

The Effect of Game-Based Technology on Students' Learning Anxiety, Motivation, Engagement and Learning Experience: Case Study Kahoot!

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Abstract

Traditional learning method encounters main difficulties around student motivation, anxieties, concentration and engagement. Game-based learning, Kahoot! has a significant role in the educational process and has become an essential alternative to traditional education, where statistics indicate that there are more than 1.3 billion active users account from more than 200 countries. Therefore, this study examines the influence of employing Kahoot! on students' experience. A qualitative method was employed, whereas a semi-structured interview approach was conducted to examine the scope to which Kahoot! effect learning anxiety, motivation, engagement, learning experience and classroom dynamics. The findings indicated that Kahoot! decreases learning anxiety, enhances learning experience, improves value of students learning in the classroom, enhances motivation and encourages engagement. As well as offers chances for teachers to adapt their tutoring established on student knowledge. Other findings showed the students welcome the use Kahoot! tool and found the use of Kahoot! was funny and reduce distractions and enhance focus.

Keywords: Game-Based Learning, Kahoot!, Learning Anxiety, Engagement, Classroom Dynamics, Motivation.

INTRODUCTION

Most scholars reported that learning with little interaction in the classroom is a vital challenge since it reduces the students' engagement, attention, concentration, motivation and increases learning anxieties over time in class (Alkhalil et al., 2021; Kiryakova, Angelova, & Yordanova, 2014; Muntean, 2011). In addition, it can consequence in a negative atmosphere in the classroom and decline of learning outcomes (A. H. Alsswey, Al-Samarraie, El-Qirem, Alzahrani, & Alfarraraj, 2020). Herein the challenge for lecturers and teachers is how to inspire and engage students in classroom learning, especially in higher education to take advantage of opportunities to practice and receive feedback on learning and achievements. It was stated in numerous researches in the literature that this challenging complex is to fix by traditional learning methods. Furthermore, motivation, attention, concentration, engagement and reducing anxieties in the learning environment cannot be attained (Al-Samarraie, Teng, Alzahrani, & Alalwan, 2018; Almaiah et al., 2022; Ghazal, Al-Samarraie, & Aldowah, 2018; Ghazal, Aldowah, & Umar, 2017).

In order to bolster students' involvement t, motivation, attention, concentration, and reducing anxieties in the learning process and improve their learning outcomes, formative assessment feedback should be used as a vital factor in the learning development and process. Hence, the formative feedback should be suitably designed and employed to enhance student's learning process. It was recommended that "game-based learning," could be influential on the enhancement of students' engagement and motivation and should be presented to the learning environment as a novel learning method (Ismail & Mohammad, 2017).

Game-based learning; is a learning technology become widespread in education that motivates and engages students in learning in different ways (Anastasiadis, Lampropoulos et al. 2018(Jaber et al., 2021)). Prior studies (i.e., Anastasiadis, Lampropoulos et al. 2018, Brezovszky, McMullen et al. 2019, Taub, Sawyer et al. 2020, Ishtaiwi & Aljaberi, 2023) depicted that utilizing game-based learning yields a favorable influence on the educational setting compared to traditional learning methods, provides actual feedback and improve students' motivational, emotional and cognitive, this due to Students are excited to use various technologies and they are capable in the utilize of mobile technologies and games designed for such devices. The objective of this

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study is to inspect the usefulness of utilizing Kahoot! as a tool for formative assessment in multimedia learners at AL-Zaytoonah private university of Jordan which is employed to achieve learning outcomes. Overall, this study employed a qualitative method to contribute and examine students' learning experience utilizing Kahoot!. The sections of this study are organized to discover classroom dynamics, student engagement, and motivation. In the Background section, we introduce the study background. The methods section provides details and procedures regarding the research methods. The study findings are presented in the third section. The discussion section entails the discussion of findings, while the limitation section presents the study's limitations. Finally, the Conclusion section presents the concluding results and recommendations.

BACKGROUND

Game-Based Technology

Game-based learning entails the use of games for educational purposes., rather than learning solely to play games. (Plass, Mayer, & Homer, 2020). Game-based learning introduces novel ideas and occasions to reconsider the students' learning methods, whereas the students can design and manage their content, practice their skills and share their learning experiences (A. Alsswey, Al-Samarraie, & Bervell, 2021; Anastasiadis, Lampropoulos, & Siakas, 2018). Previous studies have shown that game-based learning enhances learners' thinking skills and boosts motivation and engagement when compared to traditional learning methods (Hooshyar et al., 2021). Despite of advantages of employing game-based learning in the learning environment, there are some limitations in certain situations like other teaching methods. For example, collision of educational games utilized in teaching and students' foundational skills, the humble of elements design (Karakoç, Eryılmaz, Özpolat, & Yıldırım, 2020), the inability to catch the students' attention (Cop & Kablan, 2018) may affect the obstruction of learning enjoyment and engagement. While evidence supporting the effectiveness of educational games may be limited, studies on game-based learning have garnered increasing attention recently (Lamb, Annetta et al. 2018).

Kahoot! one of the popular developing game-based learning platforms and formative assessment tool employed in the education environment is Kahoot!. Kahoot! is a game-based student response system (GSRS) played free in real-time and has obtained wide acceptance universally to make learning acceptable, enjoyable and fun, thus encouraging students to learn. In 2019, statistics indicated that Kahoot! had been played by over 2.5 billion users worldwide, spanning across more than 200 countries (A. Alsswey, Al-Samarraie, & Malak, 2022; Wang & Tahir, 2020). It is employed to work with exercises, manage quizzes, ease discussions, and gather survey data as well as analyze students' knowledge for formative assessment. Here, the teacher acts as the host of the game demonstration, and the learners are the participants striving to be the best responders for questions are exposed and the generally winners will be demonstrated at the end of the Kahoot! sitting. Once respondents have provided their answers or the allotted time set by the teacher has elapsed. The accurate response appears on the teacher's monitor, accompanied by a bar graph illustrating the overall results (see figure 2). In addition, the results of responders involving their descriptive analysis data can be transferred and saved for future reference.

The objective of Kahoot! is to enhance attention, enjoyment, motivation, and engagement, as a result, enhancing learning achievement and encouraging schoolroom interaction. Tedium in both traditional and computer-based learning environments can result in reduced learning outcomes and difficult behavior. (Baker, D'Mello, Rodrigo, & Graesser, 2010). Requirements for teachers were frank to play quizzes, create context, and evaluate the students. whilst for the students to connect easily and play without discomfiture (anonymously) (Kena et al., 2015). Hence, this study designed to examine the influence of integrating Kahoot! on schoolroom dynamics, engagement, motivation, and reducing learning anxiety. For this purpose, in this perspective, the research questions are as follows:

RQ1. What impact does Kahoot! have on schoolroom dynamics?

RQ2. How does the usage of Kahoot! effect students' engagement, and in what ways?

RQ3. How does the utilization of Kahoot! affect students' motivation toward learning, and in what manner?

RQ4. In what ways does the implementation of Kahoot! enhance learning experiences??

RQ5. Does the use of Kahoot! effect students' anxiety?

Kahoot! Design

Kahoot! was employed in the first year as part of multimedia introduction course in the first semester of 2022 (October and January. Kahoot! was incorporated into fifteen out of thirty-two lectures, lasting an average of about 30 minutes each. Its purpose was to assess students on diverse subjects to gauge their proficiency, assess their comprehension of lecture content, and assist students in confirming their understanding. The teaching staff created sets of questions ranging from 12 to 20 in length. Furthermore, Kahoot! environment includes several interactive features (i.e., suspense music), n this setup, students utilize mobile devices such as tablets, laptops, and smartphones to access the games and submit their answers. (Refer to Figure 1 for the main screen of Kahoot! Screen). The system records the responses of individual learners or teams, assigns points, and assesses players according to their speed and accuracy. The performance of the top five participants is showcased after each question. (See figure 2 for a sample Kahoot! bar graph illustrating response outcomes.)

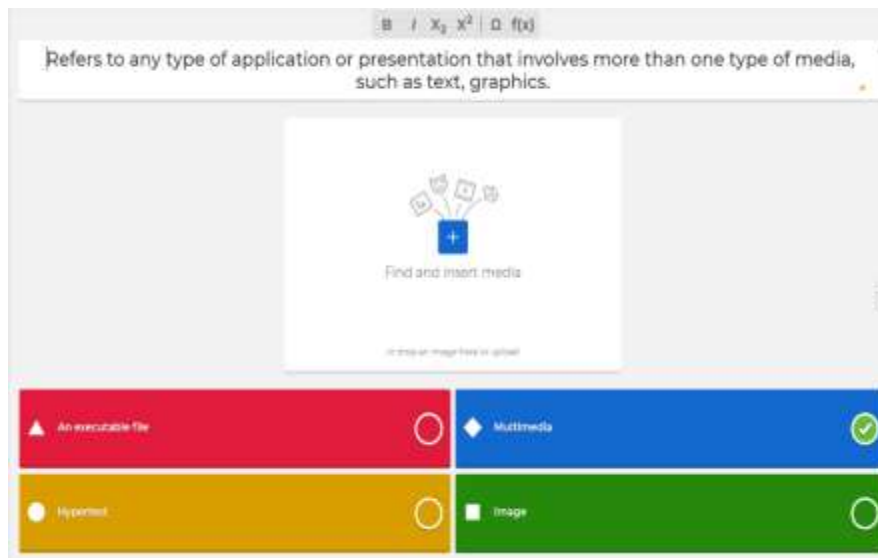


Figure 1. Main screen of Kahoot! screen



Figure 2. Sample Kahoot! response outcomes

RESEARCH PROCEDURE

Method

This study utilized a qualitative method to answer the five specified questions. The justification for using this method is based on the consideration of perception, engagement, anxiety and motivation being dynamic, Complicated and not readily decipherable within its observed context(Kelle, 2006). In addition, employing the qualitative method to explore the perceptions of learners', engagement, anxiety and motivation delivers a better understanding and deep levels of interpretation.

Interview

This study employed the interviews method to collect research involved (five questions). interview time, questions and responses were identified. Interviews were steered to investigate the engagement, anxiety, motivation, enjoyment and learning experience. This interview engaged 21 participants selected through convenience sampling. The insights gleaned from the interview were utilized to cross-reference the findings of (RQ1- RQ5). Prior to the interview, each participant received a study booklet encompassing three documents: a plain language statement, a consent form, and an instruction sheet. Later, the audio recordings of the interview were transcribed to extract notes and responses.

Demographic Data of Participants

statistical summaries respondent's characteristics details, containing gender, age, and the amount of time spent studying the course

Table 1. Demographic Data of Participants

Participant (student)	Gender	Age	Course	House spent in studying 9weekly)
1	Male	18	Principles of Multimedia Technology design	5
2	Female	18	Principles of Multimedia Technology design	6
3	Female	18	Principles of Multimedia Technology design	7
4	Male	18	Principles of Multimedia Technology design	8
5	Male	19	Principles of Multimedia Technology design	5
6	Female	20	Principles of Multimedia Technology design	6
7	Male	18	Principles of Multimedia Technology design	6
8	Male	18	Principles of Multimedia Technology design	6
9	Male	18	Principles of Multimedia Technology design	5
10	Male	18	Principles of Multimedia Technology design	7
11	Female	18	Principles of Multimedia Technology design	5
12	Female	18	Principles of Multimedia Technology design	5
13	Female	18	Principles of Multimedia Technology design	6
14	Female	18	Principles of Multimedia Technology design	5
15	Female	18	Principles of Multimedia Technology design	6
16	Female	18	Principles of Multimedia Technology design	7
17	Male	18	Principles of Multimedia Technology design	6
18	Female	18	Principles of Multimedia Technology design	4
19	Male	18	Principles of Multimedia Technology design	6
20	Female	18	Principles of Multimedia Technology design	5
21	Female	18	Principles of Multimedia Technology design	6

As presented in Table 1 the mainstream of the participants (n: 19 or 90.5%) are 18 age. Ten participants (47.6%) are male and 11 (52.4%) are female. All of the participants are Multimedia Technology students. Most of the students spent 5-7 weeks studying the course.

RESULT

This study utilized semi-structured interviews to search the influence of Kahoot! on students' engagement, motivation, learning experience, anxieties, and enjoyment. As highlighted in the background, student engagement is correlated with the level of attention and emphasis they exhibit during the course, while Motivation pertains to the encouragement students receive to engage and interact in the schoolroom, while knowledge experience involves the understanding and abilities gained, directly impacted by their schoolroom

participation. The analysis of interviews exposed four subjects correlated to students' experiences with Kahoot!: (1) courtesy and concentration, (2) interaction and involvement, (3) feedback and discourse, and (4) retention and knowledge acquisition. This section presents the insights gathered from the interviewees regarding their utilization of the Kahoot! tool, as outlined below.

Attention and Emphasis

In relation to the perceptions of the interviewee's attention and emphasis towards Kahoot! tool usage. All interviewees (n: 21 or 100%) reported that they were activated positive attention and emphasis in the classroom. For example, R7 stated” *use Kahoot! improve my attention rather than traditional learning methods*”. In addition, they were satisfied with the features of Kahoot! tool which stay them away from the distractions that may occur in use traditional education methods. This was clearly mentioned by R1 “*simplicity of using Kahoot! makes me focus and avoid distractions*”.

Interaction and Enjoyment

Twenty-one interviewees reported that using Kahoot! enhances their interaction and engagement in the lecture by enhancing their certain skills and improving their learning. In addition, students were enjoyment and satisfied with using Kahoot! tool, due to its simplicity and user-friendly interface, Kahoot! is preferred by many. For instance, R9 stated, "Kahoot! is easy to use, straightforward, and enjoyable." This observation highlights how the design elements of Kahoot! user interface (UI), including icons, layout, buttons, font, and color, contribute positively to the interaction, enjoyment, and satisfaction levels of the interviewees.

Feedback and Discussion

Seventeen (17) interviewees indicated that the use of Kahoot! has increased the students' opportunities to participate in class discussions and express their opinion more largely and broadly, which has enhanced their ability to present their ideas, share them with others, and evaluate them in comparison with the opinions of others, unlike traditional teaching methods that were limited to some students. For example, R 6 Stated “Listening to other people's opinions and discussing them helps me learn effectively and quickly”. whilst R3 stated that “The feedback of my colleagues and their opinions regarding my answers is an indirect way to learn.

Rising and Saving Knowledge

Eighteen interviewees indicated that the use of Kahoot! helped them improve their ability to remember information by linking it to play where the participants saw the ease of use and simplicity design of Kahoot! The user interface helped them a lot in memorizing and remembering information during and after the lecture. In addition, some of the interviewees mentioned using Kahoot! help them to remember the correct answers and avoid mistakes If they answered the questions incorrectly, for example, R1 claimed,” when you make mistakes in answers it is easy to remember that and avoid making mistakes again to the same questions”.

DISCUSSION

Previous research has demonstrated the challenge of capturing learners' attention in the classroom, maintaining their focus, and fostering peer interaction, as learners' distractions and loss of focus can negatively impact their performance. Consequently, there has been a notable surge in the adoption of educational games to enhance the learning process by effectively engaging, motivating, and captivating learners. However, discrepancies exist in the outcomes of certain previous studies regarding the efficacy of Game-Based Response Systems (GBRSs), Given the growing emphasis on utilizing tools like Kahoot! to bolster student learning and interaction, there is a clear necessity for a qualitative exploration into students' experiences with Kahoot!. This study delves into how integrating Kahoot! affects students' motivation, engagement, anxiety reduction, and learning within the field of multimedia technology. Its objective is to elucidate the conditions under which Kahoot! positively impacts students' learning experiences. By carefully reevaluating our findings, we seek to address the research questions posed in this study.

QR1: What impact does Kahoot! have on schoolroom dynamics?

The result of the present study indicates that the usage of Kahoot! has had a favorable effect on schoolroom dynamics. Kahoot! offers students the opportunity to initiate their learning experience, enhance their understanding of lectures, and engage in the classroom, and foster interaction and discussion. These are the main differences when compared to the traditional learning method. The findings may be explained by the fact that Kahoot! provides the opportunity for students to interact and engage with their peers and teachers. These findings are in line with previous studies, (Licorish, Owen, Daniel, & George, 2018; Muhridza, Rosli, Sirri, & Samad, 2018; Plump & LaRosa, 2017) supporting the use of Kahoot! in enhancing engagement, interacting, understanding learner content, and reducing anxiety.

Moreover, the outcomes of the study exposed the usage of Kahoot! led to an overwhelming desire for students to participate and compete among themselves, which reflected positively on their achievements and initiated their learning experience. Additionally, the results indicated that concealing a student's identity, or using a pseudonym, during participation and interaction in the lecture, especially for students who suffer from shyness and fear of expressing their opinion in front of others) helped them interact and express their opinion more openly. This finding is supported by Shi and Tan (2020) who stated that preserving anonymity is an important factor in facilitating engagement and participation in classroom discussions.

QR2: RQ2. How does the usage of Kahoot! effect students' engagement, and in what ways?

The outcomes of the study illustrate that the use of Kahoot! has expressively more influence on students' focus in the lessons and engagement than with the traditional learning method (traditional classroom and paper quiz). The use of Kahoot! stimulated and encouraged students to engage and participate to compete with their colleagues and win, which reflected positively on the student's academic achievement through prior preparation for, and focus during, the lecture. This finding is consistent with several researchers' findings (Wibisono, 2019).

In the same vein, their readiness to compete was also influenced by allowing the use of pseudonyms, which helped students focus on the content of the lecture, rather than differences of opinion. This aided students in achieving a more profound comprehension of the lesson and enhancing their capacity for recall and analysis. This finding is supported by Rachman, Soviyah, Fajaruddin, and Pratama (2020) who claimed that using Kahoot! in learning helped students achieve a deeper understanding. Moreover, Codish and Ravid (2014) claimed that diverse design elements of gamification influence the engagement of users.

QR3: RQ3. How does the utilization of Kahoot! affect students' motivation toward learning, and in what manner?

The outcomes of the study revealed that the use of Kahoot! motivates and encourages students to actively participate with their peers, to compete and win. In addition, the availability of a distinctive, attractive, and easy-to-use application interface, which contains the appropriate design elements that add an atmosphere of pleasure during use (such as sound and buttons), can motivate students. This finding is consistent with several researchers who acknowledged the values of gamification-generated motivation. It is also vital to highlight that using Kahoot! helped students achieve better grades.

RQ4. In what ways does the implementation of Kahoot! enhance learning experiences?

The results of the study indicated that the usage of Kahoot! had a positive impact on students by increasing their interaction, attention, use of their skills, and enhancing knowledge by focusing on content away from sources of distraction, which ultimately reflected positively on students' results. This finding is in line with (Méndez-Coca & Slisko, 2013; Plump & LaRosa, 2017). As the use of Kahoot! provides the necessary tools for lecturers to implement strategies Pre-prepared education and also use the feedback and statistics provided by the application to evaluate and improve the educational process. Indeed, Kahoot! improves knowledge retention beside enhance remember lecture content and learning.

RQ5. Does the use of Kahoot! effect students' anxiety?

The result of the study displayed that the use of Kahoot! engaged in an important role in reducing anxiety among students while participating in the lecture or taking the exam because they can hide their real names or use pseudonyms. In addition, the ease of use of the Kahoot! and their enjoyment in using it reduced the state of anxiety that afflicts them when submitting exams or using the application for the first time. This result is consistent with several studies such as, (Isbister, Karlesky, Frye, & Rao, 2012; Malak & Khalifeh, 2018). In addition, several studies have been showed learning and achievement are correlated to general anxiety. For example, Wang and Tahir (2020) found that Kahoot! positively influence students' anxiety. Su (2016), claimed that students who use Kahoot! are concerned on using Kahoot! because they found it motivated and exciting.

CONCLUSION

There is increasing emphasis on understanding how students' engagement impact on their learning, reducing learning anxieties and enhancing motivation where lecturers are capable to offer

to a certain degree adapting education actions founded on students' answers to assessments and real-time feedback to students. Kahoot! holds significant importance in higher education learning due to its ability to enhance student engagement, participation, and active learning. By incorporating gamification elements such as quizzes, polls, and challenges, Kahoot! transforms traditional lectures into interactive and dynamic experiences, catering to diverse learning styles. This platform fosters a collaborative and competitive environment, motivating students to actively participate in class activities. Moreover, Kahoot! facilitates instant feedback, allowing instructors to gauge student understanding in real-time and adapt their teaching accordingly. Its user-friendly interface and accessibility across multiple devices make it a versatile tool for both in-person and online learning environments. Furthermore, Kahoot! encourages peer-to-peer interaction and teamwork, promoting critical thinking and problem-solving skills. Overall, the integration of Kahoot! in higher education enhances student learning outcomes, promotes retention of course material, and cultivates a positive and engaging learning atmosphere.

The outcome of this study suggested that with effort and aspiration to engage students, Games-based learning can create an immersive atmosphere that fosters learning and encourages active participation in classroom interactions and reducing learning anxiety level.

LIMITATIONS AND FUTURE WORK

Limitations in examining Kahoot!'s impact on student learning anxiety, motivation, engagement, and learning experience may include sample size constraints, potential biases in participant responses, and the specificity of the study context. Future research could expand by conducting longitudinal studies to assess long-term effects, incorporating diverse student populations, and exploring the influence of varying Kahoot! implementations. Additionally, investigating the effectiveness of combining Kahoot! with other educational tools and platforms could provide deeper insights. Exploring the role of instructor training and support in maximizing Kahoot!'s benefits and addressing any potential drawbacks could also be valuable avenues for future investigation.

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Availability of Data and Materials

Not applicable

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REFERENCES

- Al-Samarraie, H., Teng, B. K., Alzahrani, A. I., & Alalwan, N. (2018). E-learning continuance satisfaction in higher education: a unified perspective from instructors and students. *Studies in higher education*, 43(11), 2003-2019.
- Alkhalil, S. M., Manasrah, A. A., Dabbour, L. M., Bashayreh, E. a. A., Abdelhafez, E. A., & Rababa, E. G. (2021). COVID-19 pandemic and the E-learning in higher institutions of education: Faculty of engineering and technology at Al-Zaytoonah University of Jordan as a case study. *Journal of Human Behavior in the Social Environment*, 31(1-4), 464-475.
- Almaiah, M. A., Alfaisal, R., Salloum, S. A., Hajje, F., Thabit, S., El-Qirem, F. A., . . . Alkhdour, T. (2022). Examining the Impact of Artificial Intelligence and Social and Computer Anxiety in E-Learning Settings: Students' Perceptions at the University Level. *Electronics*, 11(22), 3662.
- Allswey, A., Al-Samarraie, H., & Bervell, B. (2021). mHealth technology utilization in the Arab world: A systematic review of systems, usage, and challenges. *Health and Technology*, 11(4), 895-907.
- Allswey, A., Al-Samarraie, H., & Malak, M. Z. (2022). Older adults' satisfaction with mHealth UI design-based culture: A case study of Jordan. *Journal of Human Behavior in the Social Environment*, 1-13.
- Allswey, A. H., Al-Samarraie, H., El-Qirem, F. A., Alzahrani, A. I., & Alfarraj, O. (2020). Culture in the design of mHealth UI: An effort to increase acceptance among culturally specific groups. *The Electronic Library*.
- Anastasiadis, T., Lampropoulos, G., & Siakas, K. (2018). Digital game-based learning and serious games in education. *International Journal of Advances in Scientific Research and Engineering (ijasre)*, 4(12), 139-144.
- Baker, R. S., D'Mello, S. K., Rodrigo, M. M. T., & Graesser, A. C. (2010). Better to be frustrated than bored: The incidence, persistence, and impact of learners' cognitive-affective states during interactions with three different computer-based learning environments. *International Journal of Human-Computer Studies*, 68(4), 223-241.
- Codish, D., & Ravid, G. (2014). Personality based gamification-Educational gamification for extroverts and introverts. Paper presented at the Proceedings of the 9th CHAIS Conference for the Study of Innovation and Learning Technologies: Learning in the Technological Era.
- Cop, M. R., & Kaban, Z. (2018). Türkiye'de eğitsel oyunlarla ilgili yapılmış çalışmaların analizi. *Kocaeli Üniversitesi Eğitim Dergisi*, 1(1), 52-71.
- Ghazal, S., Al-Samarraie, H., & Aldowah, H. (2018). "I am still learning": Modeling LMS critical success factors for promoting students' experience and satisfaction in a blended learning environment. *IEEE Access*, 6, 77179-77201.
- Ghazal, S., Aldowah, H., & Umar, I. (2017). Critical factors to learning management system acceptance and satisfaction in a blended learning environment. Paper presented at the International Conference of Reliable Information and Communication Technology.
- Hooshyar, D., Malva, L., Yang, Y., Pedaste, M., Wang, M., & Lim, H. (2021). An adaptive educational computer game: Effects on students' knowledge and learning attitude in computational thinking. *Computers in Human Behavior*, 114, 106575.
- Isbister, K., Karlesky, M., Frye, J., & Rao, R. (2012). Scoop! A movement-based math game designed to reduce math anxiety. In CHI'12 extended abstracts on human factors in computing systems (pp. 1075-1078).
- Ishtaiwi, A., & Aljaberi, N. (2023). Impact of COVID-19 Pandemic on Higher Education: Jordan Higher Education Case study. *International Journal of Advances in Soft Computing & Its Applications*, 15(3).
- Ismail, M. A.-A., & Mohammad, J. A.-M. (2017). Kahoot: A promising tool for formative assessment in medical education. *Education in Medicine Journal*, 9(2).
- Jaber, K. M., Abduljawad, M., Ahmad, A., Abdallah, M., Salah, M., & Alhindawi, N. (2021). E-learning mobile application evaluation: Al-Zaytoonah University as a case study. *Int. J. Advance Soft Compu. Appl*, 13(3).
- Karakoç, B., Eryılmaz, K., Özpolat, E. T., & Yıldırım, İ. (2020). The effect of game-based learning on student achievement: A meta-analysis study. *Technology, Knowledge and Learning*, 1-16.
- Kelle, U. (2006). Combining qualitative and quantitative methods in research practice: purposes and advantages. *Qualitative research in psychology*, 3(4), 293-311.
- Kena, G., Musu-Gillette, L., Robinson, J., Wang, X., Rathbun, A., Zhang, J., . . . Nachazel, T. (2015). The condition of education 2015. National Center for Education Statistics, 144.
- Sarwat, N., Ali, R., & Khan, T. I. (2021). Challenging, hindering job demands and psychological well-being: The mediating role of stress-related presenteeism. *Research Journal of Social Sciences and Economics Review*, 2(1), 135-143.
- Kiryakova, G., Angelova, N., & Yordanova, L. (2014). Gamification in education.
- Licorish, S. A., Owen, H. E., Daniel, B., & George, J. L. (2018). Students' perception of Kahoot!'s influence on teaching and learning. *Research and Practice in Technology Enhanced Learning*, 13(1), 1-23.
- Malak, M. Z., & Khalifeh, A. H. (2018). Anxiety and depression among school students in Jordan: Prevalence, risk factors, and predictors. *Perspectives in psychiatric care*, 54(2), 242-250.
- Méndez-Coca, D., & Slisko, J. (2013). Software Socrative and smartphones as tools for implementation of basic processes of active physics learning in classroom: An initial feasibility study with prospective teachers. *European Journal of Physics Education*, 4(2), 17-24.
- Muhridza, N. H. M., Rosli, N. A. M., Sirri, A., & Samad, A. A. (2018). Using game-based technology, KAHOOT! for classroom engagement. *LSP International Journal*, 5(2).

- Muntean, C. I. (2011). Raising engagement in e-learning through gamification. Paper presented at the Proc. 6th international conference on virtual learning ICVL.
- Plass, J. L., Mayer, R. E., & Homer, B. D. (2020). Handbook of game-based learning: Mit Press.
- Plump, C. M., & LaRosa, J. (2017). Using Kahoot! in the classroom to create engagement and active learning: A game-based technology solution for eLearning novices. *Management Teaching Review*, 2(2), 151-158.
- Rachman, D., Soviyah, S., Fajaruddin, S., & Pratama, R. A. (2020). Reading engagement, achievement and learning experiences through kahoot. *LingTera*, 7(2), 168-174.
- Shi, M., & Tan, C. Y. (2020). Beyond oral participation: A typology of student engagement in classroom discussions. *New Zealand Journal of Educational Studies*, 55(1), 247-265.
- Su, C.-H. (2016). The effects of students' motivation, cognitive load and learning anxiety in gamification software engineering education: a structural equation modeling study. *Multimedia Tools and Applications*, 75(16), 10013-10036.
- Wang, A. I., & Tahir, R. (2020). The effect of using Kahoot! for learning—A literature review. *Computers & Education*, 149, 103818.
- Wibisono, D. (2019). The effects of Kahoot! In teaching reading to tenth grade students. *Magister Scientiae*, 1(45), 86-105.