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**JOHOR
INNOVATION
INVENTION
COMPETITION
AND
SYMPOSIUM
2023**



" Innovation Inspires a Society
to be Critical and Creative"

JOHOR INNOVATION INVENTION COMPETITION AND SYMPOSIUM 2023



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Editors-in-Chief

**AHMAD KHUDZAIRI KHALID
NUR INTAN SYAFINAZ AHMAD**



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Preface

In the name of Allah, the Almighty who gives us the enlightenment, the truth, the knowledge and with regards to Prophet Muhammad (peace be upon him) for guiding us to the straight path. We thank to Allah for giving us guidance and strength to write this e-book.

This e-book compiles the extended abstracts that submitted to Johor Innovation Invention Competition and Symposium 2023 (JIICaS2023), where JIICaS2023 is a virtual platform for all creative minds to share and present their invention and innovation. The extended abstracts are divided into two categories, which are Category A (Higher Educational Student/ Any Recognized Institutional Students in Malaysia) and Category B (Primary/ Secondary School Students / Special Education School Students in Johor). Each abstract gives a brief background on the innovation or project.

We hope that this e-book will help the readers to get to know the innovation done by the students from both categories and get some ideas to develop future innovation products.



EASY MATERIAL LAB TESTING

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ABSTRACT

Lab work is a hands-on activity that enhances students' skills. Therefore, it was introduced at the beginning of the course under the title Construction Materials and Material Properties, so that first semester students are exposed to different types of materials and tests related to construction industry. For this reason, the idea of developing progressive learning methods was born to replace conventional methods. Using Google Forms, the sample concept was developed by integrating the course requirement summary and the content of each lab test. The information is supported by pictures, tables or diagrams and a brief paragraph to enhance the student's understanding of the purpose and method of the test being designed. The Google Form is designed like a quiz, contains a quick feedback mechanism to score sections and answers, and takes less than five minutes to complete. Additionally, targets, equipment and materials lists, including observation results, were posted on a Google form. This method allows students to quickly choose the correct answer instead of listening to a summary in the usual mode appreciation to the one-way communication of online distance learning (ODL). A questionnaire survey was conducted to collect responses from students, respectively from the first semester of the survey degree. Analysis of the results shows that the feedback is very positive and proves that students' ability to understand the lesson increases rapidly when applying the Easy Material Lab Test format. This statement was supported by 100 respondents who answered questions related to construction materials and laboratory testing, of which 58% received top scores.

Keywords: Laboratory work test, Building Materials, Google form, online understanding.

1.0 INTRODUCTION

The building surveying program is one area of study in construction science, including aspects of building materials, design, structures and project costs. In the field of construction materials, the provision of knowledge about basic construction materials such as concrete, metals, organic materials and polymers is introduced at the beginning of the semester because of the mastery of knowledge. of students is very important. To support structural design and ensure building stability, a basic understanding of the characteristics and behavior of construction materials is required (Neville, 2008). In general, course codes are delivered via two modes:

Lectures and laboratory work materials. Students are required to attend and conduct their own material testing in the laboratory or on-site to gain further knowledge about the properties of these materials, i.e. durability, workability, humidity and others. The coronavirus disease (Covid19) phenomenon that hit the whole world, including Malaysia in early 2020, made it necessary to immediately apply and practice a new alternative learning technique. Online

distance learning (ODL) lectures have become a popular choice via Google Meet, video, YouTube or another platform. However, random survey results, including continuous assessment results (UiTM 2019), show that laboratory tests on materials assigned to students do not meet the course learning outcomes. learning (CLO). Feedback shows that students have difficulty understanding and even focusing on each topic in the program, especially the “virtual lab”.

Therefore, to overcome this problem, changing the teaching and learning process is necessary. We are launching an initiative to introduce progressive learning as an innovative alternative to the ODL approach. Using Google Forms, a conceptual model was developed by including a summary of statements related to course requirements and the content of each exam. This information is supported by images, tables, diagrams and text to enhance student understanding of testing objectives and methods. The Google form is designed like a quiz, including (i) a quick feedback mechanism for scores and answers and (ii) a time limit for answering questions - under five minutes. In addition, (iii) objectives, (iv) list of equipment and construction materials, in which (v) observation results are presented on Google Form. This method allows students to quickly choose the correct answer instead of listening to a summary in one-way communication through online distance learning (ODL).

2.0 OBJECTIVE

The target of this innovative project is students participating in the Materials Properties, Building Construction I and II courses of the Construction Surveying program. This group of students are studying the first to second semester of their diploma, at the Seri Iskandar campus of MARA University of Technology Perak Branch. There are two main goals of this innovation;

- i) Develop learning methods using Google Forms that integrate information and content of each lab test as well as images and concise text,
- ii) Improve students' understanding of the purpose and methods of laboratory testing.

3.0 DESCRIPTION OF INNOVATION/METHODOLOGY

Google Forms allows to design and evaluate surveys directly in mobile or web browser, without the need for additional software. It may receive immediate findings and quickly summarize survey data with charts and graphs.

Why was this form chosen in this innovation project?

It is because this form is easy to adapt and manage. In other words, it facilitates the method of understanding among the students. The form is named as 'Easy Material Lab Testing', aims to expose students to the basic material used in construction fields (concrete, metal, organic material, and polymer) as stated in syllabus content.

In normal practice, students are instructed to perform material testing in the laboratory or on site to obtain additional information on the qualities. Students also need to record the results from the testing work and submit a written report. However, it is very frustrating when a significant number of them did not attain a good understanding of the testing. The feedback from the students stated that they could not clearly understand the method of conducting laboratory tests due to the difficulty of listening to lectures through ODL. For that reason, the Easy Material Lab Testing Form was developed to improve the level of comprehension and information on each of the test.

Figure 1 to Figure 2 show the example of the 'Easy Material Lab Testing' forms which contain basic questions and responses to two testings that will be conducted namely Sieve Analysis, and Slump Test.

Figure 1: Example of the front page of the Easy Material Lab Testing Form.

Figure 2: Example of Section 2 displays Questionnaire related to Sieve Analysis Testing.

The following figures displays the questions regarding equipment as well as building materials related to the selected laboratory test. Figure 3 highlight the example of questions of multichoice and checkboxes regarding tools and materials use for the Sieve Analysis Testing. Meanwhile Figure 5 illustrates the example of questions of multichoice and checkboxes regarding tools and materials required in the Slump Test.

Figure 3: Example of the multi choice and checkboxes Questionnaire regarding tools and materials for Sieve Analysis Testing

4.0 RESULTS AND DISCUSSION

4.1. Data collection from Google form

A total of one hundred (100) students from the first semester of the Diploma in Building Surveying took part in this survey. The students may answer for approximately 15 seconds to complete a multiple-choice and checkbox option with a total of 12 questions, with a possible total score of 30 points. The allowed answer time is 3 minutes. Therefore, after 3 minutes of students responding, their results and position will be displayed shortly thereafter. Table 1 shows a point score and counts of respondents who answered the questionnaire.

4.2. Performance of students

Figure 4 display the graph of the result for a total score of 30 points. A hundred (100) answers from students involved in this form of the survey have been received, and the result of the performance of students was depicted in the graph below (Figure 4). The point score of each interval stated the number of respondents from the lower point of 2 to the highest point of 30. The 42 number of students recorded points more than half of the total marks of 15 points. The highest number of 16 students with 24 points was recorded as greater performance. Meanwhile, there are 7 students with a total score of 26, and 5 students achieved the full points of 30 respectively.

Table 1: Point score and count of respondent

Point score	Count of total score (respondent)
2.00	3
4.00	6
6.00	7
8.00	10
10.00	9
12.00	7
14.00	6
16.00	10
20.00	14
24.00	16
26.00	7
30.00	5
	100

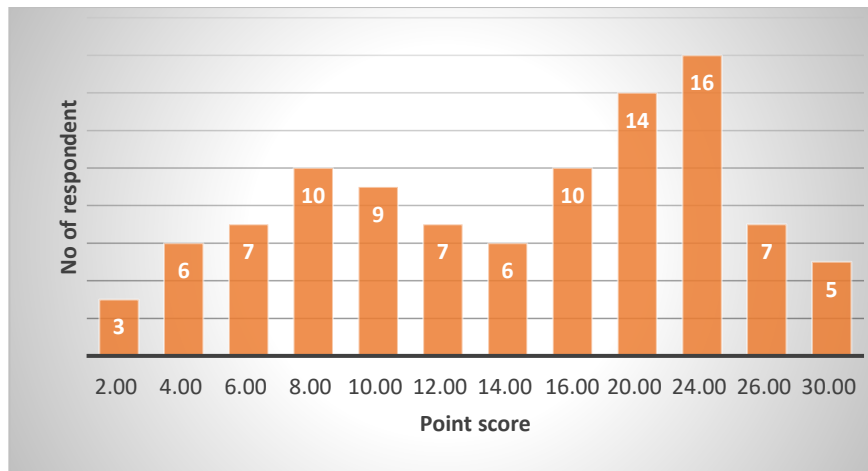


Figure 4: Graph of the total score of respondents

5.0 CONCLUSION

In conclusion, the results of these findings have encouraged new dimensions to the research team to improve the performance of EMLT Forms in the future. In fact, it is proposed to be implemented to other programs in Faculty of Architecture, Planning and Surveying that also have courses related to laboratory testing and building materials. This innovation project will be enhanced periodically to make it more effective and efficient.

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BS EN 12350-6: 2000 Testing fresh concrete. Density

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