



UNIVERSITI
TEKNOLOGI
MARA

Kampus Cengalim Kuala

i-SPIKE2025
INTERNATIONAL SYMPOSIUM ON PRODUCTIVITY, INNOVATION, KNOWLEDGE & EDUCATION

INTERNATIONAL EXHIBITION & SYMPOSIUM ON PRODUCTIVITY, INNOVATION, KNOWLEDGE & EDUCATION

E-PROCEEDING

EXTENDED ABSTRACT

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E-PROCEEDING

EXTENDED ABSTRACT



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e ISBN 978-967-2948-91-9



UiTM Cawangan Kedah

Published by:
Universiti Teknologi MARA (UiTM) Cawangan Kedah
Sungai Petani Campus
08400 Merbok
Kedah
Malaysia

Welcome Message

RECTOR, UITM KEDAH BRANCH

Assalamualaikum warahmatullahi wabarakatuh,

First and foremost, I would like to extend my deepest appreciation to the organising committee of i-SPIKE 2025 for their steadfast dedication and commitment in making this prestigious event a reality. My heartfelt congratulations to the committee for their tireless efforts in ensuring that i-SPIKE continues to grow as a meaningful and impactful platform for academics, researchers, students, and industry players worldwide.

The theme for this year, “Empowering Minds: Bridging Innovation, Knowledge and Education for a Sustainable Future,” is both timely and significant. It reflects our shared responsibility to not only embrace creativity and technological advancement, but also to ensure that innovation directly contributes to sustainable development, equitable education, and the well-being of future generations.

i-SPIKE 2025 provides a dynamic platform for showcasing innovations that address real-world challenges while opening new avenues for collaboration, engagement, and inclusivity. By bridging knowledge, innovation, and education, this symposium strengthens our collective capacity to design solutions that empower communities and inspire positive change.

I am truly impressed by the diversity and calibre of participants in this year’s event. The projects and ideas presented highlight the extraordinary creativity and determination of our innovators. I am confident that the insights and solutions shared here will pave the way for continuous advancement in teaching, learning, and innovation.

It is my sincere hope that you will find i-SPIKE 2025 an enriching experience, one that sparks new ideas, builds lasting collaborations, and strengthens our shared vision for a sustainable future. To all participants, I wish you every success, and to the winners, my warmest congratulations.

Once again, I thank the organising committee, partners, and contributors for their invaluable support. May i-SPIKE 2025 continue to inspire and empower minds for many years to come.

Professor Dr. Roshima Haji Said
Acting Rector
Universiti Teknologi MARA (UiTM) Kedah Branch

Welcome Message (i-SPIKE 2025 CHAIR)

It is my great pleasure to welcome you to the 4th International Exhibition & Symposium on Productivity, Innovation, Knowledge, and Education 2025 (i-SPIKE 2025). This year's theme, "Empowering Minds: Bridging Innovation, Knowledge, and Education for a Sustainable Future," reflects our collective commitment to advancing innovation and fostering meaningful collaboration across academia, industry, and communities.

i-SPIKE 2025 provides a platform for scholars, researchers, students, and practitioners from diverse fields to showcase their ideas, share knowledge, and inspire new solutions to global challenges. We extend our sincere appreciation to all participants and contributors whose efforts and dedication have made this symposium possible.

We hope that this e-proceedings serves not only as a record of the innovations presented but also as a valuable resource that continues to inspire long after the event.

Thank you.

Dr Junaida Ismail
Chair

4th International Exhibition & Symposium on Productivity, Innovation,
Knowledge, and Education 2025 (i-SPIKE 2025)

PREFACE

The 4th International Exhibition & Symposium on Productivity, Innovation, Knowledge, and Education (i-SPIKE 2025) marks yet another milestone in our ongoing commitment to fostering innovation, creativity, and collaboration across disciplines. Guided by this year's theme, "Empowering Minds: Bridging Innovation, Knowledge and Education for a Sustainable Future," the event provides a dynamic platform for students, educators, researchers, and professionals to share their ideas, showcase their innovations, and engage in meaningful knowledge exchange.

This year, we are pleased to report that i-SPIKE 2025 received approximately 50 initial submissions, with more than 35 projects successfully advancing to final presentation and exhibition. These projects reflect a rich diversity of innovation, ranging from educational technologies, digital applications, and gamified learning tools to sustainable materials, cultural heritage preservation, and community-focused solutions. Collectively, they embody the spirit of bridging innovation and education to address pressing societal and global challenges.

We sincerely thank all participants, reviewers, and committee members for their invaluable contributions in making i-SPIKE 2025 a success. It is our hope that this e-proceedings will not only serve as a record of the ideas and innovations presented, but also as an inspiration for future collaborations and advancements in the pursuit of sustainable knowledge and innovation.

Assoc. Prof. Dr. Azlyn Ahmad Zawawi
Editor-in-Chief, i-SPIKE 2025 Proceedings

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CATEGORY 1
S&T (YOUNG)

BIZMATH-FAST (BUSINESS MATHEMATICS – FORMULA ACCURACY & SPEED TRAINER)

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ABSTRACT

Many students struggle to identify and apply the correct formulas when solving Business Mathematics problems. This often leads to mistakes, confusion, a lack of confidence, and poor academic performance. BizMath-FAST is a gamified educational tool designed to address this issue. It is an innovative gamification tool designed to enhance conceptual understanding and support accurate formula selection in Business Mathematics problem-solving. This interactive learning aid turns formula practice into a fun and engaging experience. The tool features multiple levels, business-related challenges, time limits, and instant feedback to help students practice selecting and applying the correct formulas. Key topics include interest, profit, depreciation, and other practical areas that support students' understanding of real-world business problems. The primary objective of BizMath-FAST is to foster critical thinking, enable students to identify appropriate formulas more efficiently, and strengthen their problem-solving abilities. What makes the tool distinctive is its emphasis on helping students understand the rationale behind formula selection and application, rather than relying solely on memorization, which is a skill often neglected in traditional classroom settings. Initial classroom implementation of the gamified concept approach, piloted with repeating students as part of an instructional innovation strategy, demonstrated promising outcomes. It led to increased learner engagement, greater confidence, and improved accuracy in selecting and applying formulas. These gains were reflected in their assessment results, which showed marked improvement compared to their performance in the previous semester. This innovation supports education aligned with Sustainable Development Goal 4: Quality Education, specifically Target 4.4, which aims to increase the number of youths with relevant skills for employment and entrepreneurship. As a physical board game, it is affordable, easy to use, and does not require internet access. It also has strong potential for commercialization in schools, tuition centers, and homes, and can be adapted for online or mobile platforms.

Keywords: Business Mathematics, gamification, formula identification.

INTRODUCTION

Through classroom observations in Business Mathematics classes, it was found that many students struggle to identify and apply the correct formulas when solving real-world business problems. Although students are introduced to the necessary formulas, they often rely on memorisation rather than understanding how and when to use them. This has led to common issues such as reduced classroom engagement, incorrect formula use, and slow or inaccurate problem-solving. To address this, BizMath – FAST (Business Mathematics – Formula Accuracy & Speed Trainer) was developed as a gamified learning tool designed to strengthen students' ability to accurately identify and apply relevant formulas through interactive, scenario-based challenges. BizMath–FAST features real-world business situations, adaptive difficulty levels, and instant feedback, providing an engaging and supportive learning environment. The gamification original concept was piloted with repeater students as part of a classroom innovation strategy to increase learner participation, build confidence, and improve performance in solving mathematical problems. BizMath–FAST aims to improve students' ability to match business problems with the appropriate mathematical formulas. By embedding real-life business scenarios into timed challenges with interactive feedback, the tool is expected to enhance student engagement, confidence, and problem-solving accuracy in the classroom. This innovation supports Sustainable Development Goal 4: Quality Education, specifically Target 4.4, which focuses on increasing the number of youths with relevant skills for employment and entrepreneurship. By promoting conceptual understanding and practical learning in Business Mathematics, this project helps students develop essential skills in finance, analysis, and logical reasoning skills that are vital for academic success and career readiness.

OBJECTIVE

BizMath-FAST aims to enhance students' ability to accurately identify and apply appropriate mathematical formulas in solving Business Mathematics problems, thereby promoting deeper conceptual understanding and improving problem-solving efficiency.

METHODOLOGY AND RESULT FINDINGS

The gamification's original concept was piloted involving a group of repeating students from Semester 2 and Semester 3 who were retaking the Business Mathematics course originally offered in Semester 1. The primary objective of the study was to examine the impact of the intervention on student performance by comparing their previous assessment results with their current semester marks following the implementation of a concept-based learning approach. This approach focused on enabling students to accurately identify the appropriate formulas and apply them effectively in problem-solving tasks, as facilitated by the gamified learning tool, BizMath–FAST. The findings of the study indicate a significant improvement in participants' problem-solving skills. Classroom observations revealed that students were more engaged and enthusiastic when attempting to solve mathematical problems, as they became increasingly familiar with selecting the appropriate formulas. They also demonstrated a clearer understanding of which chapters and formulas to apply when tackling Business Mathematics exercises or assignments. This shift in approach reflects a notable enhancement in their conceptual understanding of mathematical principles. The improvement was further evidenced by higher assessment marks, suggesting that students had gained mastery and confidence in both identifying and applying the correct formulas.

GAME DESIGN

BizMath–FAST is an instructional board game designed to evaluate and strengthen students' ability to accurately identify and apply appropriate mathematical formulas in solving business-related problems. The game, which can be played individually or in groups, is structured around three progressive stages and is fully aligned with the topics covered in the Business Mathematics (MAT112) syllabus.



Figure 1. BizMath–FAST board game

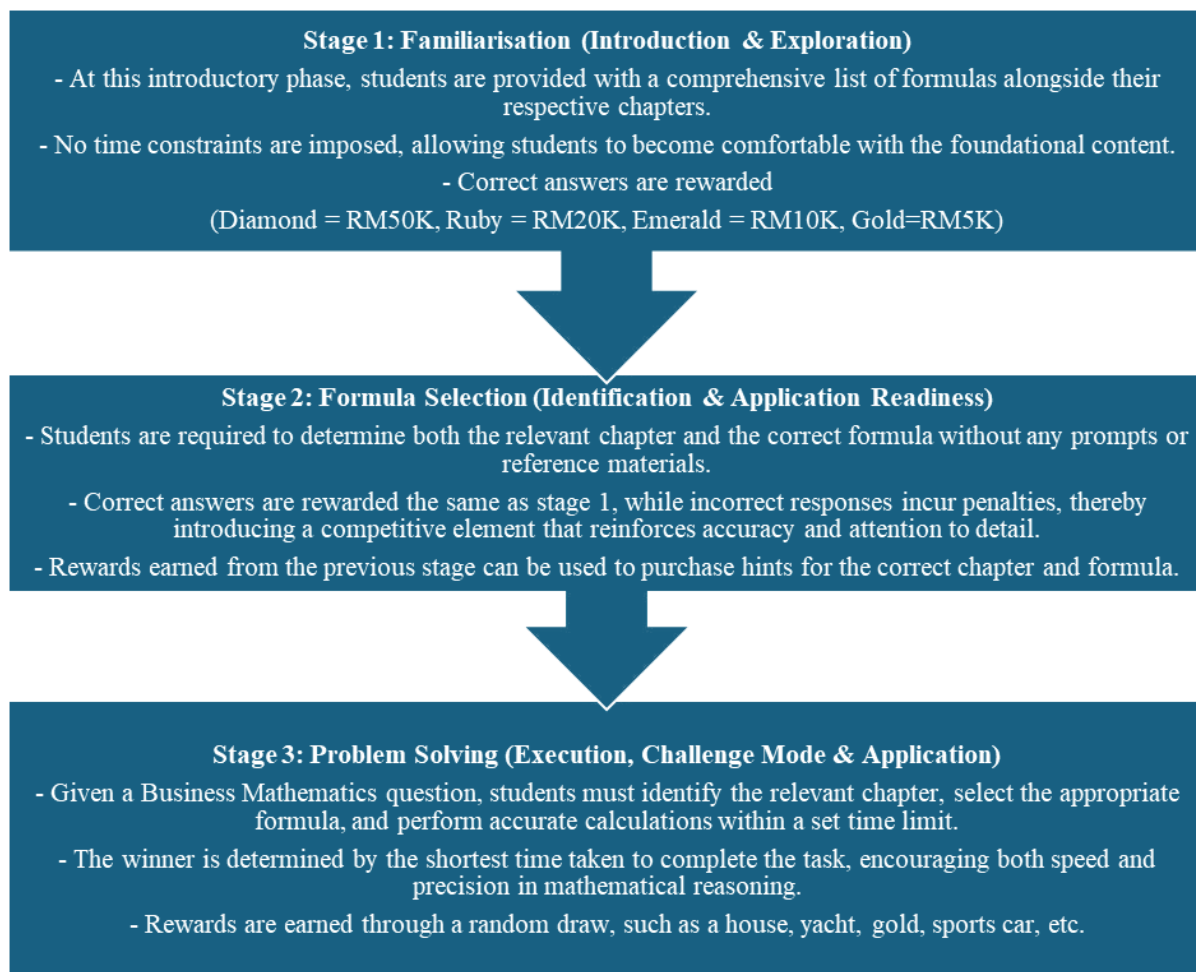


Figure 2. Flowchart illustrating the three stages of the BizMath-FAST game (Familiarisation, Formula Selection, Problem Solving)

NOVELTY

BizMath-FAST is unique because it focuses specifically on helping students identify and select the correct mathematical formulas used in specific chapters, rather than simply memorising them, which is something often overlooked in traditional teaching methods. Most learning tools teach formulas through repetition or lectures, but this innovation uses fun games and real-life business problems to improve critical thinking and decision-making. Its novelty lies in combining gamification with real-world business mathematics scenarios. Empirical evidence indicates that gamification enhances students' performance in Business Studies (Esitikut, Udosen, & Dickson, 2025), thereby reinforcing the pedagogical value of this innovation. By using time-based challenges, instant feedback, and progressive levels, the tool creates a fun and effective way for students to practice formula selection. It also adapts to different skill levels, making it useful for both struggling and advanced students. Unlike many math apps or quizzes, BizMath-FAST is designed to build students' confidence in understanding when and why to use a specific formula and not just how to solve equations. This makes it a fresh, engaging, and practical approach to mastering Business Mathematics.

BENEFIT TO MANKIND

BizMath-FAST helps students learn Business Mathematics more effectively by making formula selection easier and more accurate. This improves their problem-solving skills and confidence, which are important for both education and real-life business decisions. By using this tool, more students can succeed in mathematics, leading to better job opportunities and smarter financial choices in the future. This innovation indirectly advances the objectives of Sustainable Development Goal 4: Quality Education, particularly Target 4.4, which aims to substantially increase the number of youth and adults possessing relevant skills for employment, decent jobs, and entrepreneurship.

POTENTIAL COMMERCIALISATION

BizMath-FAST has strong potential for commercialisation as an educational board game. It can be marketed to secondary schools, colleges, tuition centres, and homeschooling communities as a classroom aid or revision tool. Because it is a physical game, it does not require electricity or internet, making it accessible in both urban and rural learning environments. Its engaging format encourages active learning, collaboration, and critical thinking, qualities valued by educators and parents. The game can be mass-produced at a low cost and distributed through educational suppliers, bookstores, or online platforms. It also has the potential to be adapted into a digital version or mobile app in the future.

CONCLUSION

BizMath-FAST enhances students' conceptual understanding and problem-solving in Business Mathematics by embedding gamified formula identification into learning. Evidence supports this approach. For example, a study by Maryana, Halim, and Rahmi (2024) found that gamification improves engagement, performance, and attitudes toward mathematics, while Parrales et al. (2024) reported gains in motivation and outcomes through increased participation. Together, these findings highlight BizMath-FAST's value as a classroom innovation that strengthens formula application while fostering confidence, engagement, and achievement.

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