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Perceived Influence of Gamification in Enhancing the Employability Skill of Computer Education Graduates in Enugu State

[1]Edozie Chinwendu Jennifer, [2]Ehisianya Nnaemeka Uche, [3]Anene Angela Okwudili & [4]Elochukwu Leonard
Department of Computer and Robotics Education, University of Nigeria, Nsukka

Abstract

This study examined the perceived influence of gamification on enhancing employability skills of computer education graduates. The study adopted a descriptive survey research design with a population of 80 students enrolled in Computer and Robotics Education programmes in public Universities in Enugu State. The instrument used for data collection was a 20-item structured questionnaire titled (PIGEESQ) developed by the researchers. The questionnaire was divided into two parts: Part 1was used to elicit personal data of the respondents while part 2 was used to elicit information on the computer education students' motivation to learn and software practical skills needed by computer education students. The reliability of the instrument was established using a Cronbach alpha that yielded reliability coefficient of 0.80. Data collected were analyzed using mean and standard deviation to answer the research questions while t-tests were employed to test the null hypothesis at 0.05 level of significance. The findings of results revealed that gamification enhances motivation to learn and positively enhances the software practical skills of computer education students. T-test analysis revealed no significant gender differences in these perceptions. The study's findings have significant implications for educators and policymakers seeking to improve graduates' employability skills. The results highlight the potential of gamification to enhance graduates' employability and suggest that its integration into computer education curriculum can lead to improved job readiness.

Corresponding Author
Edozie Chinwendu Jennifer. Chinwendu.edozie@unn.edu.ng

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Introduction

Gamification is the strategic application of game-like elements and principles in non-game contexts to enhance users' motivation. According to Chernbumroong, Ariya, Yolthasart & Puritat (2024), gamification involves incorporating game mechanics such as points, badges, leaderboards, and challenges into everyday activities and systems to make them more enjoyable and rewarding for users. Oke, Aliu, Mwanaumo, Abayomi & Kahanji (2023) states that the key goals of gamification are to increase user participation, productivity, and loyalty by tapping into people's innate desires for competition, achievement, and social interaction. Gamification has been widely adopted in various domains, including education, healthcare, marketing, and the workplace, to drive desired behaviors and outcomes, (Mominzada, Rozan & Aziz, 2024). When implemented effectively, according to Aguaya, (2024), gamification can boost motivation and improve user experience. More so, it requires careful design and consideration of needs of users and the context in which it is being used in order to avoid potential pitfalls, such as over-reliance on extrinsic rewards or creating a sense of manipulation. Chaursiya & Kumar (2024) states that gamification aids in onboarding, making training more interactive and efficient, leading to increased knowledge retention and productivity. This implies that gamification boosts motivation, engagement, and performance, and it also contributes to making graduates of computer Education more productive and employable in the recent workforce.

Computer education involves the teaching and learning of the knowledge and skills necessary to operate computers effectively in order to perform better on computer-related tasks. It encompasses learning about computer systems, software applications, and the internet, which are essential in various fields (Indrich, 2023). Computer education encompasses a wide range of topics, from learning fundamental computer concepts and using productivity software to more advanced areas like programming, networking, and digital design.(Ogueche & Nri, 2022). It aims to provide students with the necessary skills to think critically, solve problems, communicate effectively, and collaborate in the digital age (Olosunde, 2023). By teaching computer education in schools, computer graduates are given equal opportunities to acquire the necessary skills to make them employable in this recent economy. Computer education graduates are individuals who have completed a degree program in a computing-related field, such as computer science, information technology, software engineering, or a similar discipline, (Bashiru, Aliyu, Bashir,Tijan & Hussaini,2021).These graduates possess the knowledge and skills necessary to work with computers and technology in various capacities. Computer Graduates with strong computer skills are highly sought for employability in the job market, as they are believed to possess the knowledge and expertise to effectively utilize computers in various professional settings.

Employability refers to an individual's ability to gain, maintain, and obtain new employment throughout their career. (Romgens, Scoupe & Beausaert, 2020). According to Dasgupta (2020). The main aspects of employability are the ability to gain initial employment - having the necessary knowledge, skills, attitudes, and abilities that make one attractive to employers; The ability to maintain employment by demonstrating adaptability and continuous learning required to thrive in a changing work environment;t and finally the ability to obtain new employment if required, which involves possessing transferable skills and the capacity to market oneself effectively in the job market. In the opinion of Omoniyi (2022), employability is not just about having technical skills, but also encompasses soft skills like communication, problem-solving, teamwork, and adaptability. Employers value candidates who can demonstrate a combination of both hard and soft skills. Developing one's employability is an ongoing process that requires individuals to take ownership of their career development through continuous learning, gaining relevant experiences, and effectively presenting their capabilities to employers (Tight, 2023). Employability is crucial for securing and sustaining fulfilling work throughout one's career. Universities are increasingly focusing on enhancing the employability of graduates by offering work experience, work-related learning, and employability skills modules, as well as involving employers in course design and delivery (Tushar & Sooraksa, 2023). This is in response to the concerns of employers who struggle to find graduates with the required skills to effectively contribute.

Employability skills are a set of essential skills, personal qualities, and attributes that enable individuals to thrive in the workplace and adapt to changing job demands. According to Holidi & Seman (2023) employability skills includes; Communication skills, Problem-solving skills, Teamwork and collaboration, Adaptability and flexibility, Time management and organization, these employability skills are highly valued by employers across all industries, as they enable individuals to perform effectively in a wide range of roles and contribute to organizational success. Developing and demonstrating these skills can significantly enhance one's marketability and long-term career growth. Computer education graduates need a combination of

these skills to be employable in today's job market. In the opinion of Fajaryati, Budiyono, Akhyar & Wiranto (2020), to develop these employability skills, computer education graduates should pursue a mix of coursework, certifications, projects, and internships that provide both technical expertise and practical experience. Hence, this study aims to investigate the perceived influence of gamification in enhancing the employability skill of computer education graduates in Enugu State.

Statement of the problem.

There is a pressing issue of low employability rates among computer education graduates despite the evolving job market, the demand for professionals equipped with advanced computer software practical skills and adaptability is growing. Despite the increasing number of learners in computer education programs, there is a significant gap between the software practical skills possessed by computer education graduates and the competencies required in industries. Traditional pedagogical methods often fail to engage students fully or to develop the practical skills necessary for employment. More so, Computer Education students learning now, being digital natives have grown up with up-to-date digital components including games and apps and thus, they find it harder to learn by conventional classroom methods alone. Gamification can be used to improve students' software practical skills needed by graduates for employability given that gamification is capable of improving the quality of instruction as well as academic performance. However its application in computer education has not been fully integrated. This study aims to investigate the perceive influence of gamification in enhancing the employability skill of computer education graduates in Enugu State.

Purpose of the study

The purpose of the study is to determine the perceived influence of gamification in enhancing the employability skills of computer education graduates in Enugu State, specifically the study sought to determine in influence of gamification in enhancing Computer Education students' motivation to learn as well as their practical skills development. The study, therefore, answered the following questions:

1. What are the perceived influence of gamification in enhancing computer education students' motivation to learn?
2. What are the perceived influence of gamification in enhancing the software practical skill of computer education students?

Hypothesis

H01 There is no significant difference between the mean score of responses from male and female students on gamififcaton in enhancing motivation to learn.

H02 There is no significant difference between the mean score of responses of male and female students on gamification in enhancing practical skills.

Literature review

Impact of gamification on student's motivation

Gamification has been found to significantly influence students' motivation to learn. Research from other studies has proved that gamification can enhance students' learning motivation by incorporating game elements into educational environments. This approach can increase students' active participation in learning, create new connections, and make learning more enjoyable and memorable. In a study conducted by Mediavilla, Andrade, Gonzalez & Martin (2024), revealed that gamification can influence motivation by facilitating the assimilation of knowledge, the improvement of skills and academic competence of students. According to Ahmad et al.; (2020), gamification has been shown to have a positive long-term impact on learning outcomes in computer science. It was found that gamification significantly improved the learning performance and academic achievement of computer science students over the course of a semester by increased motivation Ahmad et al (2020). In same vein, Hellin, Esteban, Vallefor, Gomez, Tortosa & Tayebi, (2023), states that gamification can be used to create a sense of competition and social interaction, which can further enhance students' motivation. This implies the influence of gamification on students' motivation is essential, and it has been used successfully in various educational contexts to improve learning outcomes and student motivation. Khoshnoodifar, Ashouri & Teheri, (2023) posit that gamification was effective in teaching difficult computer science topics at the higher education level. The above authors further stated that the interactive, game-like approach helped students better understand complex concepts and improved their overall learning outcomes.

The impact of gamification on learning outcomes cannot be over emphasize Lampropoulos and Sidiropoulos (2024) states that students in gamified courses maintained higher academic performance compared to traditional teaching methods even towards the end of the semester. Gamification also enhanced students' satisfaction and positive perceptions towards computer courses. This contributed to better long-term learning and retention

of the course material. Christopoulos & Mystakidis, (2023), explains that Gamification can significantly enhance student motivation in educational settings by incorporating game design elements into the learning process. In the opinion of Dahalan, Alias & Shaharom (2023), Gamification enhances motivation in learning, leading to better academic performance and skill development. By incorporating game elements into educational contexts, students are more likely to actively participate, contribute, and cooperate. Gamification provides practical commands and feedback through game mechanics added to online platforms, helping students acquire essential skills such as problem-solving, critical thinking, teamwork, and adaptability. These skills are highly valued by employers and contribute to the employability of computer education graduates, (Singh, 2024). These games simulate real-world scenarios and challenges, allowing students to practice and hone their skills in a safe and engaging environment. Also Carmichael, et al., (2022) states that the simulation aspect of gamification is appreciated by students, as it provides them with hands-on experience and a better understanding of the practical applications of their knowledge. This helps bridge the gap between academic learning and industry requirements, making graduates more attractive to potential employers. These shows that gamification can significantly contribute to the development of employability skills among computer education graduates by enhancing motivation and providing practical feedback,

Impact of gamification on the enhancement of students' computer Skills

Gamified learning enhances specific computer skills such as problem-solving, programming, and algorithm development. It fosters motivation, engagement, and collaboration, aiding in the mastery of programming concepts and systems. (Subhash & Cudney, 2018). Also Giuseppina & Marco, (2021) opined that gamification elements like points, badges, and leader boards drive skill development and knowledge retention. Additionally, it promotes teamwork, social skills, and introduces new technologies in an interactive and enjoyable manner. Gamified learning can enhance various computer skills among students if there is feedback. Lamrani et al.; (2018) points some specific skills that can be enhanced by gamification includes, Basic Computer Literacy Navigating Interfaces, Typing Skills, Software Proficiency Word Processing, Spreadsheets, Presentation Tools, Data Management and so on. In the opinion of Adipat et al. (2021), gamification enhances problem-solving skills in programming through the process of presenting programming concepts and challenges in an engaging, game-based setting that motivates students to practice and master the material. Also Baljan, (2021) posit that fostering a safe, low-stakes environment to practice problem-solving. The game-like setting reduces anxiety and encourages students to take risks, think creatively, and develop their logical reasoning abilities without fear of failure. Also promoting collaboration and sharing of problem-solving approaches. Multiplayer programming games often require teamwork, allowing students to learn from each other's problem-solving methods and gain new perspectives. This implies, gamification harnesses the motivational power of games to engage students in deliberate practice of problem-solving skills that are essential for programming success. The interactive, feedback-rich nature of gamified learning environments is particularly well-suited for developing these critical thinking abilities. Therefore Incorporating gamification into computer education curricula can significantly enhance student's motivation, and learning outcomes. In same vein Oluwaseyi & Luz, (2024), points that Incorporating Collaborative and Competitive Elements like Leader boards will Display leader boards for individual and team achievements to foster a sense of competition and motivation for Group Projects which will encourage collaboration by assigning group projects where students can work together to solve problems and complete tasks.

In addition, quests and challenges can be used to design curriculum activities where students need to complete specific objectives. These can range from solving a series of progressively harder coding problems to developing a complete project by following a set of guidelines, (Kaya, 2019). This is in line with Oluwaseyi & Luz, who states that gamification can be inculcated into curriculum by Creating Interactive and Engaging Content. Quests and Challenges through designing assignments that require students to solve problems or complete projects can also help improve motivation and improve the desired skill, For example, a quest might involve building a simple website or creating a basic game using a programming language. Instant Feedback can also provide immediate feedback on tasks and quizzes to keep students engaged and informed about their progress (Marwan et al.; 2020). The curriculum can be structured into levels or stages, allowing students to "level up" as they master different topics or skills, similar to how they would progress in a game, (Hong, Saab & Admiraal, 2024). Computer educators can harness the power of gamification to create learning experiences that are fun, motivating, and highly relevant for learners. The

combination of practical challenges, teamwork, and clear feedback will give students a strong foundation for employability. In the opinion of Ghai & Tandon, (2022) Integrating gamification into computer education curricula can transform the learning experience, making it more engaging and effective. According to Christopoluos & Mystakidis, (2023), gamification can be inculcated into computer education curriculum by identifying Educational goals and aligning Gamification Elements with the curriculum's learning objectives, such as improving coding skills, understanding software applications, or enhancing digital literacy. This encourages students to persist even when they find the material challenging.

Methodology

The study adopted a descriptive survey research design. The design was deemed suitable for the study because the opinion of the respondents was used for the study. The population for the study was 80 respondents which comprised of both undergraduates and post graduates students of Computer Education in the public universities in Enugu State. There was no sampling since the population was manageable. Based on the reviewed literature, the researchers developed a structured questioner on perceived influence of gamification in enhancing the employability skills (PIGEESQ).The questioner contains 20 items which were divided into two major parts. Part A contains data on personal information of the respondents while Part B were divided into two parts. Part one contains information on perceived influence of gamification in enhancing motivation to learn while part two contains information on perceived influence of gamification in enhancing software practical skill of graduates of computer education. The item was based on a four point rating scale of strongly agree - 4, Agree - 3, Disagree - 2 and Strongly Disagree - 1. The instrument was face validated by three expert from Vocational and Technical Education, they were asked to validate the content for ambiguity, relevance and clarity. The internal consistency of the instrument was determined using Cronbach alpha and the co-efficient reliability value of 0.80 was obtained. The data collected were analyzed using mean and standard deviation while the hypothesis were tested using T-Test at 0.05 significant level. In taking decision on research questions, any item with a mean value of 3.00 or above was regarded agreement level while anything below is disagreement. The null hypothesis will fail to be rejected where P- value is greater than 0.05 and rejected if P- value is less than 0.05. All the computation were done using SPSS.

Results

Table 1: Mean responses of students on the Perception of gamification in enhancing computer education student's motivation and interest.

S/N	ITEMS	$\bar{x}$	SD	DECISION
1	Elements such as points create a competitive environment that motivates students' interest to learn.	3.64	.484	A
2	Gamification elements motivate students to stay engaged and focused on the learning process	3.63	.487	A
3	Gamification elements motivate students in developing problem-solving skills.	3.23	.477	A
4	Gamification elements make learning interactive and more enjoyable.	3.51	.503	A
5	feedback and encouragement help students to build confidence that motivate students to keep learning	3.60	.493	A
6	Gamification promote collaboration among students, which motivate the spirit of working together.	3.38	.487	A
7	Achievement and badges make the user more frequent and provide increased motivation and interest to learn	3.51	.503	A
8	Feedback increases student engagement and motivation to learn.	3.47	.503	A
9	Leaderboards displays competitors thereby motivating the students to keep learning.	3.41	.495	A
10	Rewards for achieving milestones, leads to a more active and participatory learning environment.	3.49	.528	A
	Cluster mean	3.48	.210	A

Data in table 1 reveal that all the 10 items have their mean values ranging from 3.23 to 3.64. This shows that the mean value of each of the item is above the cutoff point of 3.00, indicating that students perceive gamification as an instructional strategy that enhances student's motivation. Also the table reveals that the Standard Deviation of the items are within the range of 0.210 to 0.528, these are less than 1.96, which is 95% confidence limit. This indicates that there is a close range to their responses and the responses were not far from the mean.

Table 2: Mean responses of the respondents on student's perception of gamification in enhancing the practical skill of computer education students.

S/N	ITEMS	$\bar{x}$	SD	DECISION
11	Gamification makes learning to code engaging and interactive.	3.36	.534	A
12	Gamified learning makes it easier for beginners to retain information.	3.64	.484	A
13	Gamified platforms provide hands on experience in identifying and mitigating cyber security threats.	3.57	.497	A
14	Games and simulation inqqaq123rAsedyvgvolving AI models helps students to understand the principles of machine learning.	3.63	.487	A
15	Game and simulation helps students to practice configuring and troubleshooting networks.	3.43	.497	A
16	Game activities involving data entry, calculations, and graphing improves proficiency in Microsoft Excel or Google Sheets.	3.57	.522	A
17	Frequent interaction with gamified activities that require input improves typing speed and accuracy.	3.77	.420	A
18	Games that involve writing or completing tasks can enhance skills in software like Microsoft Word or Google Docs.	3.61	.490	A
19	Handling data as part of game-based tasks can improve skills in organizing, storing, and retrieving digital information.	3.38	.560	A
20	Gamified activities that teach cyber security principles enhance awareness and understanding of online safety, privacy, and data protection.	3.61	.490	A
	CLUSTER MEAN	3.56	.165	A

Data in table 2 revealed that all the 10 items have their mean values ranging from 3.36 to 3.64. This shows that the mean value of each of the item is above the cutoff point of 3.00, indicating that students perceive gamification as an instructional strategy that enhances students' practical skill. Also the table reveals that the Standard Deviation of the items are within the range of 0.420 to 0.560, these are less than 1.96 which is 95% confidence limit. This indicates that there is a close range to their responses and that their responses are not far from the mean.

Table 3: Testing of hypothesis

Gender of the respondents		MEAN	STD DEV	DF	T	SIG	DECISION
CLUSTER 1	Male	3.47	.212				
	Female	3.50	.209	78	-0.56	0.577	Not sig

The T-test analysis in table 3 shows that the p-value (0.57) is greater than the alpha level of 0.05, we therefore fail to reject the null hypothesis. This therefore suggest that there is no statistically significant difference between the responses of male and female in perceived influence of gamification in enhancing students motivation to learn.

Table 4: Testing of hypothesis: Influence of gamification in enhancing students practical skills

Gender of the respondents		MEAN	STD DEV	DF	T	SIG	DECISION
CLUSTER 2	Male	3.58	.185				
	Female	3.52	.118	78	1.712	0.091	Not significant

The T-test analysis in table 4 shows that the p-value (0.091) is greater than the alpha level of 0.05, we therefore fail to reject the null hypothesis. This suggests that there is no statistically significant difference between the responses of male and female students in their perceived influence of gamification in enhancing students practical skills.

Discussion of findings

The findings reveal that respondents agree that gamification elements enhance students motivation to learn. These findings are in agreement with the findings of Mediavilla, Andrade, Genzalez & Martin (2024) who posit that gamification significantly influence motivation by facilitating the assimilation of knowledge, the improvement of skills and academic competencies of students. Also the findings agree with Ahmad et al.; (2020) whose findings revealed that gamification significantly improved the learning performance and academic achievement of computer science students over the course of a semester by increased motivation. Also the findings agree with Dahalan, Alias & Shaharom (2023), which found that Gamification enhances motivation in learning, leading to better academic performance and skill development. In general, these prove that gamification increases students' motivation to learn.

The findings also revealed that the respondents agree that gamification elements enhances the practical skills of computer education students. The findings are in agreement with Adipat et al.; (2021), who posit that gamification enhances problem-solving skills in programming through the process of presenting programming concepts and challenges in an engaging, game-based setting that motivates students to practice and master the material. The findings of the study also agrees with Lamrani et al.; (2018) who posit that gamification platforms positively influence students' motivation and boost the self-efficacy by increasing their practical skills and also foster a competitive spirit through the leaderboard. These evidence suggest that gamification can be a powerful tool in enhancing students' practical skills especially when used in conjunction with relevant and engaging content. These environments provide hands on approach where students can practice and refine their skills in a controlled but dynamic settings.

Conclusion

There is a gap between the skills acquired by graduates during their education and those required by employers in the recent work force. Traditional method of teaching often falls short of equipping students with practical real world skills such as problem solving, teamwork and project management. This study has contributed to the body of knowledge in gamifying computer education. The contribution will be helpful in formulating effective educational strategies for preparing graduates to meet the demands of the modern workforce. Incorporating gamification into computer education can effectively bridge the gap between academic learning and the practical demands of the job market in the recent economy, thereby enhancing the employability skills of graduates.

Recommendation

1. Computer educators should endeavour to integrate gamification in teaching and learning by including activities that stimulate real world scenarios, and encouraging students to develop skills relevant to their future careers.
2. Educators integrating gamification should tailor games to the specific needs and preferences of the target group, taking into account factors such as age, gender and culture.

References

Adeoye, M. A (2023). Influence of Gamification Elements on Stuent's Academic Performance. *Indonesian Journal of teaching in Science* 3(2)105 – 112. https://doi.org/10.17509/ijotis.v312 59581

Adipat, S., Laksana, K., Busayawon, K., Asawasowan, A., & Adipat, B. (2021). Engaging Students in the Learning Process with Game- based Learning. *International*

Journal of Technology in Education. 4(3): 542 – 552. https://doi.org/10.46328/ijte.169.

Adiran, C., & Ananta, N. (2024). How Gamification can Boost Employee Engagement. Harvard Bussiness Review. Retrieved from https://hbr.org/2024/03/how-gamification-can-boost-employee-engagement.

Dicheva, D., Irwin K.,& Dichev, D. (2018). Motivational Factor in Educational Gamification. *International conference on Advance learning technologies*. https://doi.org/10.1109/ICALT.2018.00102.

Hellin, C.J., Esteban, F.V., Valledor, A., Gomez, J., Tortosa, S.O., & Tayebi, A. (2023). Enhancing Student Motivation and Engagement through a Gamified Learning Environment. *Sustainability Journals* 15(19), 14119.https://doi.org/10.3390/su1594119.

Kaya, O. S & Ercag, E. (2023).The impact of applying challenges-based gamifiction program on students learning outcomes: academic achievement, motivation and flow. *Education information technology* 28(1) 10053 – 10078. https://doi.org/10.1007/s/0639 -023-11585.

Khoshnoodifar, M., Ashouri, A., & Teheri, M. (2023). Effectiveness of Gamification in Enhancing learning and Attitudes: A study of statistics Education for Health school students. JAdvmed Educprof. 2023 11(4) 230 – 239. https://doi.org/10.30476/JAMP.2023.98953.1817.

Lampropoulos, G & Sidiropoulos,A.(2024). Impact of gamification on student's learning outcome and academic performance: A longitudinal study company traditional and gamified learning. *Education Science* 14(4)367. https://doi.org/10.3390/edusci/4040367.

Lamrani. A., & Abdelwahed, E.H., Chraibi, S., Qassimi, S., & Hafidi, M. (2020). Game-based Learning and Gamification to Improve Skills in Early Years Education. *Computer science and information system* 17(1) 339 - 356. https://doi.org/ 10.22981/CSIS.190511043L

Mediavilla, L. j., Andrade, A.B., Gonzalez, M. C., & Martin, S.C. (2024). Impact of gamification on motivation and academic performance: A systematic Review Education sciences 41(16): 639. https://doi.org/10.3390/edusci/4060639.

Nakimuhi, M, Balojja T. D., & Baim E. M., (2023). Employer Perspectives on Employability Skills of Graduates from Makerere University in two Selected Nature Unit. *Journal of Research in Humanities and Social Sciences* vol. 11(10) 175-185. https//events.mak.ac.ug.

Oke, A. E., Aliu, J., Mwanaumo E. M., Abayomi., T & Kahanji, C (2023). Leveraging Gamification to Enhance Productivity and Employee Engagement in the Nigerian Constitution Industry. *Built Environment Project and Asset Management* 13(6)https://doi.org/10.1108/BEPAM-04-2023-0064.

Oluwaseyi. J & Luz. A., (2024). Examining the Role of Leadership Behaviour in Shaping Employee Experience: A Practical Study. Public Performance & Management Review 32(2):175-205. https://doi.org/10.2753/PMR1530-9576320201.

Omoniyi T. O. (2022). Exploratory Analysis of core soft skills for employability in Nigeria. In-book: *Education for multi-dimensional skills and literacies* pp 215-233 publisher: Book of reading.

Ponikwer, F & Patel, A. P. (2021). Work Integrated Learning. A Game Based Learning Activity that Enhances Students Employability. *Journal of Chemical Education 98(3),* 888 – 895. *https://*doi.org/10.1021/acs.jchemed.0c00919.

Ratinho, E., & Martins, C. S., (2023). The Role of Gamified Learning Strategies in Student's Motivation in High School and Higher Education: *A Systematic Review*. https://10.1016/j.heliyon.2023.e19033.

Romgens, I., Scoupe. R., & Beausaert, S. (2020). Unraveling the Concept of Employability, Bringing Together Research on Employability in Higher Education and the Workplace. *Studies in higher education* 45(12) 2588-2603. https://doi.org/10.1080/03075079.2019.1623770.

Singh. A (2024). Endorsing Gamification Pedagogy for Nurturing Employability Skills in Higher Education Institute.in book: Practices and

Implementation of Gamification in Higher Education (pp.172 – 183). DOI:10. 4018/979-8-3693-0716-8.ch008.

Smiderle, R., Rigo, S. J., Marques, L.B., Coelho., J.A. P & Jaques, P.A. (2020). The impact of gamification on students' learning, engagement and behaviour based on their personality traits. *Smart learning environment.* https://doi.org/10.1186/540561-019-0088-x.

Sunith, H., Shrikanth, M., & Sumukh, H. (2024).Examining gamification's impact on satisfaction through learning parameters: a preliminary perception-based study among prospective users. *Interactive learning environment.* https://doi.org/10.1080/10494820.2024.2417719.

Tight, M. (2023). Employability: a core role of higher education? *Research in post-compulsory education* 28(4), 551 – 571. https://doi.org/10.1080/13596748.2023.2253649.