



UNIVERSITI
TEKNOLOGI
MARA



2023

JII CaS

**JOHOR
INNOVATION
INVENTION
COMPETITION
AND
SYMPOSIUM
2023**



"Innovation Inspires a Society
to be Critical and Creative"

JOHOR INNOVATION INVENTION COMPETITION AND SYMPOSIUM 2023



JOHOR INNOVATION INVENTION COMPETITION AND SYMPOSIUM 2023

"Innovation Inspires a Society to be
Critical and Creative"

Editors-in-Chief

**AHMAD KHUDZAIRI KHALID
NUR INTAN SYAFINAZ AHMAD**



الجامعة
UNIVERSITI
TEKNOLOGI
MARA

**Cawangan Johor
Kampus Pasir Gudang**

2023



First Edition 2023

Copyright © 2023 Universiti Teknologi MARA Cawangan Johor, Kampus Pasir Gudang.

All extended abstracts published in this e-book have not been subject to JIICaS2023 peer review or check. The authors are responsible for the contents of their extended abstracts and warrant that their extended abstract is original, has not been previously published, and has not been simultaneously submitted elsewhere. The views expressed in the abstracts in this publication are those of the individual authors and are not necessarily shared by the editor.

All rights reserved. No part of this publication may be reproduced in any form or by electronic or mechanical means, including information storage and retrieval systems, or transmitted in any form or by any means, without the prior permission in writing from the Course Coordinator of College of Computing, Informatics and Mathematics, Universiti Teknologi MARA Cawangan Johor, Kampus Pasir Gudang.

e ISBN: 978-967-0033-17-4

**Editors-in-Chief: AHMAD KHUDZAIRI KHALID &
NUR INTAN SYAFINAZ AHMAD**

**Art & Cover Designer: DR. WAN MUNIRAH WAN MOHAMAD
& DR. NUR IDAYU ALIMON**

**Published in Malaysia by
Universiti Teknologi MARA Cawangan Johor
Kampus Pasir Gudang
81750 Masai**





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.



CALCAMPUS: BOARD GAME

Mustaqim Syah Bin Kamarul Zaman¹, Muhammad Yazdane Bin Zalhizra¹, Ahmad Zain Bin Zulkifli¹, Muhammad Azreen Bin Shaharom¹, Aishah Mahat⁵, Dr. Shafinaz Makmor⁶

¹Universiti Teknologi MARA Cawangan Johor, Kampus Pasir Gudang, 81750 Masai, Johor, Malaysia

*email: muhammadyazdane@gmail.com (Muhammad Yazdane)

ABSTRACT

Welcome to "Calcampus: Board Game," where the world of mathematics and the excitement of Monopoly collide! In this unique board game, players will experience the thrilling world of calculus while strategizing their way to victory. After day and night brainstorming the major problem for students who hates Calculus let alone to open the book. We found that the problem is learning Calculus to them is no fun complicated. Through our research, many students rather playing games than doing practice. So, we came up with solution to help students study and practice calculus while having fun. Who doesn't like Monopoly? Everyone loves Monopoly, it's like a tradition game to play alongside your friends, family and relatives. The objective is to make students thrill to learn and practice Calculus through our Invention. Our invention maintains the rules in Monopoly with a slight change to fit our objective. Every question they answered will be rewarded with money. Isn't it thrilling? Knowledge that will reward you with money. Buy, sell, and trade properties, solve equations to earn rewards, and leverage your mathematical skills to outwit opponents. Are you ready to integrate fun and learning in a game like no other? Let the journey through the world of Calcampus begin!

Keywords: Calculus, Calcampus: Board Game

INTRODUCTION

Othman, Khalid and Mahat (2018) stated difficulty in understanding mathematical subjects such as Calculus is one of the biggest challenges that university students must overcome. Studies conducted by Ozerem (2012) have shown that students often make mistakes by having ignorant attitude and rush in solving mathematical problems. Therefore, a new tool to assist teaching and learning activities needs to be introduced to address problems involving Calculus subjects and to reduce gap in classroom student's achievement. According to (Ahmad et.al., 2016) an alternative learning approach is by implementing a Peer-to-Peer Learning Strategy in which learning is conducted in groups and students can discuss Calculus issues informally outside lecturing classes. With these strategies in place, it can encourage students to share knowledge with each other and increase students' self-confidence to help those who are weak in Calculus. In addition, lecturers should also play their role and initiatives to create different environments in teaching and learning activities primarily related to Calculus subject by introducing mathematical game. This is agreed by (Brezovszky et al., 2019) where they indicate that the game of mathematic concept is beneficial in improving many types of arithmetic abilities and knowledge, and at the same time it can provide teachers with an useful and adaptable tool to support their regular classroom activity. (Tokac et al., 2019) also emphasized that mathematical games are an effective instructional strategy for teaching mathematics as compared with traditional classroom instructional methods. With this approach, Che in and Ahmad (2018) stated indirectly it will provide advantages to students

and lecturers and will have a positive impact on overall performance of teaching in the classroom. Therefore, to enhance the students' potential in Calculus subject, Calcampus was introduced to help students identifying their weaknesses in the subtopics they have studied besides providing a solution for students to gain a deeper understanding and obtain better results in the examination.

OBJECTIVES

This product was introduced to achieve the following objectives:

- a) Giving more attention to targeted students on Calculus subject.
- b) Strengthening the understanding of subject studied by providing tips, formulas and questions.
- c) Developing students' self-confidence in facing tests and examinations by providing relevant questions based on the subtopics studied.

PRODUCT DESCRIPTION

Calcampus is an innovation product aimed to help students in Calculus I subject. It is a game with topic Limits questions and is played between facilitators who are students who scored excellent marks in Test 1 and students who scored low marks. The topic on limits is included in Calculus 1 for Engineering Students who taking course code MAT183. This topic will be completed within weeks in accordance with lesson planned. With the innovation of Calcampus, it can enhance students' level of understanding and knowledge of calculus subjects.

ADVANTAGE

This product provides several benefits to students as follows:

- a) Students are more confident in solving mathematical problems
- b) Students will be able to remember mathematics formula easier
- c) Students will be able to increase their knowledge and be more motivated in learning Calculus
- d) Students will be easier to understand and learn Calculus subject as compared to traditional methods.

CONCLUSION

Calcampus is a mathematics game based on Calculus questions. Study found that mathematics game is very much influential in students daily life activities in general. Lecturers who teach Calculus course must play an important role in ensuring that students who do not perform to benefit themselves using this game for their learning. The concept of learning Calculus using Calcampus can help students to understand Calculus courses easier.

REFERENCES

- Ahmad, S., Karim, M., Bosli, F., Abdullah, M.N., Mahat, A., Mohammed, S.R., Dasman, A., & Tarmuji, N.H.(2016). The effect of peer-assisted learning strategies (PALS) on preparatory students in mathematics. In: Abdullah M., Yahya W., Ramli N., Mohamed S., Ahmad B. (eds) *Regional Conference on Science, Technology and Social Sciences (RCSTSS 2014)*. Springer, Singapore.
- Brezovszky, B., McMullen, J., Veermans, K., Hannula-Sormunen, M. M., Rodríguez-Aflecht, G., Pongsakdi, N., Laakkonen, E., & Lehtinen, E. (2019). Effects of a mathematics game-based learning environment on primary school students' adaptive number knowledge. *Computers and Education, 128*, 63–74.
<https://doi.org/10.1016/j.compedu.2018.09.011>
- Che In, F & Ahmad, A.Z. (2018). Kajian Keberkesanan Pembelajaran Interaktif Berasaskan Aplikasi Kahoot: Satu Kajian Tindakan Terhadap Kursus Principles Of Marketing. 6th World Congress on Technical and Vocational Education and Training (WoCTVET 2018).

- Othman, Z.S., Khalid, A.K. & Mahat, A. (2018). Students' common mistakes in basic differentiation topics. *AIP Conference Proceedings* 1974, 050009 (2018); doi: 10.1063/1.5041709.
- Ozerem, A., (2012). Misconceptions in geometry and suggested solutions for seventh grade students, *Procedia - Social and Behavioral Sciences* **55**, pp. 720 – 729.
- Tokac, U., Novak, E., & Thompson, C. G. (2019). Effects of game-based learning on students' mathematics achievement: A meta-analysis. *Journal of Computer Assisted Learning*, 35(3), 407–420. <https://doi.org/10.1111/jcal.12347>