STELLAR2023Langkawi

Symposium on Teaching Excellence, Learner-Driven Learning and Academic Research

Adya Hotel, Langkawi, 25-26 October 2023

Organised by: The Office of The Deputy Vice-Chancellor (Academic and International)Level 4, Canseleri Tuanku Syed Sirajuddin
Universiti Teknologi MARA40450 Shah Alam, Selangor, MALAYSIA

Enhancing Engagement and Learning in Research Methodology: The Research Detective Challenge (RDC)

Janiffa Saidon, Zarina Denan, Hairulnizam Hashim[*],
Nurul Ainun Ahmad Atory, Nuryusmawati Mohd Yusof, Syed Ashrene Syed Omar
*Corresponding Author

Faculty of Business and Management, Universiti Teknologi MARA, UiTM Puncak Alam Campus, 42300 Puncak Alam, Selangor, Malaysia

janiffa@uitm.edu.my, zarin424@uitm.edu.my, hairul1927@uitm.edu.my, nurulainun@uitm.edu.my, nuryusmawati@uitm.edu.my, ashrene@uitm.edu.my
Tel: +60 19-3322963

Abstract
Research is crucial for knowledge advancement, problem-solving, decision-making, and improving practices. Nonetheless, comprehending research methods can be a daunting task. A survey involving 117 undergraduates found 83.8% showed low interest in the Research Methodology course. Therefore, the objective of this study is to assess and discuss the RDC's impact on student engagement, aligning with Malaysia's educational goals. Findings illustrate that the integration of Extrinsic Motivation (EM) and Intrinsic Motivation (IM) in gamification lessons are able to boost students' learning engagement. The results directly inform the design of learning activities and guide future research directions.

Keywords: Experience, Engagement, Gamification, Motivation and Research Method

_____

1.0 Introduction
According to the Malaysia Knowledge Economy Study, a 1 percent increase in innovation capacity can boost Malaysia's GDP per capita by 0.36 percent, potentially adding USD 1.21 billion (RM 5.06 billion) to the country's GDP of USD 336 billion (Ignatius, 2022). Economic growth in Malaysia will be reflected in the growth of job opportunities, foreign investments, affordability, and accessibility, thus elevating living standards and advancing it towards a high-tech, high-income nation. Many initiatives have been carried out for the transformation. However, Malaysia faces challenges such as a shortage of skilled talent and a deficit in local research and development, which need to be addressed to advance the country's position in the global value chain (Mohamed, 2021).

The bottom line in handling the issue is to strengthen the research proficiency among the citizens. This underlines the criticality of the Research Methodology course in becoming an important course to nurture essential research skills among students. It is crucial for both undergraduates and postgraduates across many disciplines, imparting expertise needed for academic research and evidence-based decision-making in various professions. However, the journey through the Research Methodology course can be a challenging

path. A preliminary study of 117 undergraduates reveals a surprising reality: 83.8% express low interest in Research Methodology courses due to challenges like unfamiliarity with research terminology, quantitative data challenges, statistics fear, unclear research design, and the perception of dry, technical content.

Given this scenario, it is timely and crucial to handle Research Methodology's challenges, simplify its complexities, and enhance engagement. By doing this, we empower future generations with the skills to shape a brighter world through research, aligning with James et al. (2022) who claimed effective pedagogical strategies that increase students' motivation are required for meaningful learning. Thus, this study intends to determine the effect of gamification as a moderating variable in the relationship between engagement and learning Research Methodology course.

2.0 Literature Review

Previous research has employed a combination of numerous research approaches, incorporating both technological and psychological theories in the domain of gamification. This study, however, is primarily focused on addressing the issue of student motivation, from an educational; teaching, and learning standpoint. The rationale behind the selection of this stance lies in the objective of enhancing student engagement as it is anticipated that addressing this issue will result in a series of positive outcomes.

These positive outcomes are expected to manifest as increased student interest in the learning process, as demonstrated in the findings of Ourdas and Ponis (2023). But in order to resolve the problem, the predictors need to be taken care. Based on the aforementioned criterions, this particular study's perspective was seen as aligned more with the Stimulus-Organism-Response (S-O-R) model which suggested that the gamification elements contained stimuli (S) that affect organisms (gamification motivation; O) and resulted in students' engagement response (R) behaviors (Mehrabian & Russell, 1974). The current study was based on the Stimulus-Organism-Response (SOR) model by Mehrabian & Russell (1974) and self-determination theory (SDT) by Deci & Ryan (1985), to understand better the relationships among the antecedent factors that constitute to gamification motivation and the consequences to the student's engagement.

Nevertheless, it is crucial to acknowledge that to address this problem effectively, it is imperative to give due consideration to the predictive factors associated with it. These are depicted in Figure 1 below.
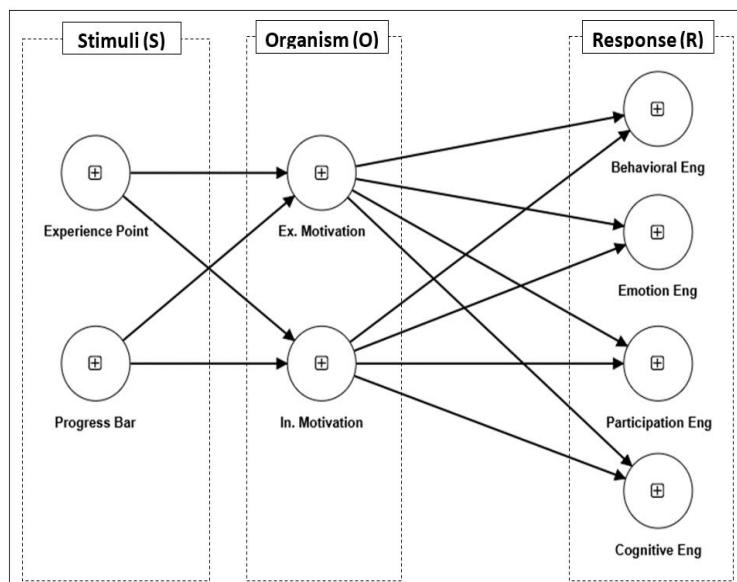
Figure 1. Conceptual Framework

3.0 Methodology

A preliminary investigation was conducted involving students studying Research Methodology to gain insights into the situation. Subsequently, based on the Scavenger Hunt concept, the Research Detective Challenge (RDC) was introduced as an innovative approach to incorporate gamification to be integrated into the pedagogy of Research Methodology. This was aimed at addressing the issues associated with the subject that had resulted in a lack of interest among students. Figure 2 illustrates the Research Detective Challenge (RDC) process flow.

Figure 2. Research Detective Challenge (RDC)
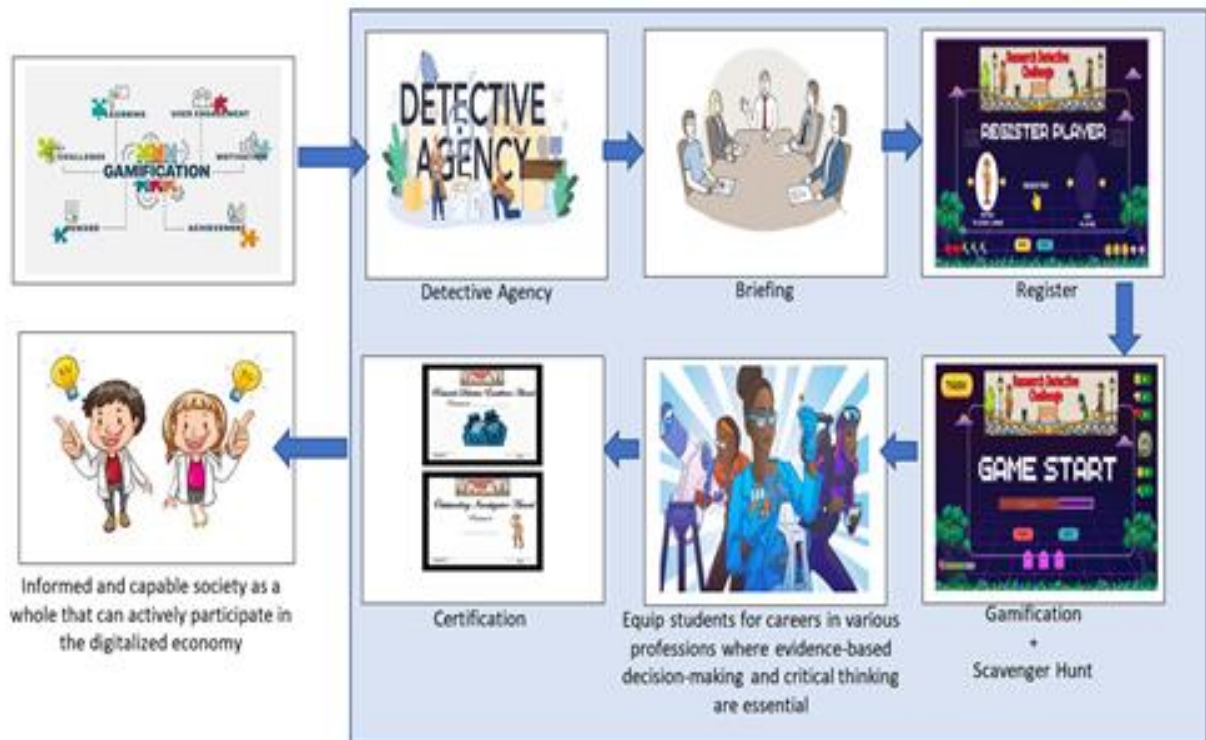
In order to understand the antecedents and the consequences of gamification motivation, a set of questionnaires was developed for this study by adapting items from existing research by Mohanty and Christopher (2023) and Handelsman (2005). The questionnaire consisted of three sections: 10 questions assessing gamification experience (experience points and progress bar), 10 questions assessing gamification motivation (external motivation and intrinsic motivation), and 21 questions assessing gamification engagement (including behavioural, cognitive, emotional, and participatory engagement).

In accordance with Leung's findings in 2011, which indicated no significant differences in psychometric properties based on Likert scale variations, a six-point Likert scale was chosen for this study (Saidon et al, 2017). Respondents were asked to rate items on a scale from 1 'Strongly Disagree' to 6 'Strongly Agree,' omitting a neutral midpoint. This choice was made with confidence that respondents could express their degree of agreement or disagreement based on their experiences. The questionnaire was further validated by two content experts in the field. Data were collected using an online google form questionnaire by means of the snowball sampling method. The study included 117 students aged 20 to 23, all of whom had prior experience with gamification in their learning process. Given the exploratory nature of the study aimed at predicting key target variables, partial least squares structural equation modeling (PLS-SEM), as outlined by Hair et al. (2022), was used to analyse the collected data.

4.0 Findings

The Research Detective Challenge (RDC) outcomes reveal that the antecedents of gamification motivation, Experience Points (XP) had a higher influence and effect size in creating Extrinsic Motivation (EM) in learning Research Methodology. In comparison, the progress bar had a higher influence and effect size in creating Intrinsic Motivation (IM). Game designers may consider emphasising the XP element to enhance the overall gamification experience, potentially leading to increased EM. Nevertheless, the progress bar also plays a significant role in fostering both types of motivation, with both elements exhibiting a moderate effect size.

On the other hand, the consequences of gamification motivation showed that Extrinsic Motivation (EM) had the highest influence and effect size on behavioural engagement, followed by participation engagement and cognitive engagement. In contrast, Intrinsic Motivation (IM) had the highest influence and effect size on participation engagement, followed by behavioural engagement and emotional engagement. Both behavioural and participation engagement was observed to be influenced by both EM and IM, which is expected given the strong attachment of this millennial group of students to their mobile phones. EM had a greater impact on behavioural engagement compared to IM. Conversely, for participation engagement, IM demonstrated a stronger influence compared to EM. It is important to note that emotional engagement was influenced only by IM, while cognitive engagement was influenced only by EM. These results demonstrate the essentiality of integrating EM and IM in gamification lessons to boost students' learning engagement. Collectively, these results can potentially guide relevant key individuals such as game designers in creating the desired type of engagement among students.

5.0 Discussion

The Research Detective Challenge (RDC) represents a paradigm shift in educational methodology, offering a gamified approach that exceeds traditional teaching practices and delivers a multitude of benefits to students. By allowing students to engage with course material prior to class meetings through gamified lessons, the RDC facilitates a dynamic learning experience that fosters active exploration and comprehension without students even realizing they are learning. This pre-class engagement sets the stage for deeper understanding during in-person sessions, maximizing the efficacy of instructional time.

One of the key advantages of the RDC is its ability to promote familiarity with research terminology, a crucial skill for navigating the complex landscape of academic inquiry. By integrating gamified elements into lessons, the RDC immerses students in a learning environment where they are encouraged to interact with and internalize research concepts and terminology progressively.

Moreover, the RDC provides invaluable clarity about research design, a topic often troubled with confusion for students. By breaking down research methodologies into accessible components within a gamified framework, the RDC clarifies the research process, enabling students to approach projects with confidence and clarity. This newfound understanding empowers students to design their research studies and make informed decisions throughout the research process.

Additionally, the RDC addresses the fear of statistics among students, a barrier that can hinder engagement with quantitative research methods. Through gamified lessons, the RDC makes complex data analysis more approachable by breaking it down into manageable tasks and providing immediate feedback. By reducing the perceived difficulty associated with quantitative analysis, the RDC fosters greater engagement with research methodology courses and empowers students to embrace statistical tools as essential instruments for empirical inquiry.

Furthermore, the skills cultivated through the RDC extend far beyond the classroom, equipping students with critical competencies for success in diverse professional contexts. In an era where evidence-based decision-making and critical thinking are essential, the RDC prepares students to excel in careers where analytical insight and research literacy are prerequisites. By instilling a deep understanding of research principles and methodologies, the RDC nurtures a cohort of professionals capable of driving innovation and progress across various industries.

Ultimately, the transformative impact of the RDC extends beyond individual students, contributing to the development of an informed and capable society to thrive in the digitalized economy. By fostering a culture of lifelong learning and inquiry, the RDC cultivates a workforce equipped to tackle the challenges of a rapidly evolving world. Through its innovative approach to education, the RDC not only enriches the learning experiences of students but also lays the groundwork for sustained societal advancement and prosperity.

The results of this study are consistent with findings by Ourdas and Ponis (2023), and also explained by the Stimulus-Organism-Response (SOR) model by Mehrabian & Russell (1974) and self-determination theory (SDT) by Deci & Ryan (1985).,

6.0 Conclusion and Recommendations

In conclusion, the findings of this study underscore the significant role of gamification in enhancing student engagement and motivation within the educational context, particularly in the realm of Research Methodology course. Through the implementation of gamification elements, such as experience points and progress bars, within the Research Detective Challenge (RDC), this study has demonstrated their positive influence on both Extrinsic Motivation (EM) and Intrinsic Motivation (IM) among students. These motivations, in turn, contribute to increased engagement and interest in learning the Research Methodology course, ultimately enriching students' educational experiences.

However, as a limitation of this study, it is essential to recognize that the analysis focuses solely on two gamification elements, thereby presenting a partial view of the broader gamification landscape. To deepen our understanding of this phenomenon and unlock its full potential, future research endeavors should consider incorporating additional gamification elements. By exploring a more comprehensive range of gamification features, researchers can uncover further insights into their efficacy and impact on student motivation and engagement. This holistic approach will provide valuable guidance for game designers and educators seeking to optimize the integration of gamification into educational practices.

Moving forward, the collaboration between the researchers and a team of game design experts from the Faculty of Creative Arts at Universiti Teknologi MARA presents an exciting opportunity to refine and enhance the RDC. By leveraging the expertise of professionals in game design, the RDC can be further developed to maximize its effectiveness in promoting student engagement and learning outcomes. Additionally, the potential collaboration with McGraw-Hill offers the prospect of broader dissemination and implementation of the RDC within educational settings, extending its benefits to a wider audience of students and educators.

Furthermore, the introduction of the RDC not only aligns with the goals of enriching students' learning experiences but also supports the educational and economic strategies of Malaysia. By emphasizing innovation and adaptability in education, the RDC contributes to the nation's efforts to cultivate a skilled workforce capable of driving economic growth and development. Moreover, the success of initiatives like the RDC highlights the importance of embracing emerging technologies and pedagogical approaches in addressing the evolving needs of the modern education landscape.

In light of these findings, it is recommended that educational institutions and policymakers prioritize the integration of gamification into curriculum design and instructional practices. By harnessing the power of gamification to enhance student engagement and motivation, educators can create dynamic and immersive learning experiences that foster deeper understanding and retention of course material. Additionally, ongoing collaboration between academia, industry, and educational technology providers is crucial for the continued refinement and implementation of gamified educational interventions like the RDC.

Ultimately, the adoption of gamification represents a promising avenue for transforming education and preparing students for success in an increasingly complex and digitalized world. By embracing innovation and creativity in teaching and learning, we can empower the next generation of learners to thrive in an ever-changing global landscape.

7.0 Paper Contribution to Related Field of Study

The initiative to develop the Research Detective Challenge (RDC) as a gamified approach for teaching Research Methodology not only represents a groundbreaking educational innovation but also is in harmony with Malaysia Higher Education 4.0, which seeks to transform the teaching and learning delivery process to meet the evolving needs of the digital age. As Malaysia strives to develop innovative human capital to drive economic growth and development, initiatives like the RDC play a pivotal role in equipping students with the skills and competencies necessary to excel in a rapidly changing world. Furthermore, the RDC initiative exemplifies the proactive approach of educational institutions such as UiTM in responding to the changing needs of students and society. By embracing emerging trends in education and leveraging cutting-edge technologies, UiTM demonstrates its commitment to providing students with a world-class education that prepares them for success in the digital age.

Education 5.0@UiTM, a comprehensive program aimed at revolutionizing teaching and learning methods, serves as a catalyst for educational transformation by placing students at the forefront of the learning process. The RDC initiative embodies the spirit of Education 5.0 by providing students with an immersive and engaging learning experience that empowers them to take ownership of their education. By leveraging gamification techniques, the RDC fosters active participation and deepens student understanding, aligning perfectly with the goals of Education 5.0 to nurture lifelong learners equipped with critical thinking skills and adaptability.

Moreover, the RDC initiative resonates with the nation's broader economic development agenda, particularly the National Key Economic Areas (NKEA) focused on developing innovative human capital. As Malaysia seeks to transition to a high-income economy, the cultivation of a skilled and innovative workforce is paramount. By integrating gamified approaches into education, the RDC initiative contributes to the development of a workforce equipped with the critical thinking, problem-solving, and research skills needed to drive innovation and competitiveness across sectors.

In conclusion, the initiative to develop the Research Detective Challenge (RDC) as a gamified approach for teaching Research Methodology represents a transformative leap forward in education that aligns with key educational initiatives and government policies outlined in the Malaysia Education Plan 2015–2025. By embracing innovation and leveraging technology to enhance teaching and learning practices, the RDC initiative not only enriches the educational experience for students but also contributes to the development of a skilled and innovative workforce essential for Malaysia's economic growth and competitiveness in the global arena.

References

Ab. Rahman, R., Ahmad, S., & Hashim, U. R. (2018). The effectiveness of gamification technique for higher education students' engagement in polytechnic Muadzam Shah Pahang, Malaysia. *International Journal of Educational Technology in Higher Education,* 15(1), 1–16.

Battestilli, L., Bohorquez, E.B., Khan, S. & Meral, C. (2023). Exploring students' perceptions and engagement in hybrid flexible courses. *In Proceedings of the Tenth ACM Conference on Learning,* July 20–22, 2023, Copenhagen, Denmark. ACM, New York, NY, USA. https://doi.org/10.1145/3573051.3593383.

Burke, B. (2016). *Gamify: How gamification motivates people to do extraordinary things*, Routledge.

Caru, A., & Cova, B. (2006). How to facilitate immersion in a consumption experience: Appropriation operation and service elements. *Journal of Consumer Behaviour,* 5(1), 4–14.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behaviour.* New York: Plenum. doi: 10.1186/s41239-018-0123-0.

Hair, J.F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A Primer on Partial Least Squares Structural Equation Modelling (PLS-SEM).* 3rd Ed., Sage: Thousand Oaks.

Handelsman, M. M., Briggs, W.L., Sullivan, N., & Towler, A. (2005). A measure of college student course engagement. *The Journal of Educational Research,* 98(3), 184–191.

Henseler, J., Ringle, C.M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modelling. *Journal of the Academy of Marketing Science*, 43, 115–135.

Howell, R. A. (2021). Engaging students in education for sustainable development: The benefits of active learning, reflective practices and flipped classroom pedagogies. *Journal of Cleaner Production*, 325, 1–12.

Ignatius, C. (2022). Malaysia needs big innovation purpose to stay ahead. https://www.businesstoday.com.my/2022/03/01/malaysia-needs-big-innovation-purpose-to-stay-ahead/ Accessed 21 August 2023.

James, N., Vincent, O.R., Akande, N.O. & Makinde, A.S. (2022). Covid-19: Why virtual learning becomes a pedagogical acceptance model in Africa. *International Journal of Emerging Technologies in Learning*, 17(01), 206–223.

Lavoue, E., Ju, Q., Hallifax, S. & Serna, A. (2021). Analyzing the relationships between learners' motivation and observable engaged behaviors in a gamified learning environment. *International Journal of Human-Comnputer Studies*, 154, 1–13.

Mehrabian, A., & Russell, J.A. (1974). *An approach to environmental psychology,* Cambridge, MA: MIT Press.

Mohamed, M. (2021). Malaysia needs to address skilled talent shortage, lack of R&D. https://www.thesundaily.my/home/malaysia-needs-to-address-skilled-talent-shortage-lack-of-rd-in-ee-sector-mustapa-CX8462949 Accessed 17 August 2023.

Mohanty, S. & Christopher, B.P. (2023). A study on role of gamification elements in training outcomes: Comparing the mediating effect of intrinsic and extrinsic motivation. *The Learning Organization*, 30(4), 480–500.

Ourdas, C. & Ponis, S. (2023). Evaluating the effects of gamification in behavioural change: proposed SEM-Based approach. *Sustainability*, 15, 1–31.

Palia, A.P. (2020). Enhancing experiential learning via sustained engagement. *Developments in Business Simulation Experiential Learning*, 47, 42–70.

Parra-Gonzalez, M.E., Segura-Robles, A., Moreno-Guerrero, A.J., & Lopez-Belmonte, J. (2022). Elaboration and validation of the scale to measure the experience on gamification in education. *Journal of Technology and Science Education*, 12(1), 217–229.

Ringle, C.M., Wende, S. and Becker, J.M. (2022). *SmartPLS 4*. Oststeinbek: SmartPLS GmbH. http: www.smartpls.com.

Rodriguez, P. (2021). The ultimate 2022 definition of gamification. Growth Engineering. https://www.growthengineering.co.uk/definition-of-gamification/ Accessed 16 August 2023.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68–78.

Saidon, J., Musa, R. & Harun, M.H.M. (2017). Pathological smartphone use and its consequences. *Pertanika Journal of Social Science & Humanities*, 25(S), 395–402.

Sallleh, M.I.M., Alias, N.A., Ariffin, S., Ibrahim, Z., Ramli, A.R. & Aliman, S. (2023). The sudden transition to remote learning in response to Covid-19: Lesson from Malaysia. *Humanities and Social Sciences Communications*, 10, 1–10.

.