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“Optimizing Innovation in Knowledge, Education and Design”

EXTENDED ABSTRACT



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Assalamualaikum warahmatullahi wabarakatuh,



First and foremost, I would like to express my gratitude to the organizing committee of i-Spike 2023 for their tremendous efforts in bringing this online competition a reality. I must extend my congratulations to the committee for successfully delivering on their promise to make i-Spike 2023 a meaningful event for academics worldwide.

The theme for this event, 'Optimizing Innovation in Knowledge, Education, and Design,' is both timely and highly relevant in today's world, especially at the tertiary level. Innovation plays a central role in our daily lives, offering new solutions for products, processes, and services. By adopting a strategic approach to 'Optimizing Innovation in Knowledge, Education, and Design,' we have the potential to enhance support for learners and educators, while also expanding opportunities for learner engagement, interactivity, and access to education.

I am awed by the magnitude and multitude of participants in this competition. I am also confident that all the innovations presented have provided valuable insights into the significance of innovative and advanced teaching materials in promoting sustainable development for the betterment of teaching and learning. Hopefully, this will mark the beginning of a long series of i-Spike events in the future.

It is also my hope that you find i-Spike 2023 to be an excellent platform for learning, sharing, and collaboration. Once again, I want to thank all the committee members of i-Spike 2023 for their hard work in making this event a reality. I would also like to extend my congratulations to all the winners, and I hope that each of you will successfully achieve your intended goals through your participation in this competition.

Professor Dr. Roshima Haji Said
RECTOR
UiTM KEDAH BRANCH



WELCOME MESSAGE (i-SPIKE 2023 CHAIR)



We are looking forward to welcoming you to the 3rd International Exhibition & Symposium on Productivity, Innovation, Knowledge, and Education 2023 (i-SPIKE 2023). Your presence here is a clear, crystal-clear testimony to the importance you place on the research and innovation arena. The theme of this year's Innovation is "*Optimizing Innovation in Knowledge, Education, & Design*". We believe that the presentations by the distinguished innovators will contribute immensely to a deeper understanding of the current issues in relation to the theme.

i-SPIKE 2023 offers a platform for nurturing the next generation of innovators and fostering cutting-edge innovations at the crossroads of collaboration, creativity, and enthusiasm. We enthusiastically welcome junior and young inventors from schools and universities, as well as local and foreign academicians and industry professionals, to showcase their innovative products and engage in knowledge sharing. All submissions have been rigorously evaluated by expert juries comprising professionals from both industry and academia.

On behalf of the conference organisers, I would like to extend our sincere thanks for your participation, and we hope you enjoy the event. A special note of appreciation goes out to all the committee members of i-SPIKE 2023; your dedication and hard work are greatly appreciated.

Dr. Junaida Ismail

Chair

3rd International Exhibition & Symposium Productivity, Innovation, Knowledge, and Education 2023 (i-SPIKE 2023)

“BUILD-A-RIDE”: AN ONLINE SIMULATION GAME FOR LEARNING CONSTRUCTION

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ABSTRACT

The emergence of Generation Z in tertiary education has created a need for innovative adaptive learning approaches that cater to their distinct characteristics, including their avid use of the internet and social media, as well as their relatively shorter attention spans. Game-based learning has been identified as a promising method to enhance student engagement and motivation in this tech-savvy generation. “Build-A-Ride”, an Online Simulation Game, has been developed as a response to these needs. It aims to assist students in effectively memorizing complex technical terminologies by providing repeated exposure to the words within the game. Through gameplay, students reinforce their understanding and retention of subject-related information. The game also allows the lecturer to assess students' comprehension of the topic. In conclusion, “Build-A-Ride” offers an engaging, effective, and enjoyable way for Generation Z students to master technical terminology and improve their learning experience in construction-related topics. By harnessing the power of game-based learning and catering to the characteristics of this cohort, educators can bridge the gap between traditional teaching methods and the expectations of a technology-driven generation.

Keywords: Build-a-Ride, education online games, game-based learning, online simulation game

INTRODUCTION

Over the last decade, a fresh cohort, commonly known as Generation Z, has begun their tertiary education journey, leading to an escalating need for innovative adaptive learning approaches. Generation Z individuals are avid users of the internet and social media, seamlessly integrating these platforms into their daily lives and social interactions. They grow up in a very highly sophisticated media and technological environment that had made them an internet-savvy nation and much more expert compared to their predecessor (Sharil et al., 2017). One notable characteristic of this generation is a lack of attention span (Hernandez-de-Menendez et al., 2020). The distinctive traits of Generation Z serve as a driving force to develop learning methods i.e., game-based learning that align with their characteristics.

Researchers and educators have asserted the educational capabilities of games to enhance levels of student's engagement. There are many benefits of game-based learning as listed by Adipat et al. (2021) i.e., increase student motivation and engagement, promotes teamwork, quick feedback, and progress record, promotes creativity and lateral thinking, and allows risk-taking and experimentation. Moreover, Liao et al. (2010) found that the effects of game-based learning are positive over traditional instruction in Taiwan. Similarly, Cheng & Su (2012) found that the learning motivations of students have a significant impact on learning achievement, and the learning achievements of students with game-based learning are better than those who use traditional face-to-face teaching. Following the trend of game-based education, Online Simulation Game "Build-A-Ride" has been designed to further promote game-based learning in tertiary education.

"BUILD-A-RIDE" FOR LEARNING CONSTRUCTION

Studying theoretical construction topics can indeed become monotonous and uninteresting. Additionally, students often find themselves grappling with the need to memorize numerous technical terminologies, which can be quite perplexing. To address these challenges and enhance the learning experience, "Build-A-Ride" aims to assist students in memorizing these complex terminologies effectively. Through repeated exposure to the words within the game, students can reinforce their understanding and better retain the word-related information in their minds (Atikah & Rezki, 2018).

By doing so, it not only serves as a means for students to review and reinforce what they have learned in class but also provides an opportunity for the lecturer to assess the students' comprehension of the topic. Overall, this game can play a valuable role in making the learning process more engaging, effective, and enjoyable for students while aiding in their mastery of technical terminology.

How To Play

The game is designed as a multiplayer experience, allowing up to four players to participate simultaneously in the same virtual environment. Each player takes control of a character riding a bicycle, navigating along a predetermined route set by the game. Throughout the gameplay, question boxes will appear at various points along the route. When a player rides over one of these question boxes, a random multiple-choice question related to the subject of construction will appear on the screen. Players must select their answers by clicking on the appropriate option. Importantly, only when a player provides a correct answer will their energy recharge.

The primary objective of the game is to be the first player to reach the finish line. Therefore, participants need to not only demonstrate their skill in controlling their characters but also their knowledge of construction-related topics to answer the questions correctly and maintain their energy levels for a competitive edge. The player who successfully combines strategic riding and accurate answers will emerge as the winner of the game.



Figure 1. Screenshot of the “Build-A-Ride”

CONCLUSION

In conclusion, the rise of Generation Z in tertiary education has driven the need for adaptive learning approaches. "Build-A-Ride," an Online Simulation Game for learning construction-related topics, leverages game-based learning to engage and motivate students. Through navigating a virtual environment and answering construction-related questions, students reinforce their understanding and retention of technical terms. The multiplayer aspect fosters teamwork and creativity, making learning more effective. Overall, this innovative approach has the potential to revolutionize education for Generation Z, offering an exciting and interactive learning journey.

REFERENCES

- Adipat, S., Laksana, K., Busayanon, K., Ausawasowan, A., & Adipat, B. (2021). Engaging Students in the Learning Process with Game-Based Learning: The Fundamental Concepts. *International Journal of Technology in Education*, 4(3), 542–552. <https://doi.org/10.46328/ijte.169>
- Atikah, D., & Rezki, A. (2018). Repetition Facilitates Retrieval Opportunity in Vocabulary Learning. *IOP Conference Series: Earth and Environmental Science*, 175(1). <https://doi.org/10.1088/1755-1315/175/1/012148>
- Cheng, C. H., & Su, C. H. (2012). A Game-based learning system for improving student's learning effectiveness in system analysis course. *Procedia - Social and Behavioral Sciences*, 31(2011), 669–675. <https://doi.org/10.1016/j.sbspro.2011.12.122>
- Hernandez-de-Menendez, M., Escobar Díaz, C. A., & Morales-Menendez, R. (2020). Educational experiences with Generation Z. *International Journal on Interactive Design and Manufacturing*, 14(3), 847–859. <https://doi.org/10.1007/s12008-020-00674-9>

Liao, Y., Chang, L. E., & Chang, C.-C. (2010). Game-based Learning vs. Traditional Instruction: A Meta-Analysis of Thirty-Eight Studies from Taiwan. *Technology and Teacher Education Annual Vo - Conf 21, March 2010*, 1491.

Sharil, M., Mahbob, N. N., & Baharudin, N. S. (2017). Overview of “Generation Z” Behavioural Characteristic and Its Effect Towards Hostel Facility. *International Journal of Real Estate Studies*, 11(2), 2017.

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