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INNOVATIONS IN TEACHING & LEARNING COMPETITION

ACTIVE EXPERIENTIAL LEARNING OF GEOTECHNICAL ENGINEERING LABORATORY: THE OFF-CAMPUS ATTEMPT

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ABSTRACT

Civil Engineering syllabus requires basic soil mechanics lab, which is difficult to deliver online, especially during the COVID-19 pandemic. This project evaluates active experiential learning for two laboratory tests (permeability and field density) to demonstrate that off-campus laboratories can produce comparable student performance. These laboratory tests should help students connect geotechnical engineering theory and practise and follow standard procedures. The lab outcome also required students to work well together. Two cohort students performed off-campus lab tests.

Based on two laboratory tests, students had to choose a parameter to gather. Interpreting data and assessing the problem were also required. This is expected in an open-ended laboratory condition. Students make a video and write a report about data and results. Then, students had a viva to test their understanding of the test's fundamentals and laboratory testing sequences. Before the lab, students received rubrics related to the expected learning outcomes. Results showed that the learning outcomes were achieved. This shows that future laboratory design will include new technologies, open educational resources, self- and active learning, and universal basic laboratory design to understand laboratory test concepts and principles.

OBJECTIVE

This project was initiated to ensure the following objectives were achieved:

1. To ensure all psychomotor assessments able to be conducted remotely
2. To ensure all laboratory tests, according to the syllabus completed
3. To ensure students attain groupwork evaluation despite being away from campus and classmates

ADDED VALUES

Authenticity: Each laboratory assessment will produce an authentic result based on the sampling location.

Alternative assessment option: This project proves that regardless of no standard equipment off-campus, applying the basic concept and fundamental understanding is more important to improve student knowledge and ability to solve the required problem.

USEFULNESS

Flexibility: Remote assessments offer greater timing and location flexibility. For students with scheduling conflicts or limited access to testing facilities, taking remote assessments can be helpful.

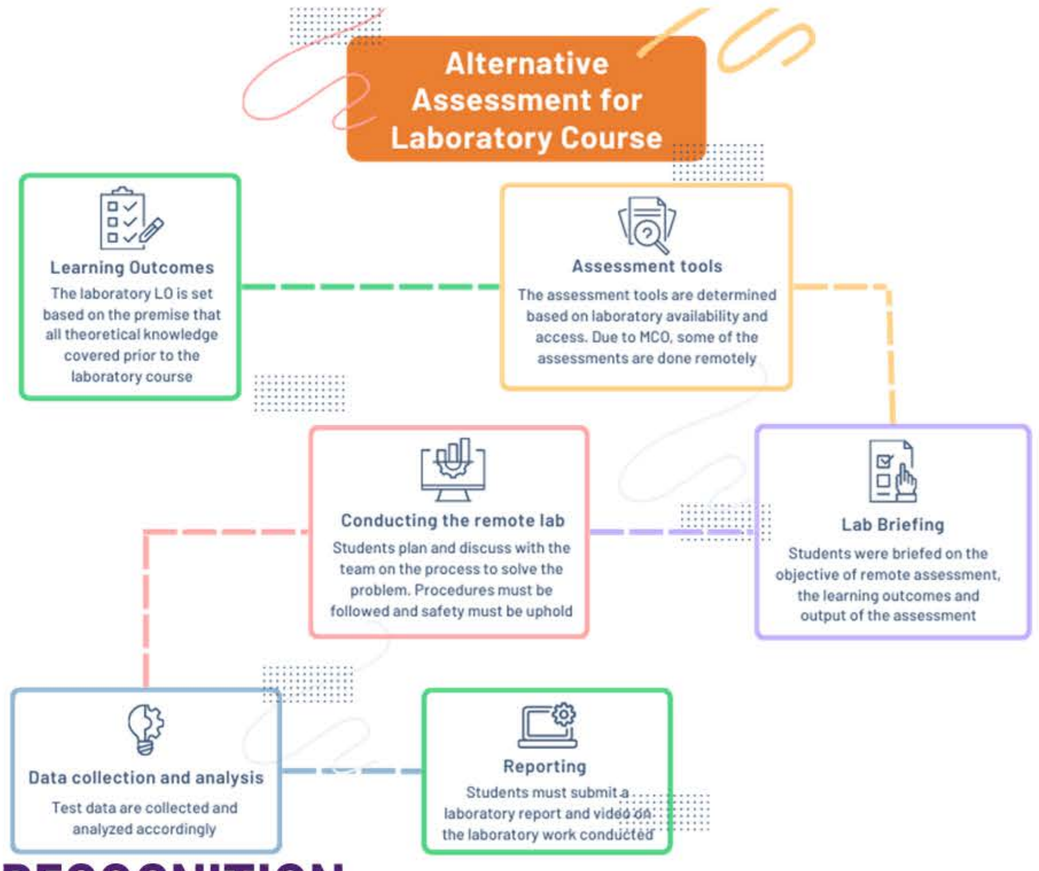
Increased accessibility: Remote assessments can be more accessible to students with disabilities or other special needs, as they may require accommodations that are easier to provide remotely at home.

COMMERCIALIZATION POTENTIAL

Innovative educational resources and tools: to assist educators in engaging students and providing more personalised and effective instruction.

STEM education curricula: Alternative laboratory assessments can be incorporated into STEM curricula to provide students with a more comprehensive and engaging learning experience.

Alternative resources: Create and sell educator resources like assessment rubric and instructional materials that integrate alternative laboratory assessments into classroom instruction.



RECOGNITION

The Engineering Accreditation Council requires all engineering programmes to ensure laboratory assessments are conducted according to the program standard requirement on Open Ended Laboratory and complex problems. The psychomotor assessment requires not only an open-ended level in laboratory simulation but also a higher level of the psychomotor domain. Therefore, the remote laboratory is recognised as part of attaining psychomotor domain outcomes.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