relating to Distance Travelled and Journey Travelled**

<b>Questions Relating to Distance Travelled</b>	
<b>Q1</b>	How much has your understanding of the nature of leadership increased?
<b>Q2</b>	How much has your understanding of the practical aspects of leadership in different contexts increased?
<b>Q3</b>	How much has your understanding of the theoretical aspects of leadership in different contexts increased?
<b>Q4</b>	How much has your understanding of the implications for future leadership practices increased?
<b>Questions Relating to Journey Travelled</b>	
<b>Q5</b>	How much has your ability to distinguish between leadership and management improved?
<b>Q6</b>	How much has your ability to evaluate the major theoretical approaches to leadership improved?
<b>Q7</b>	How much has your ability to apply leadership theoretical approaches with reference to leader power and influence improved?
<b>Q8</b>	How much has your ability to critically analyze the ethical, organisational, social and environmental challenges and constraints faced by today's organisations improved?

Authors' own work

### **3 Teaching Organisational Leadership**

The rationale for delivering leadership education on undergraduate business and management degrees is that graduates should aspire to reach a managerial or leadership role in their career, or be at least exposed to leadership functions within the businesses for which they work. Furthermore, a shortage of leadership and management skills in applicants has been identified. In fact, the Employer Skills Survey (2020) determined that in terms of softer and people related skills, time management skills, prioritization skills and managing one's own feelings, are the main causes for skills-shortage based vacancies. The ability to lead, motivate and persuade others contributed to 44% of all skills shortage vacancies. Graduates who lack leadership and management-related skills, are likely to struggle with working independently, and making fast decisions. Furthermore, with a lack of these skills, career progression may be slowed down, since working with others, motivating others, and exerting influence are required as an individual's management responsibilities increase. The above-mentioned developments provided a rationale for including leadership in degree courses which are geared at the business and management orientated professions. The curriculum therefore contains topics which aim to address any gaps in these soft skills.

The delivery of the Organisational Leadership module is shaped by four factors. Firstly, students need to learn theoretical knowledge about leadership theory. Secondly, students need to be aware of contemporary problems experienced by businesses and that have to be addressed by leaders. Thirdly, most undergraduate students cannot reflect on their own

leadership experiences because they have not had any, and therefore, leadership examples and case studies serve as tools for reflection and the application of theory to practice. Fourthly, students need to become critical thinkers and writers in order to review and discuss the implications of potential leadership challenges facing businesses.

A qualitative study by Oberg and Andenoro (2019) found that there are certain learner barriers which need to be overcome to ensure a successful student journey and learning experience is delivered. Such barriers include external engagements and activities (distractions) which students engage in, ongoing pressure and stress relating to life and study, and pre-existing beliefs about leadership. Examples of environmental barriers include technology, physical space, location, and the learning environment provided by the educational institution itself. Furthermore, instructor barriers are considered to include time, competing commitments, and department support. This research recommends that to be effective, leadership learning should take place through staff-student relationships, critical reflection, and adaptive learning.

A variety of well-established teaching methods support the achievement of key learning moments in leadership education. These are lectures, guest speakers, experiential learning, action learning, feedback sessions, reflective practices, teamwork, and coaching (Murphy and Johnson, 2011). The use of pop culture has become a well-established practice among leadership educators, and is a popular activity amongst students to enable them to explore leadership concepts. For example, this technique can be used to teach students poor and toxic leadership through film (Edwards and Schedlitzki, 2015).

In addition to this, the curriculum exposes students to thought-provoking topics such as the use of gender and diversity in leadership, the role of followership, responsible leadership, toxic leadership and the use of power and influence. Learning about critical issues is essential for future employees, as they will be navigating through uncertain environments more than ever. Understanding the differences between leadership and management, and different leadership styles and theory, can enable students to become influential professionals and so maximize their personal impact within their workplace.

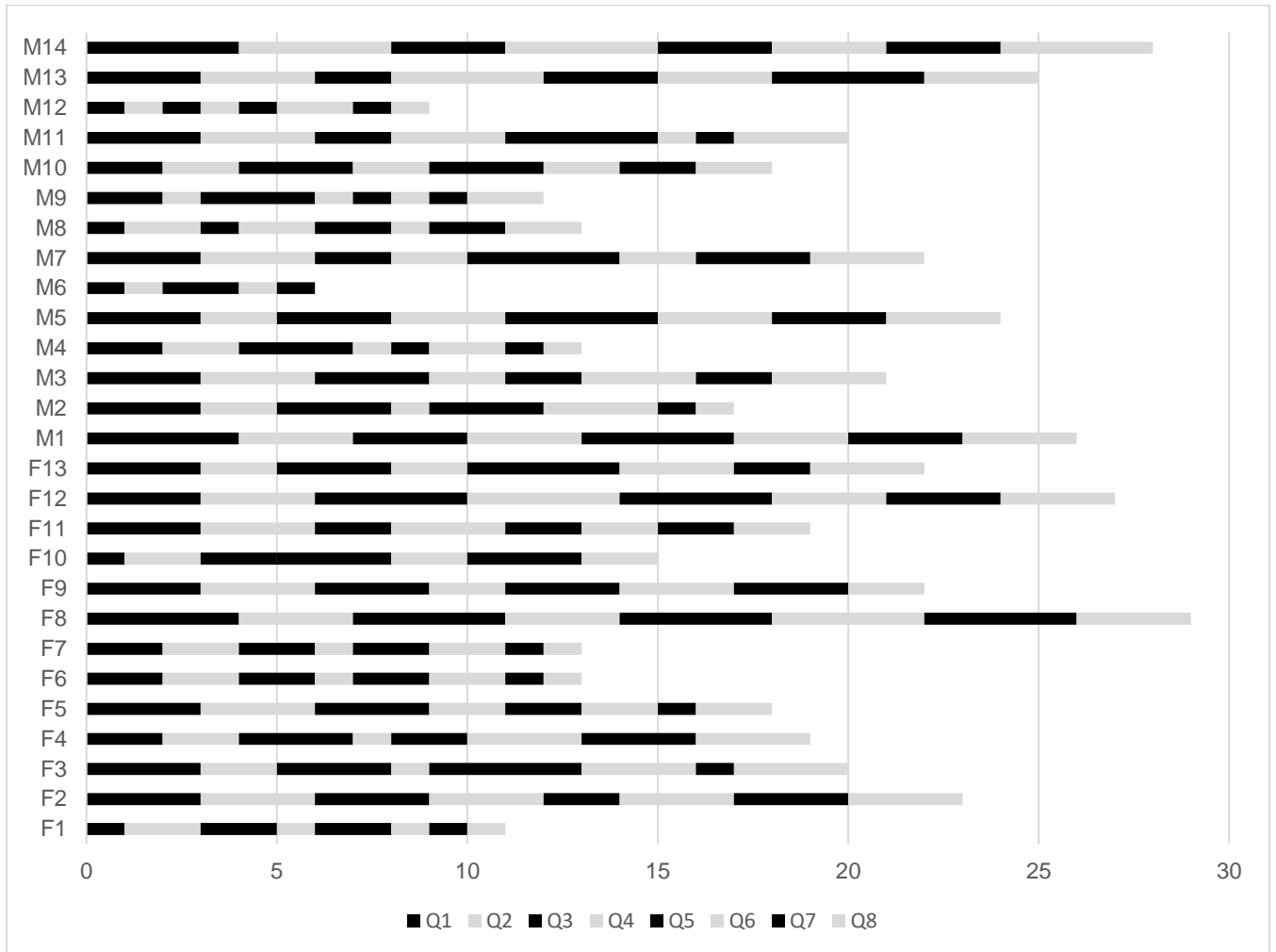
#### **4 Data Collection and Analysis**

The data collected from students in the 2019-20 pre-Covid period when in-person teaching was delivered on-campus are detailed in Figure 1. A frequency analysis technique was used with a focus upon those students reporting significant improvement in their learning (indicated by a code 3) or exceptional improvements in their learning (indicated with a code 4). Using this approach, it is apparent that the highest levels of learning were reported by students for Question 1 (*How much has your understanding of the nature of leadership increased?*) and Question 3 (*How much has your understanding of the theoretical aspects of leadership in different contexts increased?*) with 59% of students reporting significant or exceptional improvements in their learning for each.

The lowest level of learning was reported by students for Question 4 (*How much has your understanding of the implications for future leadership practices increased?*) with only 33% of students reporting significant or exceptional improvements in their learning.

The median across the questions when considering just the high-level results for all students is 48%, i.e. this is the percentage of students typically reporting significant improvement or exceptional improvements in their learning. The mean across the questions when considering just the high-level results for all students is also 48%, and this is considered to represent the perceived overall learning gain for this cohort of students.

**Figure 1: 2019-20 Learning Gain Responses for Questions 1-8: Data Representing Females 1-13 and Males 1-14**



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By grouping the data together for Q1 to Q4 it is possible to gain an appreciation of student reported perceived learning in relation to distance travelled (DT). Similarly, by grouping the data together for Q5 to Q8 it is possible to gain an appreciation of student reported perceived learning in relation to journey travelled (JT). Clearly from the data (Table 2), 6 students, e.g. students Female 1 and Male 1, have not reported any high-levels of learning, whereas 5 students, e.g. students Female 13 and Male 14, have reported the highest-levels of learning for both distance travelled, and journey travelled.

Incidences are apparent of 6 students reporting much stronger levels of distance travelled compared to journey travelled, e.g. students Female 8 and Male 9, and conversely, 7 students have reported much stronger levels of journey travelled compared to distance travelled, e.g. students Female 5 and Male 11. Overall learning gain combining both distance travelled, and journey travelled, and is indicated in Table 2 by the column marked LG.

**Table 2: Grouped Distance Travelled and Journey Travelled Learning Gain Responses for Individual Students: 2019-20**

<b>Student</b>	<b>DT</b>	<b>JT</b>	<b>LG</b>	<b>Student</b>	<b>DT</b>	<b>JT</b>	<b>LG</b>
<b>Female 1</b>	0%	0%	0%	<b>Male 1</b>	0%	0%	0%
<b>Female 2</b>	0%	0%	0%	<b>Male 2</b>	0%	0%	0%
<b>Female 3</b>	0%	0%	0%	<b>Male 3</b>	0%	0%	0%
<b>Female 4</b>	0%	50%	25%	<b>Male 4</b>	25%	0%	13%
<b>Female 5</b>	25%	75%	50%	<b>Male 5</b>	25%	0%	13%
<b>Female 6</b>	50%	75%	63%	<b>Male 6</b>	25%	25%	25%
<b>Female 7</b>	50%	75%	63%	<b>Male 7</b>	50%	50%	50%
<b>Female 8</b>	75%	0%	38%	<b>Male 8</b>	50%	75%	63%
<b>Female 9</b>	75%	0%	38%	<b>Male 9</b>	75%	50%	63%
<b>Female 10</b>	75%	75%	75%	<b>Male 10</b>	75%	50%	63%
<b>Female 11</b>	100%	75%	88%	<b>Male 11</b>	75%	100%	88%
<b>Female 12</b>	100%	100%	100%	<b>Male 12</b>	75%	100%	88%
<b>Female 13</b>	100%	100%	100%	<b>Male 13</b>	100%	100%	100%
				<b>Male 14</b>	100%	100%	100%

Authors' own work

The data collected from students in the 2020-21 Covid-19 period, when in-person teaching delivered on-campus was replaced with remote online teaching, are detailed in Figure 2. Once again, a frequency analysis technique was used with a focus upon those students reporting significant improvement in their learning (indicated with a code 3) or exceptional improvements in their learning (indicated with a code 4). Using this approach, it is apparent that the highest level of learning was reported by students for Question 5 (*How much has your ability to distinguish between leadership and management improved?*) with 72% of students reporting significant or exceptional improvements in their learning. The lowest level of learning was reported by students for Question 4 (*How much has your understanding of the implications for future leadership practices increased?*) with only 4% of students reporting significant or exceptional improvements in their learning.

The median across the questions when considering just the high-level results for all students is 57% which represents an increase of 8% when compared to the previous cohort of students. The mean across the questions when considering just the high-level results for all students is 55%, which represents an increase of 7% when compared to the previous cohort of students.

When comparing the two student cohorts, is it possible to identify how perceived learning reported against each question has changed over time (Figure 3). The maximum reported learning gain for any single question has increased by 12% from 59% (Q1 and Q3 in 2019-20) to 72% (Q5 in 2020-21). Similarly, the minimum reported learning gain for any single question has increased by 8% from 33% (Q4 in 2019-20) to 41% (Q4 in 2020-21).

The most significant change in reported perceived learning for an individual question was for Q5 which changed a very significant 20% from 52% (2019-20) to 72% (2020-21). The only question which did not see an increase in reported perceived student learning was Q8 (*How much has your ability to critically analyze the ethical, organisational, social and environmental challenges and constraints faced by today's organisations improved?*) for which there was a 3% drop from 48% (2019-20) to 46% (2020-21).

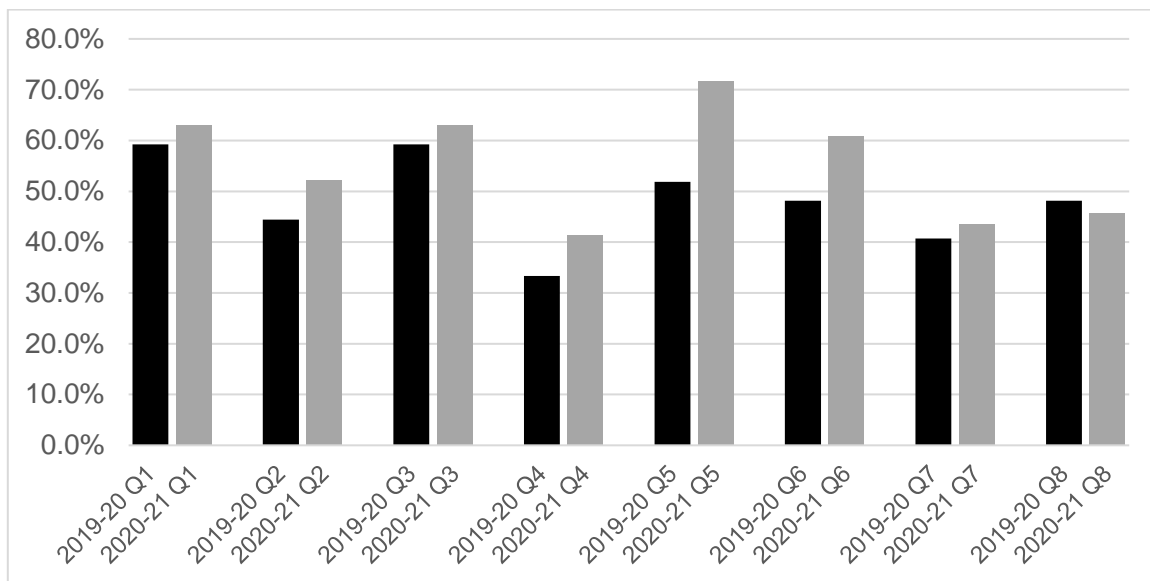
**Figure 2: 2020-21 Coded Learning Gain Responses for Questions 1-8: Data Representing Females 1-22 and Males 1-24**



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**Figure 3: Mean Frequency of High-Level Overall Student Learning Gain by Question**



Authors' own work

Once again, by grouping the data together for Q1 to Q4 it is possible to gain an appreciation of student reported perceived learning in relation to distance travelled, and grouping Q5 to Q8 we can gain an appreciation of student reported perceived learning in relation to journey travelled (Table 3). Clearly from the data, 7% (3 students), e.g. students Female 1 and Male 1, have not reported any high-levels of learning, whereas 15% (7 students), e.g. students Female 22 and Male 24, have reported the highest-levels of learning for both distance travelled and journey travelled. Incidences are apparent of 28% (13 students) reporting much stronger levels of distance travelled compared to journey travelled, e.g. students Female 15 and Male 15, and conversely, 22% (10 students) have reported much stronger levels of journey travelled compared to distance travelled, e.g. students Female 6 and Male 4.

Furthermore, when we consider the aggregated mean frequency data for distance travelled, journey travelled, and for overall learning gain, for the 2019-20 cohort, and compare this against the data for the 2020-21 cohort, an 'across the board' increase in perceived learning reported by the students is revealed (Figure 4). The data indicates that the aggregated distance travelled learning has increased by almost 6%, the journey travelled learning by 8%, and the overall learning gain by 7%.

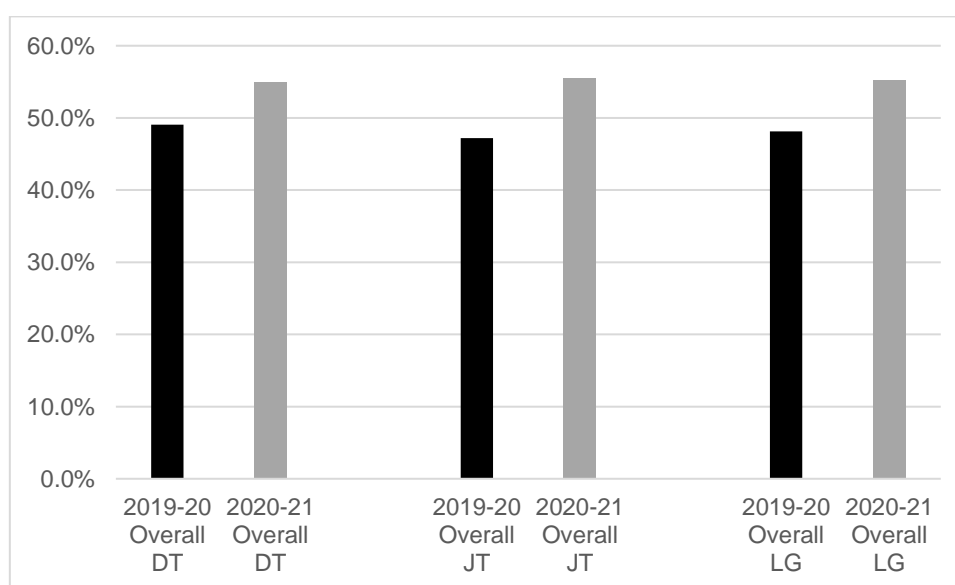
However, by considering the data in terms of gender, a different and more significant picture is revealed. In the case of male perceived learning gain (Figure 5), there was a reported increase in learning for questions Q2, Q3, Q5, Q6 and Q7 of between +2% and +10%, but a decrease in reported learning for questions Q1, Q4, and Q8 of between -3% and -12%. Overall, male learning had either increased and decreased depending upon the question, with some of the changes, both positive and negative, being quite significant.

**Table 3: Grouped Distance Travelled and Journey Travelled Learning Gain Responses for Individual Students: 2020-21**

Student	DT	JT	LG	Student	DT	JT	LG
Female 1	0%	0%	0%	Male 1	0%	0%	0%
Female 2	0%	0%	0%	Male 2	0%	25%	13%
Female 3	25%	25%	25%	Male 3	0%	25%	13%
Female 4	25%	50%	38%	Male 4	0%	75%	38%
Female 5	25%	50%	38%	Male 5	0%	75%	38%
Female 6	25%	100%	63%	Male 6	25%	0%	13%
Female 7	50%	25%	38%	Male 7	25%	25%	25%
Female 8	50%	50%	50%	Male 8	25%	25%	25%
Female 9	50%	50%	50%	Male 9	25%	50%	38%
Female 10	50%	75%	63%	Male 10	25%	75%	50%
Female 11	50%	100%	75%	Male 11	50%	0%	25%
Female 12	75%	25%	50%	Male 12	50%	25%	38%
Female 13	75%	75%	75%	Male 13	50%	50%	50%
Female 14	75%	75%	75%	Male 14	50%	50%	50%
Female 15	100%	25%	63%	Male 15	75%	0%	38%
Female 16	100%	75%	88%	Male 16	75%	25%	50%
Female 17	100%	100%	100%	Male 17	75%	25%	50%
Female 18	100%	100%	100%	Male 18	75%	75%	75%
Female 19	100%	100%	100%	Male 19	75%	75%	75%
Female 20	100%	100%	100%	Male 20	75%	100%	88%
Female 21	100%	100%	100%	Male 21	75%	100%	88%
Female 22	100%	100%	100%	Male 22	100%	75%	88%
				Male 23	100%	75%	88%
				Male 24	100%	100%	100%

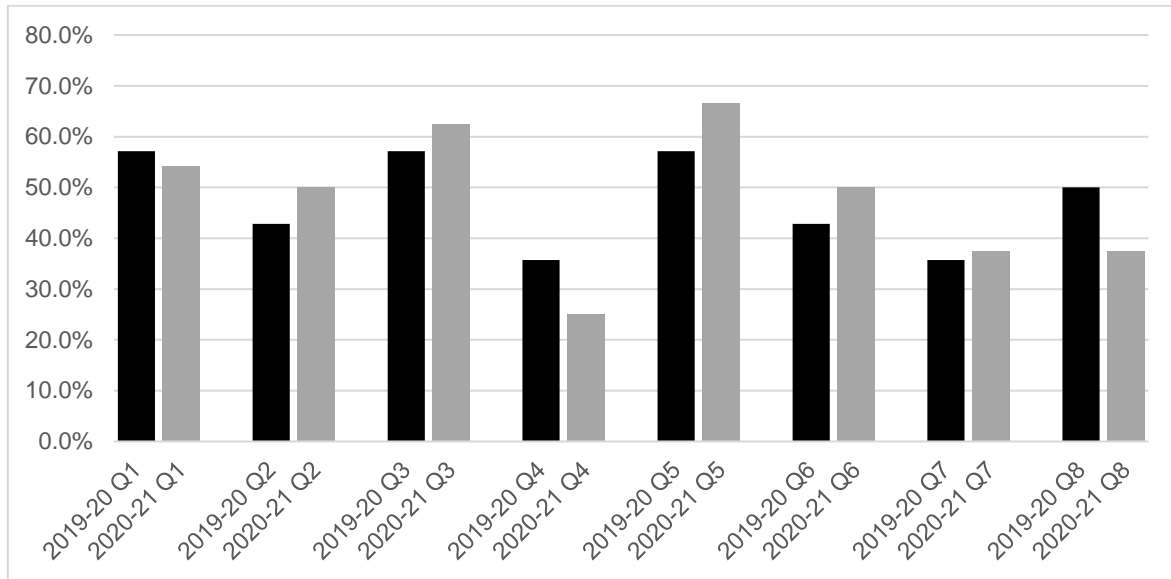
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**Figure 4: Aggregated Overall Mean Frequency Grouped Responses for High-Level Distance Travelled and Journey Travelled Perceived Learning**



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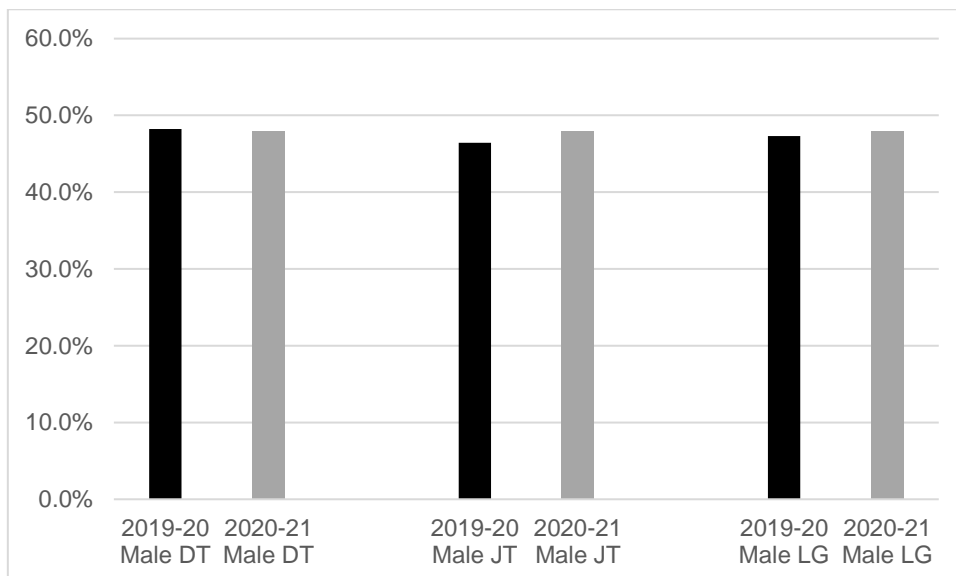
**Figure 5. Mean Frequency of High-Level Male Student Learning Gain by Question**



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Taking a more holistic perspective for male learning, there was no substantive change in distance travelled learning reported, and only a modest +2% improvement in perceived learning relating to journey travelled (Figure 6). Overall, the reported change in learning gain for males was a negligible <1%. Therefore, if we just consider males, there appears to be no significant difference in reported learning between teaching in-person and on-campus in 2019-20 and teaching online instead in 2020-21.

**Figure 6: Aggregated Mean Males Frequency Grouped Responses for High-Level Distance Travelled and Journey Travelled Perceived Learning**



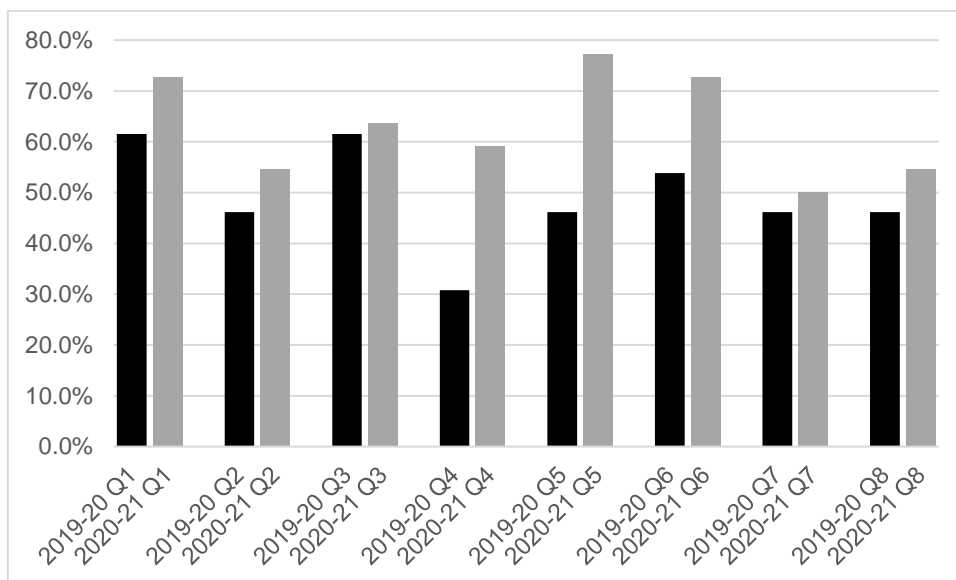
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In practice, males have reported significant improvements in learning for Q2 (*How much has your understanding of the practical aspects of leadership in different contexts increased?*), Q5 (*How much has your ability to distinguish between leadership and management improved?*) and Q6 (*How much has your ability to evaluate the major theoretical approaches to leadership*

improved?), and significant reductions in learning for Q4 (*How much has your understanding of the implications for future leadership practices increased?*) and Q8 (*How much has your ability to critically analyze the ethical, organisational, social and environmental challenges and constraints faced by today's organisations improved?*).

In the case of female perceived learning gain, a far more positive story emerges as there was a reported increase in learning for all questions of between +2% for Q3 and +31% for Q5 (Figure 7). Taking a more holistic perspective for female learning, the reported perceived learning relating to distance travelled improved by +13%, and the reported perceived learning relating to journey travelled improved by +16% (Figure 8). Overall, the change in learning gain for females was +14%. Therefore, if we just consider females, there appears to be a significant difference in reported learning between teaching in-person and on-campus in 2019-20, and teaching online instead in 2020-21. With this data, the very significant improvements in reported perceived learning should be noted for Q4 (*How much has your understanding of the implications for future leadership practices increased?*) of +28%, Q5 (*How much has your ability to distinguish between leadership and management improved?*) of +31% and Q6 (*How much has your ability to evaluate the major theoretical approaches to leadership improved?*) of +19%.

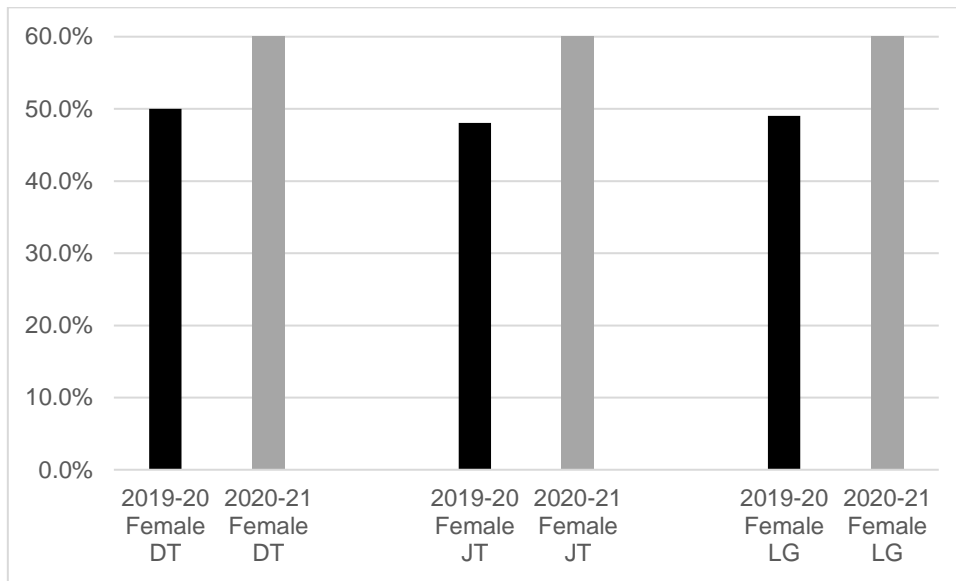
**Figure 7. Mean Frequency of High-Level Female Student Learning Gain by Question**



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Whilst both males and females reported an improvement in learning for Questions Q5 and Q6, question Q4 is more interesting, as this represents one of the most significant improvements in learning for females of +28%, and yet one of the most significant reductions in learning for males of -11%. This finding is aligned to the work of Shahzad (2021) who also identified similar variations in learning based upon gender when investigating online learning.

**Figure 8: Aggregated Mean Female Frequency Grouped Responses for High-Level Distance Travelled and Journey Travelled Perceived Learning**



Authors' own work

## 5 Discussion

The study has focussed upon a cohort of Business Studies students at a UK University. The students in question were studying Organisational Leadership and were in the final year of their undergraduate degree course. Data were collected in the academic year 2019-20 (before the Covid-19 pandemic) for the first cohort of students, and again in the academic year 2020-21 (during the Covid-19 pandemic) for the subsequent cohort of students.

Through the analysis of both sets of data, a comparison has been possible between how students perceived their learning to have changed due to the alternative educational delivery method being offered. Of course, each cohort of students is unique, and it also cannot be disregarded that the very nature of the Covid-19 pandemic may have changed the views of individual students towards their own life goals and achievements, but the anticipation was that online learning would be perceived by the students as being less valuable to them when compared to in-person on-campus learning.

However, the results from this study were somewhat surprising in that, the online learning provision was viewed by students to be broadly equivalent in terms of perceived learning achieved when compared to the previous pre-Covid-19 cohort of students. In fact, female students actually reported a considerable rise in their perceived learning based upon the online teaching being delivered. This finding aligns with a separate study by Hernandez (2021) which also found indications of a possible improvement in student performance when teaching was delivered online.

In comparison to first and second year students, final year undergraduate degree students have passed through a number of checkpoints, including a placement year for many of them, and have therefore had several opportunities to realize that they are the ones who need to be responsible for, and to drive, their own learning. For this final year group of students, it is possible that online learning enabled them to more fully engage with the teaching, supported by the added convenience of increased access and availability of lectures and associated materials, providing them with an enhanced learning experience as a result.

Notable changes between the two points of data collection were that the delivery was on campus (2019-20) and then online (2020-21), and that seminars were delivered by a male (2019-20) and a female (2020-21) teaching team. Therefore, one possible explanation is that female students perceive an increased learning gain in an online learning environment. Indeed, a higher readiness for online delivery has been reported in female students under the age of 24, as compared to their male counterparts (Firat and Bozkurt, 2020). Another explanation is that female students perceived higher learning gain when seminars were delivered by female staff, perhaps because they could relate better to the positive role model being offered.

The reported perceived change in learning varied considerably by gender with females reporting that their learning for Q4 (*How much has your understanding of the implications for future leadership practices increased?*) had increased significantly, whilst simultaneously the males were reporting a substantial drop in their perceived learning for the same question. The cause of this remains inconclusive and therefore requires further investigation and consideration. An interesting observation is that the aspect of 'implications for future leadership practices' is present in the Independent Learning Outcomes, but is not formally assessed, which may mean that male students put in less effort for this area of learning. Another possible factor might be perspective, and that male students may have reviewed their learning gain based upon the areas in which they were being assessed, and females may have reflected upon their learning gain based on the topics presented in lectures and discussed in seminars.

## **6 Conclusion**

The research undertaken in this study has considered how students perceived their learning to have changed during the Covid-19 pandemic during which in-person teaching on university campuses was replaced with online teaching due to Government enforced mandatory lockdowns. A recommendation of this study is that in a post-pandemic world, universities should offer a mix of campus-based and online (live) learning solutions to accommodate for diverse learners with different demographics and variations in learning needs and styles. Perhaps, more diverse teaching teams would accommodate for the difference in learning preferences amongst male and female students. Based upon the findings of this study, online learning may offer enhanced opportunities for those students who take responsibility for their own learning, and the students most likely to fit these criteria will be those later on in their studies who have had more chance to evolve themselves into more effective learners. The results from this study are therefore quite revealing, and the lessons that can be learnt have wider implications for the global Higher Education sector.

Furthermore, if universities are able to demonstrate the value of the courses which they offer in an online format, and the resultant increased learning which can be achieved by students, they may decide to use this information to defend themselves against claims of a reduction in educational quality as a result of online teaching provision delivered during the Covid-19 pandemic. Taking this position will enable universities to address the 'value for money' questions with a robust defence.

## **7 Limitations and Future Research**

The study reported on in this paper relates to a single module being taught on an undergraduate degree course at a UK university. The uniqueness of the study, and the relatively small number of participating students, prevents any large-scale generalisations from being possible. However, the findings are consistent, and demonstrate the need for larger scale studies to be undertaken in the future. A further study could investigate the perceived learning gain linked to students with different demographic backgrounds compared to the principal characteristics of the teaching team.

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