



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

UiTM *di hatiku*

اوسها تقوى موليا

E-PROCEEDING

EXTENDED ABSTRACT



Copyright © 2025 by Universiti Teknologi MARA (UiTM) Cawangan Kedah

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher.

© i-SPIKE 2025 Extended Abstract Proceedings is jointly published by Universiti Teknologi MARA (UiTM) Cawangan Kedah.

The views, opinions, and technical recommendations expressed by the contributors and authors are entirely their own and do not necessarily reflect the views of the editors, the faculty, or the University.

Editors

- Prof. Madya Dr. Azlyn Ahmad Zawawi
- Dr. Anis Farawahida Mohd Karim
- Dr. Nursyazwanie Mansor
- Dr. Roshidah Safeei
- Azni Syafena binti Andin Salamat
- Hasniza binti Hassim
- Dr. Nur Zharifah Che Adenan
- Mohd Rozman Mohd Nasir
- Nurfaznim binti Shuib
- Norsyazwani binti Ab Halim

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

TABLE OF CONTENTS

No	Title	Page No.
CATEGORY 1 – S&T (ACADEMIC)		
1.	THE CC GUY RETURNS: VISUALISING CONTINUITY CORRECTION USING CHARACTER NARRATIVES AND BAR LOGIC	2
2.	ENHANCING CONCEPTUAL UNDERSTANDING IN DIFFERENTIAL CALCULUS THROUGH EASYDIFF	8
3.	THERMAL ANTINOCICEPTIVE EFFECT OF TRANSDERMAL TRAMADOL HYDROCHLORIDE IN AVIAN	13
4.	OPENAIPEROVSKITE: A SMART DASHBOARD FOR SOLAR PERFORMANCE TRENDS OF 2D LEAD-HALIDE PEROVSKITES	18
5.	RENEWED3D: MODUL REALITI MAYA BUKAN IMERSIF UNTUK PENDIDIKAN TENAGA BOLEH BAHARU	25
6.	ROACHAWAY: A NATURAL COCKROACH REPELLENT AND INSECTICIDE FROM SEKENTUT LEAVES (<i>PAEDERIA FOETIDA</i>) EXTRACTS	31
7.	VIRTUAL REALITY IN INDUSTRIAL TRAINING: SUSTAINABLE CAMPUS-BASED LEARNING INNOVATION	36
8.	MA-TICK 2.0: A TRULY GREEN TICKICIDE	41
CATEGORY 1 - S&T (YOUNG)		
1.	AUTOMATED ROBOT MOVEMENT FOR SORTING (ARMS)	48
2.	SPEAKEASY NIHONGO: MOBILE APPLICATION FOR JAPANESE BEGINNER LEARNERS	53
3.	AURA: STREAMLIT-BASED DECISION SUPPORT SOFTWARE FOR SUSTAINABLE MULTI-CRITERIA DECISION-MAKING	59
4.	ELECTROCOAGULATION CLEANUP WITH RECYCLED CANS	64
CATEGORY 2 – SS (ACADEMIC)		
1.	ReProDB 2.0: A DIGITAL GATEWAY TO SMARTER RESEARCH DATA MANAGEMENT	70
2.	BIZMATH-FAST (BUSINESS MATHEMATICS – FORMULA ACCURACY & SPEED TRAINER)	84
3.	COLLABORATIVE INNOVATION LAB: RATE & REFLECT SIMULATION	89

CATEGORY 1
S&T (ACADEMIC)

THE CC GUY RETURNS: VISUALISING CONTINUITY CORRECTION USING CHARACTER NARRATIVES AND BAR LOGIC

Syah Runniza binti Ahmad Bakri
Faculty of Computer and Mathematical Sciences
Universiti Teknologi MARA, Sarawak Branch
runniza@uitm.edu.my

Lai Tze Wee
Faculty of Computer and Mathematical Sciences
Universiti Teknologi MARA, Sarawak Branch
laizewee@uitm.edu.my

Adeline Engkamat
Faculty of Computer and Mathematical Sciences
Universiti Teknologi MARA, Sarawak Branch
adeline@uitm.edu.my

Juliza binti Salleh
Faculty of Computer and Mathematical Sciences
Universiti Teknologi MARA, Sarawak Branch
Juliza3369@uitm.edu.my

Rumaizah binti Che Md Nor
Faculty of Computer and Mathematical Sciences
Universiti Teknologi MARA, Sarawak Branch
rumaizah@uitm.edu.my

Lee Siaw Li
Faculty of Computer and Mathematical Sciences
Universiti Teknologi MARA, Sarawak Branch
siawli@uitm.edu.my

Shirley Sinatra Gran
Faculty of Computer and Mathematical Sciences
Universiti Teknologi MARA, Sarawak Branch
siawli@uitm.edu.my

ABSTRACT

In the field of statistics, continuity correction is the necessary change made when estimating the Binomial or Poisson distribution with the normal distribution. It is made by adding or subtracting 0.5 to the discrete value. However, a preliminary study has indicated that this adjustment is challenging for many students to grasp. Building on the principle of visualisation, The CC (Continuity Correction) Guy, a character-based manual, was introduced, while the extended version, The CC Guy Returns, presents an additional bar logic visualisation to explain further why the adjustment of ± 0.5 is needed. When switching to the continuous scale, the concept emphasises the range that each value represents by treating each integer ($X = 10$, for example) as a bar that extends from 9.5 to 10.5 inclusively. These images present two explicit representations: the narrative logic (Visual 1) and the numerical logic (Visual 2), when positioned alongside the original CC Guy illustration. This thoughtful pairing enhances understanding, particularly for compound inequalities that require the visualisation of multiple bars, such as $P(8 \leq X \leq 10)$. Furthermore, the updated CC Guy with bar logic is presently undergoing testing with the aim of gathering detailed feedback, although the original version was well received in classroom settings. With an approachable, animated, and narrative framework, this practical innovation is expected to enhance the students' precision in applying the continuity correction. Accordingly, this tool can be modified into interactive digital content, printed guides, or animated slideshows, and it can be integrated into both in-person and virtual learning environments.

Keywords: correction continuity, visualisation, continuous distribution, probability

INTRODUCTION

In the field of statistics, the continuity correction is the necessary change made when estimating the Binomial or Poisson distribution with the normal distribution. It is made by adding or subtracting 0.5 to the discrete value. However, a preliminary study has demonstrated that this adjustment is challenging for many students to grasp. These results align with those of The Academy of St. Nicholas (2021), which also reported that students are misapplying the corrections. For instance, add instead of subtract, or confuse with the directions of the inequalities.

Apart from that, Tuh et al. (2017) likened the process of making adjustments to climbing an extremely steep ladder. Supporting this, Munyaruhengeri et al. (2024) have indicated that students have difficulty understanding continuity as a result of abstract definitions and the lack of visual representation.

In response to these challenges, scholars have stressed the importance of using visual prompts. Schoenherr et al. (2024) identified the power of diagrams, drawings, and number lines designed in particular educational contexts to improve mathematics and statistics education.

This observation is similar to that of A. Bakri et al. (2021), stated that the use of visuals enables students to be able to think while learning, particularly in the case of abstract ideas like graphs. Therefore, with visual aids, students can develop a more refined understanding of the art of continuity correction and a better sense of applying the 0.5 adjustments.

To further illustrate the visualization concept, a character-based manual was introduced; The CC Guy. The expanded version, "The CC Guy Returns" includes a new bar-logic breakout that explains why we have to add or subtract 0.5 to each value.

The innovation is therefore aligned with UNESCO's Sustainable Development Goal 3, which aims to enhance well-being through all stages of life. By systematically lowering cognitive load, The CC Guy effectively offers a source of stress relief, thereby fostering a more relaxed learning atmosphere.

MATERIAL AND METHODOLOGY

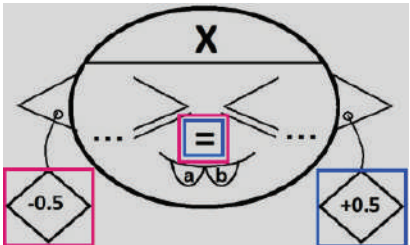
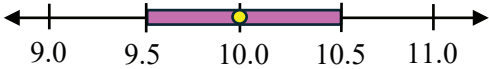
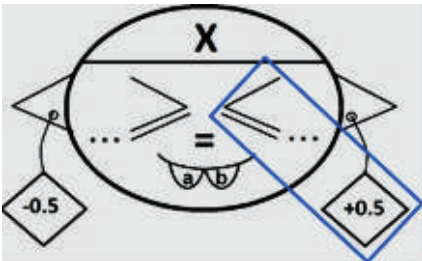
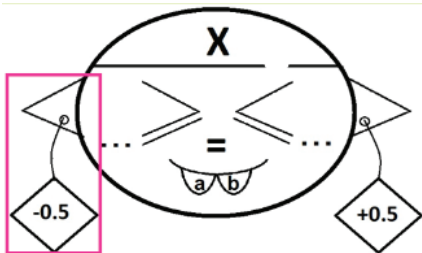
In this extended version, The CC Guy Returns, a dual visualisation approach is introduced.

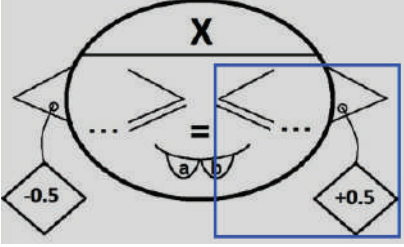
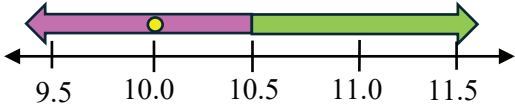
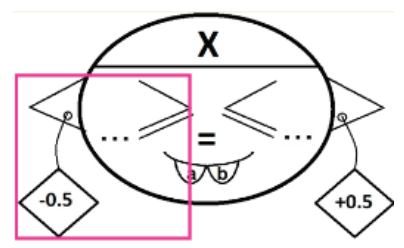
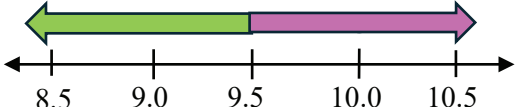
1. Character Narrative (Visualisation 1): Students engage with a symbolic character whose expressions signify various forms of inequalities (e.g., $<$, $\leq$, $=$). The character employs arrows and symbols to direct learners on the use of -0.5 or $+0.5$.
2. Bar Logic (Visualisation 2): Each number is conceptualised as a bar extending one unit, centred at its corresponding value. For instance, $X = 10$ is demonstrated to cover the range 9.5 to 10.5. This logic allows students to visualise which portion of the number line is included, improving comprehension when solving compound inequalities (e.g., $P(8 \leq X \leq 10) \rightarrow P(7.5 < X < 10.5)$).

Table 1 depicts the required correction when substituting a discrete distribution with its continuous counterpart for a random variable X , with the discrete values of a and b . Explanation for the illustration is organized into five distinct cases.

Table 1. Continuity Correction Adjustments

Discrete	Continuous	Case
$P(X = a)$	$P(a - 0.5 < X < a + 0.5)$	1
$P(a \leq X \leq b)$	$P(a - 0.5 < X < b + 0.5)$	2
$P(a < X < b)$	$P(a + 0.5 < X < b - 0.5)$	3
$P(X \geq a)$	$P(X > a - 0.5)$	4
$P(X < a)$	$P(X < a - 0.5)$	
$P(X \leq a)$	$P(X > a + 0.5)$	5
$P(X > a)$	$P(X < a + 0.5)$	

Case	Character Narrative	Bar Logic
	Visualisation 1	Visualisation 2
1		
	$P(X = 10) = P(9.5 < X < 10.5)$	
	When the equal sign is used, we create the range from 0.5 below the integer to 0.5 above it for both visualisations.	
2		
	$P(8 \leq X \leq 10) = P(7.5 < X < 10.5)$	
	When the $\leq$ is used, focus on the upper limit. We add 0.5 to the upper limit and, contradictorily, deduct 0.5 from the lower limit.	For any bar logic, if an integer is included, follow Case 1 setting. This follows the character narrative setting too.
3		
	$P(8 < X < 10) = P(8.5 < X < 9.5)$	
	When the $<$ is used, focus on the upper limit. We deduct 0.5 from the upper limit and, contradictorily, add 0.5 to the lower limit.	As in Case 1, each integer is treated as a bar from 0.5 below to 0.5 above. However, in this case, only bars for integers strictly between 8 and 10 are included. Hence, only $X = 9$ is visualized.

		
4	$P(X > 10) = P(X > 10.5)$ or $P(X \leq 10) = P(X < 10.5)$	When the $\leq$ and $>$ are used, we add 0.5 to the integer. For bar logic, this means we shift the cut-off point by -0.5, excluding the bar of the integer itself and only capturing values strictly beyond it.
5		 $P(X < 10) = P(X < 9.5)$ or $P(X \geq 10) = P(X > 9.5)$ When the $<$ and $\geq$ are used, we deduct 0.5 from the integer. For bar logic, this means we shift the cut-off point by $+0.5$ to the right of the integer. This ensures that the bar representing the included integer is fully captured.

RESULTS AND DISCUSSIONS

The CC Guy's original iteration has been introduced in actual classrooms, and students have demonstrated promising responses to it. Correspondingly, a significant number of students mentioned that the character-based story helps to reduce the confusion associated with applying the continuity correction, especially when it comes to subtracting or adding 0.5. At the same time, informal feedback suggested that the friendly and animated approach to teaching the adjustment rule effectively engaged students in the lesson. Thus, students remembered better when they learned the rule through a more engaging approach than if they learned it through rote memorization.

The CC Guy Returns builds upon the previous character and teaches students to use bar logic visualisation to broaden their explanation. Although this specific add-on has yet to be assessed with students, it is anticipated that it will be beneficial in illustrating the adjustments on the continuous number line. Specifically, the addition of this second layer of visualisation is intended to assist students in understanding better by linking the story-based reasoning with the numbers.

FUTURE WORKS

The next stage of the project will involve conducting classroom trials with the revised version in order to assess its impact and gather detailed feedback. Essentially, this will help determine whether the use of two different types of representations, narrative and bar logic, enhances students' precision in applying the continuity correction. Accordingly, this tool can be modified into interactive digital content, printed guides, or animated slideshows, and it can be integrated into both in-person and virtual learning environments.

REFERENCES

- Munyaruhengeri, C., Umugiraneza, G., Ndagijimana, C., & Hakizimana, D. (2024). Students' misconceptions and difficulties with learning limits and the continuity of functions at selected Rwandan secondary schools. *International Journal of Education and Practice*, 12. 10.18488/61.v12i2.3719.
- Bakri, S. R. A., Ying, L. C., Khium, C. C., Hua, T. M., & Ching, L. S. (2021). Bridging the gap between the derivatives and graph sketching in calculus. *Asian Journal of University Education*, 16(4), 121-136.
- The Academy of St. Nicholas. (2021). *Normal distribution approximation to binomial: Teaching resource*. Retrieved from <https://theacademyofstnicholas.org.uk>
- Tuh, M. H., Runniza, A. S., Liew, C.Y., & Chang, Y. R. (2017). Effectiveness of visual representations in promoting exact selection of continuity correction. *Journal of Academia*, 5(1), 209- 222.

