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Preface

Pioneering Educational Perspectives: Series 2025 is a collection of thought-provoking insights and research contributions exploring contemporary educational trends and practices. This eBook presents a diverse range of perspectives on innovative teaching methodologies, digital learning strategies, and transformative approaches in education. Designed to serve as a resource for educators, researchers, and practitioners, it aims to inspire meaningful discussions and advancements in the field. Through carefully curated chapters, this publication offers fresh ideas and practical solutions to enhance learning experiences in an ever-evolving educational landscape.

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REFLECTION TEST MODULE FOR SELF-REGULATED LEARNING

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ABSTRACT

Reinforced Concrete Design is a fundamental course in the Civil Engineering curriculum. It aims to equip students with comprehensive design skills for future engineering careers. The instructor has noticed a recent drop in students' performance post-COVID, which requires immediate intervention to improve the learning environment for engineering students. Academic success for engineering students depends on several factors, including cognitive abilities, self-efficacy, and internal motivation. Moreover, the ability to regulate the learning process, motivation, and actions through self-directed learning strategies significantly influences their educational achievements. A reflection test module was developed in this project to improve students' self-regulated learning. The project aimed to help students prepare for their test assessments. This module comprises a series of reflection test materials, each incorporating a timer to help students manage their time during tests. Students have expressed difficulty in completing tests within the allocated time, so the timer feature aims to address this issue. Additionally, the content emphasizes repetition, enabling students to practice and reinforce their learning before actual examinations. These unique features enhance academic performance and provide students with lifelong learning skills for future endeavors.

KEYWORDS: Engineering Education, Self-Regulated Learning, Reflection Strategy, Student Achievements, Motivation

PROBLEM AND OBJECTIVE

The engineering industry is deeply concerned about the quality of graduates in the post-COVID19 era and the transition to online learning. Employers prioritize graduates who can demonstrate technical skills, problem-solving abilities, critical thinking, and strong communication skills. (Zaharim, 2009). Ensuring the graduates can meet industry requirements and contribute meaningfully is the main objective of the Civil Engineering program.

Reinforced Concrete Design is a fundamental course in the Civil Engineering curriculum. The aim is to provide students with comprehensive design skills for their future engineering careers. The instructor has observed a decrease in student performance following the COVID-19 pandemic, necessitating immediate action to enhance the learning environment for engineering students. This course requires students to apply critical thinking to solve design problems, utilizing design standards and appendices. The design process involves numerous equations and formulas. Students may feel overwhelmed and lost during exams.

During examinations, students frequently struggle to locate the correct equations, significantly losing time. As a result, they often find it challenging to finish the exams within the allocated time frame. Mastery of this course requires extensive practice to ensure that the design process flows smoothly and the formulas are correctly applied to solve problems. Encouraging self-

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efficacy and internal motivation through self-regulated learning strategies may help students to enhance their learning environments.

Self-regulated learning (SRL) is the ability to control the learning process through self-efficacy, internal motivation, and cognitive intelligence. Practicing SRL offers many advantages for students. Research has shown that most students exhibit poor SRL behaviors, such as inaccurately assessing their learning process. Additionally, without instructional support, students may overestimate their understanding of the course materials, which can negatively impact their overall learning progress. (Olga et al, 2020; Chang et al, 2018; Dunlosky and Lipko, 2007; Dunlosky and Rawson, 2012)

The primary goal of developing the reflection tests module is to assist students in self-studying for examinations. The creation of the reflection test module was inspired by the university's student-centered learning philosophy, which promotes active student involvement in their education and aims to support them in becoming independent learners. (Anwar and Menekse, 2020)

DESIGN DESCRIPTION

The reflection test module is an e-content series designed to help students prepare for their examinations. It provides a collection of questions that mimic the format, complexity, and scoring system of the actual exam. These questions are taken from in-class exercises. The module is presented in an interactive video with a countdown timer to simulate the real exam environment. Its main aim is to give students extensive practice in Reinforced Concrete (RC) design procedures and processes rather than to assess their cognitive performance in the course. Detailed insights into the development process are provided in the figure below.

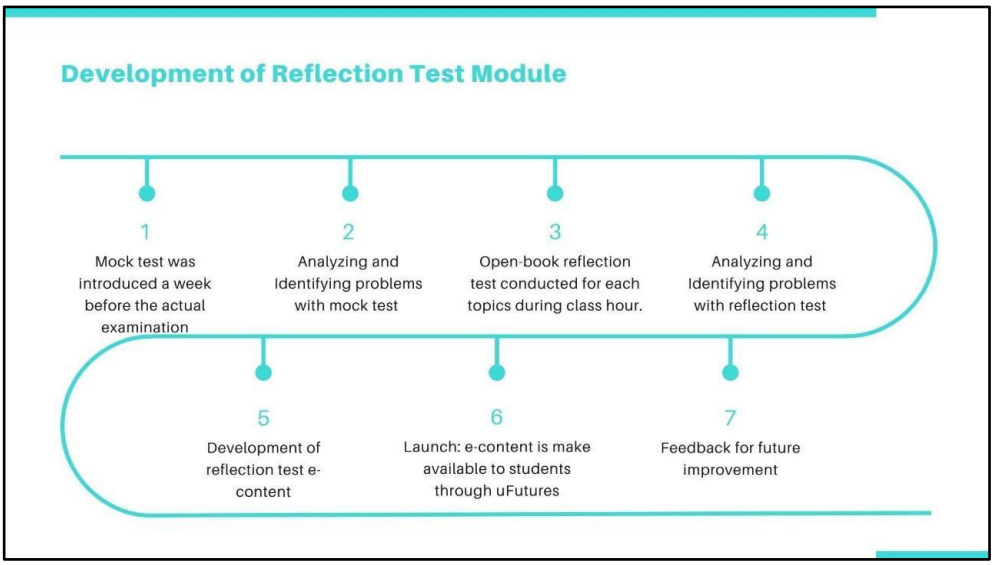


Figure 1: Development process of reflection test module

VISUALS

The module is based on the 3R concept: Reflect, Recall, and Repeat. Students begin with a reflection test, answering questions within a specified time. Afterward, they can reflect on their understanding of the topic and identify areas for improvement. They then have the opportunity to retake the test to measure their progress. This concept is similar to traditional pre-tests, but this e-content provides students with greater flexibility in managing their learning process. Figure 2 shows the content of the reflection test.

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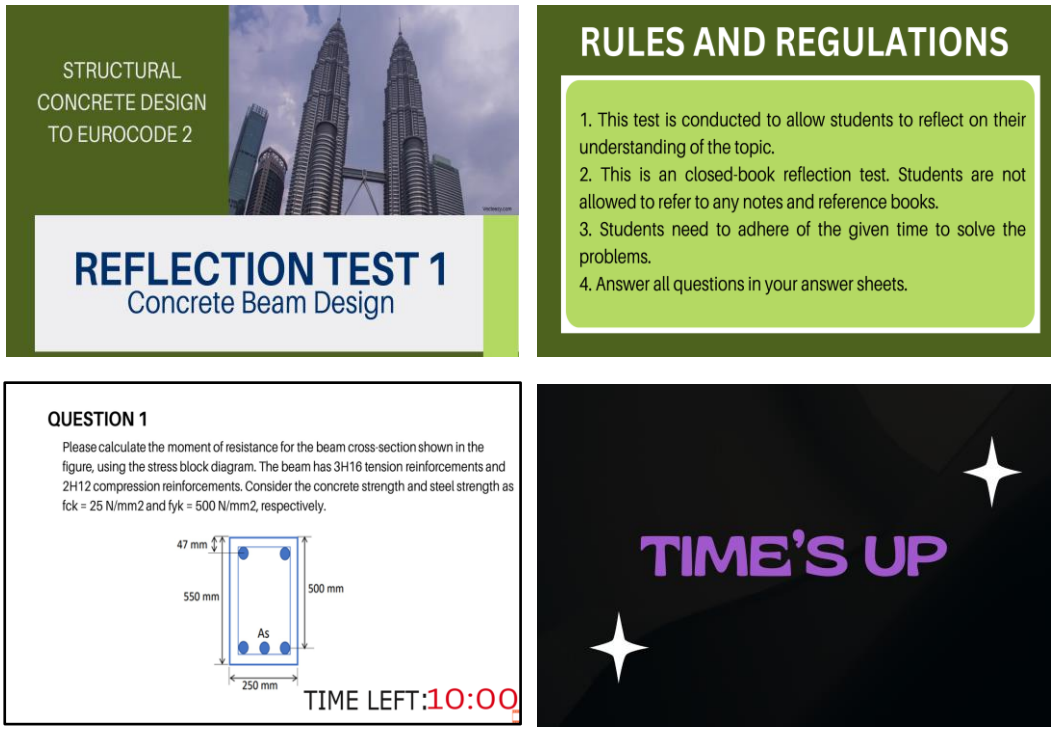


Figure 2: Content of Reflection Test Module

NOVELTY AND UNIQUENESS

The module was designed as an e-content series covering all the topics in RC Design. This allows flexibility for students to engage in self-directed learning and practice. A countdown timer is included in the contents to help students manage their time effectively. Additionally, this module provides students with access to a special learning resource that allows them to learn at their own pace.

BENEFITS TO MANKIND

Students can utilize the reflection test module as needed and complete it within the specified time frame. Additionally, upon completing a module, students gain experience and knowledge from it, which motivates them to exert even more effort if their exam scores are not satisfactory.

COMMERCIAL POTENTIAL

The concept used in this reflection test module could be applied to other courses that require students to memorize steps and equations to solve problems. In addition, RC design is a fundamental skill required for every civil engineer. This module could be extended to all engineering students and industrial practitioners to enhance their design skills.

CONCLUSION

The development of this reflection test e-content module helps students become independent learners and take responsibility for their success. The module can also be used to fulfill student learning time (SLT) as stated in the syllabus. In the future, this module could be designed as a website for commercial potential.

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