International
Journal of
Modern
Education
(IJMOE)
eISSN: 2637-0905

# INTERNATIONAL JOURNAL OF MODERN EDUCATION (IJMOE)
www.ijmoe.com

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GLOBAL ACADEMIC EXCELLENCE

# EVALUATING THE INFLUENCE OF STUDENT FEEDBACK ONLINE (SuFO) ON GEOTECHNICS COURSE DESIGN AND TEACHING STRATEGIES FOR QUALITY IMPROVEMENT

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**Article Info:**

**Abstract:**

The study explores the transition in teaching and learning (T&L) from pre-COVID-19, during COVID-19, to post-COVID-19, focusing on students' adaptation from physical to online classes using an open and distance learning approach. It evaluates the effectiveness of Student Feedback Online (SuFO) as an indirect measurement tool for quality assurance in higher education. A survey of 24 closed-ended questions divided into 4 sections collected student feedback on various aspects of a geotechnics course, including course content, teaching methods, and university facilities, from 2019 to 2023. Results show a significant increase in student satisfaction for post-COVID-19, with performance indicators for most sections rated "Very Good" or "Excellent," averaging over 80% based on performance indicator scale. The study

The Influence Of Student Feedback Online (SuFO) On Geotechnics Course Design And Teaching Strategies For Quality Improvement. *International Journal of Modern Education, 7* (24), 372-386.

highlights the importance of student feedback in assessing and enhancing teaching and learning processes, emphasising the potential of SuFO to drive continuous quality improvement and ensure the achievement of program and course learning outcomes. Potential future research directions include investigating the long-term impact of the changes made to the course, including course content, delivery method, and assessment approaches based on the SuFO outcomes.

## Introduction

The transition in teaching and learning (T&L) from pre-COVID-19, during COVID-19, and post-COVID-19 has sparked interest in understanding students' adaptation and adoption of the shift from physical classes to online classes. This shift, utilising an open and distance learning approach, aims to ensure continuous quality development. The student feedback online (SuFO) evaluation is utilised to monitor and ensure the performance of program and course learning outcomes provided by higher education institutions.

The students' feedback is on their educational experiences, the performance of teaching staff, and specific aspects of their institutions, such as the facilities, infrastructures, and courses. Student Feedback Online (SuFO) has been used for UiTM students to evaluate the teaching and learning process.

Student evaluation of teaching or student feedback on teaching evaluation is a generalised practice in almost every institution of higher education worldwide (Huybers, 2014). These evaluations provide valuable feedback to educators. This is a process to understand students' progress and identify areas for improvement. According to Ricci et al. (2018) students are the stakeholders in assessment. Therefore, the students must evaluate the academicians and their courses since they are part of an educational institution. Effective assessment and evaluation strategies create a positive learning environment and improve student outcomes. Academicians can use the student's feedback for two main purposes: summative and formative assessment.

In addition, Gold (2001) gives a more specific definition of summative purpose. It refers to student evaluation used for administrative or personnel decisions such as promotion, salary increment, demotion, dismissal, awards and meeting public or government accountability demands. Hence, the feedback outcome can also be used to improve the quality of the assessment and teaching effectiveness in the classroom. The feedback can also be analysed in continuous quality improvement (CQI) for administrative purposes, especially for the course's Quality Management System (QMS). The university's future planning heavily relies on their feedback on the current teaching and learning techniques (Nasruddin and Ariffin, 2020).

However, as mentioned in Hammonds (2016), there is some discrepancy about whether students can provide quality feedback regarding teaching effectiveness (Husbands 1998; Nasser and 2013; Boysen, 2015). Uttl et al. (2017) also mentioned the possibility of controversial points in the relationship of student evaluation of teaching (SET) ratings to their

learning outcomes, such as academic achievement. The evidence in support of SET as a measure of teachers' instruction effectiveness comes from the studies showing a correlation between measures of student evaluation and student achievement. Potential confounding factors include class size, class time, department, location, gender of instructor and/or student, grades, expected grade, class difficulty, instructors' academic rank, whether courses are required or elective, first impressions of the instructor, gender, age, whether the students are graduates or undergraduates, and timing and method of SET administration (Remedios and Lieberman, 2008; Liu, 2012; Nargundkar and Shrikhande 2012; Surgenor 2013). Liu (2012) also agreed that the is a possibility of biases that might influence the SET results. Hence, negative evaluations might even lead to hostility towards students and other faculty members and even substance abuse or verbal and grade abuse of students (Theall and Franklin 2001). Hammonds (2016) concluded and recommended that it is necessary to improve student responses' quality and assist educators in using the data for maximum benefit. The students' feedback on technology, learning style, instructional approach, and attitude may affect the learning outcomes of the course (Hala and Xhomara, 2024). It may help to learn better by having engagement from student feedback (Rudnak et al, 2024).

This study adopted a questionnaire survey instrument via SuFO to gather students' feedback regarding course content, lecturer professionalism, teaching and learning activities and infrastructure. The study assesses Geotechnics students' satisfaction and performance in all four sections.

**Methodology**

The study group comprised students enrolled in the Geotechnics course during semester Four of the March 2019 (20192) to October 2023(20234) session at the Civil Engineering Studies, College of Engineering, Universiti Teknologi MARA, Penang Branch, Malaysia. The year of study for the semester session, which ends with 2, indicates the semester begins in March; meanwhile, the semester session ends with 4, indicating the semester starts in August or October of the year. This group was chosen for the study because they were registered for the course in line with their academic calendar programme. This study utilised a questionnaire survey tool to collect students' comments on course information, teaching staff, instructional methods, and university facilities. The survey comprises 24 closed-ended questions and is organised into 4 sections, each containing questions that utilise a four-point Likert scale to assess course content outcomes and teaching methodologies, as exhibited in Table 1. The four-point Likert scale was chosen to eliminate the neutral option (either positive or negative) response. The initial component has four inquiries, encompassing the overall impression of the course, the course content's relevance to the topic of study, and the effectiveness of the assessment methods in promoting learning proficiency. The second segment comprised seven questions about the speaker's professionalism, including their approachability and accessibility for discussion. The third component has eleven questions about teaching and learning (T&L) activities, such as the lecturer explaining the course topic and the expected objectives. The last component consists of two questions about the university's facilities, specifically the suitability of the teaching and learning spaces and the adequacy and functionality of the equipment. All respondents who participated in the survey were asked for their consent and informed about the data privacy and confidentiality of the findings.

**Table 1: List of Survey Questions**

| No. | Question | Strongly Disagreed (1) | Disagreed (2) | Agreed (3) | Strongly Agreed (4) |
|-----|----------|------------------------|---------------|------------|---------------------|
| The First Part - Section A : Overall Impression about the course (4 question) | | | | | |
| 1 | I have increased my knowledge from taking the course. | A 4-point Likert scale created these questions (i.e., "strongly disagreed, disagreed, agreed, strongly agreed"). This section also includes overall impression of the course. | | | |
| 2 | The course content is related to my field of study. | | | | |
| 3 | The method of assessments in this course has enhanced my learning ability. | | | | |
| 4 | My confidence level in this course has increased. | | | | |
| The Second Part - Section B : Lecturer Professionalism (7 question) | | | | | |
| 5 | The lecturer completes the scheduled hours of instruction. | A 4-point Likert scale created these questions (i.e., "strongly disagreed, disagreed, agreed, strongly agreed"). This section also includes lecturer professionalism. | | | |
| 6 | The lecturer is ever ready to provide academic guidance to students. | | | | |
| 7 | The lecturer uses English as a medium of instruction during the lectures except for CITU and Third Language courses. | | | | |
| 8 | The lecturer is approachable. | | | | |
| 9 | The lecturer is accessible for discussion. | | | | |
| 10 | The lecturer monitors student attendance. | | | | |
| 11 | Overall, the lecturer exhibits high professionalism. | | | | |
| The Third Part - Section C : Teaching and Learning Activities (11 question) | | | | | |
| 12 | The lecturer explains the course content. | A 4-point Likert scale created these questions (i.e., "strongly disagreed, disagreed, agreed, strongly agreed"). This section also includes teaching and learning activities. | | | |
| 13 | The lecturer explains the outcomes of the course. | | | | |
| 14 | The lecturer explains the methods of assessment for the course. | | | | |
| 15 | The lecturer teaches according to plan. | | | | |
| 16 | The lecturer actively involves students in the learning process. | | | | |
| 17 | The lecturer creates an environment for students to ask questions and offer opinions. | | | | |
| 18 | The lecturer delivers the content interestingly. | | | | |
| 19 | The lecturer's delivery style challenges the mind | | | | |
| 20 | The lecturer provides feedback for each assessment/assignments/tests/projects. | | | | |
| 21 | The lecturer helps students master the learning content. | | | | |

| 22 | Overall, I enjoyed the teaching style of this lecturer. | |
|---|---|---|
| The Fourth Part - Section D : Infrastructure (2 question) | | |
| 23 | The equipment space for teaching and learning is conducive. | A 4-point Likert scale created these questions (i.e., "strongly disagreed, disagreed, agreed, strongly agreed"). This section also includes infrastructure. |
| 24 | The teaching and learning equipments are adequate and functioning. | |

Each question was averaged in percentage terms and assigned an average score. Additionally, the Likert scale responses for each question were summed and averaged to obtain a total average overall. The performance is calculated as the average of Sections B and C. The survey findings are evaluated using a performance indicator on a percentage scale, ranging from excellent to weak, as depicted in Table 2.

**Table 2: Performance Indicator Scale**

| Scale | Indicator |
|---|---|
| 90-100 | Excellent |
| 80-89 | Very Good |
| 70-79 | Good |
| 60-69 | Average |
| Below 60 | Weak |

To participate in the poll, the students had to sign up to UFUTURE, the university's online learning management system (LMS). According to the university's academic schedule, released at the start of each semester, students should reply to the survey during Weeks 11 and 15 of lectures and study sessions before final exams start. Every SuFO record from the pre-COVID-19 (2019), COVID-19 (2020–2021), and post–COVID–19 (2022–2023) periods was gathered online via UFTURE and subsequently subjected to JASP version 0.18.3.0 descriptive statistical analysis. The ordinal data collected from the survey were then analysed by an open-source statistical tool, JASP version 0.18.3.0, for minimum, maximum, mean and standard deviation values. Simple mathematical calculations analysed the total average and overall average.

**Results and Discussion**

The average percentage results for all the questions in the survey are given in Table 3. The data from SuFO in ten semesters were collected from 2019 (pre-COVID-19) to 2023 (COVID-19 and post-COVID-19), representing the transition period from physical class and online class to physical class back. The data in the table indicates a noteworthy rise in student contentment with the course during the latest periods in the post-COVID-19 compared to the pre-COVID-19 and COVID-19 periods. It shows an increase in student satisfaction from an average of 87.82% in 2019 to 94.46% in Section A (Overall Impression). A notable increase (87.82% to 94.46%) indicates a better general course experience. The most recent periods post-COVID-19 saw increased student satisfaction from 85.59% in 2019 to 89.56% in Section B (Lecturer Professionalism). Meanwhile, during COVID-19 in 2020, satisfaction was slightly declined for Section B. A rise in satisfaction indicates positive perceptions of lecturers' professionalism (85.59% to 89.56%) in the post-COVID-19 period. Student satisfaction in Section C (Teaching and Learning Activities) increased from 85.26% on average in 2019 to 90% in the most recent time-frame (post-COVID-19). Students appear to find the exercises exciting and useful, as evidenced by a significant increase in their satisfaction with the teaching techniques (85.26%

to 90%). Student satisfaction in Section D (Infrastructure) increased from 85.59% on average in 2019 to 89.67% in the most recent post-COVID-19 period due to concerns about the importance of the university's strong internet connection and bandwidth. However, in 2020, during COVID-19, satisfaction declined slightly due to unpreparedness in providing good internet facilities. A boost in infrastructure satisfaction (85.59% to 89.67%) suggests that resources, technology, and course materials serve students. Even though the gain is less, it makes learning more seamless. It is concluded that the significantly more positive overall impression of the course is likely due to more engaging and effective teaching and learning activities delivered by professional instructors and supported by appropriate resources.

### Table 3: Average Percentage of Questions in All Sections of Survey

| Question No. | Pre COVID-19 | | COVID-19 | | | | | Post COVID-19 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 20192 | 20194 | 20202 | 20204 | 20212 | 20214 | 20222 | 20224 | 20232 | 20234 |
| The First Part - Section A : Overall Impression about the course (4 question) | | | | | | | | | | |
| Q1 | 86.05 | 87.33 | 84.45 | 88.14 | 89.01 | 89.88 | 90.05 | 94.51 | 94.22 | 90.38 |
| Q2 | 86.47 | 87.84 | 84.53 | 88.14 | 89.01 | 89.88 | 89.03 | 95.33 | 93.1 | 89.23 |
| Q3 | 85.62 | 86.82 | 83.95 | 87.08 | 86.85 | 86.61 | 89.03 | 94.11 | 92.54 | 89.23 |
| Q4 | 85.13 | 86.15 | 83.36 | 85.59 | 86.70 | 87.8 | 88.78 | 93.9 | 91.42 | 90 |
| Total Average (Section A) | 85.82 | 87.03 | 84.07 | 87.24 | 87.89 | 88.54 | 89.22 | 94.46 | 92.82 | 89.71 |
| The Second Part - Section B : Lecturer Professionalism (7 question) | | | | | | | | | | |
| Q5 | 85.2 | 86.82 | 85.2 | 86.02 | 88.55 | 91.07 | 90.56 | 93.29 | 92.72 | 90.77 |
| Q6 | 85.84 | 86.66 | 85.2 | 86.02 | 88.40 | 90.77 | 88.78 | 93.5 | 92.35 | 89.62 |
| Q7 | 85.69 | 86.99 | 84.28 | 84.53 | 87.21 | 89.88 | 89.16 | 93.9 | 92.16 | 88.85 |
| Q8 | 85.76 | 86.15 | 85.12 | 86.02 | 87.95 | 89.88 | 88.78 | 94.92 | 92.54 | 88.85 |
| Q9 | 85.69 | 86.99 | 85.03 | 84.96 | 87.72 | 90.48 | 88.78 | 93.5 | 92.72 | 90.38 |
| Q10 | 84.99 | 87.67 | 84.87 | 85.59 | 88.18 | 90.77 | 89.67 | 94.31 | 91.98 | 89.23 |
| Q11 | 85.98 | 87.5 | 84.7 | 85.59 | 87.89 | 90.18 | 90.05 | 94.31 | 93.47 | 89.23 |
| Total Average (Section B) | 85.59 | 86.97 | 84.91 | 85.53 | 87.98 | 90.43 | 89.4 | 93.96 | 92.56 | 89.56 |
| The Third Part - Section C : Teaching and Learning Activities (11 question) | | | | | | | | | | |
| Q12 | 85.62 | 86.82 | 84.95 | 84.96 | 87.87 | 90.77 | 89.29 | 93.9 | 93.47 | 89.62 |
| Q13 | 85.55 | 87.16 | 84.7 | 84.75 | 87.76 | 90.77 | 89.41 | 94.31 | 93.28 | 90 |
| Q14 | 85.69 | 85.98 | 84.95 | 85.17 | 87.23 | 89.29 | 89.41 | 93.5 | 91.79 | 90.38 |
| Q15 | 85.62 | 87.33 | 84.53 | 86.44 | 88.46 | 90.48 | 89.67 | 94.51 | 93.1 | 89.23 |
| Q16 | 85.13 | 86.49 | 84.62 | 84.96 | 87.57 | 90.18 | 89.54 | 94.51 | 92.72 | 89.62 |
| Q17 | 85.27 | 87.5 | 85.28 | 85.38 | 87.93 | 90.48 | 88.52 | 93.9 | 92.72 | 88.85 |
| Q18 | 84.42 | 86.32 | 83.7 | 85.17 | 87.68 | 90.18 | 88.9 | 93.7 | 91.23 | 90 |
| Q19 | 85.55 | 86.49 | 83.86 | 84.75 | 86.57 | 88.39 | 89.29 | 92.89 | 92.91 | 90 |
| Q20 | 84.77 | 86.99 | 84.62 | 84.96 | 87.57 | 90.18 | 89.03 | 92.48 | 91.98 | 91.15 |
| Q21 | 84.77 | 86.15 | 83.86 | 84.75 | 87.17 | 89.58 | 89.8 | 94.92 | 91.6 | 90.38 |
| Q22 | 85.48 | 86.66 | 84.78 | 85.38 | 87.78 | 90.18 | 89.29 | 93.5 | 92.54 | 90.77 |
| Total Average | 85.26 | 86.72 | 84.53 | 85.15 | 87.60 | 90.04 | 89.29 | 93.83 | 92.49 | 90 |

| (Section C) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| The Fourth Part - Section D : Infrastructure (2 question) | | | | | | | | | | |
| Q23 | 85.91 | 85.47 | 79.68 | 84.32 | 86.06 | 87.8 | 88.78 | 92.28 | 92.91 | 89.62 |
| Q24 | 85.48 | 85.81 | 80.27 | 84.75 | 85.98 | 87.2 | 88.14 | 92.28 | 92.16 | 89.23 |
| Total Average (Section D) | 85.69 | 85.64 | 79.97 | 84.53 | 86.02 | 87.5 | 88.46 | 92.28 | 92.53 | 89.43 |
| Total Average Overall | 85.59 | 86.59 | 83.37 | 85.61 | 87.37 | 89.13 | 89.09 | 93.63 | 92.6 | 89.67 |

The total average of Sections B (Lecturer Professionalism) and C (Teaching and Learning Activities) in Table 3 were calculated to obtain the total average overall for each semester (SuFO). The total average overall percentage for all sections in the survey results from 2019 to 2023 are presented in Figure 1. The figure shows some increment of the students' satisfaction in 2019. However, the satisfaction level was reduced during COVID-19 in early 2020. This scenario happens due to drastic changes in the T&L method from face-to-face (F2F) to online distance learning (ODL) (Md Nujid, Masyitah and Tholobon, 2021). During this transition, most students had problems adapting to the change in T&L, especially due to the lack of gadgets and internet access problems (Sundarasen et al., 2020, Md Nujid & Tholibon, 2023). However, when all the problems were solved, students' satisfaction was improved and measured from academic performance obtained Nujid & Tholobon, 2023). The obvious satisfaction was when the full F2F was implemented in 2022. It can be said that students' satisfaction drops during COVID-19 (2020-2021) and improves after post-COVID-19. Figure 2 shows the summary results of Sections A, B, C and D's total average overall (SuFO) for each semester from 2019 to 2023.
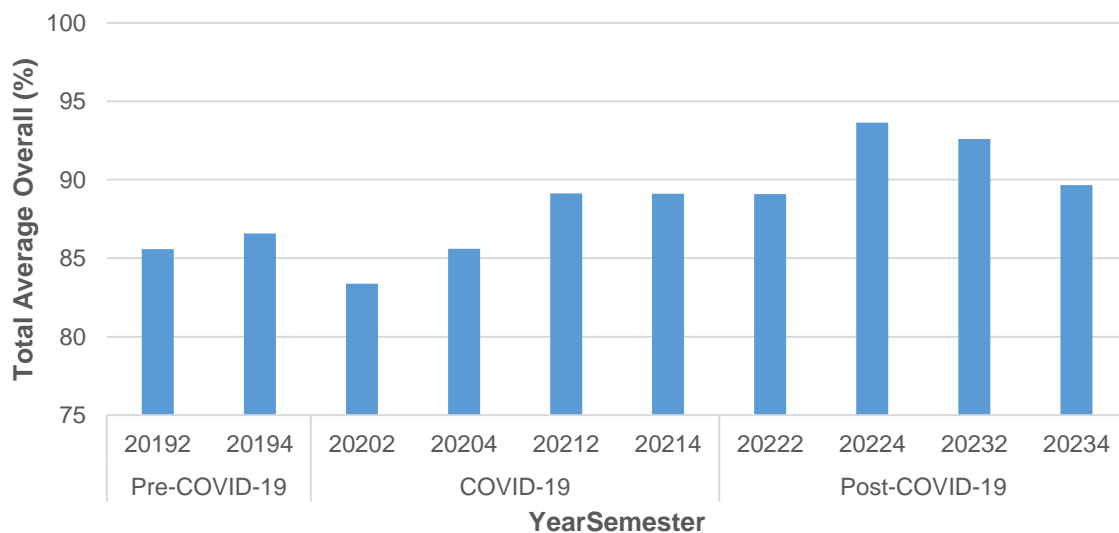


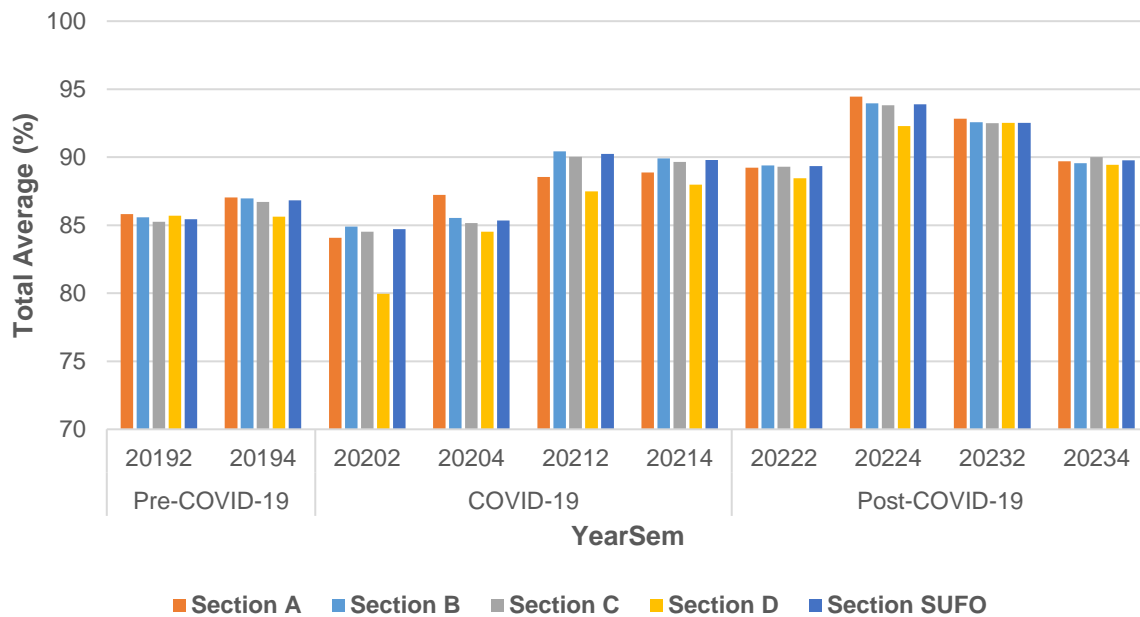**Figure 1: Total Average Overall Per Semester From 20192 to 20234**

**Figure 2: Total Average by Section for All Semesters From 2019 to 2023**

Table 4 contains descriptive statistics of mean and standard deviation for all questions in each section. All sections have high mean scores, with most questions scoring above 88, indicating overall student satisfaction with the course, lecturers, teaching and learning activities, and infrastructure.

The average scores for all questions in Section A exceed 88, suggesting an overall favourable perception of the course. The standard deviations vary from 3.082 to 3.211, indicating moderate response variation. The average scores range from 88.042 to 89.498, suggesting a highly favourable overall opinion of the course. The standard deviations have a mean value of approximately 3.1, indicating moderate variability in the replies. Meanwhile, the average ratings for Section B vary from 88.496 to 89.246, which is somewhat higher than Section A. This suggests that there is a high level of satisfaction with the professionalism of the lecturers. The standard deviations in Section B are marginally lower than those in Section A, ranging from 2.871 to 3.22. This suggests that there is less unpredictability in Section B. Section C similarly displays the average scores for most questions falling within the range of 88.297 to 89.099, consistent with Sections A and B.

This suggests a high level of satisfaction with the teaching and learning activities. The standard deviations for Section C vary between 2.971 and 3.553, except for one question (Q22) with a significantly high standard deviation of 28.228. This suggests the presence of an outlier or a misreading. In addition, Section D has mean scores of 88.677 and 88.532 for Q23 and Q24, respectively, suggesting favourable feedback regarding the infrastructure. Both questions exhibit a substantial degree of dispersion, as seen by their high standard deviations (about 27.9), implying a significant level of variability in the replies for Section D. The average scores across all parts are consistently high, suggesting a high level of overall satisfaction with the course, professionalism of the lecturer, teaching and learning activities, and infrastructure. The majority of questions have mean scores exceeding 88. The mean scores for lecturer professionalism (Section B) are slightly higher, and the variability is lower than other sections, suggesting a strong and consistent positive feedback for lecturers. It is important to continue

supporting and enhancing lecturer professionalism, as it is a notable strength based on student feedback. Although overall satisfaction is good, variation in certain replies suggests the need for enhancements in infrastructure and teaching approaches to address specific student problems. This could involve clarifying survey questions or directly addressing individual student concerns.

**Table 4: Descriptive Statistics for Average in Each Question by Section for All Semesters**

| | Section A | | | | | Section B | | | | | | | | Section C | | | | | | | | Section D | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 | Q11 | Q12 | Q13 | Q14 | Q15 | Q16 | Q17 | Q18 | Q19 | Q20 | Q21 | Q22 | Q23 | Q24 |
| Valid | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Missing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean | 89.498 | 89.300 | 88.281 | 88.042 | 89.246 | 88.852 | 88.496 | 88.735 | 88.816 | 88.930 | 89.112 | 88.943 | 89.002 | 88.551 | 89.099 | 88.763 | 88.740 | 88.316 | 88.297 | 88.576 | 88.550 | 79.858 | 78.677 | 78.532 |
| Std. Deviation | 3.211 | 3.082 | 3.091 | 3.166 | 3.114 | 2.871 | 3.159 | 3.169 | 3.080 | 3.139 | 3.220 | 3.292 | 3.397 | 2.971 | 3.191 | 3.387 | 3.036 | 3.266 | 3.156 | 3.037 | 3.553 | 28.228 | 27.917 | 27.823 |
| Minimum | 84.450 | 84.530 | 83.950 | 83.360 | 85.200 | 85.200 | 84.280 | 85.120 | 84.960 | 84.870 | 84.700 | 84.950 | 84.700 | 84.950 | 84.530 | 84.620 | 85.270 | 83.700 | 83.860 | 84.620 | 83.860 | 0.000 | 0.000 | 0.000 |
| Maximum | 94.510 | 95.330 | 94.110 | 93.900 | 93.290 | 93.500 | 93.900 | 94.920 | 93.500 | 94.310 | 94.310 | 93.900 | 94.310 | 93.500 | 94.510 | 94.510 | 93.900 | 93.700 | 92.910 | 92.480 | 94.920 | 93.500 | 92.910 | 92.280 |

Table 5 presents a comprehensive overview of course evaluation metrics for all sections across several semesters, divided into three periods: Pre-COVID-19 (20192-20194), COVID-19 (20202-20214), and Post-COVID-19 (20222-20234). It provides total average scores and performance indicators for various sections, including Overall Impression (Section A), Lecturer Professionalism (Section B), Teaching and Learning Activities (Section C), Infrastructure (Section D), and SuFO (Section E). The SuFO from Section E is calculated as the average of scores from Section B and Section C.

Before the onset of the pandemic in late 2019, the average scores fluctuated between 85.26 and 87.03. There has been a marginal increase in the scores from Semester 20192 and Semester 20194. For example, the general perception of the course (Section A) rose from 85.82 to 87.03. This improvement could be attributed to advancements in course delivery, content, or other relevant variables. This could be due to the adoption of new technologies and interactive platforms in content delivery. The scores demonstrate a notably high level of satisfaction in all categories for both semesters. All sections achieved a "Very Good" rating for their performance indicators. The marginal rise in scores from one semester to the next indicates continuous enhancements. This may be attributed to responsive modifications implemented in response to prior input, more efficient use of resources, or advancements in teaching approaches. This indicates a uniform view of excellence throughout the course and its many elements. This signifies utilising efficient pedagogical techniques, well-developed facilities, and favourable student encounters.

Amidst the pandemic, there was a discernible fluctuation in scores, with certain scores experiencing a modest decline in 20202 and 20204, which can be attributed to the early difficulties encountered in adapting to remote learning and other adaptations necessitated by the pandemic. Significant advancements were observed in the years 20212 and 20214, with scores attaining the level of "Excellent" in certain sections, specifically Section C (90.04) and

Section E (90.24). The performance indicators predominantly maintained a "Very Good" status, with certain areas achieving "Excellent" ratings by the conclusion of the COVID-19 period. This indicates that the organisation effectively adjusted to the challenges presented by the pandemic.

The overall mean scores demonstrated substantial enhancement, with multiple segments attaining "Excellent" performance benchmarks throughout the post-COVID-19 timeframe. In the years 20224 and 20232, specific sections like Overall Impression (94.46 and 92.82) and Teaching and Learning Activities (93.67 and 92.49) were given ratings of "Excellent". The scores and performance indicators demonstrate a favourable recovery and potential improvement in teaching methodologies, infrastructure, and overall course delivery following the epidemic.

The pandemic originally presented difficulties evident in the small decrease in scores observed during the early semesters affected by COVID-19. Nevertheless, the institution experienced a substantial improvement in scores and performance indicators as it adjusted to distant learning and other changes brought about by the pandemic. The course delivery techniques have demonstrated durability and adaptability during the changeover phase amid the COVID-19 pandemic. After the pandemic, multiple sectors experienced enhanced ratings, suggesting successful approaches in overcoming the initial obstacles. The post-COVID-19 scores and signs of "Excellent" achievement in numerous parts indicate a substantial improvement in the quality of the course. This can be ascribed to the incorporation of efficient remote learning strategies, enhanced infrastructure, and better pedagogical approaches acquired during the pandemic.

**Table 5: Total Average and Performance Indicator by Section**

| YearSem | Scale | Section A: Overall Impression about the course | Section B: Lecturer Professionalism | Section C: Teaching and Learning Activities | Section D: Infrastructure | Section E: SuFO |
|---|---|---|---|---|---|---|
| Pre-COVID-19 | | | | | | |
| 20192 | Total average (%) | 85.82 | 85.59 | 85.26 | 85.69 | 85.43 |
| | Performance Indicator | Very good | Very good | Very good | Very good | Very good |
| 20194 | Total average (%) | 87.03 | 86.97 | 86.72 | 85.64 | 86.84 |
| | Performance Indicator | Very good | Very good | Very good | Very good | Very good |
| COVID-19 | | | | | | |
| 20202 | Total average (%) | 84.07 | 84.91 | 84.53 | 79.97 | 84.72 |
| | Performance Indicator | Very good | Very good | Very good | Very good | Very good |
| 20204 | Total average (%) | 87.24 | 85.53 | 85.15 | 84.53 | 85.34 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Performance Indicator | Very good | Very good | Very good | Very good | Very good |
| 20212 | Total average (%) | 88.54 | 90.43 | 90.04 | 87.5 | 90.24 |
| | Performance Indicator | Very good | Excellent | Excellent | Very good | Excellent |
| 20214 | Total average (%) | 88.88 | 89.92 | 89.67 | 87.98 | 89.79 |
| | Performance Indicator | Very good | Very good | Very good | Very good | Very good |
| **Post-COVID-19** | | | | | | |
| 20222 | Total average (%) | 89.22 | 89.4 | 89.29 | 88.46 | 89.34 |
| | Performance Indicator | Very good | Very good | Very good | Very good | Very good |
| 20224 | Total average (%) | 94.46 | 93.96 | 93.83 | 92.28 | 93.9 |
| | Performance Indicator | Excellent | Excellent | Excellent | Excellent | Excellent |
| 20232 | Total average (%) | 92.82 | 92.56 | 92.49 | 92.53 | 92.52 |
| | Performance Indicator | Excellent | Excellent | Excellent | Excellent | Excellent |
| 20234 | Total average (%) | 89.71 | 89.56 | 90 | 89.43 | 89.78 |
| | Performance Indicator | Very good | Very good | Excellent | Very good | Very good |

Figure 3 shows the bar graph displaying the descriptive statistics for average scores by section across all semesters. The bars represent the mean scores and the standard deviation for each section. All sections show mean scores for each section very close to each other, ranging from 88.70 to 88.88. This indicates a high level of satisfaction or performance in these sections. The mean score for Section D is slightly lower at 87.40 compared to the other sections. This could indicate the section has areas that might need improvement to match the performance of other sections. All sections exhibit high mean scores above 87, indicating positive feedback or performance. The standard deviation values are relatively low for all sections, suggesting that the scores are clustered closely around the mean, indicating consistency in responses. Section D has the highest standard deviation at 3.73, indicating slightly more variability in scores compared to other sections. Section B has the lowest standard deviation at 3.07, suggesting the least variability and more consistent responses. The low standard deviations across sections indicate reliable and consistent responses, suggesting that the evaluation process is stable and dependable. Section D stands out with a lower mean and higher standard deviation. This section may benefit from a closer review to identify potential areas for improvement.
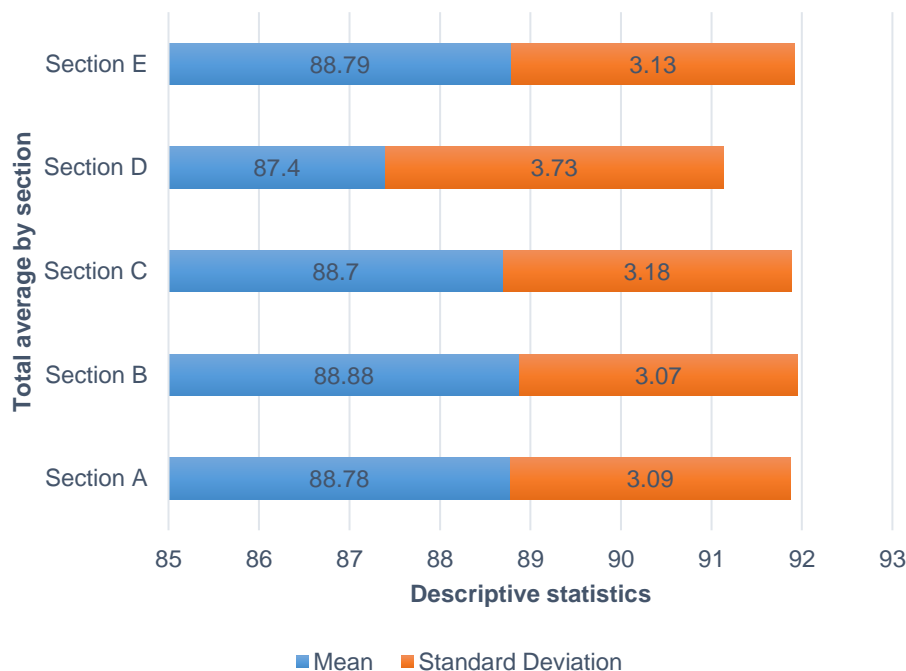
**Figure 3: Total Average by Section for All Semesters**

Table 6 provides descriptive statistics to evaluate the SuFO in Section E; it is the average calculated from Sections B and C. Section B has a slightly higher mean score compared to Section C, specifically by 0.18 units. The standard deviation for Section B is 3.07, slightly lower than that for Section C, which is 3.18. Thus, teaching and learning performance needs to be evaluated as an average between Section B and Section C. Regarding the mean score, Section E falls between Section B and Section C. It indicates good performance and satisfaction, slightly better than Section C but not as high as Section B. Section E has a standard deviation slightly higher than Section B but lower than Section C. This indicates a moderate level of consistency in responses, with less variability than Section C but more than Section B. Section B stands out for its high mean and lowest standard deviation, suggesting consistent high performance and satisfaction. Section C shows the highest variability, which could indicate areas where student experiences differ more significantly, even though the average feedback remains positive. Section E maintains a balance, with a high mean and moderate variability, indicating consistent satisfaction with some variation.

**Table 6: Descriptive Statistics for Total Average by Sections B, C and E for All Semesters**

|                | Section B | Section C | Section E |
|----------------|-----------|-----------|-----------|
| Valid          | 10        | 10        | 10        |
| Missing        | 0         | 0         | 0         |
| Mean           | 88.883    | 88.698    | 88.790    |
| Std. Deviation | 3.073     | 3.183     | 3.126     |
| Minimum        | 84.910    | 84.530    | 84.720    |
| Maximum        | 93.960    | 93.830    | 93.900    |

The high mean score in Section B and the low standard deviation suggest that students' perceptions of lecturers' professionalism are generally favourable and consistent. This consistency is important since the total score of Section E can be greatly improved by consistent and dependable input regarding the professionalism of lecturers. Section C retains a high score despite having a slightly lower mean and larger variability than Section B. Positive ratings in this area greatly contribute to the overall satisfaction shown in Section E. Teaching and learning activities are fundamental to the student experience. Section E, which is the mean of Sections B and C, represents the overall quality of the professionalism of the lecturers as well as the activities related to teaching and learning. A high score in Section E, which measures overall satisfaction with the educational experience, is guaranteed by high scores in both sections. Sections B and C have slightly different mean scores, and standard deviations counterbalance one another. Section C marginally higher variability points to areas where adjustments could further raise Section E's score, while Section B's lower variability helps to create a steady perception. The high mean scores in Sections B and C show favourable feedback regarding the professionalism of the lecturers as well as the activities related to teaching and learning. It is imperative to sustain a high score in Section E by providing this positive feedback. Maintaining high standards for lecturer professionalism and making strategic enhancements to teaching and learning activities will continue to benefit the overall student feedback summarised in Section E.

## Conclusion

The SuFO data analysis provides valuable insights into student satisfaction with the Geotechnical Engineering course. Students perceive the course favourably, with high average scores across various sections. Notably, lecturer professionalism (Section B) stands out as a strength, while teaching and learning activities (Section C) receive consistent positive feedback, suggesting good satisfaction in learning delivery and assessments. The average score for section A (course perception) exceeding 88 proved that students had a favourable perception of the course overall. However, addressing specific student concerns and enhancing infrastructure (Section D) could elevate overall satisfaction. This study underscores the importance of indirect measurements, such as SuFO data, in assessing course outcomes and optimising teaching and learning experiences. Potential future research directions include investigating the long-term impact of the changes made to the course, including course content, delivery method, and assessment approaches based on the SuFO outcomes.

## Acknowledgement

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