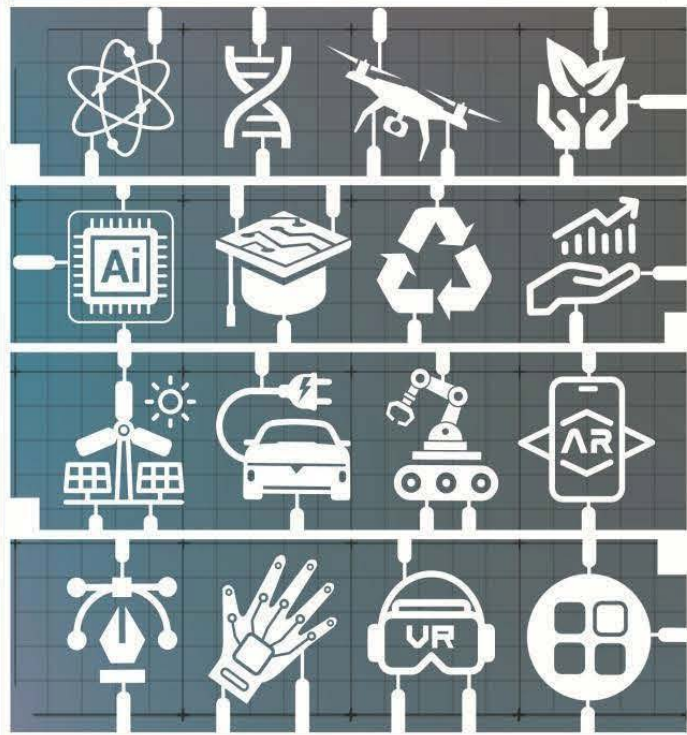




THE 15TH INTERNATIONAL INVENTION, INNOVATION & DESIGN COMPETITION 2026

E-BOOK OF

EXTENDED ABSTRACT

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ENHANCING QUANTITY SURVEYING STUDENTS UNDERSTANDING OF STRUCTURAL ANALYSIS THROUGH UFUTURE MICRO-CREDENTIAL MODULES (UMC513) WITH STEP-BY-STEP RECORDED CALCULATIONS

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ABSTRACT

Students frequently face difficulties when learning the topic of structural analysis, especially when it comes to grasping intricate mathematical processes using specific engineering formula or equation for structural components like one-way slabs, single reinforced beams, and short braced columns. Following traditional in-person lectures, students often find it difficult to remember and maintain detailed analytical procedures, which negatively impacts their performance on assignments and tests. By creating a micro-credential module that incorporates recorded training sessions that concentrate on intricate, step-by-step computations, this module presents a novel teaching strategy. By giving students on-demand access to organized problem-solving demonstrations, the module is intended to enhance traditional classroom instruction. According to the study's findings, recorded modules based on micro - credentials improve comprehension and provide adaptable learning settings. In addition, results also show an increase in students' performance, confidence, and involvement. It has been demonstrated that blended learning strategies, which integrate traditional instruction with online resources, enhance learning results and students' engagement. An emerging trend that enables students to learn certain skills through adaptable and modular learning formats is micro-credential learning. Previous research indicates that micro-credentials offer chances for ongoing skill development and self-paced learning.

Keyword: Micro-credential, Structural Analysis, Recorded Learning, Engineering Education, Student Engagement

1. INTRODUCTION

Strong analytical and problem-solving abilities are necessary for the primary subject of structural analysis in civil engineering education. In order to do intricate calculations involving structural components like beams, columns, and slabs, students must comprehend theoretical ideas. Nonetheless, a lot of students struggle to remember calculation techniques and use them successfully in assignments. Students' capacity to review difficult subjects is frequently restricted by traditional teaching techniques, which mostly rely on in-person lectures. Quantity Surveying (QS) students frequently find structural analysis challenging due to its conceptual abstraction and rigorous mathematical demands. Because the QS curriculum prioritizes measurement and valuation, students often lack the deep technical exposure needed to translate structural behavior. Furthermore, traditional time-bound lectures hinder the ability to revisit complex calculations, resulting in poor knowledge retention. To address this, implementing Ufuture micro-credential modules with recorded, step-by-step tutorials offers a flexible, self-paced

solution to bridge the gap between structural theory and practical QS applications. As a result, students could find it difficult to switch from classroom instruction to working independently on assignments. This emphasizes the necessity of creative teaching strategies that improve comprehension and retention. In order to help students learn structural analysis, this study describes the creation and application of a micro-credential module that includes recorded, step-by-step calculation sessions.

2. METHODOLOGY

The creation and application of a micro-credential module is the main focus of this qualitative study. The module is made up of recorded video sessions that cover important structural analysis subjects. The topics covered are a rectangular or circular column with short bracing, a beam with a single reinforcement and one-way slab. These are the three basic calculations presented by Lecturer from Faculty of Civil Engineering and Technology for a first tier of engineering calculation for structural analysis learned by Quantity Surveying's students. Next, step-by-step calculation techniques are shown in each video, including the interpretation of data given, application of formulas or equation, detailed computation procedures and steps and lastly the verification of the final solution. The module was given to students as additional learning resources and incorporated into the course delivery. After lectures and while preparing assignments, students were urged to listen to the recordings.

3. FINDINGS

Information was gathered using comments from students during their self-learning to complete the assignments. Findings can be monitored towards students' performance on assignments and unofficial conversations that take place in class to clarify impact of module of micro-credential to their preparations of assignment. However, positive results were obtained from the micro-credential module's implementation. Students showed enhanced confidence in their problem-solving skills and a better grasp of calculation techniques. According to the students, the taped sessions were beneficial in revising difficult subjects, being able to comprehend detailed answers and getting ready for assignments which students were able to learn at their own pace because they could access the videos whenever they wanted. Therefore, this meets a variety of learning requirements and is consistent with the ideas of self-directed learning. Additionally, the method improved academic achievement by bridging the gap between theoretical lectures and real-world application as shown in Figure 1.

INTRODUCTION TO BUILDING STRUCTURE AND STRUCTURAL ANALYSIS FOR COLUMN, BEAM AND SLAB/FLOOR.

ABOUT THIS MODULE

This course is designed to provide students with knowledge and understanding of the construction of reinforced concrete frame structures and all the elements such as columns, beams, ground floors, upper floors, flat roofs and staircases. This course includes the concept and type of the Industrialised Building Systems. It is designed to enable students to understand the construction materials and basic knowledge on the design of a simple reinforced concrete beam, one-way slab and column. In addition, students are also provided with knowledge and understanding on the properties of concrete, concreting processes, concrete quality and defects.

CLUSTER	LENGTH	EFFORT
Science & Technology (ST)	3 day(s)	3 hour(s) per week

SYLLABUS

- 1) The overview of Reinforced Concrete Frame and Building Structure
- 2) Structure Component/Element 1 : RC Column & Stuctural Analysis
- 3) Structure Component/Element 2 : RC Beam & Stuctural Analysis
- 4) Structure Component/Element 3 : RC Slab/Floor & Stuctural Analysis

Figure 1 Overview of UMC513 Micro-Credential in Ufuture UiTM

4. CONCLUSION

An efficient teaching and learning method for structural analysis is the combination of recorded step-by-step calculation sessions with micro-credential modules. This method promotes flexible learning, increases comprehension, and increases student involvement. Quantitative evaluation of student performance ratings of 4 (Excellent) as per Figure 2 and an extension of the module to other topics are possible for future projects.

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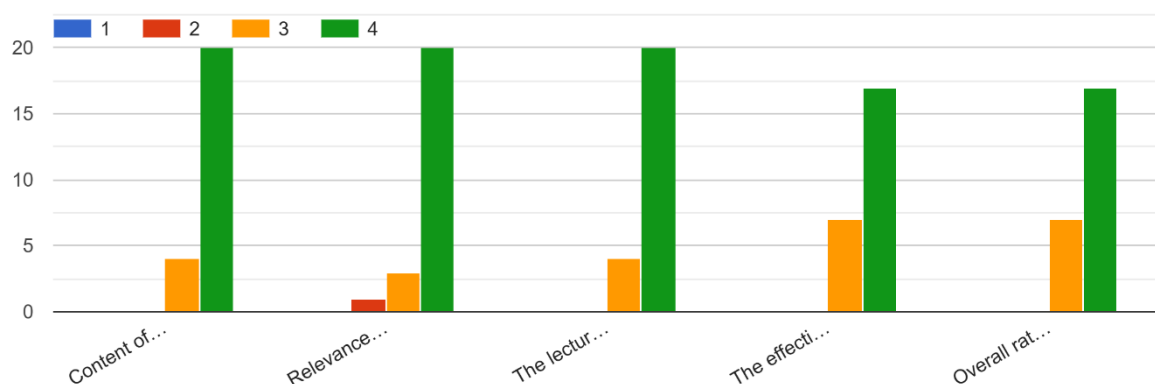


Figure 2 Overall Satisfaction Feedback towards Micro-Credential UMC513 in Ufuture UiTM

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