UNIVERSITI TEKNOLOGI MARA

Public Interest Centre of Excellence

# International Teaching Aid Competition 2023

Reconnoitering Innovative Ideas in Postnormal Times

# iTAC 2023

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## INTERNATIONAL TEACHING AID COMPETITION
# E-PROCEEDINGS

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**PREFACE**

iTAC or International Teaching Aid Competition 2023 was a venue for academicians, researchers, industries, junior and young inventors to showcase their innovative ideas not only in the teaching and learning sphere but also in other numerous disciplines of study. This competition was organised by the Special Interest Group, Public Interest Centre of Excellence (SIG PICE) UiTM Kedah Branch, Malaysia. Its main aim was to promote the production of innovative ideas among academicians, students and also the public at large.

In accordance with the theme "Reconnoitering Innovative Ideas in Post-normal Times", the development of novel ideas from the perspectives of interdisciplinary innovations is more compelling today, especially in the post-covid 19 times. Post-pandemic initiatives are the most relevant in the current world to adapt to new ways of doing things and all these surely require networking and collaboration. Rising to the occasion, iTAC 2023 has managed to attract more than 267 participations for all categories. The staggering number of submissions has proven the relevance of this competition to the academic world and beyond in urging the culture of innovating ideas.

iTAC 2023 committee would like to thank all creative participants for showcasing their innovative ideas with us. As expected in any competition, there will be those who win and those who lose. Congratulations to all the award recipients (Diamond, Gold, Silver and Bronze) for their winning entries. Those who did not make the cut this year can always improve and join us again later.

It is hoped that iTAC 2023 has been a worthy platform for all participating innovators who have shown ingenious efforts in their products and ideas. This compilation of extended abstracts published as iTAC 2023 E-Proceedings contains insights into what current researchers, both experienced and novice, find important and relevant in the post-normal times.

Best regards,

**iTAC 2023 Committee**
**Special Interest Group, Public Interest Centre of Excellence (SIG PICE)**
**UiTM Kedah Branch**
**Malaysia**

# CALCU-STRUCTURE: A FASCINATING VIDEO-BASED LEARNING

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**ABSTRACT**
Digital video is the most influential tool in our everyday life. In this technological era, people spend more time on screen obtaining and learning new things. With digital videos continuing to gain popularity, it seems only natural that this familiar and widespread platform should extend into the education system. Students can be very demanding nowadays because they have raised their learning criteria compared to the past generation. Students today are using educational videos as a tool for learning everything. A great educational video consists of some attributes including; being short and comprehensive, having proper auditory and visual elements, being segmented, and having interactive and responsive features. Here, 'Calcu-stucture' is an interactive video learning that has it all. Basic Structural Design is a course that focuses on the basic reinforced concrete design of building structural elements namely beam, column, slab, foundation, and steel design of beam, column, and connections. It comprised almost calculations that seemed difficult to teach and learn in the classroom. Apart from having too many formulas, these courses also consist of many different appendices that need to be referred to. Many students could not perform individually in assignments or tests. With 'Calcu-structure', Basic Structure Design courses are now more accessible and understandable by students. The students can access it anytime and anywhere from their mobile devices: laptops, and tablets at their own individual pace for free.

**Keywords:** digital-video learning, interactive learning, structural design, calculation video, learner engagement

## INTRODUCTION

It is undeniable that the use of technology in the educational system has brought immense changes. One of the technological approaches in education is Video-Based Learning (VBL). The term "video-based learning" (VBL) refers to the knowledge or abilities gained through video-based instruction. VBL offers a multisensory learning experience since it integrates camera footage, animation, graphics, text, and voice (Hemmer, 2022). VBL is an efficient learning technique that can supplement and partially replace conventional learning methods due to its unique and fascinating properties (Sablić et al., 2020). It has been proven that various studies conducted showed that video could be an effective educational tool (Brame, 2016). Apart from that, the learner can use video to play, replay, pause, and fast-forward to particular lessons making it easy and efficient for them to study and understand the contents based on

their pace. According to Strickland (2020), a great educational video consists of some attributes including; being short and comprehensive, having proper auditory and visual elements, being segmented, and having interactive and responsive features. Here, 'Calcu-stucture' is an interactive video learning that is created for Building Construction students taking courses in Basic Structural Design. Structural design is the methodical investigation of the stability, strength, and rigidity of structures of a building such as beams, columns, slabs, foundations, etc. This subject mainly requires students to do calculations and plenty of multi-step processes. Calcu-structure helps students to understand the subject easily through a fascinating approach. Students can access the video through any social media platform such as Instagram, TikTok, YouTube, etc which is not only free but they can access it anytime and anywhere.

What is Calcu-structure?

Calcu-structure is derived from the word 'calculate' and 'structure'. It is created as a video-based learning approach to assist the students who are taking the Structural Design course. Basically, a short fascinating video of approximately up to one minute is uploaded to any social media account such as Instagram, TikTok, or YouTube. For example, one account created on Instagram with the name 'Calcu-structure' can be searched by those with an Instagram account. There, users can see the short video (also known as reels) uploaded by the Calcu-structure account. The reels comprise short, useful, and comprehensive calculation videos explaining the calculation for any particular structure. For example, one reel is explaining about 'how to calculate loads on beam' which only focuses on that particular calculation. The reels are segmented by part accordingly, making it easy to understand one by one and step-by-step. In addition, Instagram consists of some features that allow for sharing information, and creating quizzes (poll and voting) through 'Instagram Stories'. From the survey conducted, most students in the class are having at least one of these social media namely Instagram, TikTok, and YouTube. Data from 723 Malaysian researchers confirmed that the use of social media for learning was embraced by Malaysian higher education students, and it was discovered that engagement had a favorable impact on academic performance (Al-Rahmi et al., 2018). With this VBL approach combined with the popularity of social media usage, it appears that this could offer promising student engagement.

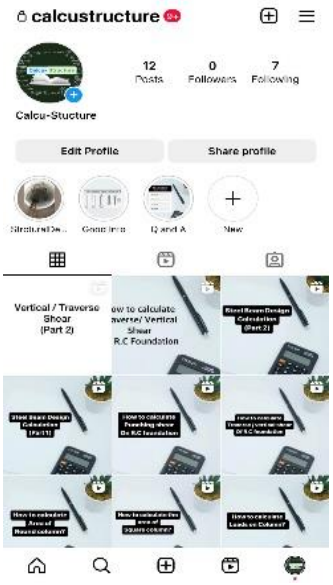


**Figure 1.** Calcu-Structure Instagram Account

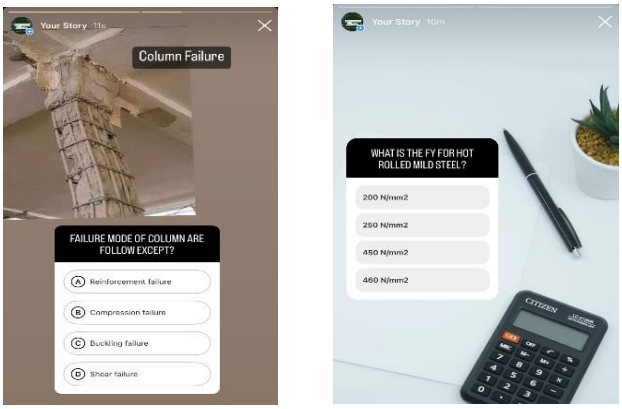


**Figure 2.** Instagram Stories (Quiz)

## AIM AND OBJECTIVES

The aim is to assist the students in learning Structural Design courses. From this aim, two (2) objectives are derived, which are: (i) To develop a fascinating Video-Based Learning (VBL) for the students. (ii) To provide easy and free access for students to obtain learning materials.

## PROBLEM STATEMENT

The basic structural design course is taken by construction students at UiTM. The basic objective in structural design is generally producing a structure capable of resisting all applied loads without failure during its intended life which is done through calculation and computation. Unfortunately, this course is not everyone's cup of tea. Apart from its technical and theoretical difficulties, a lot of students seem to need more time to digest and understand it. Structural design is difficult for students especially if they are not good in advanced mathematics, including Physics (statics & dynamics). This can be proved by the number of students repeating the subject every semester. The majority of students fail the individual test showing that this course is difficult for them. To stay on top or at least intact with the subject, the students are required to have dedication. This includes doing a lot of revisions and practices. Nevertheless, a lecturer should know how to impart knowledge to the students in the most efficient and fascinating way. Students may refer to video learning from YouTube but apart from having a different syllabus, the video was too long to watch as the explanation can up to an hour. Students ended up watching it halfway or even stop watching it as they couldn't understand it clearly. It was undeniable that students are more engaged and enhance their academic performance by learning through short videos. (Zhu, J et al., 2022). Therefore, one of the best ways to deal with this issue is by introducing the Calcu-structure as it is a short video approach, and yet it's comprehensive, having proper auditory and visual elements, being segmented, and having interactive and responsive features.

## METHODOLOGY

This preliminary study uses a quantitative approach. For this quantitative approach, a survey by questionnaire is used. The questionnaires were distributed to the students who are taking the Structural Design course specifically under the program AP116 Diploma in Building at UiTM Sarawak Branch. The questionnaire is in the form of a Likert scale (1 to 5) used to understand respondents' opinions. The sample was done based on a random sampling method where the respondents were chosen. Simple random sampling was used in doing the sampling as Calcu-Structure's still in the stages of trial and is to be improvised. The respondents were among students currently taking the structural courses (56 students) and those who have taken the course previously (51 students). The respondents responded to the survey using the Google Form application. From the total of students who currently taking and have taken the course (107 students), only 41 students were responded to the survey. The measure of central tendency, i.e., the mean score is used to analyze respondents' opinions. A score of more than 2.5 points means that the respondents agree with the statement. Whilst means below 2.50 indicated an expression of disagreement with the statement. The raw data were analyzed using the Statistical Package for the Social Sciences (SPSS) to come up with the percentage, mean rating, and also standard deviations. The computed mean rating of items that were greater than 2.50 indicated agreement with the statement, whilst items that were less than 2.50 showed disagreement with the statement.

## RESULT AND FINDINGS

**Table 1.** Respondent's Satisfaction with Video-Based Learning (Calcu-structure)

| No | Element of satisfaction with video-based learning (VBL) | Mean Rating | Standard Deviation |
|---|---|---|---|
| 1. | I find the video lessons enjoyable | 4.341 | 0.728 |
| 2. | This VBL has contributed greatly to my acquisition of relevant input about Structural Design. | 4.293 | 0.642 |
| 3. | I find the video lessons to be effective in meeting the learning objectives. | 4.561 | 0.634 |
| 4. | I would describe the video lessons as being highly interesting. | 4.439 | 0.594 |
| 5. | I would recommend the use of video lessons to my friends | 4.469 | 0.480 |
| 6. | The video lessons make me spend more time studying to acquire more knowledge about structural design | 4.146 | 0.792 |
| 7. | I am satisfied with my learning from the VBL (Calcu-structure) | 4.366 | 0.662 |

From Table 1 above, it showed that all the items had mean ratings that far exceeded the mean of 2.50 points. This showed that most respondents agreed with the statements. From the survey, it can be seen that item "I find the video lessons to be effective in meeting the learning objectives" (item #3) has the highest mean rating of 4.561 (SD = 0.634). This could be due to the comprehensive output from the videos. Follow up next item "I would recommend the use of video lessons to my friends" (item #5) has a mean rating of 4.469 (SD = 0.480). Item number 6, "The video lessons make me spend more time studying to acquire more knowledge about structural design" has the lowest mean rating of 4.146 (SD = 0.792). Though it had the least mean rating, the value of 4.146 substantially exceeded the theoretical mean of 2.50. Generally, every item showed great acceptance from the respondents. This shows that students were satisfied with the establishment of Calcu-structure the fascinating Video-Based Learning (VBL).

## CONCLUSION

Based on the analysis conducted, it was found that students agreed that the use Video-Based Learning (VBL) is beneficial in terms of understanding the structural course effectively. The integration of video-based learning (VBL) in the educational system helps to increase student satisfaction and learning outcomes. It also can be seen that video is becoming one of the most powerful learning media that captures and distributes information while also providing a stimulating learning environment where students can better understand and retain information. Videos can attract students' attention, motivate them, and thus increase their in-class participation. The students appreciate the flexibility of VBL, which allows them to re-watch

the content, and do their own or group revision at their own pace. Students are also a generation that is mostly savvy in ICT and most of them have social media which will attract students to be actively involved. This study is a pilot study for the construction of a Video-Based Learning (VBL) tool in online teaching and learning. It is hoped that this Video-Based Learning approach such as 'Calcu-Structure' could improve the quality of teaching and understanding of students who are taking structural design courses.

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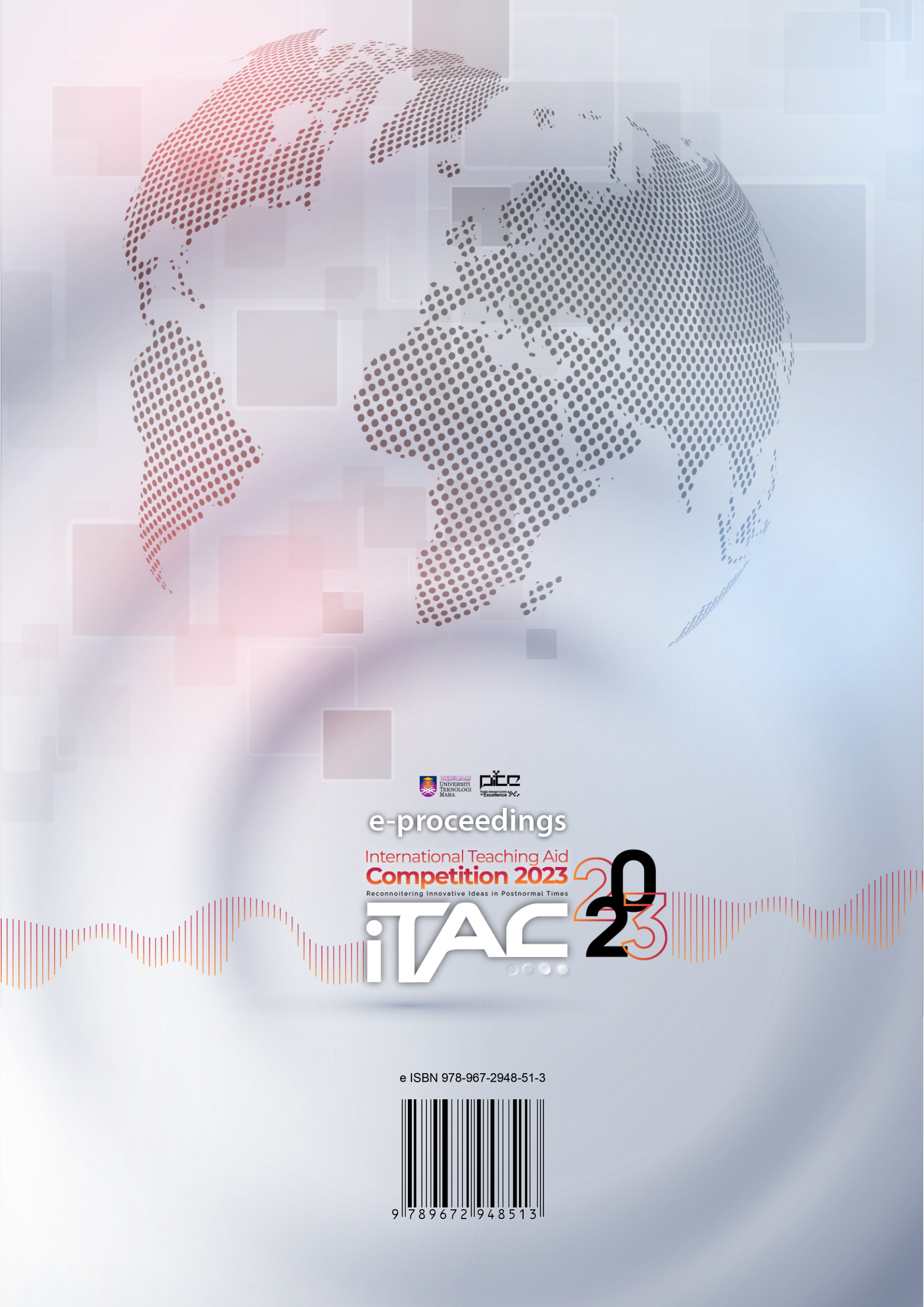

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