Role of Digitalization: Why Game-Based Learning Important During the COVID-19 Pandemic?

Yoriska Noventi Putri[1*], Achmad Lutfi[2], Harun Nasrudin[3]
[1,2,3] State University of Surabaya, Surabaya, Indonesia

Sections Info	ABSTRACT
	Objective: Game-Based Learning (GBL) is an e-learning platform that drives learning. It can be used as an additional option for teachers because it integrates the learning process with the experience of playing games that can be done anywhere and anytime. The distance learning or online learning set by the government during the COVID-19 pandemic could not support learning. Obstacles faced by students resulted in a decrease in achievement due to the inaccuracy of the strategies and learning methods used by the teacher during the learning process. This study aimed to determine the role and usefulness of the GBL method during the pandemic. **Method:** The research method used is a qualitative literature review method with fifteen main articles as a reference. **Result:** The results of the study found that the role of GBL during the pandemic is to fun learning, increase interest in learning, increase student motivation, improving student learning outcomes, improving mastery of learning, improve student cognitive ability, increase student activity, boosting creativity, improve concept understanding & knowledge, practice digital literacy, and practice self-efficacy. **Novelty:** GBL method is essential and plays a significant role in learning during the pandemic. The advantage it has can be used to improve student achievement, primarily when online learning is implemented. However, in the process, parental supervision is still needed so students can avoid game addiction.

INTRODUCTION

The COVID-19 pandemic that has hit the world resulted in negative impacts in various fields, including education. During the pandemic, the government imposed a lockdown policy to limit the spread of the virus. The COVID-19 pandemic seems to have "paralyzed" the world by limiting the movement and activities of people outdoors in order to comply with health protocol regulations. The number of policies taken by the government has caused upheaval in the world of education, one of which is social distancing. Due to social distancing regulations, many school institutions are closed, and students must study independently at home (Marx & Padmanabhan, 2021; McKeown et al., 2022; Kundu & Ngalim, 2021). The pandemic has taught people how important digitalization in education is because all learning is done remotely (Hassanien & Darwish, 2021). The COVID-19 pandemic has forced students, teachers, and schools to taste digital technology-based education (Hassanien & Darwish, 2021; Jandrić et al., 2020; Jandrić et al., 2021; Rapanta et al., 2021). The result was predictable; almost all parties involved in education did not complain about this new emergency system (Kundu & Ngalim, 2021).

Digitalization is the process of change that occurs from analog to digital technology. The function of digitalization is to get efficiency and optimization in many ways, including efficiency and optimization of storage space, security from various forms of disaster, and increased resolution, images, and files being more stable (Marx &

Padmanabhan, 2021). The development of Digital technology and communication is increasingly rapid, that is, of course, affects various other aspects such as social, cultural, economic, and in particular, education (Hasseinin & Darwish, 2021; Kaimara et al., 2021; Marx & Padmanabhan, 2021). The Millennial Era, always in contact with technological advances, tends to use gadgets and the internet (Srivatanakul, 2022). Digitalization of education is an effort to support the online learning process without reducing the essence of delivering material. Online learning is flexible, wherever you can study without meeting with a teacher. With that, schools can provide a platform that can be used to access student learning every day (Hasseinin & Darwish, 2021). Game-based learning is one of the appropriate digital technology-based education to use during the pandemic (Abdel-Hameed et al., 2021: Baek & Whitton, 2013; Tan, 2019). As technological applications are proliferating, games and simulations are often used in traditional educational processes. Adding games to education is common, and much research has been done on this subject. Learning is made easier with digital or web-based games (Justo et al., 2022).

Games are played to produce a victory or defeat, and people who play games are called players. The game consists of a set of rules that builds a competitive situation from two to several people or groups by choosing a strategy that is built to maximize victory alone or to minimize the opponent's victory (Chee, 2016). Rules determine the possible actions for each player, the number of descriptions received by each player as playing progresses, and several wins or defeats in various situations (Romero et al., 2017). Games are identical to fun challenges so that players will not feel bored while playing the game (Baek & Whitton, 2013; Barr et al., 2019; Chee, 2016; Daniela, 2021; Kim et al., 2018; Plass et al., 2019; Romero et al., 2017). Games have specific characteristics, such as clearly defined rules, points, and challenges, providing system feedback and responses, and motivating players to get involved (Barr et al., 2019; Daniela, 2021). Games are very popular with everyone from all walks of life and ages, their game has a solid appeal to students, and hundreds of average hours are spent by students playing games (Kim et al., 2018). These characteristics of games that the researchers assessed could be applied to learning because learning can invite sleep and boredom, especially when students study independently due to the COVID-19 pandemic (Chan, 2022; Nisiotis, 2021). The characteristics of 'fun' games combined with learning will create fun learning for students. Playing games do not always have a negative impact; through games, it turns out that many lessons can be applied in real life (Baek & Whitton, 2013). Games have several advantages that can be used in learning from home, including:

1. Improved memory and retention

   In general, a video game encourages creative thinking and problem-solving that students must do to complete the challenges given in a game. The existence of levels, scores, and multimedia helps remember and repeat what has been done. Ultimately, game help students remember better information; by watching and playing, learning all the concepts they learn in class come alive and pleasant.

2. Problem-Solving Skills Development

   Good games help students to develop problem-solving skills the important one. For children and youth, these are fundamental skills to learn early on to equip them in this millennial era. Games also make students think more, process information, understand instructions, and answer questions, solving challenges not only by

reading and memorizing. This method changes the learning to become creative, fun, and relevant to the real world.

3. Instant Feedback

   Games increase student engagement and provide instant feedback on how well the participants learn to complete the challenges given. The game has advantages in providing a prompt response. This makes participants learn to interact and complete any given challenge. Student involvement can be felt completely and is personal; each student experience and go through the process with their characteristics (Kemendikbud, 2020).

Game-Based Learning (GBL) is a learning model using game applications or games that have been specifically designed to assist the teaching and learning process in order to achieve the learning objectives that have been set. Digital Game-Based Learning strategies are now widely used in various fields, such as education, marketing, and advertising. This learning strategy has received significant attention from academics and practitioners in recent years due to its effectiveness in various educational fields (Bakhsh et al., 2022). This model is applied by educators when they want to equip students with the ability to think analytically, logically, critically, systematically, and creatively and work together in fun learning (Plass et al., 2019). GBL is an e-Learning platform that can encourage learners to increase their learning motivation through the experience of playing games (Chee, 2016). GBL includes applications that use the characteristics of video games and computers, and even smartphones to create a learning experience (Chee, 2016; Kim et al., 2018). GBL provides a platform for learning through experience and knowledge (Chee, 2016). This combination is more efficient rather than learning just by studying (Barr et al., 2019). Developing educational games can be helpful for students besides having fun. Thus, mentally, learners can relax and focus on something different without pressure (Barr et al., 2019; Baek & Whitton, 2013; Chee, 2016; Plass et al., 2019; Tan, 2019). Several characteristics of GBL need to be considered: (1) Students learn while playing (Plass et al., 2019); (2) Activate critical thinking skills through in-game problem solving (Barr et al., 2019); (Kemendikbud, 2020); (3)There is a conflict or one that needs to be resolved, providing unexpected and stressful situations that must be resolved (Baek & Whitton, 2013; Daniela, 2021; Kemendikbud, 2020; Muntanah, 2022; Utami & Hartono, 2022); (4) There is feedback (Barr et al., 2019; Daniela, 2021; Kemendikbud, 2020); (5) Encourage students to take risks and evaluate their actions (Tan, 2019); (6) Allow students to make mistakes and learn from them (Chee, 2016); (6) Provide an environment for collaborative and social learning (Baek & Whitton, 2013).

Based on the characteristics of games and GBL, this model will likely be very suitable when used during a pandemic requiring distance learning. Many researchers have proven that using GBL can improve student learning quality from various fields of view. According to this explanation, the author will review more deeply based on previous studies by considering the advantages and disadvantages that students will have. This review involves the possibility of bad habits that students will possess after applying GBL found in previous research by Nadeak (2021) and how to overcome them.

RESEARCH METHOD

This study uses a qualitative literature review method. A literature review is a written summary of journal articles, books, and other documents that describe the past and current state of information on the topic of your research study. A qualitative study is to mention or justifies the importance of the research problem and uses the literature to support the findings. The type of data used is secondary data. A secondary source is a source of data obtained utilizing reading, learning, and understanding through the media; others are sourced from literature, books, and document (Creswell, 2012). Data collection techniques in this literature study by taking data from fifteen articles with a game theme of education. The analysis technique in this literature study is Document Analysis Method. Document Analysis Method is research conducted systematically against records or documents as data sources or, in other words, intended for collecting and analyzing official documents. Documents validity is guaranteed for legal and policy documents and research results. These document analysis research characteristics are: (1) research is conducted on documented information in the form of recordings, pictures, and so on; (2) subject research is a book, magazine, goods, and others; (3) the primary data source is in the form of documents (Sugiyono, 2012).
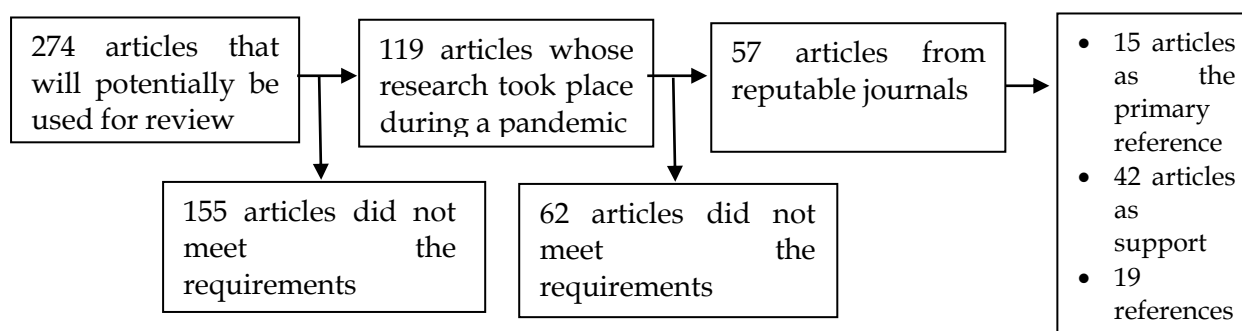

Figure 1. Research flowchart.

Based on **Figure 1**, in the first stage, the author collects as many as 274 articles having a game-based learning theme. This article comes from various sources, both international and national. The next stage is screening criteria for articles whose research was conducted during the COVID-19 pandemic. There were 115 articles whose research did not occur during a pandemic, and there were 119 articles that met the criteria. The next step is selecting articles from reputable journals or proceedings. At this stage, as many as 64 articles met the criteria, and 55 still needed to meet the requirements. From 64 articles that met the criteria, 15 were selected as main articles and the rest as supporting articles. This was done because most of the subject matter between one article and another is the same as in **Table 1.**

Table 1. List of 15 main articles used in this research.

Author, Title, Journal
Wati, I. Y. (2020). Digital game-based learning solves fun learning challenges during the COVID-19 pandemic. *Advances In Social Science, Education, and Humanities Research, 508. 1st International Conference On Information Technology And Education (ICITE 2020).*
Savitri, A., & Kusnarto. (2021). *Pemanfaatan game edukasi wordwall sebagai evaluasi pembelajaran bahasa indonesia secara daring di perguruan tinggi. Proceedings: Digital Transformation in Language, Education, and Culture: Challenges and Opportunities (ISoLEC*

Author, Title, Journal
2021).
Nugroho, F., Yuniarno, E. M., & Hariadi, M. (2021). Game-based learning as an alternative during the COVID-19 epidemic based on k-13 for Indonesia elementary schools. *International Conference on Engineering, Technology and Social Science (ICONETOS 2020).*
Sari, R., & Ahmad, H. (2022). Game based learning: Media edutainment matematika untuk pembelajaran mandiri bagi siswa sekolah. *Seminar Nasional Manajemen, Desain Dan Aplikasi Bisnis Teknologi (SENADA).*
Barr, M., & Copeland-Stewart, A. (2022). Playing video games during the COVID-19 pandemic and effects on players' well-being. *Games and Culture: A Journal of Interactive Media.*
Krouska, A., Troussas, C., & Sgouropoulou, C. (2021). Mobile game-based learning as a solution in COVID-19 era: Modeling the pedagogical affordance and student interactions. *Education and Information Technologies.*
Rincon-Flores, E. G., & Santos-Guevara, B. N. (2021). Gamification during COVID-19: Promoting active learning and motivation in higher education. *Australasian Journal of Educational Technology.*
Venigallaa, A. S. M., Vagavolub, D., and Chimalakondac, S. (2021). Survive COVID-19 - An Educational Game to Facilitate Habituation of Social Distancing and Other Health Measures for COVID-19 Pandemic. *International Journal of Human–Computer Interaction.*
Apriloka, D., Suyadi, S., & Na'imah, N. (2020). The use of games virus hunter in the pandemic COVID-19 against early childhood *development. Indonesian Journal of Early Childhood Education Studies.*
Mubarokah, K., & Hidayana, I. (2020). *Edugames ular tangga electronic untuk peningkatan pengetahuan dan literasi tubercolosis siswa kelas 5 SDN 2 bangunharji semarang. Visikes.*
Maksum, E., Nurharlina, N., Nugrahaeni, D., Inayah, I., & Lukman, M. (2022). *Efektivitas Promosi Kesehatan Permainan Ular Tangga Modifikasi terhadap Tingkat Pengetahuan tentang Protokol Kesehatan* COVID-19. *Journal of Telenursing (JOTING).*
Sufiaty, S., Any A., & Cahyadhi, R. (2020). Learning chemistry with the "red and ox" game during the COVID-19 pandemic at SHS 22 Surabaya. *JCER (Journal of Chemistry Education Research).*
Pratama, R. A., & Waskitoningtyas, R. S. (2020). Game android "*menalar*" *berbasis* adobe animation CC. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika.*
Khairani, D., Prayoga, M. I., Rosyada, D., Zulkifli, & Mintarsih, F. (2021). *Penerimaan sistem pembelajaran bahasa arab dengan e-learning dan gim di masa pandemi* COVID-19. *EDUKASI: Jurnal Penelitian Pendidikan Agama dan Keagamaan.*
Sueca, I., & Dewi, I. A. (2021). *Pengembangan klinik literasi berbasis permainan bahasa dalam kegiatan literasi dasar pada masa pandemi COVID-19. Paedagoria : Jurnal Kajian, Penelitian dan Pengembangan Kependidikan.*

RESULTS AND DISCUSSION
Results
Based on the results of secondary data collection from fifteen articles, there are several points of use and role of GBL during the COVID-19 pandemic. This data was obtained based on the analysis of problems, data, and research results as in **Table 2**.

Table. 2 Matrix analysis of the results of a literature study of fifteen journals.

Author	Method	Result
Wati, I. Y. (2020)	The Descriptive Content Analysis Study	Digital game-based learning can increase student motivation and engagement in learning. In addition, game-based learning tools are also available to improve student learning outcomes and creativity.
Savitri, A., & Kusnarto (2021)	Descriptive Qualitative Method.	The results of this study indicate that the amount of students' understanding using WordWall is 96.8%. Using games, students' interest in learning Indonesian material is shown to extend.
Nugroho, F., Yuniarno, E. M., & Hariadi, M. (2021)	Five Research Procedure Methods	The test results on 60 students showed a significant positive increase. The average score of students during the pre-test was 58.2. The average score of students after playing ten times is 65.9. After playing 25 games, the student's score increased to 72.5; after 30 games, the student's understanding increased to 79.6.
Sari, R., & Ahmad, H. (2022)	Qualitative Methods and DDE (Design, Dynamics, Experience)	Results show that aspects of mathematics learning presented in the gameplay through story elements, problems, and adventure themes provide a more engaging learning experience because they involve the activeness and creativity of students in problem-solving. Through game-based learning, the learning process independently becomes fun and effective in increasing motivation for study.
Barr, M., & Copeland-Stewart, A. (2022)	Online Survey	The result shows that 71.0% of respondents spend more time playing games, and 58.0% of respondents report that playing games affects their health, with the majority of respondents showing a positive impact. It provides cognitive stimulation, social opportunities, and reduced anxiety and stress, among other benefits associated with mental health.
Krouska, A., Troussas, C., & Sgouropoulou, C. (2021)	Survey	The survey results are MGbL technology is critical to student engagement and Academic achievement.
Rincon-Flores, E. G., & Santos-Guevara, B. N. (2021)	Survey and Analysis Final Grade	The results obtained from the analysis of online surveys, final grades, and their correlations show that gamification motivates active student participation in settings where the teaching modes are distance, synchronous, and online. It is revealed that games helped improve academic performance. Results show that while gamification supports the relationship between attention, participation, and performance, it humanizes the virtual environment created during academic confinement.

Author	Method	Result
Venigallaa, A. S. M., Vagavolub, D., & Chimalakondac, S. (2021)	Survey	The survey results are encouraging, with an average score of over 3.5 for all survey questions. The game quality factor is 69.3, indicating that the game can be classified as excellent. Self-awareness also increases and makes people more cautious.
Apriloka, D., Suyadi, S., & Na'imah, N. (2020)	Qualitative Method	Based on observations and interviews with children's games, this virus hunter can be used as a vehicle for children at home. This game can introduce children to the current virus outbreak. In addition, it helps children enthusiastically learn about the dangers of viruses.
Mubarokah, K., & Hidayana, I. (2020)	Pre-Experiment One Grup Pre-Test Post-Test	The results showed a difference in knowledge (p-value 0.001) and TB literacy (p-value 0.03) before and after media exposure.
Maksum, E., Nurharlina, N., Nugrahaeni, D., Inayah, I., & Lukman, M. (2022)	True Experiment Pre-test & Post-test Group Control Design	Results The research shows that the difference between the pre-test and post-test scores is 0.025. In conclusion, the modified snake and ladder game is effective in improving 1st-grade elementary school students' knowledge of COVID-19 health protocols
Sufiaty, S. Any, A & Cahyadhi, R. (2020)	Descriptive Quantitative with One Group Pre-test Post-test Design	The results show the effectiveness of this game based on 87.73% of student responses, with a significant difference between pre-and post-learning averages for achieving classical perfection.
Pratama, R. A., & Waskitoningtyas, R. S. (2020)	Multimedia Development Life Cycle (MDLC)	The results of the study concluded that the educational game "*MENALAR*" based on Adobe Animation CC was very influential on average 88.9% and very practical on average 83.6%. This is effective even if you only complete 60.4%. Thus, the learning media developed can be a substitute for learning activities, especially mathematical reasoning problems.
Khairani, D., Prayoga, M. I., Rosyada, D., Zulkifli, & Mintarsih, F. (2021)	Technology Acceptance Model (TAM)	Consistent use of e-learning and games in learning, especially in learning Arabic Implementation of e-learning and games to support the curriculum is expected to improve student performance. By utilizing e-learning and games, Positive Perceptions of Convenience Support Usability and Ultimately Influence Attitudes. User behavior in learning Arabic can be proven.
Sueca, I., & Dewi, I. A. (2021)	Research and Development	The result from this study (1) presents a clinical concept of literacy in the form of literacy service

Author	Method	Result
	(R&D)	Basic (learning classes) based on language games that are very suitable for literacy activities base; (2) the development of language game-based literacy clinics is very effective; In basic literacy activities during the COVID-19 pandemic.

Discussion

The use of GBL is seen as very important during the COVID-19 pandemic. This is because technology is the only tool that can fulfill learning needs. Students and teachers, such as the lack of facilities and infrastructure, lack of parental support, boredom, and geographical conditions, face the problems of distance learning. At the same time, the obstacles students face are boredom, anxiety, family conditions, internet networks, and others (Sunarto & Ghifari, 2021). The only way to overcome this is to optimize technology or digitalization. GBL is one of the results of digitalization in education, where learning is based on an educational game. The characteristics of GBL can reduce some of the problems of distance learning. Thanks to its characteristics, the GBL has a vital role during the pandemic. The following is the role of the GBL during a pandemic that the author has analyzed based on fifteen articles:

1. Fun Learning

   Teachers must strive to create a meaningful and fun learning atmosphere. The rapid development of technology requires teachers to be able to adapt to creative and innovative learning trends. This is very relevant to the characteristics of Generation Z students. They generally like creative, practical, and fun things in their activities. Distance learning during a pandemic requires new technology, like digital games. That is why this model is very suitable during the COVID-19 pandemic. Games are fun and attract and engage users with specific goals, such as developing knowledge and skills. Learning packaged in games makes students feel comfortable, active, and critical; students interact and play a direct role in learning. Teachers can evaluate directly during the game. This method makes learning more lively and dynamic and fosters a sense of comfort, fun, and enthusiasm in students while studying. Research by Wati (2020) shows that playing and having fun is an important activity for everyone. In positive psychology, theorists use flow theory to explain that people do everything best when engaging in enjoyable activities.

   According to various studies showing many benefits of implementing digital game-based learning, applying digital game-based learning models can create enjoyable learning. Students become more active and enthusiastic about learning. For this reason, designing Game-based learning strategies for school students in the form of games is a good option for teachers. In this activity, students can enjoy answering, replying, and asking questions to the teacher. This creates intimacy between teachers and students. Game-based learning is also categorized as learning without pressure or stress on students and teachers. Students happily complete their teacher's assignments without being overwhelmed (Barr, 2022; Daud et al., 2021; Nugroho et al., 2021; Sany & Nurbaiti, 2021; Sufiaty & Cahyadhi, 2020; Utomo, 2020; Wati, 2020).

2. Increase Interest in Learning

   Interest is a sense of preference and attachment to a thing or activity without anyone telling. There is currently robust research evidence that the presence of interest

positively affects student attention, strategy use, and goal setting. With interest, learners can self-regulate and persist in completing a task even when challenging. In contrast, learners with little interest usually have difficulty engaging and continuing to work with the task. Studies have shown that student interest is significantly reduced during a pandemic resulting in low self-efficacy, lack of academic goals for learning, and inability to self-regulate. The interest indicator turned out to be in fit with the GBL model, where interest itself was closely related to "feeling good." In one of the studies conducted by Savitri (2021), student responses showed that 93.5% answered that using games could increase their interest in learning Indonesian. This interest indicator is undoubtedly in line with the characteristics of GBL, which emphasizes playful learning. Thus the use of GBL during a pandemic can increase student interest in learning (Rizqiana, 2021; Sany & Nurbaiti, 2021; Savitri & Kusnarto, 2021; Setiawan & Santosa, 2021; Nugroho et al., 2021).

3. Increase Student Motivation

Motivation is an effort that can cause a particular person or group to be moved to do something because they want to achieve the desired goal or get satisfaction with their actions. Motivation is essential in learning because it can provide enthusiasm and a sense of pleasure (Gelpherin, 2017). Motivated students will be easily directed, given assignments, have great curiosity, actively seek information about the material the teacher explains, and use higher cognitive processes to learn and absorb the lessons. During the pandemic, research has proven a decrease in student learning motivation. One factor that influences student motivation is the environmental conditions of students who study from home. Because the period is long enough and the facilities for some students are only sometimes adequate or supportive in carrying out distance learning, this is the reason why some students have difficulty interpreting the material being studied. The first thing necessary for effective learning is student motivation because motivation is crucial to effective learning. Put learning must be accompanied by happy things first. To enhance this aspect, the game is very suitable; the features of the game encourage intrinsic motivation and increase students' interest in the learning topic. Scientific evidence has demonstrated that games add motivation to study academic and non-academic topics (Rizqiana, 2021; Sari & Ahmad, 2022; Krouska et al., 2021; Sany & Nurbaiti, 2021; Savitri & Kusnarto, 2021; Utomo, 2021).

4. Improving Student Learning Outcomes

The lockdown policy resulted in school closures and became a scourge for almost all students. Distance learning is new for some parents who need experience accompanying their children to learn. So it impacts the decline in the child's learning outcomes. When learning through a distance learning system, most teachers do not feel more attached to students, thus reducing the two-way communication between teachers and students. In addition to these obstacles, teachers also need help tracking students' understanding of the subjects they teach because sometimes many students go off-cam (turn off the camera). So that the teacher cannot see and understand students' responses directly when learning takes place. The decrease in student learning outcomes is caused by several things, such as the decreased activeness of students during distance learning, the different grasping power of students compared to face-to-face learning, the decreased enthusiasm for learning of students, the number of students who do not take advantage of learning time and play more games. However, the game itself can be used to improve student learning

outcomes through GBL. The acquisition of learning outcomes will be good if one is supported by using learning media. Games can stimulate students to learn so that learning becomes more meaningful and easy to understand (Barr, 2022; Eutsler, 2021; Ensmann, 2021; Khairani et al., 2021; Krouska et al., 2021; Nugroho et al., 2019; Pratama & Waskitoningtyas, 2020; Rincom-Flores & Santos-Guevara, 2021; Rizqiana, 2021; Sany & Nurbaiti, 2021; Sari & Ahmad, 2022; Savitri & Kusnarto, 2021; Sueca & Dewi, 2021; Sufiaty & Cahyadhi, 2020; Utomo, 2020; Yang et al., 2021).

5. Improving Mastery of Learning

    Learning outcomes are abilities (in the form of attitudes, knowledge, and skills) obtained from learning activities, and this is related to learning mastery. Mastery is a matter (a state of completeness), while learning is trying to gain intelligence or knowledge. To measure the achievement of learning outcomes, it is necessary to have a test instrument. Meanwhile, to realize mastery of learning, it is necessary to have the right strategy for learning. Many research studies state that learning mastery during the COVID-19 pandemic decreases when compared to learning mastery before and after the COVID-19 pandemic. The ineffective application of learning models and methods can cause this. Problems with internet connectivity or accessibility of students are also part of the cause of the decline in the percentage of learning completeness. The factor that influences distance education is accessibility. Technology adoption in education is influenced by learning technology, academics (teachers), context, and strategy. It can also be stated that the factors that influence the success of learning during the COVID-19 pandemic, apart from accessibility and technology adoption, relate to the readiness of teachers or lecturers and inappropriate strategies. GBL is a learning method that uses game applications or games that have been specifically designed to assist the learning process and help improve student learning mastery (Daud et al., 2021; Holenko & Hoic-Bozic, 2021; Khairani et al., 2021; Krouska et al., 2021; Savitri & Kusnarto, 2021; Setiawan & Sentosa, 2021; Sufiaty & Cahyadhi, 2020; Utomo, 2021; Pratama & Waskitoningtyas, 2020; Wati, 2020)

6. Improve Students' Cognitive Ability

    The GBL method is also excellent in cognitive development, such as student achievement. Games in learning are an ideal setting for cognitive development. In this learning, students are required to learn, but with a playful approach so that the learning is not boring. This is based on the characteristics of Generation Z, who prefer to play and learn in a way that is not boring. Based on one study conducted by Savitri (2021), 96.8% of games can help remember the learning material provided by the teacher. This is because students work on learning evaluation questions packaged in games so they do not feel like they are taking an exam. In the form of a game so they do not feel like they are taking an exam. Games in learning are used as triggers for students' enthusiasm for learning because games are essential to increase motivation in learning. Students will also be interested in the various games served in learning so that student interest will increase, which will help increase learning achievement. This enthusiasm for learning can increase students' concentration in absorbing knowledge. The cognitive aspects of students increase when they concentrate more on learning by the objectives of Game-Based Learning (Aprilioka et al., 2020; Barr & Copeland-Stewart, 2022; Cloude et al., 2022; Ensmann, 2021; Rajan, 2022; Widjayatri et al., 2022; Yang et al., 2021).

7. Increase student activity

Learning activities are all carried out in the interaction process (teachers and students) to achieve learning objectives. The activity meant here is the emphasis on students because, with the activities of students in the learning process, an active learning situation is created. The results showed that during online learning, student learning activity still needed to be fully achieved by the indicators of learning activity. This is due to the constraint factors during online learning, such as the lack of teaching aids, inappropriate strategies, and limited internet access. Because of some of these limitations, learning is not very effective and makes students bored, passive, and lazy to learn. Students will feel interested and enthusiastic when the subject matter is carried out with a fun learning model. The GBL model can be used as a learning strategy in this case. Learning packaged in games makes students feel comfortable, active, and critical; students interact and play a direct role in learning. Teachers can evaluate directly during the game. This method makes learning more lively and dynamic and fosters a sense of comfort, fun, and enthusiasm in students while learning (Daud et al., 2021; Khoirani et al., 2021; Putranta et al., 2021; Pratama & Waskitoningtyas, 2020).

8. Boosts creativity

Games are a kind of entertainment that activates the brain. However, while most games are safe and productive for abstract and creative thinking, these potential benefits depend on your game type. Educational games are packaged to stimulate the mind, including increasing concentration and solving problems. Without teachers and students in the classroom, the learning process could reduce the quality of education. Online learning has yet to be able to support children's creativity fully. A game is a medium used to hone brain skills in overcoming a problem in the game itself. These problems can be determined according to the learning objectives, one of which is to train creativity. To practice creativity, teachers can choose problems that are taken from real life and can be connected with games. That way, teachers can stimulate students' creativity by training them through various existing problems. The teacher will be able to measure the extent to which creativity is developed by seeing how many solutions students give in solving problems. GBL can be a varied learning model supported by games with varying and adequate difficulty levels. Some experts are of the view that this GBL has excellent potential to provide students with readiness in a more complex realm in facing the demands and needs of competence during the COVID-19 pandemic because technology can increase the ability to innovation, creativity, and adaptability (Rahimi & Shute, 2021; Sari & Ahmad, 2022).

9. Improve Concept Understanding & Knowledge

Concept understanding is the ability of students to absorb the meaning or message of the material and materials being studied. Students are said to have understood the concept of the material presented if they can construct the meaning of their learning, whether verbal, written, graphics, books, or others. So to achieve understanding, students must be able to obtain, accept, and interpret the lessons obtained previously. The obstacles experienced by teachers during distance learning are the need for more understanding of students when carrying out the learning process. This is because students do not understand the learning taught by the teacher, not face to face, and the teacher is not difficult to develop student learning. So that in order to improve students' understanding of concepts during distance

learning, it is necessary to apply a model or even learning media that can support students who are actively involved in the learning process. GBL is a game-based learning design process that involves balancing material with games. In the game, GBL is defined as a process in which players or students engage in an artificial conflict determined by rules that make the outcome measurable. Using game media as a stimulus to strengthen students' ability to absorb meaning or messages from the material and materials being studied (Al-Dokhny, 2022; Eutsler, 2021; Maksum et al., 2022; Mubarokah & Hidayana, 2020; Savitri & Kusnarto, 2021; Widjayatri et al., 2022; Yang et al., 2021).

10. Practice Digital Literacy

Playing games itself is a form of digital literacy practice. A game is a narrative cut from the 'verbs' in the game design. Unlike television, books, and other media before it, video games alternate between reading and writing the game's meaning. The game is a narrative space that the player forms with their intentions. From a more modern perspective of literacy, therefore, games are exercises in digital literacy. During the COVID-19 pandemic, every individual must understand that digital literacy is essential to participate in the modern world and anticipate the spread of harmful information during the current COVID-19 pandemic. Digital literacy is as essential as reading, writing, arithmetic, and other disciplines. Everyone should be responsible for how to use technology to interact with the surrounding environment. Being digitally literate means processing various information, understanding messages, and communicating effectively with others in various forms. In this case, the form in question includes creating, collaborating, communicating, and working according to ethical rules and understanding when and how technology must be used to achieve goals effectively. This includes awareness and critical thinking about the various positive and negative impacts that may occur due to the use of technology in everyday life. In education, digital literacy is utilized by using digital media as a learning medium in the learning period from home. This is very positive to prepare the 21st century generation with digital competence. One of the media that can be used to practice digital literacy skills is games. Through games, you can display the ability to understand and use information from various types of formats from a broader range of information sources (Agbo et al., 2021; Fung et al., 2023; Mubarokah & Hidayana, 2020; Sueca & Dewi, 2021; Tüzün et al., 2022; Suryati et al., 2021).

11. Practice Self-Efficacy

Self-efficacy is task-specific and should be considered and evaluated regarding specific components. The concept of self-efficacy has been extensively studied in the training literature, and trainees with high general and/or task-specific self-efficacy learn more and perform better than those with low self-efficacy levels. It has been consistently found to deliver excellent performance. Game self-efficacy is the task-specific effectiveness of most interest. Video game self-efficacy is a belief in one's ability to successfully play a video game or accomplish a task in the context of a video game. Studies in the literature show that video game self-efficacy has a similar impact on exercise efficacy in video with game context, although considerably less compared to normal self-efficacy, as an overall self-efficacy for your workout.

Due to the COVID-19 pandemic, learning has been shifted to distance learning and focuses on assignments that make students burdened by the availability provided by the school. The number of assignments given by the school regarding

academic assignments and demanding grades makes students experience academic anxiety. Students feel stressed and even exhausted due to the problem. Students who experience anxiety will bring up feelings of insecurity in their abilities, so they feel stressed due to the burden that must be met. Self-efficacy is the belief in one's ability to organize to overcome the challenges and obstacles experienced. This is in line with the characteristics of GBL, which is to challenge students to solve them. In GBL, students feel a strong sense of control and a clear idea of their goals and ways of learning, so they develop a high level of self-efficacy during the process. A significant predictor of learning efficiency mainly affects students' decision-making and problem-solving abilities and their learning persistence in facing challenges. (Sari & Ahmad, 2022; Ortis et al., 2015; Venigalla et al., 2019;).

Based on the explanation above, the importance of the role of GBL during the COVID-19 pandemic can be seen. However, keep in mind that in addition to the positive impact, there are also negative impacts of GBL that need to be considered, namely, 'Game addiction' (Besalti & Satici, 2022). Addiction is a strong feeling towards something he wants, so he will try to find something he wants, for example, internet addiction, addiction to watching television, or addiction to work. A person can be said to be addicted if he is unable to control the desire to use something, thus causing negative impacts on the individual, both physically and psychologically. This addiction can be caused by various things, such as a lack of supervision from people or students' failure to regulate self-regulation. Based on research conducted by Han et al. (2022), Most studies found increases in gaming time and gambling addiction scores during the COVID-19 pandemic. Some children and adolescents with emotional pain play games to communicate with peers. When it comes to parenting, violent parenting and lack of parental supervision increase gambling addiction in children. Gaming disorder was caused by her COVID-19 impact in a vulnerable group with predispositions such as depression, anxiety, and attention-deficit/hyperactivity disorder. Therefore, family participation is also needed to help supervise children's actions in using GBL during a pandemic.

Educational games can be considered fun and help to learn, but too much can lead to addiction. For students who are already addicted to games, it would be better if give behavior modification, such as reducing behavior and juxtaposing it with punishment and reward. Suppose students can reduce the behavior of playing games by participating in school activities. In that case, the subject will be given a prize, and if they violate or still play the game over time, they will be punished. In addition, students are also encouraged to make their study plans at home (Hidayat, 2022). Self-regulation is also essential to anticipate students being exposed to game addiction. Self-regulation is when individuals who learn as controllers of their learning activities monitor motivation and academic goals, manage human resources and objects, and become behaviors in the decision-making process and implementers in the learning process (Rahayu et al., 2021). Before using GBL in learning, it would be better if students were trained in self-regulation first.

CONCLUSION
Fundamental Finding: GBL has essential roles during the pandemic. Its advantage can be used to improve student achievement, primarily when online learning is implemented. The roles and uses of GBL are fun learning, increasing interest in

learning, increasing student motivation, improving student learning outcomes, improving mastery of learning, improving student's cognitive ability, increasing student activity, boosting creativity, improving concept understanding & knowledge, practicing digital literacy, and practice self-efficacy. Even so, using GBL from home requires parental participation to supervise student activities to avoid game addiction. **Implication:** The results of this study suggest that implementing GBL during the pandemic can significantly improve students' performance in learning. **Limitation:** This study has limitations because the data used only focuses on the learning process during the COVID-19 pandemic. In addition, the sample data used differs (including research at elementary school, junior high school, senior high school, and college). Hence, the conclusions drawn should be narrower and more specific. **Future Research:** More in-depth research about GBL is still needed for more measurable and targeted results. For researchers and teachers, research in the future can be carried out even though the COVID-19 pandemic has ended (Post-pandemic) because the use of GBL is widespread and can even be used in direct learning.

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*Yoriska Noventi Putri (Corresponding Author)
Postgraduate
Universitas Negeri Surabaya,
Jl. Lidah Wetan, Surabaya 60213, Indonesia
Email: yoriska.21004@mhs.unesa.ac.id

Prof. Dr. Achmad Lutfi
Department of Chemistry, Faculty of Mathematics and Natural Science,
Universitas Negeri Surabaya,
Jl. Ketintang, Surabaya 60231, Indonesia
Email: achmadlutfi@unesa.ac.id

Prof. Dr. Harun Nasrudin
Department of Chemistry, Faculty of Mathematics and Natural Science,
Universitas Negeri Surabaya,
Jl. Ketintang, Surabaya 60231, Indonesia
Email: harunnasrudin@unesa.ac.id