Effects of Game Based Learning in Comparison of Traditional Learning to Provide Effective Learning Environment- A Comparative Review

Muhammad Hafeez[1]

[1]Institute of Southern Punjab, Multan, Pakistan
Correspondence: Muhammad Hafeez, Institute of Southern Punjab, Multan, Pakistan.
Email: mh9589041@gmail.com

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Abstract: With the advancement of technology, various new learning strategies have been developed according to the requirement and learning environments of the learners. The game-based learning strategy is an advance learning strategy in which a learner fully engaged in the learning process. This learning strategy completely replaces the traditional learning strategy. A lot of research studies indicated the improvement in learning process by game-based learning strategy. The purpose of current study was to compare the students' learning outcomes with game based and traditional learning strategies by descriptive and statistical ways. A total of 26 articles published from 2012 to 2021 were selected by following inclusion and exclusion criteria. The literature reviewed of previous studies indicated that game-based learning strategy proved to be highly effective learning strategy in numerous disciplines under different learning environments. In game-based learning strategy, the learners highly engaged in learning process.

Keywords: Game Based Learning, Traditional Learning Strategy, Effective, Engagement

1. Introduction

Education is a basic human necessity as well as a critical component of a country's development (Hafeez et al., 2020). The selection of appropriate and effective teaching techniques to make the learning process helpful and to promote critical thinking abilities in learners is the most essential problem in the educational process (Senthamarai, 2018; Tavoosy & Jelveh, 2019). The instructor's method and the learners' dynamic participation in the teaching learning process are two essential variables in developing critical thinking abilities among the students (Nelson, 2017). Instead of transferring knowledge, the teacher must function as a guide during the teaching-learning process (Molbaek, 2018).

The traditional learning strategy is a one-way discourse in which an instructor presents the material to the audience (Gholami et al., 2016). In this strategy, the teacher gives notes and assigns homework activities

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(Gregorius, 2017). In traditional learning strategy, no feedback session is conducted for the students (Almanasef et al., 2020). In general, there is limited interaction between students and teachers (Sarıhan et al., 2016).

Traditional learning strategies provide learners with a passive learning technique (Maqbool et al., 2018). Various researchers including (Dufva & Dufva, 2016; Arise, 2018; Richards & Graber, 2019; Bohari, 2020) concluded that traditional learning strategy has abortive to transfer conceptual knowledge to the learners. As a result, traditional learning strategies are only suggested when information transmission is the primary goal (You et al., 2017). The traditional learning strategy does not help students build critical thinking abilities (Carter et al., 2016; Dehghanzadeh & Jafaraghaee, 2018). The basic concept of traditional learning strategy is shown in Figure 1.

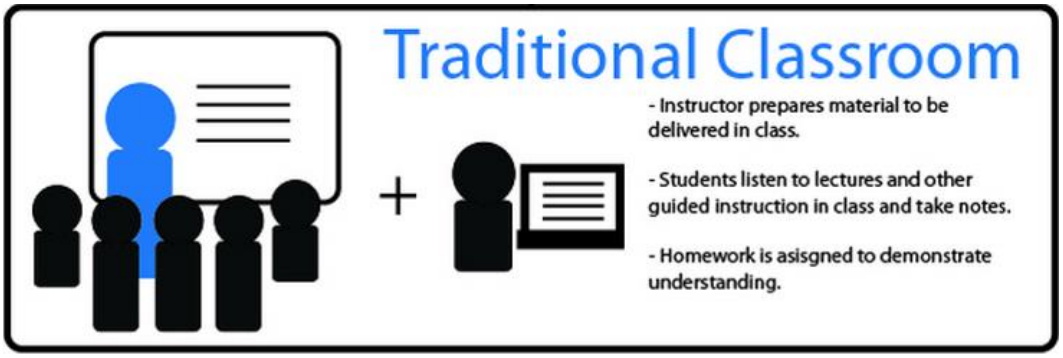

Figure 1: Conceptual view of traditional learning strategies

Students in this age are called digital natives because they grew up with digital technology. New and advanced technologies have changed the learning style of students. By using these technologies, they are more confident, autonomous and creative (Lorenzo-Alvarez et al., 2020). The digital game learning strategy is based on activating prior knowledge, experience and giving instant feedback. This learning strategy can be used to solve real-life problems (Hamari et al., 2016). Game-based learning strategy is a modern learning strategy in which students learn in a fun way. Digital platform-based games motivate students and help them to learn with full focus and participation. Play-based digital learning strategy improves students' ability to experience, create, communicate and visualize by accepting play challenges (Haruna et al., 2018). Computer games encounter the real requirements and interests of adults and has become the most widespread computer-based activity by providing a new means of communication. Some advantages of games-based learning are that these provide engaging, creative, a better atmosphere and thus support learners to focus on the task. Modern computer based and video games-based learning provide learning chances every second or fraction of a second (Moylan et al., 2015). Learners like everyone like to work when it's not enforced on them (Prensky, 2003). Von Wangenheim & Shull, (2009) argued that real value of video games and computers is that they permit people to reconstruct themselves in new worlds of learning. Educational games put the learners to act as a main role in learning process, making the learning easier, more enjoyable and efficient. The basic concept of game-based learning strategy in shown in Figure 2. The objective of this study was to compare the results of previous published studies on the

traditional and game-based learning strategies by descriptive and statical ways. The game-based learning strategy and its effectiveness is shown in Figure 2.

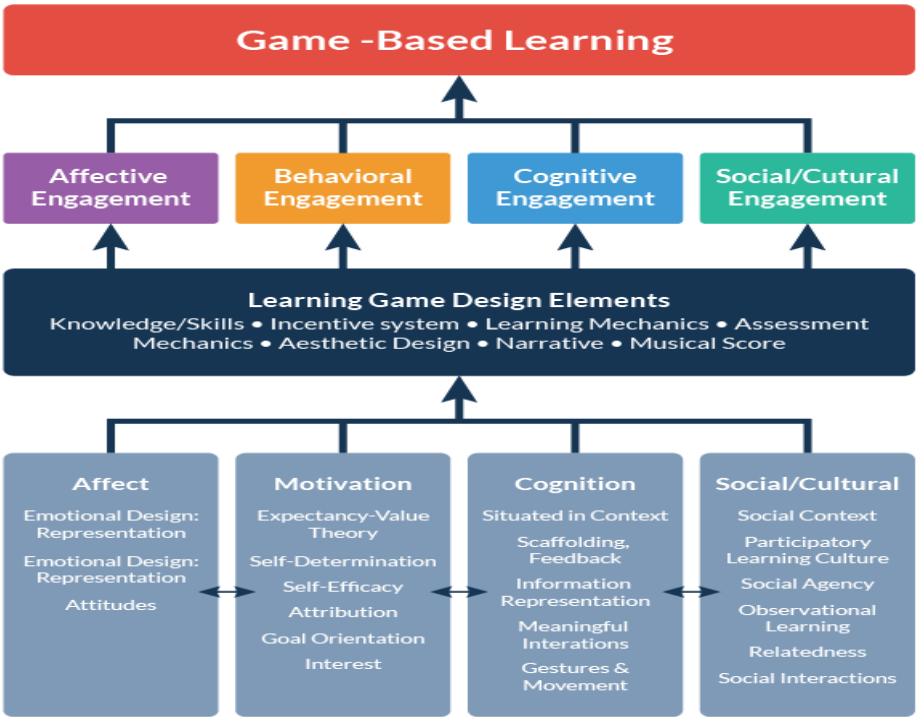

Figure 2: Basic concept of game based learning strategy

2. Methodology

Article Selection Process

The key objective of current review research was to compare the significance of blended and traditional learning strategies. For this purpose, Web of Science and Scopus databases were selected to collect the review of related articles. In Web of Science and Scopus interface, blended versus traditional learning strategies were added terms were entered as the main contents of the search. The custom year range from 2012 to June 2021" was determined as the time limit for current study. The advanced search was done from 10th to 15th September, 2021. Based on the initial results, 126 papers were discovered. The specific inclusion criteria were applied to limit articles for review on the game-based versus traditional learning strategies. The first criterion was to use "Educational research" as a web of science and Scopus category. "Only items" as documents and Pdf types were the other inclusion criterion. After applying the inclusion criteria, 51 articles have been found. In order to conclude the research and review articles to be reviewed, specific exclusion criteria were then implemented. The first criterion of exclusion was to exclude more than once the same articles. Secondly, articles not available in full text were to be excluded. The final criterion for exclusion included the removal of articles that had no direct connection with the comparison

of blended and traditional learning strategies. Finally, the main sample of this systemic review study was determined by a total of 26 articles. The main selection process is summarized in Figure 3.

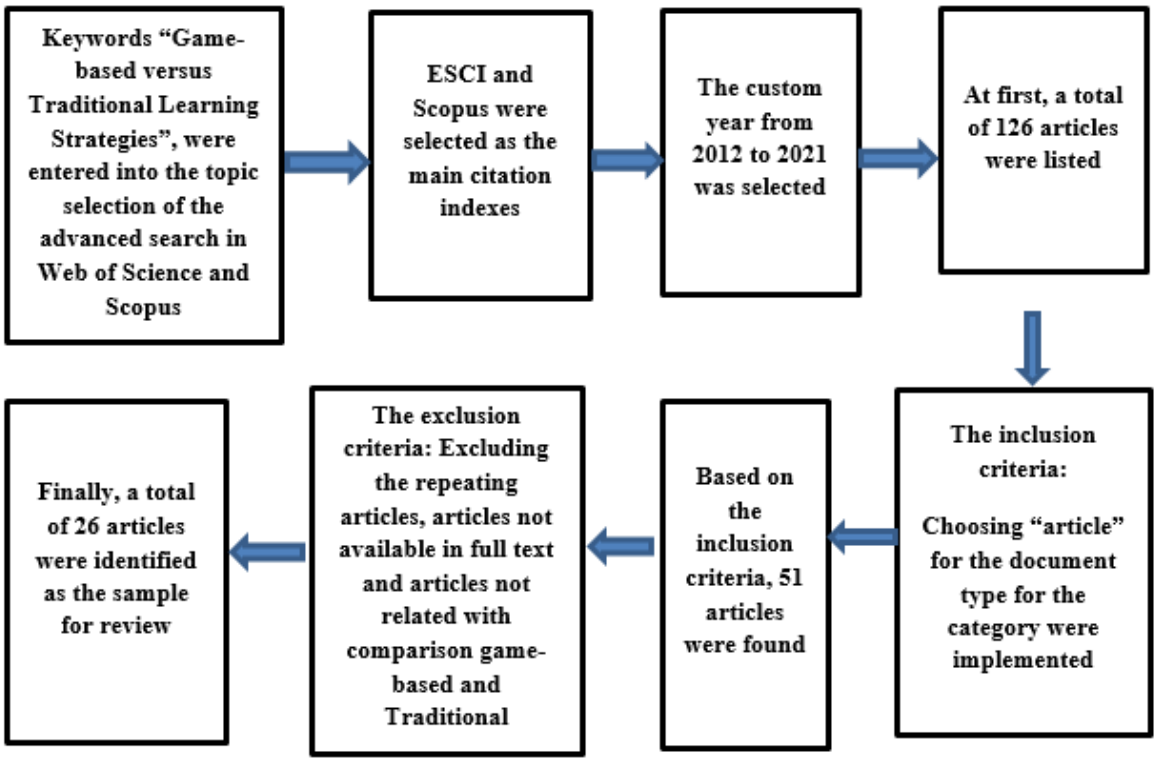

Figure 3: Article selection process

3. Review of Literature

3.1 Traditional Learning Strategy

Previous studies have found that learners had conflicting opinions of traditional learning strategies for their efficacy (Lee et al., 2016; Zaidi et al., 2017; Raja, 2018; Habibzadeh et al., 2019; Lo et al., 2020). Nurutdinova et al., (2016) conducted research at a primary school for grade five pupils to assess the efficiency of various learning methodologies. According to the study's findings, traditional learning strategy resulted in worse critical thinking abilities in learners when compared to other learning methodologies. Some study also determined that when learning information is not available in written form, such as a book, the traditional learning technique is a viable option (Balliu, 2017; Alaagib et al., 2019). Zlotskaya, (2016) suggested a study to assess the applicability of learning strategies in different learning contexts. The study's findings suggested that the traditional learning is a good learning strategy, particularly when there is a big number of learners in front of the instructor.

3.2 Game Based Learning Strategy

Researchers defined game-based learning strategy as voluntary, an immersive and enjoyable learning activity in which inspiring objectives are followed according to the approved rules (Stenros, 2017). Chang & Yeh, (2021) proposed that combining computer games with educational goals and objectives not only stimulate student learning but also motivate them and provide them interactive and innovative learning opportunities. Kikot et al., (2014) pointed out that essence of using computer games is one of the most natural types of learning. Burguillo, (2010) proposed a framework to implement ability-based learning to motivate students and improve their academic achievements. Watson et al., (2011) and Holbrey, (2020) introduced the classroom usage of game-based educational learning strategy in undergraduate courses and resulted that usage of game-based learning strategy led to changes in traditional learning strategies. The instructor-centered learning strategy is transformed into a learner-centered learning strategy, in which learners are more dynamic and involved. The comparison between the advantages and disadvantages of traditional and game-based learning strategies are illustrated in Table 1.

Table 1: Advantages and disadvantages of traditional based and game based learning strategies

Learning Strategy	Advantages	Disadvantages
Lecture Based	1. Information may be given in an impressive and timely manner. 2. It has the potential to pique people's interest in the subject matter. 3. It boosts one's speaking ability and vocabulary. 4. By employing a variety of languages, it may be tailored to the needs of all students. 5. Various ways can be used to address the issues.	1. It appears to be a waste of time to convey material that is already presented in the books. 2. The teacher must prepare the lesson from many perspectives. 3. If the lecturer speaks quickly throughout the lecture, it may be difficult for many students to follow along. 4. The students become apathetic. 5. Between the learners and the instructor, there is no contact or cooperation.
Game Based	1. The competition is low-risk. 2. Development of "soft" talents promotes social-emotional development. 3. Student-centred education 4. Boost a child's memory capacity 5. Fluency with computers and simulations	1. Too much time spent in front of the screen. 2. Games aren't usually made in the same way. 3. Games can be a source of distraction. 4. It requires a technology learning curve

		5. Not always in line with teaching or learning objectives

The descriptive results of the studies reviewed in this article are illustrated in table 2. A total of 26 published articles in various data bases from 2012 to 2021 were selected for conducting this review study by selecting the inclusion and exclusion criteria. The results of most of the articles reviewed showed that game-based learning strategy was an effective and critical thinking skills developed strategy. The learners felt very useful and enjoyable learning environment in the game-based learning strategy.

Table 2: The outcomes of the studies reviewed in current study

References	Class	Subject	Outcome
Rondon et al., (2013)	Undergraduate	Anatomy and Physiology	The game-based learning strategy proved to be an effective learning strategy
Telner et al., (2010)	Graduate Medical Students	Stroke Prevention and Management	Participants in the game-based learning group reported higher levels of satisfaction with the learning process.
Brumels et al., (2008)	Undergraduate Students	Educational Training	It was concluded that not only use of video games increased participant enjoyment and engagement, but they also improve selected balance performance measurements
Kliem & Wiemeyer, (2010)	Health Care Volunteers	Training Programme	Game based learning improved the efficiency of the experimental learning group
Proske et al., (2014)	Undergraduate Students	Essay Writing	Results of the study showed that learners perceived game-based practice as significantly more interesting and engaging than traditional learning strategy.
Boeker et al., (2013)	Medical Students	Urology	The students in the game-based learning group achieved significantly better results in the cognitive

			knowledge test than the learners in traditional learning group.
Holbrey, (2020)	final-year undergraduate	Primary Education	Students reported improvements in engagement, concentration and retention in game-based learning strategy as compared to the traditional learning strategy.
Liao, (2010)	Undergraduate	Various Courses	The game-based learning strategy significantly improved the learning process of the learners.
Dortaj, (2014)	Third Grade	Math	The results of the study indicated that motivation and achievement levels of students who had been trained through game-based learning were more compared to motivation and achievement levels of the students who had been trained through the traditional learning strategy.
Hsu et al., (2008)	Undergraduate	Chemistry	Game based learning strategy improved the learning process of the learners.
Chen et al., (2019)	Fourth-Grade Students	Various Subjects	The game-based learning strategy significantly improved the engagement of the learners in the learning process.
Widiana et al., (2018)	Fourth Grade Students	Essay Test	The study concluded positive effects of game-based learning strategy on the student's cognitive process learning achievement.
Ghari et al., (2021)	University Students	Physical Education	The results showed that game-based learning strategy can enhance physical activity level and quality of motivation of university students in physical education classes.
Lo & Hew, (2020)	Grade 9 Students	Mathematics	Flipped learning with gamification promoted students' cognitive

			engagement better than the traditional learning strategy.
Toharudin et al., (2021)	Secondary School Students	Different Subjects	No significant improvement in students learning by using game-based learning strategy.
Boateng-Nimoh & Nantwi, (2020)	School Students	Different Subjects	The study concluded that game-based learning strategy used in various subjects significantly improved the critical thinking skills and students' engagement.
Chen & Lin, (2019)	Intermediate Students	Science Education	Game based learning strategy improved the cognitive skills of the learners.
Yang, (2017)	Graduate students	Computer Science	Game based learning strategy proved to be an effective learning strategy than traditional learning strategy.
Moradian & Nazdik, (2019)	High School Students	Disaster Risk Education	Game's educational method was more effective than the traditional learning method on students' knowledge.
All et al., (2017)	Bank Employees	E- Learning	No significant improvement shown by game-based learning strategy.
Iliadou et al., (2021)	Older Adults	Cognition Assessment	Declination in cognition skills by Game based learning strategy
Purwaningrum et al., (2017)	Elementary School	Healthy Life Style	The conclusion of the study indicated that there was a significant difference between the two groups in learning the concepts of addition and subtraction and the experimental group (game-based learning group) has a higher mean score than the traditional learning group.
Segovia & Gutiérrez, (2020)	School Students	Primary Education	GBHIIT appeared to be effective in countering effects on schoolchildren's body composition.
Palasí Melià, (2020)	School Students	Secondary Education	Game based learning strategy improved the learning efficiency of the school children.

Volk et al., (2017)	3rd Grade Students	Math	It was concluded that in cross-curricular maths teaching, tablets offer efficient use of resources from different subjects and multiple representations which facilitate learning outcomes in the cognitive, affective-social and psychomotor learning domains.

Table 3: Statistical results of the studies reviewed in this article

References	Learning Strategy	Mean	SD	p	Remarks
Rondon et al., (2013)	Game based	2.83	0.32	0.003	Significant
	Traditional	2.24	0.41		
Telner et al., (2010)	Game based	2.72	0.61	0.049	Significant
	Traditional	1.94	0.82		
Brumels et al., (2008)	Game based	3.78	1.03	0.031	Significant
	Traditional	3.29	1.21		
Kliem & Wiemeyer, (2010)	Game based	7.32	1.34	0.018	Significant
	Traditional	6.99	1.73		
Proske et al., (2014)	Game based	11.34	2.23	0.009	Significant
	Traditional	9.30	2.76		
Boeker et al., (2013)	Game based	3.98	1.03	0.021	Significant
	Traditional	3.01	1.11		
Holbrey, (2020)	Game based	4.67	2.01	0.02	Significant
	Traditional	3.89	2.12		
Liao, (2010)	Game based	2.34	0.89	0.008	Significant
	Traditional	2.03	1.04		
Dortaj, (2014)	Game based	9.92	3.23	0.0007	Significant
	Traditional	8.09	3.56		
Hsu et al., (2008)	Game based	29.61	6.34	0.0001	Significant
	Traditional	27.82	7.01		
Chen et al., (2019)	Game based	39.70	9.23	0.082	Non-significant
	Traditional	36.87	10.09		
Widiana et al., (2018)	Game based	1.02	0.31	0.071	Non-significant
	Traditional	0.71	0.35		
Ghari et al., (2021)	Game based	3.21	1.19		

	Traditional	2.99	1.28	0.092	Non-significant
Lo & Hew, (2020)	Game based	5.81	2.08	0.07	Non-significant
	Traditional	7.01	2.31		
Toharudin et al., (2021)	Game based	18.17	4.56	0.002	Significant
	Traditional	16.09	4.70		
Boateng-Nimoh & Nantwi, (2020)	Game based	1.34	0.39	0.023	Significant
	Traditional	1.01	0.42		
Chen & Lin, (2019)	Game based	16.34	5.21	0.08	Non-significant
	Traditional	17.32	5.99		
Yang, (2017)	Game based	21.22	6.92	0.0002	Significant
	Traditional	19.23	7.11		
Moradian & Nazdik, (2019)	Game based	3.02	1.06	0.006	Significant
	Traditional	2.99	1.22		
All et al., (2017)	Game based	23.21	7.56	0.05	Non-significant
	Traditional	25.90	7.98		
Iliadou et al., (2021)	Game based	12.23	4.23	0.09	Non-significant
	Traditional	13.29	4.50		
Purwaningrum et al., (2017)	Game based	5.21	1.79	0.02	Significant
	Traditional	4.99	2.04		
Segovia & Gutiérrez, (2020)	Game Based	7.87	2.89	0.0001	Significant
	Traditional	6.98	3.04		
Palasí Melià, (2020)	Game based	2.12	1.01	0.005	Significant
	Traditional	1.87	1.10		
Volk et al., (2017)	Game based	0.98	0.21	0.009	Significant
	Traditional	0.65	0.25		

4. Discussion

Traditional classroom learning relies on uninteresting learning skills and absences interaction. Learners lose interest about the objectives of learning courses. Students look forward to new learning techniques, digital assignments and stimulating valuation models. In higher educational learning context, some new learning processes have been presented to attract active students and ignite the practices of self-learning, thereby paving the way for better knowledge of skills and abilities. With numerous inventions in ICT in higher educational environment, game-based learning approach is one of the innovative learning approaches that have aroused the interest of many universities. ICT paradigm shifts are entangled with

various teaching methods adapted to students in the 21st century (Afari et al., 2013). ICTs have improved the efficiency and flexibility of learning and training systems and can be implemented in work settings, linking formal learning with informal learning. ICT helps universities prepare students through primary education and continuing professional development in international and global markets. Research on the adaptability of ICT in teaching shows that technological innovation in this field is achieved in different ways (Shah, 2017). Changes are needed from all levels of systems, organizations, and individuals to put the new teaching methods into practice. Teachers need to continuously develop teaching in their own teaching environment. These teaching environments are usually the junctions of different cultures and the most diverse groups of students and experts. ICT-assisted learning environments are becoming more and more common. They require teachers to be able to use new systems and tools and new communication methods in a multicultural environment. The organization and system levels, the planning and implementation entities require quality assurance (Plass et al., 2020).

Recent studies suggested that students growing in a digital game-based learning environment are psychologically different from generations of traditional learners. This is caused by the fact that it provides a direct linking between the struggle and the instant rewards that have been spent digital all over the world. In contrast, class rewards are often repeated until an evaluation and formal inspection are carried out. Students have found a recovery in the future so that it feels to learn in the future. On the other hand, digital students prefer to learn relevant, aggressive and immediate and fun things (Chang et al., 2020). The famous psychiatrist William Glasser, (Glasser, 1999) claimed that there is a close linking among fun and learning. Glasser's theory of choice regards fun as a basic requirement that drives social behavior. The Pupils acquire best when they enjoy freely what they are educated because they have a great need to link and have fun.

In an educational environment, it is well known that computer games can provide a variety of benefits, such as involving students in an active learning environment, increasing inspiration, enhancing information retaining and improving real life problem-solving and critical thinking skills. Moreover, computer games let student groups to share knowledge learned, resources, skills and collaboration to solve real life educational problems (Byun & Loh, 2015). Supporters of computer game-based learning believe that educational computer games have the abilities to change the way of pupils learning styles and can inspire and involve a new group of students in a way that traditional learning approach does not have (Romero & Kalmpourtzis, 2020). Nazarova & Galiullina, (2016) pointed out that compared to the traditional classroom teaching method, the traditional classroom method is to provide facts and data, and then find out their relevance, so the game has a motivating effect, because the Players need to find facts and information to be successful complete the challenge. In the current study, a comparison between game based and traditional learning strategies were conducted. A total of 26 published articles were selected after setting inclusion and exclusion criteria. The conclusion of the studied reviewed showed that game-based learning strategy is more effective learning strategy as compared to the traditional learning strategy. The learner’s engagement level increased more in game-based learning strategy.

5. Conclusion

The purpose of this was to compare the outcomes of the studies on game based and traditional learning by

descriptive and statistical ways. A total of 26 articles published from 2012 to 2021 were selected by inclusion and exclusion criteria. The review of the selected studies indicated that game-based learning strategy is an effective learning strategy. This learning strategy improves the learning process of the learning by engaging the learners towards the learning process. So, it is recommended on the basis of the results of the review studies that game-based learning strategy should be used to increase the students learning process.

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