INVESTIGATING THE EFFECT OF DIGITAL-GAME BASED LEARNING ON EFL STUDENT'S MOTIVATION

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Abstrak

Penelitian ini bertujuan untuk menyelidiki bagaimana DGBL "menggunakan aplikasi Quizizz" mempengaruhi motivasi siswa EFL dalam belajar bahasa Inggris dan mengidentifikasi persepsi siswa tentang metode pengajaran ini terhadap motivasi mereka. Penelitian ini menggunakan metode deskriptif kuantitatif yang dikombinasikan dengan desain kuasi-eksperimental. Instrumen dalam penelitian ini menggunakan kuesioner dengan skala likert 5 poin, mulai dari "sangat tidak setuju" hingga "sangat setuju". Penelitian ini dilakukan selama satu semester di sebuah sekolah menengah atas negeri di Jakarta, dengan melibatkan sampel sebanyak 72 siswa kelas XI. Para siswa dibagi menjadi dua kelompok: 36 orang dalam kelompok kontrol yang menjalani metode pembelajaran tradisional, dan 36 siswa dalam kelompok eksperimen yang terlibat dengan platform Quizizz yang menggunakan pendekatan Digital Game-Based Learning (DGBL). Hasil kuesioner motivasi menunjukkan bahwa Digital Game-Based Learning (DGBL) meningkatkan motivasi siswa untuk belajar, baik dari perspektif intrinsik maupun ekstrinsik dengan skor rata-rata motivasi intrinsik (IM) siswa (M= 3,7-3,9), dan pada dimensi motivasi ekstrinsik (EM), respon siswa menunjukkan antusiasme yang lebih tinggi dengan kisaran (M= 4,0-4,4) dan kuesioner persepsi siswa terhadap DGBL cenderung positif. Kesimpulannya adalah siswa lebih termotivasi untuk belajar bahasa Inggris menggunakan metode DGBL dibandingkan dengan metode tradisional. Siswa tidak hanya tertarik dan dapat menerima, tetapi juga meningkatkan motivasi dan partisipasi selama proses pembelajaran, serta pembelajaran berbasis permainan.

Kata Kunci: pembelajaran berbasis permainan digital; kuis; siswa EFL; motivasi siswa

Abstract

This study aims to investigate how DGBL "using Quizizz application" affecting EFL students' motivation in learning English and identify student's perceptions of this teaching method on their motivation. This study employs a quantitative descriptive method combined with a quasi-experimental design. The instrument in this study employed a questionnaire on a 5-point likert scale, ranging from "strongly disagree" to "strongly agree". This study was carried out over a single semester at a public high school in Jakarta, involving a sample of 72 students from grade XI. The students were split into two groups: 36 individuals in the control group who underwent traditional learning methods, and 36 students in the experimental group who engaged with the Quizizz platform utilizing a Digital Game-Based Learning (DGBL) approach. The results of motivation questionnaire show that Digital Game-Based Learning (DGBL) enhances students' motivation to learn, both from intrinsic and extrinsic perspectives with the average score of student's intrinsic motivation (IM) is (M= 3.7-3.9), and the extrinsic motivation (EM) dimension, students' responses showed higher enthusiasm ranging (M=4.0-4.4) and the questionnaire student's perceptions of DGBL tend to be positive. The conclusion is that students are more motivated to learn English using the DGBL method compared to traditional methods. Students were not only interested and acceptable, but also increased motivation and participation during the learning process, as well as game-based learning.

INTRODUCTION

Looking at the problems that exist in EFL students, EFL students have a lack of motivation in language learning, especially in learning English. According to Research (Camacho-Sánchez et al., 2022), this problem may be caused because the teacher is still using traditional methods. Where traditional methods are no longer relevant, monotonous, boring and only focus on the teacher centre.

Considering the progress in technology, educators are encouraged to incorporate technology into English instruction, as numerous studies have supported the growing use of technology in teaching, such as (Karpayah & Lynn-Sze, 2023) which uses Video-Assisted Learning (VAL) technology, research (Rangel-de Lázaro & Duart, 2023) uses AI, research (Marrahi Gomez & Belda-Medina, 2023) uses Augmented Reality (AR) and one of the Research (Zheng et al., 2024) uses the Digital Game-Based Learning method.

The Digital Game-Based Learning method is an approach to education that employs digital games or computer games as tools in the learning experience (Singh, 2022). An illustration of a platform that falls under Digital Game-based Learning is Quizizz. Quizizz is a prominent example of digital game-based learning because according to (Irwansyah & Izzati, 2021) this platform provides a fun learning experience, and this platform can be utilized as a game-shaped learning and assessment media that can be accessed via smartphone or PC. By integrating game elements, Quizizz is designed to attract students' motivation and maintain their interests through the learning process.

Motivation is one of the key elements because motivation affects students' desire to learn a new language (Hasanzadeh et al., 2024). By having high motivation, students will be more active in learning and deepening the new language. Furthermore, students' perception of their motivation in learning are equally important, as these perceptions are very important and can significantly impact their learning outcomes (Anggraheni et al., 2023a).

Previous studies (K. Wang et al., 2023a) have demonstrated that DGBL can enhance motivation, though the research focused on Arabic language courses, (Zheng et al., 2024) found that DGBL positively affects digital ethical literacy, motivation, and learning engagement compared to traditional methods. However, the study primarily emphasized digital ethical literacy and did not delve deeply into its impact on motivation, and (Jääskä et al., 2022a) state that it can influence student motivation but is limited to project management education.

Digital Game-Based Learning

According to (Kiguchi et al., 2022) in the larger domain of educational technology, Digital Game-Based Learning (DGBL) represents a specific subset, (Ishak et al., 2021) Digital Game-based learning involves utilizing digital games

to enhance and facilitate the educational experience, and (Prensky, 2001) said Digital game-based learning is enjoyable and also integrates significant educational components through captivating interactive media. From the studies we can conclude that DGBL is a part of educational technology that uses digital games to enhance learning with elements of entertainment and serious learning through interactive media.

As it continues to evolve, Digital Game-Based Learning (DGBL) is increasingly in demand because it has various advantages over traditional learning methods. The advantages of DGBL, for example, are evident in research (Zheng et al., 2024b) found that DGBL influenced motivation in a favorable way when compared to conventional approaches, (Jääskä et al., 2022a) says it can influence students' motivation in project management education and (K. Wang et al., 2023b) also shows it can have a positive influence on digital literacy ethics, learning motivation and student engagement (Anggraini et al., 2024). However, some other studies, such as (Barz et al., 2024) and (C.-H. Chen et al., 2020), suggest that the DGBL approach seems to have little to no significant effect on both cognitive and emotional learning motivation.

Quizizz

According to (L.-C. C. Wang et al., 2024), Quizizz is a web-based education platform founded in 2015 and its headquarters are in Bengaluru, India. Quizizz is an educational software based on digital games that allows the user to carry out a questionnaire, discussions and exams online (Munawir & Hasbi, 2021). Teachers can create questions in Quizizz with various types, such as Multiple choices questions consisting of 4 answer options, fill-in questions, and so on (Nur & Abubakar, 2022). Teachers can use it in live sessions for classroom learning by displaying the code or barcode through a projector for students to see.

Students can access Quizizz through the web or the app on their phones, then enter the code or scan the barcode they have been given to enter the waiting room and wait for the teacher to start the session. Quizizz integrates game features such as avatars, themes, memes, and music to enrich educational experiences (Setiyani et al., 2020). While in the waiting room, students can change their avatars according to what they want and give reactions using emojis. The platform can accommodate up to 100 participants in a live quiz, with a leaderboard displayed after the quiz is completed (Yong & Rudolph, 2022).

Motivation in Learning

According to (Anicharico et al., 2024) Motivation in learning is an individual's or group's ability to keep trying and to have a projection of themselves into the future, in (Hashemi et al., 2024) Motivation in learning English is critical to success, as it impacts both integrative and instrumental factors that affect students' academic performance and achievement, in (Laksmi et al., 2021) and (C.-C. Chen & Tu, 2021) said In education, motivation plays a crucial role in keeping students engaged and enthusiastic during learning tasks, enabling them to grasp the content more effectively and thoroughly. In conclusion, Motivation

in learning is essential for success, as it encourages individuals or groups to persevere and envision their future, influencing academic performance and achievement, especially in learning English, by helping students stay focused, engaged, and effectively understand the material.

The way to increase motivation is to incorporate game elements in learning (Jääskä et al., 2022b). Interesting design, visual appeal, and interactions that engage students can make learning more fun and encourage active engagement. As in research (Turg`unova & Rustamova Shahnoza Abdurahimovna, 2023), Motivation holds a significant role in acquiring a foreign language. When students show interest in learning, they can effortlessly tackle challenges, grasp the material more effectively, and build solid language skills and proficiency.

Student's Perception

Student's Perception of the application game-based learning has a great influence on the effectiveness of this method (Jihan & Maharsi, n.d.). If students perceive game-based learning as fun and rewarding in the learning process, they will feel more encouraged to be actively involved. Conversely, if the perception is negative, it can inhibit motivation and reduce the spirit to try harder. A person's perspective also plays an important role in motivating their actions and goals (Tempski et al., 2021). Therefore, educators are advised to understand and pay attention to students' perceptions to optimize the potential and success of this learning method.

Several previous studies have discussed relevant topics. Research by (Anggraheni et al., 2023b) examined the study focused on how students view the implementation of flipped classroom and game-based learning approaches in business writing, with the goal of enhancing their motivation, engagement, comprehension, and application of learning concepts. Meanwhile, researcher (Perera & Hervás-Gómez, 2021a) examined students' perception on the implementation of Socrative in gamified learning, revealing that Socrative positively influences students' perceptions.

Thus, this study aims to investigate how DGBL "using Quizizz application" affecting EFL students' motivation in learning English and identify student's perceptions of this teaching method on their motivation. The study will address the following research questions (RQ):

1. How does the implementation of Quizizz influence EFL students' motivation in studying English?
2. What are the perceptions of EFL students concerning the use of Quizizz on their motivation in learning the English language?

The advantage of this research is to offer a greater insight into how Digital Game-based learning affects the motivation of EFL students when learning English at the high school level. From this study we can also see how students perceive the teaching method in increasing motivation so that the results can be used to design more effective, interactive learning strategies, according to student needs, to increase student motivation and student learning outcomes.

RESEARCH METHOD

The approach taken in this study employs a quantitative descriptive method combined with a quasi-experimental design. The purpose of this research is to examine how DGBL influences students' motivation in learning English as a foreign language (EFL). This approach was selected because it enables the researcher to evaluate and compare the learning results between a group receiving traditional teaching techniques and a group engaged in DGBL, with the expectation that the findings will illustrate the positive effects of DGBL on students' motivation in EFL learning.

This study was carried out over one semester at a public high school in Jakarta. Starting from the beginning of semester 1 and continued in stages until all research processes were completed according to the planned schedule. The location and time of the research were chosen by considering the availability of participants, supporting facilities, and environmental conditions suitable for conducting research. The participants included 72 students from Grade XI, with an average age between 16 and 17 years.

Participants were split into two groups, consisting of a control group and an experimental group, with each group containing 36 students. The control group received instruction through a traditional teacher-centered method, while the experimental group used the Quizizz platform to implement the Digital Game-Based Learning (DGBL) approach. Before the study commenced, participants were made aware of the anonymous and entirely voluntary nature of the research. This measure was taken to uphold research ethics. A questionnaire was used to evaluate students' motivation to learn and their opinions on the impact of game-based learning (Quizizz) on their motivation.

Descriptive statistics were applied to analyze the data gathered from students' feedback regarding their motivation and perceptions. This methodology aimed to enhance the understanding of students' responses to the integration of Digital Game-Based Learning (DGBL) in educational contexts. To ensure the reliability of the responses, the questionnaire was translated from English into Bahasa Indonesia to provide clarity and understanding for all participants.

The Motivation questionnaire was adopted and adapted from research conducted by (Zheng et al., 2024a), which consists of two main elements, which is Intrinsic Motivation and Extrinsic Motivation, this motivation questionnaire includes six questions. The student's perception questionnaire was adopted and adapted from (Jääskä et al., 2022). The questionnaire consists of eight questions and is divided into two elements, which are the attention and satisfaction elements. The attention element consists of four questions to see how DGBL affects student motivation and four more questions to see student satisfaction in using DGBL. The students were asked to complete a questionnaire on a 5-point likert scale, ranging from "strongly disagree" to "strongly agree". Once the experiment concluded for each group, a survey was distributed online using Google Forms to ensure efficient data collection.

To assess if a significant difference exists between the DGBL teaching method and the traditional teaching approach, an independent sample t-test was utilized to evaluate the final scores in English subjects of both the experimental and control groups. The hypotheses formulated for the t-test in this study are (H0: There is no significant difference in the final scores between the two teaching methods) and (H1: There is a significant difference in the final scores between the two teaching methods). The threshold for rejecting the null hypothesis was set at a statistical significance level of 0.05. Before conducting the t-test analysis, the data underwent tests for normality and homogeneity, with results showing that the data were normally distributed and derived from a homogeneous population. Both data (test scores) and (questionnaire responses) were analyzed using SPSS, thus allowing for systematic and reliable data processing.

FINDING AND DISCUSSION

The findings in Table 1 The findings reveal a notable difference in the final scores between students in the experimental group who engaged in the Digital Game-Based Learning (DGBL) approach and those in the control group who experienced conventional learning methods. A T-value of 2.080 was observed, accompanied by a p-value of 0.041 ($p=0.041<0.05$). This indicates that a significant distinction exists between the two groups. As a result, the null hypothesis (H0), which posits that there is no significant difference in final scores between the two educational strategies, is dismissed. Therefore, the alternative hypothesis (H1) is accepted. In summary, the Digital Game-Based Learning (DGBL) approach has proven to be more effective in improving student grades compared to the traditional learning method, making it a more advantageous strategy for facilitating student academic success.

Table 1. Final Score t-test

		Levene's Test for Equality of Variances		T-test for Equality of Means				
		F	Sig	t	df	Sig (2 tailed)	Mean difference	Std. error d
Score	Equal variances assumed	0.003	0.958	2.080	70	0.041	1.889	0.908
	Equal variances not assumed			2.080	69.8	0.041	1.889	0.908

Table 2. Student's Learning Motivation Questionnaire

Dimen-sions		Survey Statement	Strongly Disagree	Dis-agree	Neu-tral	Agree	Strongly Agree	Mean
Intrinsic motivati on (IM)	1	I prefer course material that really challenges me so I can learn new things.	0%	0%	33%	**38%**	**29%**	3.96
	2	I prefer courses that spark my curiosity, even if they are difficult to learn.	1%	1%	31%	**43%**	**24%**	3.86
	3	When I have the opportunity, I choose course assignments that I can learn from even if they don't guarantee a good grade.	3%	4%	26%	**45%**	**22%**	3.79
Extrinsic motivati on (EM)	4	Getting a good grade in this class is the most satisfying thing to me.	0%	1%	10%	**47%**	**42%**	4.29
	5	If I can, I want to get better grades in this class than most of the other students.	0%	0%	18%	**46%**	**36%**	4.18
	6	I want to do well in this class because it is important to show my ability to my family, friends, teachers, or others.	3%	1%	24%	**40%**	**32%**	3.97

Descriptive statistic student's learning motivation of DGBL (n=72)

The results of the questionnaire in Table 2 show that Digital Game-Based Learning (DGBL) enhances students' motivation to learn, both from intrinsic and extrinsic perspectives. The average score of student's intrinsic motivation (IM) is (M= 3.79-3.96), such as item 1 statement *"I prefer course material that really challenges me so I can learn new things"* as many as (38% agree and 29% strongly agree, M=3.96) and item 2 statement *"I prefer courses that spark my*

curiosity, even if they are difficult to learn" as many as (43% agree, 24% strongly agree, M= 3.86). This shows that DGBL is able to encourage students' internal motivation to learn through the challenge and curiosity generated by the game element in learning.

In addition, on the extrinsic motivation (EM) dimension, students' responses showed higher enthusiasm ranging (M=3.97-4.29). The majority of students strongly believe that achieving a high grade in this class is the most fulfilling experience for them, such as item 4 statement *"Getting a good grade in this class is the most satisfying thing to me"* (47% agree, 42% strongly agree, M=4.29) and item 5 statement *"If I can, I want to get better grades in this class than most of the other students"* (46% agree and 36% strongly agree, M=4.18). In addition, (40% agreed, 32% strongly agreed, M=3.97) students also agreed that they wanted to show their abilities to family, friends or teachers.

Table 3. Student's Perception Questionnaire

No.	Survey statement	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree	Mean
1	I think learning for gaming was fun and exiting.	0%	1%	19%	**31%**	**49%**	4.26
2	There was not enough challenge and complexity in the game.	3%	7%	**51%**	29%	10%	3.36
3	The game content and flow capture my attention.	0%	1%	22%	**53%**	**24%**	3.99
4	Learning the game rules and mechanics felt frustrating.	**14%**	**40%**	25%	14%	7%	2.60
5	I enjoy participating in this game-based learning session.	0%	0%	26%	**52%**	**22%**	3.96
6	I felt gaming stressful.	**15%**	**39%**	25%	14%	7%	2.58
7	I prefer other learning method over game-based methods.	3%	21%	**57%**	14%	5%	2.99
8	I wouldn't like to be graded according to my game result.	1%	6%	35%	**43%**	**15%**	3.65

Descriptive statistic student's perception of DGBL (n=72)

The results of this study are consistent with those of (Zheng et al., 2024a) who found that Digital Game-Based Learning methods are more engaging and demanding than traditional techniques. Consequently, this enhances student

motivation. Another study (Jääskä et al., 2022) demonstrated that DGBL plays a significant role in boosting motivation due to its interactive elements and incorporation of gaming into the educational process. The current study's findings imply that DGBL can increase both intrinsic and extrinsic motivation to learn among EFL students.

The results of the questionnaire in Table 3 show that student's perceptions of DGBL tend to be positive. Game-based learning makes students happy and engaged. With (31% agree, 49% strongly agree, M= 4.26), on the statement 1 *"I think learning for gaming was fun and exciting."* which means that most of the respondents stated that they considered DGBL as a fun method. Furthermore, the response statement 3 *"The game content and flow captured my attention"* (53% agree, 24% strongly agree, M= 3.99) shows that the content and flow of the game effectively caught students' attention, so indicating a significant measure of learning engagement.

On the other hand, the negative comments on statements 4 and 6, *"I feel frustrated learning the rules and mechanics of the game" and "I feel stressed when playing the game,"* got low mean scores of (M=2.60 – 2.58) respectively, suggesting most students did not feel stressed or frustrated when grasping the game. This is reinforced by the fact that many students "15% strongly disagree" and "39% disagree" with both statements. However, careful use of DGBL should be done. For instance, the mean score of (M=3.65) for the remark statement 8 *"I wouldn't like to be graded according to my game result"* shows that some students might be uneasy if learning results are based just on their game performance. Important consideration is teachers' ability to balance the assessment with other approaches.

This understanding is backed by the results of (Anggraheni et al., 2023), who determined that Game-Based Learning approaches can enhance student motivation. Further evidence is shown by (Perera & Hervás-Gómez, 2021), who claim that students' favorable opinions of gamification influence their desire to study. Therefore, the results of the questionnaire confirm that DGBL is not only popular with students but also competent to provide an interesting, relevant, and pleasurable learning environment in relation to EFL education.

CONCLUSION

The use of the Digital Game Based Learning approach via the Quizizz platform has a beneficial effect on the learning motivation of EFL students during their English language studies. The findings from the data analysis address research question 1 (RQ1). This is further illustrated by the notable contrast in final scores between the experimental group and the control group, along with the questionnaire findings that indicate a rise in both intrinsic and extrinsic learning motivation. Moreover, the findings from the research suggest that students have a highly favorable view of using Quizizz in their learning, which addresses research question 2 (RQ2).

The conclusion is that students are more motivated to learn English using the DGBL method compared to traditional methods. Students were not only

interested and acceptable, but also increased motivation and participation during the learning process, as well as game-based learning. These results related to previous research that DGBL EFL students provide a more engaging educational experience and encourage active student participation in the context of English language education.

This study has a few limitations that should be taken into consideration. First, there is a small and low relative sample size for EFL students in one educational setting, which may make it more challenging to extrapolate knowledge to other groups or situations. However, this study only looks at Quizizz as a DGBL platform; results may differ if you use a different platform or game-based learning tool.

REFERENCES

Anggraheni, D., Yogatama, A., Semarang, U., Soekarno Hatta, J., Kulon, T., Pedurungan, K., Semarang, K., & Tengah, J. (2023a). Student Perception Of Game-Based Learning To Facilitate English Business Writing In A Flipped Classroom. *Journal on Education*, *05*(04), 17345–17351.

Anggraheni, D., Yogatama, A., Semarang, U., Soekarno Hatta, J., Kulon, T., Pedurungan, K., Semarang, K., & Tengah, J. (2023b). Student Perception Of Game-Based Learning To Facilitate English Business Writing In A Flipped Classroom. *Journal on Education*, *05*(04), 17345–17351.

Anggraini, M. P., Anugerahwati, M., Sari, R. N., & Miranty, D. (2024). *The ICT Use of Informal Digital Learning in Enhancing EFL University*. https://callej.org/index.php/journal/article/view/414

Anicharico, E. J., Mercado, E. E. B., Brugés, L. E. A., & Ojeda, J. D. (2024). Effects of Motivation When Learning: A Case Study in Valledupar Secondary Education. *Nanotechnology Perceptions*, *20*(S14). https://doi.org/10.62441/nano-ntp.v20iS14.128

Barz, N., Benick, M., Dörrenbächer-Ulrich, L., & Perels, F. (2024). The Effect of Digital Game-Based Learning Interventions on Cognitive, Metacognitive, and Affective-Motivational Learning Outcomes in School: A Meta-Analysis. *Review of Educational Research*, *94*(2), 193–227. https://doi.org/10.3102/00346543231167795

Camacho-Sánchez, R., Rillo-Albert, A., & Lavega-Burgués, P. (2022). Gamified Digital Game-Based Learning as a Pedagogical Strategy: Student Academic Performance and Motivation. *Applied Sciences*, *12*(21), 11214. https://doi.org/10.3390/app122111214

Chen, C.-C., & Tu, H.-Y. (2021). The Effect of Digital Game-Based Learning on Learning Motivation and Performance Under Social Cognitive Theory and Entrepreneurial Thinking. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.750711

Chen, C.-H., Shih, C.-C., & Law, V. (2020). The effects of competition in digital game-based learning (DGBL): a meta-analysis. *Educational Technology*

Research and Development, *68*(4), 1855–1873. https://doi.org/10.1007/s11423-020-09794-1

Hasanzadeh, S., Shayesteh, S., & Pishghadam, R. (2024). Investigating the role of teacher concern in EFL students' motivation, anxiety, and language achievement through the lens of self-determination theory. *Learning and Motivation*, *86*, 101992. https://doi.org/10.1016/j.lmot.2024.101992

Hashemi, S. S. A., Fayaz, M. I., & Ramesh, F. (2024). Role of Motivation for Learning English as Foreign Language. *Sprin Multidisciplinary Journal in Pashto, Persian & English*, *2*(01), 01–04. https://doi.org/10.55559/smjppe.v2i01.145

Irwansyah, R., & Izzati, M. (2021). Implementing Quizizz as Game Based Learning and Assessment in the English Classroom. *TEFLA Journal (Teaching English as Foreign Language and Applied Linguistic Journal)*, *3*(1), 13–18. https://doi.org/10.35747/tefla.v3i1.1055

Ishak, S. A., Din, R., & Hasran, U. A. (2021). Defining Digital Game-Based Learning for Science, Technology, Engineering, and Mathematics: A New Perspective on Design and Developmental Research. *Journal of Medical Internet Research*, *23*(2), e20537. https://doi.org/10.2196/20537

Jääskä, E., Lehtinen, J., Kujala, J., & Kauppila, O. (2022a). Game-based learning and students' motivation in project management education. *Project Leadership and Society*, *3*, 100055. https://doi.org/10.1016/j.plas.2022.100055

Jääskä, E., Lehtinen, J., Kujala, J., & Kauppila, O. (2022b). Game-based learning and students' motivation in project management education. *Project Leadership and Society*, *3*, 100055. https://doi.org/10.1016/j.plas.2022.100055

Jääskä, E., Lehtinen, J., Kujala, J., & Kauppila, O. (2022c). Game-based learning and students' motivation in project management education. *Project Leadership and Society*, *3*, 100055. https://doi.org/10.1016/j.plas.2022.100055

Jihan, C. N., & Maharsi, I. (n.d.). *J-SHMIC : Journal of English for Academic An EFL Students' Perception Towards Game-Based Learning in Secondary School: A Descriptive Qualitative Study*. https://journal.uir.ac.id/index.php/jshmic

Karpayah, A. A., & Lynn-Sze, N. (2023). Using Video-Assisted Learning in Teaching Camera Tracking to Visual Effects Students in Malaysia – A Review. In *2nd International Conference on Creative Multimedia 2022 (ICCM 2022)* (pp. 67–74). Atlantis Press SARL. https://doi.org/10.2991/978-2-494069-57-2_9

Kiguchi, M., Saeed, W., & Medi, I. (2022). Churn prediction in digital game-based learning using data mining techniques: Logistic regression, decision tree, and random forest. *Applied Soft Computing*, *118*, 108491. https://doi.org/10.1016/j.asoc.2022.108491

Laksmi, N. K. P., Yasa, I. K. A., & Mirayani, K. A. M. (2021). The use of animation video as learning media for young learners to improve efl students'

motivation in learning english. *Lingua*, *17*(1), 42–52. https://doi.org/10.34005/lingua.v17i1.1378

Marrahi Gomez, V., & Belda-Medina, J. (2023). The Integration of Augmented Reality (AR) in Education. *Advances in Social Sciences Research Journal*, *9*(12), 475–487. https://doi.org/10.14738/assrj.912.13689

Munawir, A., & Hasbi, N. P. (2021). The effect of using quizizz to efl students' engagement and learning outcome. *English Review: Journal of English Education*, *10*(1), 297–308. https://doi.org/10.25134/erjee.v10i1.5412

Nur, S., & Abubakar, M. (2022). Teachers' perception towards the use of quizizz in english education department at uin alauddin makassar. *ETERNAL (English, Teaching, Learning, and Research Journal)*, *8*(02). https://doi.org/10.24252/Eternal.V82.2022.A10

Perera, V. H., & Hervás-Gómez, C. (2021a). University students' perceptions toward the use of an online student response system in game-based learning experiences with mobile technology. *European Journal of Educational Research*, *10*(2), 1009–1022. https://doi.org/10.12973/EU-JER.10.2.1009

Perera, V. H., & Hervás-Gómez, C. (2021b). University students' perceptions toward the use of an online student response system in game-based learning experiences with mobile technology. *European Journal of Educational Research*, *10*(2), 1009–1022. https://doi.org/10.12973/EU-JER.10.2.1009

Prensky, M. (2001). *Digital Game-Based Learning From Digital Game-Based Learning (McGraw-Hill, 2001) The Digital Game-Based Learning Revolution Fun at Last!*

Rangel-de Lázaro, G., & Duart, J. M. (2023). You Can Handle, You Can Teach It: Systematic Review on the Use of Extended Reality and Artificial Intelligence Technologies for Online Higher Education. *Sustainability*, *15*(4), 3507. https://doi.org/10.3390/su15043507

Setiyani, S., Fitriyani, N., & Sagita, L. (2020). Improving student's mathematical problem solving skills through Quizizz. *JRAMathEdu (Journal of Research and Advances in Mathematics Education)*, *5*(3), 276–288. https://doi.org/10.23917/jramathedu.v5i3.10696

Singh, P. (2022). Attitude of Prospective Teachers towards Digital Game-Based Learning (DGBL). *Educational Quest- An International Journal of Education and Applied Social Sciences*, *13*(1). https://doi.org/10.30954/2230-7311.1.2022.6

Tempski, P., Arantes-Costa, F. M., Kobayasi, R., Siqueira, M. A. M., Torsani, M. B., Amaro, B. Q. R. C., Nascimento, M. E. F. M., Siqueira, S. L., Santos, I. S., & Martins, M. A. (2021). Medical students' perceptions and motivations during the COVID-19 pandemic. *PLOS ONE*, *16*(3), e0248627. https://doi.org/10.1371/journal.pone.0248627

Turg`unova, F., & Rustamova Shahnoza Abdurahimovna. (2023). Ways to increase students' motivation in english classes. *Journal of Foreign Languages and Linguistics*, *5*(5).

Wang, K., Liu, P., Zhang, J., Zhong, J., Luo, X., Huang, J., & Zheng, Y. (2023a). Effects of Digital Game-Based Learning on Students' Cyber Wellness Literacy,

Learning Motivations, and Engagement. *Sustainability*, *15*(7), 5716. https://doi.org/10.3390/su15075716

Wang, K., Liu, P., Zhang, J., Zhong, J., Luo, X., Huang, J., & Zheng, Y. (2023b). Effects of Digital Game-Based Learning on Students' Cyber Wellness Literacy, Learning Motivations, and Engagement. *Sustainability*, *15*(7), 5716. https://doi.org/10.3390/su15075716

Wang, L.-C. C., Lam, E. T. C., & Jiang, S. (2024). A Preliminary Investigation of the Effectiveness of Quizizz on Vocabulary Acquisition Between Individual and Group Practices in Chinese as a Foreign Language High School Classes in the U.S.A. *International Journal of Chinese Language Teaching*. https://doi.org/10.46451/ijclt.20240307

Yong, A., & Rudolph, J. (2022). A review of Quizizz – a gamified student response system. *Journal of Applied Learning & Teaching*, *5*(1). https://doi.org/10.37074/jalt.2022.5.1.18

Zheng, Y., Zhang, J., Li, Y., Wu, X., Ding, R., Luo, X., Liu, P., & Huang, J. (2024a). Effects of digital game-based learning on students' digital etiquette literacy, learning motivations, and engagement. *Heliyon*, *10*(1), e23490. https://doi.org/10.1016/j.heliyon.2023.e23490

Zheng, Y., Zhang, J., Li, Y., Wu, X., Ding, R., Luo, X., Liu, P., & Huang, J. (2024b). Effects of digital game-based learning on students' digital etiquette literacy, learning motivations, and engagement. *Heliyon*, *10*(1), e23490. https://doi.org/10.1016/j.heliyon.2023.e23490