UNIVERSITI TEKNOLOGI MARA

Public Interest Centre of Excellence

International Teaching Aid Competition 2023

Reconnoitering Innovative Ideas in Postnormal Times

iTAC 2023

iTAC 2023
INTERNATIONAL TEACHING AID COMPETITION
E-PROCEEDINGS

Copy Editors*: Syazliyati Ibrahim, Azni Syafena Andin Salamat, Berlian Nur Morat (Dr.), Najah Mokhtar, Noor 'Izzati Ahmad Shafiai, Muhamad Khairul Anuar Bin Zulkepli (Dr.)*
Cover Design : *Asrol Hasan*
Layout : *Nurina Anis Mohd Zamri*
eISBN : 978-967-2948-51-3

Published by : Universiti Teknologi MARA Cawangan Kedah,
08400 Merbok,
Kedah,
Malaysia.

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

SPIRAL LIMIT

Fuziatul Norsyiha Binti Ahmad Shukri
Department of Computer and Mathematical Sciences,
College Of Computing, Informatics and Media,
Universiti Teknologi MARA (UiTM) Cawangan Pulau Pinang
fuziatul@uitm.edu.my

Nur Azimah Binti Idris
Department of Computer and Mathematical Sciences,
College Of Computing, Informatics and Media,
Universiti Teknologi MARA (UiTM) Cawangan Pulau Pinang
nurazimah7083@uitm.edu.my

Norshuhada Binti Samsudin
Department of Computer and Mathematical Sciences,
College Of Computing, Informatics and Media,
Universiti Teknologi MARA (UiTM) Cawangan Pulau Pinang
norsh111@uitm.edu.my

Wan Nur Shaziayani Binti Wan Mohd Rosly
Department of Computer and Mathematical Sciences,
College Of Computing, Informatics and Media,
Universiti Teknologi MARA (UiTM) Cawangan Pulau Pinang
shaziayani@uitm.edu.my

Sharifah Sarimah Binti Syed Abdullah
Department of Computer and Mathematical Sciences,
College Of Computing, Informatics and Media,
Universiti Teknologi MARA (UiTM) Cawangan Pulau Pinang
sh.sarimah@uitm.edu.my

Noor Azizah Bt Mazeni
Department of Computer and Mathematical Sciences,
College Of Computing, Informatics and Media,
Universiti Teknologi MARA (UiTM) Cawangan Pulau Pinang
noorazizah1103@uitm.edu.my

ABSTRACT
Spiral Limit is an educational game designed to assist teachers in creating an enjoyable and engaging

learning experience for their students. This game aims to dispel fear and promote excitement about mathematics. Through engaging exercises, it will make mathematics more approachable and thus inspire interest in the topic. It specifically focuses on promoting mental calculation skills, encouraging students to rely less on calculators for simple calculations. This game also offers a fun and creative alternative for students to improve their mathematics skills and strengthen their comprehension of the subject at hand. Teachers act as facilitators, offering assistance to students as needed and allowing them to complete the game independently. Students in their first semesters of university are the main target users for this board game. This game requires at least two players and one moderator. Each player rolls the dice and moves forward according to the number of spaces shown on the dice. Players will need to answer the question correctly within 3 to 5 minutes. If the answer is wrong, the player gets a penalty card. In addition to being used in the classroom, the board game is appropriate for workshops and educational events to spark interest in mathematics. In general, Spiral Limit complements the current educational trend of encouraging active learning, in which students actively engage in the learning process. Overall, Spiral Limit is a valuable tool for teachers to create an engaging and interactive learning experience in calculus. It not only reinforces mathematical concepts but also develops critical thinking, collaboration, and communication skills, all while making the learning process enjoyable for students.

Keywords: board game, limit, calculus, mathematics

INTRODUCTION

Mathematics is a required subject in Malaysia's primary and secondary schools and also in universities. Despite how important it may be, many students have found it difficult to study mathematics. Like elsewhere in the world, students in Malaysia schools also have wide range of problems with mathematics and mathematics becomes one of the subjects in which many students often perform poorly (Borzsonyi).

The teaching methods used in mathematics classrooms can vary widely. If it is taught in a passive and one-sided way, it will discourage active participation, exploration, and problem-solving, making students feel bored and disinterested. Furthermore, some students also may perceive learning mathematics as difficult right from the start. This perception can create anxiety or fear and leading to a negative attitude towards the subject. Students with high mathematics anxiety will realize low achievement in mathematics (Zakaria, et al., 2012).

Although getting students to like mathematics can be difficult but there are various strategies can be used to enhance their engagement and enjoyment of the subject. One of the strategies is by using interactive teaching methods. By incorporate interactive approaches such as group activities and games can make learning mathematics more enjoyable and enable students to view the subject from different perspectives (Wiersum, 2012).

Lack of engagement is one of the reasons why mathematics subject often considered boring by some people. According to Wiersum (2012), compared to more formal activities, games allow students for more interaction and provide opportunities to test intuitive ideas and problem solving techniques. Playing games can also promote a positive learning environment by reducing mathematics anxiety and increase students' motivation.

PROBLEM STATEMENTS

Many students face challenges in learning mathematics which leading to difficulties in understanding mathematical concepts, low achievement and lack of confidence in their mathematical abilities. Therefore, in this project, learning games based on mathematics will be implemented. It has the potential to address the challenges in learning mathematics and enhance students' understanding, engagement, and achievement in the subject.

This projects aims to:

1. create an enjoyable learning experience that dispels fear and promotes excitement about mathematics. It offers students additional opportunities to interact with moderators while playing the game.
2. provide a fun and creative platform for students to strengthen their comprehension in mathematical concepts and develop critical thinking all while sparking interest in the subject and promoting active learning.

PRODUCT DESCRIPTION

Students can learn about limits in mathematics while having fun and engaging fun with the instructional board game Spiral Limit. Limits are key calculus concepts that are the subject of this article. The game encourages cooperation and teamwork among students by allowing flexibility for individual or team play. Players can test both themselves and one another in this dynamic, engaging learning environment.

The game's spiral pathway playing board serves to illustrate how learning and comprehension grow over time. As they proceed along this road, players face a variety of obstacles and activities involving constraints. These tasks might involve resolving limit issues, examining limit traits, and using limit ideas in practical contexts. Students improve critical thinking skills and strengthen their grasp of boundaries by taking on these difficulties.

For the game Spiral Limit, chance and strategy are combined with game elements including cards, dice, and a board game. These elements might also include arbitrary incentives, punishments, or events that affect how far the players get. This increases the excitement of the

game and gives players the chance to plan their moves based on their grasp of the game's constraints.

Spiral Limit seeks to make learning about limitations an enjoyable and engaging experience overall. The game contributes to the creation of a positive learning environment that inspires students to actively engage in their calculus studies and gain a deeper understanding of limits by fusing game play with educational content.

NOVELTY

Spiral Limit emphasizes the development of mental calculating skills in addition to going beyond simply teaching calculus limits. It enhances computational fluency and encourages students to rely less on calculators. Students are encouraged to execute calculations mentally by participating in the game's challenges and activities, improving their capacity to answer mathematical problems quickly and accurately without exclusively using electronic equipment.

Calculus and instructional board game components are combined in the game to provide an engaging and dynamic learning environment. This blend of teaching material and game components makes learning more enjoyable and encourages students to actively learn and apply calculus principles.

The versatility of Spiral Limit is one of its advantages. The game can also be used in workshops and educational events, giving students a unique way to improve their mathematical skills outside of the classroom. This versatility enables educators to customize the game for various learning environments and pedagogical approaches.

Spiral Limit attempts to increase students' accessibility to mathematics by providing an entertaining and interactive way to learn calculus. It offers students a pleasant and engaging way to actively practice their mental calculating abilities, increase their computational fluency, and solidify their awareness of boundaries.

POTENTIAL COMMERCIALIZATION

Spiral Limit holds substantial potential for commercialization in educational institutions, retail markets, events, partnerships with education technology companies, and professional development. Its unique features and benefits make it an attractive product to enhance mathematics education and promote engaging and interactive learning experiences.

Spiral Limit is positioned as a prospective solution for commercialization in a variety of markets due to its distinctive features and advantages overall. It is a desirable alternative for educational institutions, retail marketplaces, events, partnerships with educational technologies businesses, and professional development programs due to its potential to improve mathematical teaching and encourage interactive learning experiences.

CONCLUSION

In conclusion, using games like Spiral Limit as a tool for learning mathematics can be an effective and engaging approach for students. It has the potential to make the learning process enjoyable, motivating, and interactive, and also will increase students' interest and participation in mathematics.

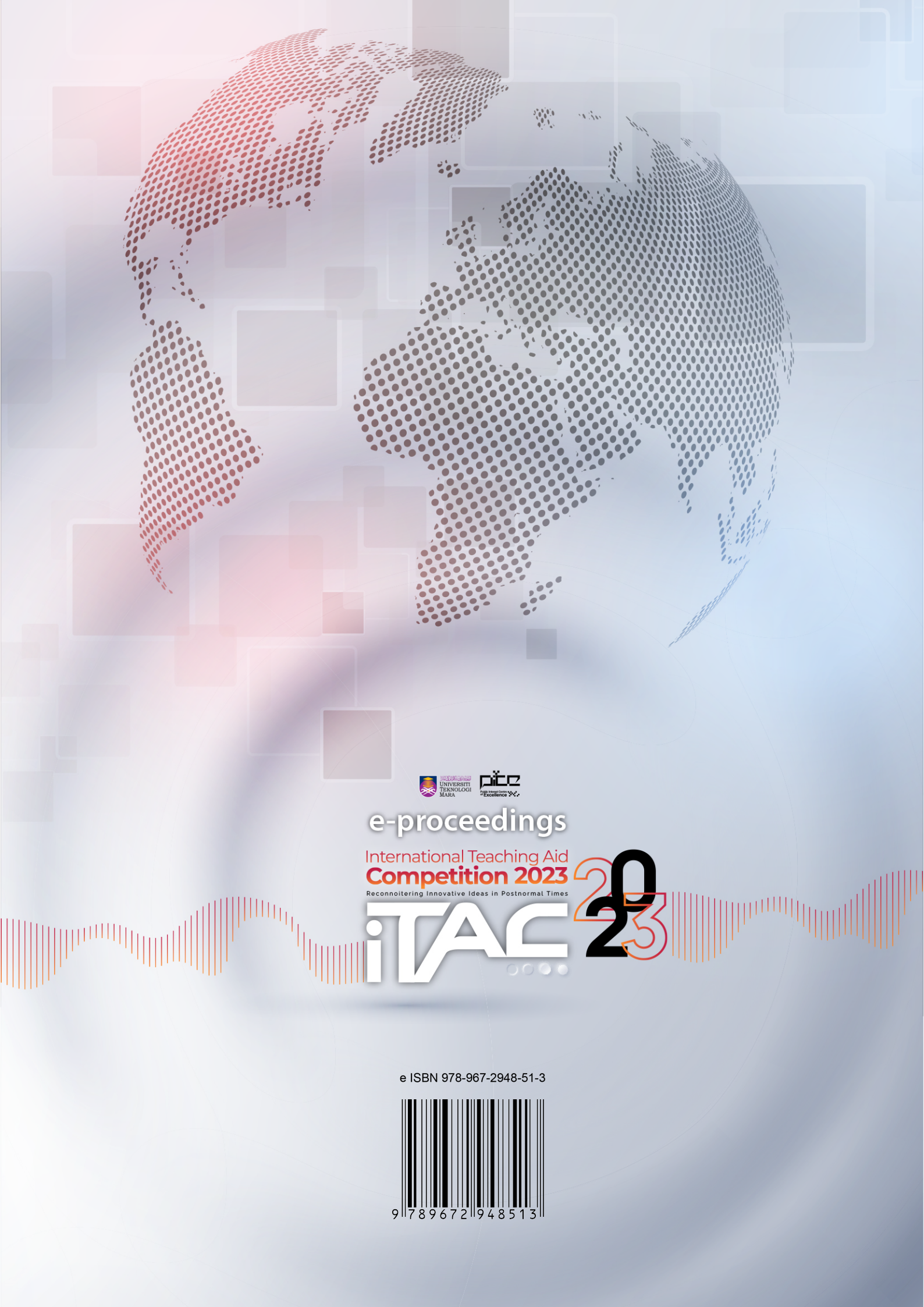
However, it is important to note that games should not replace traditional mathematical practice. It should be used as a complementary tool to enhance mathematical learning. While games can make learning mathematics enjoyable, it is important to ensure that students still receive systematic instruction, practice fundamental skills, and engage in problem solving.

REFERENCES

Borzsonyi, A. (n.d.). *PISA 2018 Worldwide Ranking – average score of mathematics, science and reading*. Retrieved 10 June, 2023, from factsmaps.com: https://factsmaps.com/pisa-2018-worldwide-ranking-average-score-of-mathematics-science-reading/

Wiersum, E. G. (2012). Teaching and learning mathematics through games and activities. *Acta Electrotechnica et Informatica*, *12*(3), 23-26.

Zakaria, E., Zain, N. M., Ahmad, N. A., &Erlina, A. (2012).Mathematics anxiety and achievement among secondary school students. *American Journal of Applied Sciences*, *9*(11), 1828.



e ISBN 978-967-2948-51-3