


**LITERATURE REVIEW: LEARNING THROUGH GAME-BASED TECHNOLOGY  
ENHANCES COGNITIVE SKILLS**

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ARTICLE INFO	ABSTRACT
<p><b>Article history:</b></p> <p><b>Received</b> 31 January 2023</p> <p><b>Accepted</b> 06 April 2023</p>	<p><b>Purpose:</b> The goal of this study was to determine that video games can have a variety of effects on players, including improving working memory, cognitive flexibility, planning, spatial memory, emotions, and recognition through Digital Game-Based Learning</p>
<p><b>Keywords:</b></p> <p>Video Games; Game Design; Cognitive and Skill Abilities; Spatial Memory; Attitudes and Motivation.</p>	<p><b>Theoretical framework:</b> Recent research has indicated positive outcomes for student performance and engagement in digital gaming in education with a significant impact on intrinsic motivation, game mechanics, and the learning process as a whole, with scientifically confirmed favourable consequences. DGBL is a recent creation, thus there is still a lot to research and discover about it.</p>
	<p><b>Design/methodology/approach:</b> This study's objective was to gather and evaluate all empirical studies on improving cognitive abilities through game technology that had been published between 2000 and 2023. The author discusses a number of earlier research to investigate how game-based learning affects the growth of cognitive skills. 75 journal articles and 10 conference papers are examined by the author. The author also looks at three books about game-based learning. The author condenses his investigations into 58 articles by contrasting the various research gaps and approaches. The 58 articles included in this study were chosen from 30 reputable journals and provided trustworthy information as well as empirical evidence for further examination of the results of the 58 studies. These papers all drew their information from reliable sources with high indexes.</p>
	<p><b>Findings:</b> According to the findings of this study, game-based learning should become an important tool and e-resource for future learning in universities, particularly in academic libraries. This research backs up previous findings that game based will play an important role in learning in the future.</p>
	<p><b>Research, Practical &amp; Social implications:</b> We Suggest that more studies on game-based learning need to be conducted in the future to produce an effective learning environment based on credible frameworks and ideas.</p>
	<p><b>Originality/value:</b> The results indicate that the number of publications is growing and a consistent research framework and procedures for conducting reliable video game research must be developed. When arbitrary information is necessary to advance toward the objective of the game; the context in which the game is used. The study conclusions may be used as a general guideline to create a game-based technology model by indulging all the game elements and through that game-based technology the user will be tested to understand the enhancement of cognitive ability. This study may present the reader with further intriguing study subjects.</p>
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## UMA REVISÃO DA LITERATURA: APRENDER POR MEIO DA TECNOLOGIA BASEADA EM JOGOS APRIMORA AS HABILIDADES COGNITIVAS

### RESUMO

**Objetivo:** O objetivo deste estudo foi determinar que os videogames podem ter uma variedade de efeitos nos jogadores, incluindo melhorar a memória de trabalho, flexibilidade cognitiva, planejamento, memória espacial, emoções e reconhecimento por meio da aprendizagem baseada em jogos digitais.

**Referencial teórico:** Pesquisas recentes indicam resultados positivos para o desempenho e engajamento dos alunos em jogos digitais na educação com impacto significativo na motivação intrínseca, na mecânica do jogo e no processo de aprendizagem como um todo, com consequências favoráveis cientificamente confirmadas. O DGBL é uma criação recente, portanto ainda há muito o que pesquisar e descobrir sobre ele.

**Design/metodologia/abordagem:** o objetivo deste estudo foi reunir e avaliar todos os estudos empíricos sobre a melhoria das habilidades cognitivas por meio da tecnologia de jogos publicados entre 2000 e 2023. O autor discute uma série de pesquisas anteriores para investigar como o aprendizado baseado em jogos afeta o crescimento das habilidades cognitivas. 75 artigos de periódicos e 10 documentos de conferências são examinados pelo autor. O autor também analisa três livros sobre aprendizagem baseada em jogos. O autor condensa suas investigações em 58 artigos, contrastando as várias lacunas e abordagens de pesquisa. Os 58 artigos incluídos neste estudo foram escolhidos de 30 revistas conceituadas e forneceram informações confiáveis, bem como evidências empíricas para um exame mais aprofundado dos resultados dos 58 estudos. Todos esses jornais extraíram suas informações de fontes confiáveis com altos índices.

**Resultados:** De acordo com os resultados deste estudo, a aprendizagem baseada em jogos deve se tornar uma ferramenta importante e um recurso eletrônico para o aprendizado futuro nas universidades, particularmente nas bibliotecas acadêmicas. Esta pesquisa confirma as descobertas anteriores de que jogos baseados terão um papel importante na aprendizagem no futuro.

**Implicações de pesquisa, práticas e sociais:** Sugerimos que mais estudos sobre aprendizagem baseada em jogos precisem ser conduzidos no futuro para produzir um ambiente de aprendizagem eficaz baseado em estruturas e ideias confiáveis.

**Originalidade/valor:** Os resultados indicam que o número de publicações está crescendo e uma estrutura de pesquisa consistente e procedimentos para conduzir pesquisas confiáveis sobre videogames devem ser desenvolvidos. Quando informações arbitrárias são necessárias para avançar em direção ao objetivo do jogo; o contexto em que o jogo é usado. As conclusões do estudo podem ser usadas como uma diretriz geral para criar um modelo de tecnologia baseado em jogo, satisfazendo todos os elementos do jogo e, por meio dessa tecnologia baseada em jogo, o usuário será testado para entender o aprimoramento da capacidade cognitiva. Este estudo pode apresentar ao leitor outros assuntos de estudo intrigantes.

**Palavras-chave:** Videogames, Design de Jogo, Habilidades Cognitivas e Habilidades, Memória Espacial, Atitudes e Motivação.

## UNA REVISIÓN DE LA LITERATURA: EL APRENDIZAJE A TRAVÉS DE LA TECNOLOGÍA BASADA EN JUEGOS MEJORA LAS HABILIDADES COGNITIVAS

### RESUMEN

**Propósito:** El objetivo de este estudio fue determinar que los videojuegos pueden tener una variedad de efectos en los jugadores, incluida la mejora de la memoria de trabajo, la flexibilidad cognitiva, la planificación, la memoria espacial, las emociones y el reconocimiento a través del aprendizaje digital basado en juegos.

**Marco teórico:** investigaciones recientes han indicado resultados positivos para el rendimiento y la participación de los estudiantes en los juegos digitales en la educación con un impacto significativo en la motivación intrínseca, la mecánica del juego y el proceso de aprendizaje en su conjunto, con consecuencias favorables científicamente confirmadas. DGBL es una creación reciente, por lo que aún queda mucho por investigar y descubrir al respecto.

**Diseño/metodología/enfoque:** el objetivo de este estudio fue recopilar y evaluar todos los estudios empíricos sobre la mejora de las habilidades cognitivas a través de la tecnología de juegos que se publicaron entre 2000 y 2023. El autor analiza una serie de investigaciones anteriores para investigar cómo el aprendizaje basado en juegos afecta el crecimiento de las habilidades cognitivas. El autor examina 75 artículos de revistas y 10 documentos de conferencias. El autor también analiza tres libros sobre el aprendizaje basado en juegos. El autor condensa sus investigaciones en 58 artículos contrastando las diversas lagunas y enfoques de investigación. Los 58 artículos incluidos en este estudio se eligieron de 30 revistas acreditadas y proporcionaron información confiable, así como evidencia empírica para un examen más detallado de los resultados de los 58 estudios. Todos estos periódicos extrajeron su información de fuentes confiables con altos índices.

**Hallazgos:** Según los hallazgos de este estudio, el aprendizaje basado en juegos debería convertirse en una herramienta importante y un recurso electrónico para el aprendizaje futuro en las universidades, particularmente en las bibliotecas académicas. Esta investigación respalda hallazgos previos de que los juegos jugarán un papel importante en el aprendizaje en el futuro.

**Implicaciones de investigación, prácticas y sociales:** sugerimos que se realicen más estudios sobre el aprendizaje basado en juegos en el futuro para producir un entorno de aprendizaje efectivo basado en marcos e ideas creíbles.

**Originalidad/valor:** los resultados indican que la cantidad de publicaciones está creciendo y que se debe desarrollar un marco de investigación y procedimientos consistentes para realizar investigaciones confiables sobre videojuegos. Cuando sea necesaria información arbitraria para avanzar hacia el objetivo del juego; el contexto en el que se utiliza el juego. Las conclusiones del estudio se pueden usar como una guía general para crear un modelo de tecnología basada en el juego al permitirse todos los elementos del juego y, a través de esa tecnología basada en el juego, se evaluará al usuario para comprender la mejora de la capacidad cognitiva. Este estudio puede presentar al lector más temas de estudio intrigantes.

**Palabras clave:** Videojuegos, Diseño de Juego, Habilidades Cognitivas y de Habilidad, Memoria Espacial, Actitudes y Motivación.

## INTRODUCTION

Remember how we used to spend hours upon hours on our PSPs playing Super Mario? Or the hours spent on old Nokia phones playing the ever-challenging Snake game? Or the continual squandering of money in the game arcade's claw game? Thus, the essential question here is: What motivates us to actively spend valuable time or money on such games when we know we could be doing something else with that time? Below are a few significant reasons why we play and will continue to play. The very first element is indeed the achievement component, which relates to a desire and needs to progress in the game all the way to the end; as well as a curiosity about the game's system and regulations, and a desire to compete fairly with other players. Social Connection creates a big impact on teens both positively as well as negatively (Panchanathan, S., & Raj, K., 2022). The cultural factor is the second element, which refers to the need to create social connections, be a part of a group, and converse with various people—all while playing games. The third component is immersion, which exemplifies what games are all about: providing a brief respite from the monotony and sorrows of everyday life. This feature allows us to design an avatar based on specific features that we find appealing, and then use that avatar to participate in the game's unique tale. Researchers in psychology and cognitive science have looked at the effects of video games in two different approaches: A first set of studies tries to see how computer games affect cognitive capacities (perception, visual attention), as well as personality and development (particularly on aggressive behaviours). In the theoretical underpinnings of the interactive media learning community, a second body of research has lately evolved, wherein content-based VG (video games) are seen as a distinct kind of interactive multimedia educational resource. Although the VG is used in both cases as

a specific task or material, its special qualities are not taken into consideration. Significant improvements in gaming technology, including Virtual Reality (VR) and Nintendo Switch, as well as expanding digital game distribution, have resulted in greater opportunities in the business (e.g. Steam, Humble Bundle). Computer game pursuits such as watching ESports and Gaming video material online are also becoming more popular. As a result, by 2019, the worldwide games market is estimated to reach \$118.6 billion (Ukie 2017). Research has been done on how playing video games affects memory, perception, emotion, and learning, however, the findings are conflicting. Furthermore, despite formal variations, no study assessed how various game styles affect the assessments that were made. This research will cover several studies of cognitive domains including VG so that sincere interests might be shown, as well as the lack of shared paradigms that still exist. Knowing the long-term effects of video games and the quick evolution of the medium over time is a difficulty with VG research, as it is with most digital technology. The subject of video game research has drastically changed even though it is only a few decades old. First-person shooters of the upcoming high-definition generation are tough to compare to older text-based action games, as Kirriemuir & McFarlane (2004) pointed out. Some game rules and their capacity to completely capture our attention, referred to as "immersion" (MacMahan, 2003), can be compared across generations. People's games, on the other hand, have evolved and varied in a variety of ways. Our relationship with virtual play changed as we progressed from video games seen in penny arcades to networked home consoles and desktop computers. Game creators have to adjust their goods as game design and ergonomics improved from a small and specialized phenomenon to mass market methods, and the market has developed. Interest in mobile and casual gaming, as well as virtual reality gaming, has changed and continues to change (McGonigal, 2007). According to McFarlane et al. (2002), there are three potential uses for VG: Building skills and competencies: the writers compile a list of prospective improvements made possible through gaming., with incorporation in a lecture hall environment, ranging from specialized abilities like memorization or deductive reasoning to more context ones like communication skills and co-operation. Cognitive talents and skills are altered by video games. As video games become more popular, the value of a psychological study on the topic will become more pertinent to both the scientific community and the gaming community (King et al 2010: 561). A learning stimulus: the gaming sessions can be used to kick off other activities like creative writing or chart analysis. Affective and motivational factors are influenced by video games. Content-based learning is possible, but it can be very tangential. Furthermore, the game's information

may be taught in a way that is very different from how it is taught in a classroom. The greatest games for directly imparting knowledge still tend to be simulations, but they require meticulously precise driving models and still require the development of learning activities. Content learning and direct knowledge is possible through games. As a result, even if previous study has identified the possible applications and effects of VG, we still have to understand how a game might be used in a particular way and what game components can have an influence. If games have the ability to change players, the shift can be used to improve brain performance in areas such as memory retention, cognitive flexibility, planning, spatial memory, moods, and identification.

## LITERATURE REVIEW

Oscarido, Juan, et al., 2023. The issue we now have is that a lot of people believe that playing video games only negatively affects a person's brain and conduct, however, it is a reality that playing games have advantages in a variety of ways. The purpose of this article is to demonstrate if playing video games may actually affect how people behave and make decisions. 22 participants who are teenagers and adults between the ages of 17 and 25 will be put through a direct testing process, and their scores will be determined when they've had enough of the video games in the genres we chose. Findings demonstrated that (First-Person Shooter) FPS video games are competitive which improves players' capacity for quick, informed decisions. A majority of the participants in our study concur that playing competitive first-person shooter games has a good effect on their cognitive abilities. According to the participants, people can immediately compare the effects of their choices and decide which is the best course of action.

Ishak, S.A., Hasran, U.A. and Din, R., 2023. Digital games as a component of media education have been the subject of a significant amount of research over the last two decades. It has been determined as a promising educational approach to enhance learning in the digital age is digital game-based learning (DGBL). This study, which provides a thematic assessment of the literature on DGBL, takes into account the growth & the elements that have an impact on how well children learn, given the rise in research studies on educational games. The results demonstrate that, while adhering to developmental best practices, a different viewpoint between the game creator and the educator is crucial. The learner-centred, model methods, game-centred, and game-centred are the three main strategies that have been discovered. Digital gaming in education has a significant impact on intrinsic motivation, game mechanics, and the learning process as a whole, with scientifically confirmed favourable consequences.



Boldi, A., & Rapp, A., 2023. The ability of games to favourably impact a number of mental health issues has led to the progressive and effective implementation of game-based therapies in the mental health field. Due to the growing popularity, availability, and affordability, academics have only recently realised the value of Commercial Off-the-Shelf (COTS) video games for this purpose. However, important components in this field of study have not yet been determined because there has not yet been a detailed examination of how commercial video games affect various mental illnesses. The use of commercial video games in mental health is the subject of contemporary research, which we discuss in this article through a comprehensive review of the literature. To provide a complete understanding of the used methodological techniques, the research results, the key diseases addressed, and the VG genres tapped, we examined 39 publications and map the relevant topics that have emerged throughout the course of the past ten years of studies. Based on these data, we emphasise unresolved problems of ongoing work & identify the number of potential study areas that might be investigated in the coming years, such as the requirement for undertaking more fieldwork and long-term studies, the requirement for increasing design expertise, and the potential for bridging academic study and clinical practise.

Bell, Imogen, et al., 2022. Psychosis-related cognitive deficits have a significant influence on quality of life and functional recovery. Current measures to treat cognitive deficits in psychosis with treatment effectiveness vary with recent onset, minimal effects, Low generalizability to daily functioning and poor engagement. In this approach, we look at how technology using digital may be able to overcome these constraints and enhance cognitive and functional outcomes in individuals with recently acquired psychosis. For standardised, automated delivery of cognitive rehabilitation training, computer programmes can be used. In a virtual setting, virtual reality offers the chance to study and practise cognitive skills in real-world situations. To compensate for cognitive impairments, notification reminders could be sent via smartphone apps for routine chores. Technologies based on the internet can provide psychoeducational resources and training materials to improve cognitive abilities. According to preliminary research, some digital therapies for improving cognitive function can be successful, and cognitive remediation using a computer with human support in recently developing psychosis has a strong record of success. There is growing evidence that virtual reality can enhance social cognition. Overall, increasing engagement and effectiveness by combining human support with technology initiatives. Few trials have been done to date despite the potential of digital therapies for improving cognition in individuals with recent-onset

psychosis. Clinical integration, sustained engagement, and a shortage of high-quality products in the commercial sector are implementation issues that have an impact on the use of recent-onset psychosis and digital technologies for cognitive impairment. The inclusion of behavioural change treatments and motivational frameworks, as well as boosting young people's service engagement and lived experience participation in the creation of digital interventions, represent future opportunities.

Boonwang, Theerasak, et al., 2022. Esports are fastly gaining popularity as a worldwide trend in athletics and may be advantageous for traditional sports players. The purpose of the current study was to ascertain whether participation in esports was related to enhanced cognitive soccer skills due to the popularity of soccer which demands highly competent performances. In this meta-analysis, soccer players' executive functions, decision-making skills, memory and reaction times were assessed in relation to esports. Studies comparing esports to any other sport or control were eligible for inclusion if they were conducted for soccer players. Quasi-experimental studies and randomised controlled trials were among the study types chosen from 276 records in five databases. This analysis included three research, two of which were randomised controlled trials with participants who played soccer between the ages of 14 and 20 and had three to five years of experience. In all, 150 soccer players took part in these three studies, with 75 players constituting the largest sample size. The results of these three studies were reported as descriptive outcomes because there were no shared interventions or outcomes; all three studies produced significant results. The results of this study suggest that playing esports may help young soccer players develop their cognitive abilities and that larger, more thorough randomised controlled trials are needed.

Suryadi, D., & Fatimah, S., 2021. Eight seventh-grade students from a junior high school in Pidie Jaya Regency took a test to assess their critical thinking abilities using the Watson-Glaser sub-skills. Based on the findings of the data analysis and discussion, it is possible to conclude that one of the Pidie Jaya Regency's students in junior high school has poor critical thinking abilities. The deduction, assumptions, information, argument analysis and conclusion drawing are the five critical thinking sub-skills that were analysed, and in that order, information, deduction and conclusion drawing are the three that scored the lowest (inference). According to this study's findings, it is recommended to tutors and schools develop students' critical thinking abilities in mathematics by implementing styles of instruction that can improve students' capacity for critical thought. Enhancing critical thinking abilities can be done in a number of ways, such as a) reading critically; b) enhancing the effectiveness of

problem analysis in a debate, identifying the ideal solution, and examining the negative effects of the problem; c) enhancing observational skills further by outlining the benefits and drawbacks, the pros and downsides of the observed issues are anticipated to test students' analytical skills; d) getting a more curious, ability to ponder and ask questions, as a result, students must actively think, & critical thinking abilities may be strengthened by integrating learning that is centred on the student. Future research could utilise markers of using other experts to inform one's critical thinking, such as Paul, Ennis, and others, concerning methods using critical thinking techniques, in addition to subject content and varied academic levels.

Gargish, Shubham, et al., 2021. The core discipline for engineering students in mathematics. Due to the intricacy of mathematics, students frequently find the subject to be challenging or lose interest. The use of AR could enhance instruction and learning materials as well as help students understand some topics or concepts which were challenging for them to comprehend in a learning environment. In this research, a geometry learning assistant (GLA)—an AR-based learning environment—was created to educate students taking a maths course using geometry. Students who participate in GLA's interactive and immersive programmes get knowledge of vectors and direction ratios in three dimensions. For improved learning, the app offers real-world examples of vector addition, position vector, cross product, dot product and direction ratios. To find out how the AR intervention affected learners' capacity for learning and memory retention, experimental research was set up. This study involved 80 students in the first year of the polytechnic, those were randomly split into a group of two: the group of experimental ( $K = 40$ ) & the controlled group ( $K = 40$ ). In the group of experimental the students used AR-based GLA to learn, while those in the control group received instruction through interactive simulation (IS). The study's findings indicated that after two and four weeks of learning activities, students in the experimental group had improved memory retention skills. Students who participated in GLA based on AR provided a 3D interactive learning environment that helped them better visualise key ideas and, as a result, retain information.

Dale, G, et al., 2020. An increasing corpus of research has looked at the impact of VG on cognitive activity and behaviour. One important conclusion in this research is that different entertaining video games have different impacts on one's cognitive performance. Previous studies have compared the effects of playing 1<sup>st</sup> or 3<sup>rd</sup> person shooter games on cognitive function (together referred to as action video games) with relation to the effects of playing different game genres. The perceptual, attentional, and cognitive processes were put under more stress by action video games when the study first started in the late 1990s than by other types



of video games did not, the VG business, on the other hand, has changed considerably in between those years. 1<sup>st</sup> or 3<sup>rd</sup> person shooter games in particular are not any more exceptional in how much they impair cognitive abilities. Instead, it appears that these systems are under similar amounts of stress from a number of different gaming genres. Given these circumstances, the area of cognitive neuroscience must adopt a new paradigm for its research that the video game play's impact on cognitive abilities and the brain mechanisms that mediate them a change that is just starting to occur.

Faridi, Harun, et al., Science's field of physics examines the various characteristics of matter and energy. Numerous mathematical, mechanical, optical, electrical, magnetic, and thermodynamic theories serve as the foundation for most physics principles. Students frequently struggle to understand concepts because they are unable to comprehend the phenomena, which makes the issue of their lack of interest in STEM topics worse. With the use of augmented reality (AR), learning experiences can be facilitated through improved visibility and interaction with three-dimensional virtual items that resemble real-world objects. In this study, an AR-based learning environment is designed to aid students in comprehending Maxwell's equations, the Fleming rules for electromagnetic waves, electromagnetism, magnetic field, and electric current ideas. To ascertain the effect of AR intervention on students' learning and critical thinking skills, an experimental study was carried out. Eighty engineering students participated in the study, divided into two groups: the AR teaching group (P = 40) and the conventional teaching group (P = 40). The students in the conventional teaching group were taught using a conventional teaching strategy, while the students in the AR teaching group were taught utilising an AR-based learning environment. According to the experimental findings, the AR-based learning environment significantly enhances students' capacity for critical thought and academic growth. Students' grasp of abstract physics ideas was improved by the AR experience, which assisted in understanding them.

Bavelier, D., & Green, C. S., 2019. A new discipline, located in the midst of cognitive neurosciences, health science, training treatments, and game design, has emerged because of the opportunity to use video games to improve behaviour and brain function. Here we examine the effects on attentive control of video game play, especially action video games. We also analyse the neurological foundations of these effects and the game design aspect, which is assumed to influence plastic alterations. We claim that not all games have the same effect and both disparities in player style diminish the end results. The qualities of the games themselves are different. Combined with changes in the gaming business (e.g. more mixing of genre

properties; greater user experience freedom) these facts demand a paradigm shift in relation to the current methodology, including the iterative alternative between focused game design and effectiveness assessment.

Ferguson, C. J., 2014. In response to tragic news events, politicians and certain intellectuals frequently make an appearance, like mass shootings by associating video games that promote hostility and violent crime, despite the fact that video games have been linked to considerable decreases in societal violence, not increases. In actuality, conclusive links are difficult to come by. The area has potentially become engulfed in a loop of quasi-religious dedication to and, as a result, severe criticism of the notion that playing violent video games causes harm. Sincere arguments for and against the effects of different sorts of video games on hostility could be made within reason; nonetheless, the field might benefit from putting more emphasis on the user than the content and distinctive racial stereotypes.

Granic, I., Lobel, A., & Engels, R. C., 2014. In the United States, A ubiquitous part of the life of almost every youngster, 97 per cent play at least an hour each day in video games. The vast majority of the psychological study on the effects of "gaming" focuses on negative effects including aggression, addiction, and desperation. We recognize the relevance of this study; nevertheless, we think that we need a more balanced approach which examines not just the possible harmful repercussions but also the advantages of these games. Because of the significant changes in the nature of these games in the last decade, the nature of them is becoming more complex, different, realistic and social, these potential advantages have to be taken into account. A modest but significant quantity of research, primarily documenting these advantages, has started to appear in the past five years. In this article, we examine the beneficial effects studies of video games focusing on four important areas: cognition, drive, behaviour and social. Video games can stimulate genuine psychosocial advantages by merging principles from developmental, positive, and social psychology as well as media psychology. We provide many feasible paths. We offer Our aim is to provide adequate data and a theoretical basis for further study into the widely undisputed advantages of gaming mental health. Finally, we challenge interveners to assess the good use of video games and we provide a variety of feasible methods.

Prot, Sara, et al., 2012. The increased popularity of video games has sparked a discussion among parents, scholars, video game creators, and legislators over their negative and positive consequences. Video games are excellent teachers who have an impact on players across different areas. Some of these consequences may be hazardous (eg, the effects of violent

video games on aggression). Other video game effects (for example, the effects of action games on visual-spatial skills) can be helpful. Computer game effects are complicated, and rather than a basic "good-bad" dichotomy, they should be viewed in several aspects.

Kent, Steven L., 2010. Without forgetting when you were a child, you'd anticipate from a bright arcade all the pop, bang, whiz, and sparkle you'd have. The last history of video games shows you all the extraordinary video games that impacted society, the creative minds behind their creation, and the players. Video games have been fascinating for children for almost 30 years, from an arcade to a TV, from a PC to a mobile gadget. Steven L. Kent, a writer and expert on video games, was present from the start to document the craze. This intriguing book tells the extraordinary narrative of the cultural phenomenon of a Backroom surprise. His first-hand stories of how games like Centipede, Space Invaders, and Pac-Man have influenced the development of the culture which defined a particular generation and the Empires of today such as the electronic arts and Sony and Nintendo, through thorough research and in-depth conversations with hundreds of industry leaders have inspired a new generation of video games and a multibillion-dollar business.

Achtman, R. L., Green, C. S., & Bavelier, D., 2008. Adult neuroplasticity is generally difficult to induce, despite the fact that it is possible. Adult training regimens can provide specific improvements in the trained task without resulting in broader benefits in quality of life. This research will explore the case of playing action video games to promote broad visual improvement. We look at how action video gameplay affects a variety of visual skills, as well as the game elements that are critical for increasing visual plasticity. We also examine what these findings could entail for different patient populations in terms of rehabilitation.

Terlecki, M. S., Newcombe, N. S., & Little, M., 2008. This study examined the following subjects: (1) if men and women with more or less spatial experience have distinct paths for development; (2) whether videogame training affects performance; and (3) whether repeated tests and training have long-lasting impacts. Undergraduates took part in multiple MRT tests or played the video game Tetris. The results of repeated testing and training demonstrated significant increases in mental rotation, which were sustained several months later. Male's and women's MRT scores did not converge, but men grew quicker in the beginning and women improved more afterwards. The first progress with video game training was larger than with repeated testing alone. More than the effects of repeated testing the benefits of video gaming training were transferrable to different space activities and after several months this advantage was still evident.

Christopher J. Ferguson., 2007. Researchers have given a lot of attention to the violence in video games for more than a decade. Violent video games may encourage aggressive behaviour in players, according to professionals in this field. On the other hand, the state of the current literature has not yet been evaluated for publication bias. This omission is being addressed in the current meta-analysis. The conclusions demonstrated that publication bias occurs in experimental and non-experimental investigations of violent behaviour and thought. The conclusions demonstrated that publication bias occurs in experimental and non-experimental investigations of violent behaviour and thought. The results of the moderator effects also showed that studies utilising less standardised and trustworthy measures of aggression had larger effect sizes.

Green, C. S., & Bavelier, D., 2006. The ability of subjects in tests to illustrate how many objects it is possible to capture by playing action video games is enhanced. Accuracy evaluations have shown a close range of performance for low numbers and a dramatic decline in performance once a squares threshold was reached, while an enumeration job was performed to identify the number of quick-flashed squares. Importantly, video game players (VGPs) had a critical number that was around two items greater than the players who don't play video games (NVGPs). A further test showed that this improvement was attributable to an improvement in the slower, serial process of counting, rather than an improved capacity to instantaneously comprehend the multiplicity of the presentation, in the subitizing procedure. We contrasted VGPs with NVGPs for the multiple object tracking (MOT) jobs which require attention to various items to confirm that video games encourage the processing of various objects simultaneously. Two additional things besides NGVs have been tracked by VGPs. In addition, NVGPs taught video action games were able to prove that playing the game was a causal factor in their improved performance in the activities.

Nieder, A., Diester, I., & Tudusciuc, O., 2006. Nonverbally, humans and animals can count visual things in order over time or assess the spatial dot patterns' set size in a single glance. As a result, the Intraparietal sulcus populations of neurons of acting monkeys were involved in temporal and spatial enumeration processes. However, upon completion of the enumeration process, the set of cardinality was reflected by a different neuronal population, regardless of whether the arrangement of spatial is been cued or in time. The findings pointed to multiple brain processing phases for various numerical forms, as well as a finally converged disparate input that generates the most amorphous representations of quantity.

Ishikawa, T., & Montello, D. R., 2006. Existing theories to comprehend how the knowledge of spatial is acquired in a novel context suggest either stage-like or continuous development. A longitudinal study was done to investigate individual spatial microgenesis. Over the course of ten weekly sessions, twenty-four college students were driven individually along two routes in a previously unfamiliar neighbourhood. Participants estimated the spatial features of the routes after each session. Some participants' knowledge improved steadily over time, but the majority of them either had accurate metric knowledge from the session or had never had precise metric knowledge. The findings are explored in the context of these considerable individual differences, notably in terms of accuracy and the development of integrated conjugational knowledge.

Gentile, D. A., & Gentile, J. R., 2005. There is a lot of information out there regarding how to teach well. We present numerous “best practices” in learning and training, as well as examples of how violent video games employ them. Three theories are proposed and put to the test. First, the most transferable curricula are those that impart the same fundamental ideas in all contexts and fields. Second, when practice is spread out across time rather than massed, The likelihood of learning over time is higher. Third, systematic physiological and emotional responsiveness can help with learning and may even lead to “video game addiction,” as some refer to it. Each of these theories is supported by data from elementary school children, high school children, and college students. Finally, we discuss what educators can learn from successful video game educational techniques.

Gentile, D. A., & Stone, W., 2005. Studies on the impact on children and adolescents of video gaming violence have been evaluated with the aim of 1) determining the numerous impacts, 2) providing critical remarks on common strengths and flaws within the literature and 3) providing an expanded viewpoint on video game research. The evaluation contains a discussion of the general aggressiveness model as well as the theoretical and methodological general aspects of media violence (GAM). Literature was assessed in light of the GAM. There includes a review of the published literature, includes meta-analyzes and relevant information which is unpublished, for example, dissertations and conference papers. In general, research supports ideas that relate the play of violence to aggression, physiological excitement, hostile cognition and aggressive behaviour. There is also an examination of the impact of video games on the performance of academic, finishing with a multidimensional approach to game effects. This dimensional method evaluates the effects of video games in terms of quantity, nuance,



structure and concepts and it seems to have a number of advantages to understand and predict the various kinds of effects found in the literature.

Orwant, J., 2005. In a system called EGGG, the Extensible Graphical Game Generator, an ontology of games was created, and the commonalities between games were evaluated and codified into reusable software components. EGGG uses game similarities to allow anyone to construct a fully working computer game with minimal programming work. The dissertation's thesis is that there are enough parallels between games to build such a software system. The theory, in plain English, is that games are a lot more similar than most people think and that these similarities can be exploited to construct a generic game engine: you tell it the rules of your game, and the engine turns it into a genuine computer game that anybody can play.

Kearney, P., 2005. A preliminary investigation on the cognitive talents that could be enhanced by playing video games. With the help of the neuro-psychological evaluation tool SynWin, individuals were assessed on their capacity to function in a modelled work situation. Following a certain period of time spent playing electronic games, the participants were examined and Scores were recorded. Counter-Strike was the computer game used. This is a multiplayer networked game that is been classified as an FPS. In comparing FPS games like Quake III and Counter-Strike (CS), CS gives the immersive realism elements that the players have been surrounded by. The control group's participants took three tests during which they were not required to play any games, whereas the other group's participants who played CS took two tests but were only required to play CS only for two hours prior to the test of second. The multitasking abilities of this group improved statistically significantly. In conclusion, this result demonstrates that specific types of video games on computers can improve cognitive ability. More research is needed to see whether games like Counter-Strike can help players develop new skills and preserve their abilities.

Kiili, K., 2005. The fundamental requirements of student learning are met by DGBL, which can offer students engaging learning possibilities. But no model exists that successfully integrates elements of educational theory and game design. This paper offers a model for experience gaming that is based on game design, flow theory, and the theory of experiential learning. The strategy emphasises the significance of delivering fast feedback, clear goals, and challenges that are appropriate for the player's skill level. In order to ensure a positive user experience, the flow theory is used as a framework to analyse the effects of educational games. In specifically, the factors that affect flow experience are looked at Designing and analysing educational computer games can be done using the experiential gaming concept. However, the

approach merely serves as a bridge between game design and educational theory not as a mechanism to complete a whole gameplay project.

Kirriemuir, J., & McFarlane, A., 2004. Computer and video game business, market and culture contemporary conditions an overview and a summary of the literature derived from the present research provides a basis for communication between the educational research community and the business sector on the use of game technology in designing learning resources, which provides the basis for discussion in the educational community.

Green, C. S., & Bavelier, D., 2003. Video Gaming is an all-present social activity, and its possible effects on perceptual and motor skills must be considered. The exposure of an organism to a changed visual environment is widely known to often result in a change in the organism's visual system. There are several examples of training-induced performance increases in the realm of perceptive learning. However, perceptual learning tends to depend on the work being done; in other words, it is not frequently observed to spread to other tasks. In contrast, here we demonstrate that playing action video games can change a spectrum of visual abilities. In comparison with non-video game players, four tests affect several components of visual attention in ordinary video game players. A fifth experiment shows a significant increase in the talents of the non-players, who are trained in an action video game, and the role of their play in it.

McFarlane, A., Sparrowhawk, A., & Heald, Y., 2002. The study investigates the concept of digital games that lead to a greater level of commitment that does not have school activities by studying the experiences of gaming teachers and the experience of students with gambling in the country. It aims to uncover certain kinds of gameplay that contribute to learning; to study the correlation and inconsistency between those abilities and abilities that in traditional educational environments are identified as desirable. Many great gambling talents are only indirectly appreciated in a school environment. Learning facilitated by games can be divided into three types. The knowledge obtained from game material and skills resulting from game-stimulated activities are learning. Learning. Children have often said they have learned to work in a team through their games. Their devotion was affected by their adequacy, the incorporation of practical or personal expertise and the absence of time constraints. The document concludes with an assessment of the impact of classroom software design.

Sims, V. K., & Mayer, R. E., 2002. Two trials have studied whether competence in video games translates spatial capacity to performance. In Experiment 1, expert players of Tetris performed non-Tetris players on a mental shape rotation that was the same when

compared with Tetris shape but was not on another spatial capacity examination. The performance model in these mental activities showed that qualified players in Tetris produce the equal brain rotation method as the players of non-Tetris; they were, however, exercised quicker while utilizing Tetris's forms. Experiment 2 did not discriminate from the coinciding control students in the space test gain from the players of non-Tetris who had received 12 hours of Tetris play. However, experienced Tetris participants were more likely than players with Tetris to apply an alternative type of mental rotation in Tetris's forms. The findings demonstrate that area competence is very domain-specific and typically does not translate into other disciplines.

Prensky, M., 2001. We give the game generations very little attention from their perspective and then blame them for not paying attention to a vast, unstimulated extent in our education and training. Many of the people used to their video, MTV, and Internet worlds of lightning speed, multiple tasks, random access, print, active, connected, fun and fast-powered gaming feel bored by many of today's teaching and learning approaches, which are as important as they can be. And, unfortunately, many skills boosted by the new technologies – which have enormous implications for learning – have practically entire consequences for parallel processing, graphical awareness and random access, where training and Education are almost entirely overlooked. Thus, all these cognitive distinctions, which arise from years of "new media socialization" and deeply affect and alter the learning styles and skills of generations, are what call for new ways of learning that will better "fit" the Games generation. And though certainly not the only way computer games and video gaming may address many of the evolving learning needs and objectives of the Games Generation, they offer one of the few structures that we presently have. This is the main cause for the emergence and development of digital game-based learning.

Lieberman, D. A., 2001. Interactive media contrast sharply with traditional campaign tactics. While mass media mostly send one-way messages to audiences, interactive media teach each user through involvement and personalized answers. Instead of persuasive communication construction campaign designers utilizing interactive media might concentrate on experience interventions. We can design a campaign and generate goals and approaches that have previously not been viable on a wide scale with interactive media. While no two people will probably encounter each campaign in the same manner, the choices are theirs in interactive media and the system answers for each person are distinct. These experiences have been improved.

Thompson, K. M., & Haninger, K., 2001. A comprehensive study in certain E- Video games classed as a substantial level of violence. The content descriptors provide parents with information and should be utilized together with the rating, but the game type is also a component of violent playing. It should also be noted to parents and doctors that popular electronic video games can be the cause of violence and that games can also be used to reward players with acts of violence. The health repercussions of video games and other media with violent content remain uncertain, however substantial concern exists amongst the general medical profession as regards the possible repercussions of child media violence.

Anderson, C. A., & Bushman, B. J., 2001. Film and television exposure research indicates that violent video games are more aggressive. A meta-analytical review of the video game literature shows that violence in children and young people has increased the abuse of children and young people. This finding is supported by experimental and non-experimental studies with men and women in laboratory and field environments. Exposures to violent video games also show that physiological excitement and hostility are increasing.

*Cognitive training games (also called brain games) are video games that aim to improve the ability and ability of people to react rapidly and store knowledge, among other things. In the scientific world, the effectiveness of brain training games is debated. Some research has shown that they can lead to improved cognitive function while other research demonstrates that such games don't lead to any substantial improvements, especially compared to conventional computer games.* Overall, although cognitive training games have a controversy about their efficiency, research indicates that these games may help people to some extent improve their cognitive skills in particular scenarios. So, if you appreciate brain training games, especially when it is a matter of tasks beyond those in the game itself, and feel that they enable you to enhance your cognitive capabilities, then it's good to play them. You only have to make sure that you remain realistic about your expectations regarding the cognitive benefits offered by these games, particularly as the corporations pushing these games can often overwhelm their products in an effort to make them seem more successful. Cognitive capabilities, emotional and motivating components, knowledge and the learning of content. Video games are considered in most of this research to be potential additional resources or actions that could improve the dimension being studied. They don't regard VG as science-based things and hence don't want to add to an understanding of the cognitive effects of video games in general. In addition, the video game research that tries to link specific skills to play them (e.g. attentive and visual-spatial capacities) has a methodological challenge, since it is impossible to distinguish between them

which influences the other: Is it through extended play that the particular ability to be promoted or, vice versa, does the player play a major role? To circumvent this bottleneck, we offer a path for research into how video games affect cognitive function. To date, most literature has explored the extent to which video gaming influences a certain capacity, skill, and knowledge. The opposite method is suggested: Based on the past study, the cognitive, emotional and representative influence of a particular video game should be identified. There must be two major moves: To establish which game is proven to function on every particular dimension, firstly, the research needs to be explicit about the cognitive and affective effects of video games. Second, large-scale statistical research and small-scale experiments should then empirically evaluate the findings. The major investigations will involve evaluating the ability of the players in regular games to measure the existence of a correlative relationship with their particular dimensions. Through small-scale trials, participants are invited to play this game on a regular basis to assess the development of their capacity, skill or knowledge.

We argue that the resulting multi-dimensional classification will provide a framework for a systematic analysis of the sort of game that has the potential to encourage skill, know-how or know-how development. As Gentile (2005) asserted, there is a clearly improved perception of video games, perceived as good or evil, that goes beyond the public and scientific dichotomy. This category would not, of course, give a handbook ready to use in school for the usage of video games. After the cognitive study has evaluated the impact on processes and performance, educational research needs to establish the optimal educational environment so that the potential becomes an actual outcome.

Evidence from several sources suggests that executive processes can help to delay choices over immediate income. Cognitive and workplace capabilities measures are regularly linked to lower discounts (Burks et al., 2009; Grey and Shamosh, 2008) and comparable prefrontal regions of the dorsolateral cortex (dlPFC) are used during working memory and time discounting activities (Bickel and Wesley, 2014). Many neuroimaging research studies show that dpfc engagement may influence the vmPFC (ventromedial prefrontal cortex) to exhibit value-related activity and VS(ventral striatum), (DelParigi et al., 2007; Hare et al., 2009; Kober et al., 2010; Rushworth et al., 2011; Hare et al., 2011; Jimura et al., 2013; FitzGerald et al., 2014; Vaidya and Fellows, 2015; Bissonette and Roesch, 2016).

The Lumosity program has demonstrated a superior performance than crossword puzzles (Hardy et al. 2015) in tasks like the measuring of memory, cognitive flexibility, problem-solving, and response inhibits, but the Platform has not been examined in a study under a



scenario with non-adaptive videos. Lumosity is comparable in the approach of numerous other broad cognitive training schemes by using a large number of challenges which target various cognitive capacities (Schmiedek et al., 2010; Owen et al., 2010; McDougall and House, 2012; Nouchi et al., 2013). Our key behavioural indicators, delay reductions and sensitivity to risk did not have an impact on cognitive training. There were no effects during decision-making from the cognitive training on brain activity. This excludes the potential of brain alterations caused by cognitive training but these neural changes cannot produce major behavioral impacts. In comparison to the control group, the conclusions indicate cognitive training doesn't mainly impact decision-making and brain activity, since there were basically no changes in those following cognitive formation. (Switzerland, Germany, 2014). The meta-analysis therefore, demonstrates a small to medium-sized size for intervention studies that directly assess the impact of action video games on increasing knowledge, as well as a medium-effect size for the typical action video game. Note that only active control interventional studies are included with the latter result, which is known to establish a higher bar than no control groups or only test-rehearsed control groups. These results are in accordance with Powers et al's previous work (Powers & Brooks, 2014; Powers et al., 2013).

Learning and modelling theories are commonly used to explain video game impacts. However, Players did not report using video games for learning, according to Sherry et al. (2006: 222), implying that these theories may not be sufficient. The authors then advised that video game research shift its focus to researching why individuals play VG, which they believe would be of greater use in developing a structure for speculating about the potential psychological effects of video games. Researchers will be capable of making more realistic predictions regarding how video games affect players, as a result of this and will be able to pinpoint the processes via which computer games can affect consumer behaviour. An experience could be defined as a process and result of an interaction of the user with their surroundings at a certain point in time. This could be communicated using qualitative means, such as the person's feelings and thoughts (Gámez, Cairns, and Cox 2015: 50). As a result, the proper definition of Gameplay experience is 6 a player's interaction with computer games. Motivation, Immersion and Flow are common ideas to explain bad and positive experiences in previous research on gameplay experiences, which are primarily person-centred. According to Ermi and Mäyrä (2005), immersion is defined as participating fully or virtually in the experience. The gaming experience model, created by Ermi and Mayra (2005), describes the gameplay as a relationship between a specific player and a particular game type, this concept is shortened as the model of SCI (

Sensory, Challenge Based and Imaginative) because it comprises of three major elements of immersion that are linked to other gaming components. The model's first dimension is Sensory Immersion, which is based on the game's audio-visual characteristics. The second type of immersion is Challenge-Based Immersion, which happens when a player achieves good and balanced abilities and challenges. Finally, immersion of imagination occurs when users are capable of empathizing with characters and may take pleasure in the game's locations and narrative elements. Ermi and Mäyrä (2005) used the SCI model in their research and discovered support for all three of its components. To begin, the study discovered that games with strong audiovisual elements had a higher level of Sensory Immersion. Second, role-playing games and story-driven games had the highest levels of Imaginative Immersion, which is to be expected given that these types of games have characters and narratives that allow players to identify with the game and engage their imagination. Finally, competitive games, as well as puzzle and strategy games, benefited from Challenge-based Immersion. This gives players a variety of obstacles, some of which may appear to be easier than others based on the players' abilities.

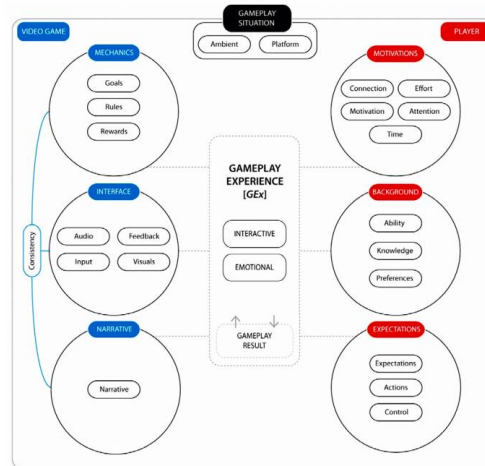
Self-Determination Theory (SDT), was applied to the desire to play video games by Ryan, Rigby, and Przybylski (2006). SDT is a motivation theory that is based on both inner and extrinsic motivation. The elements that influence motivation to play video games can be categorized into three basic psychological needs: autonomy, competence, and relatedness. Perceived competence is increased, according to Ryan et al., 2006, when the game may provide the player with an opportunity to learn new skills and talents, as well as challenge and provide positive feedback. The structural qualities that are widely used in video games were outlined by King, Griffiths, and Defabbro (2010). The researchers identified these characteristics by playing a range of video games, as well as conducting interviews with gamers and analyzing video game design literature. This technique, however, was not detailed in detail in the paper.

Video games are created to make an impact on players, and when that experience is aided, it is most effective and appealing. The eight basic elements of GameFlow (Sweetser and Wyeth 2005) can be translated into the elements of Flow. (1) social; (2) skills; (3) defined goals; (4) control; (5) challenge; (6) immersion; (7) feedback; and (8) concentration are the factors to consider. The objective that can be accomplished is the game itself, where video games should be able to keep the player's attention by presenting clear goals that are suitably hard for the player's expertise. The first aspect is Social, which actually doesn't fall within Csikszentmihályi's (1990) Flow but is relevant because gamers like social connections. Flow is "such a delightful experience that people are eager, even in difficult times or in danger, to do it

for themselves with little concern over what they will do" [Csikszentmihalyi 1990]. Eight aspects are part of the flow experience: (1) the goal that could be accomplished; (2) the capacity to engage on the activity; (3) the ability to concentrate is feasible because the task has clear goals; (4) the possibility to concentrate, given the task that immediately offers feedback; (5) the alliance to regulate actions; (6) a profound yet straightforward commitment which removes awareness of daily problems; (7) the care for oneself decreases, but later the sense of one's self rises stronger; (8) the meaning of time duration is changed

The user experience and usability in games present various heuristic features to create and evaluate games. The design of the game is the major factor that allows the user to improve his working memory while playing a video game. There are now many independent, segregated, repetitious and even contradicting game design heuristics. Therefore, the heuristics of game design must be synthesized and integrated into a structured model of gameplay. The GameFlow model will discriminate between high-quality and low-ranking games successfully and find out why one is successful and why the other has failed as fig 1.

Figure 1. Gameplay Experience Model (Almeida *et al* 2013)



The intellect of a person is certainly changeable in a favourable way. In the case of video game play, this flexible impact on intellect happens not just throughout infancy but even in the elderly (Goldstein, 2003; Green, C. S., & Bavelier, D, 2006). In addition to the correlation between a child's IQ and the amount of time, they spend playing video games, (van Schie & Wiegman, 1997), studies have revealed that training with video games can boost an elderly person's IQ and other cognitive skills. (Waters & Drew, 1986). Along with other studies, these (Goldstein et al., 1997; Ricci, Salas, & Cannon-Bowers, 1996; Clark, Lanphear, & Riddick, 1987), shows that VG can be an effective instrument for correcting age-related losses in

cognitive, perceptual, and motor abilities (Green, C. S., & Bavelier, D, 2006). The world-famous games and their abilities are been listed below in table 1.

Table 1. Video Games Cognitive Ability

AUTHOR	JOURNALS	GAME	DOMAIN
Valadez & Feruguson	Computers in human behavior	FIFA'10	Spatial Imagery
Whitlock et al.,	Computers in human behavior	World of Warcraft	Executive Functions, Spatial Imagery, Perceptual Processing
Sanchez	Psychonomic Bulletin & Review	Halo	Spatial Imagery
Wu et al.,	Journal of cognitive neuroscience	Medal of Honor	Perceptual Processing
Green et al.,	Computers in human behavior	Unreal Tournament, Call of Duty	Executive Functions
Maillot et al.,	Psychology and aging	Wii Sports, Wii Fit, Mario & Sonic on Olympic Games	Motor Skills, Executive Functions, Spatial Imagery, Perceptual Processing
Masson et al.,	Applied Cognitive Psychology	Enigmo	Motor Skills

Source: Prepared by the author (2023)

## MATERIAL AND METHODOLOGY

This study's objective was to gather and evaluate all empirical studies on improving cognitive abilities through game technology that had been published between 2000 and 2023. Each search was conducted for the following reasons, using both the publication names and, when available, the abstracts of each piece of literature: (i) Game-based learning may not specifically be mentioned in the article's title's keyword restrictions., and (ii) In order to better understand how game-based learning improves cognitive skills, the researcher may employ additional synonyms or keywords. As a result of the thorough search, the author discusses a number of earlier research to investigate how game-based learning affects the growth of cognitive abilities. 75 journal articles and 10 conference papers are examined by the author. The author also looks at three books about game-based learning. The author condenses his investigations into 58 articles by contrasting the various research gaps and approaches. The 58 articles included in this study were chosen from 30 reputable journals and provided trustworthy information as well as empirical evidence for further examination of the results of the 58 studies. These papers all drew their information from reliable sources with high indexes. The findings of this study will demonstrate how game-based learning might improve cognitive development and foreshadow the next research.

## RESULTS & DISCUSSION

Games are being played because they offer many feelings such as fear, surprise, orgy, relief, and so on, as well as other motivating factors such as fantasy and challenge. In view of this intrinsic drive for playing, various training games, including all those which are termed "edutainment" have been developed. Whilst it has been proved that games are more motivating than traditional schooling in certain settings (Wishart, 1990 in Hays, 2005), These titles seemed to have lower levels of engagement or 'gameplay' as though the increase in educational limits to the motivation was lower in the game than in pure games of entertainment (HagBOOD, 2005). As Malone & Lepper (1987) remarked, "learning fun" is still a difficult undertaking (Hays, 2005). The active aspect of games in terms of pedagogy encourages educational training. According to Rieber (1996), playing is a child's innate, theory-based learning strategy; this makes computer-based learning video games suitable. GBL is often connected to the place of learning (Brown, Collins & Duguid, 1989), as every move has meaning in a circumstance in the play in many games, notably 3D games (Gee, 2003, p. 84)

In fact Video Games also have several other advantages, in addition to increasing your cognitive ability. For instance:

- You can relax and relieve tension by playing video games.
- The more proficient you feel in the game, the more proficient you will be, and the more your self-esteem and mood can be increased.
- Video games also have a range of advantages that are useful in particular circumstances.
- Video games may, for example, enable people to learn different topics from science to history and can also encourage people to study for themselves when they are more motivated to get knowledge.
- Playing training sets on the ground will enhance people's skills (commonly referred to as serious games or applied games). Playing video games with other players can enhance people's real-life prosocial behaviour.
- Electronic games can enhance ties with family members through play with your family.
- The play of therapeutic video games can improve results in several ways, such as assisting people to control their fears or helping them recover.
- Certain video games can enhance the results of physical health, including inspiring people to practice or educating people about health concerns.



### **Video Game's Short-Term vs. Long-Term Advantages**

Video games have a range of advantages, as indicated above. Some of these benefits, such as enhanced moods, are often short-term in nature, while others can affect people long after play, such as many of the cognitive benefits of playing video games. For example, one study demonstrated that allowing children to play cognitive training for a month consistently led to considerable cognitive benefits after children had been evaluated 3 months after they stopped playing. In addition, neurological studies demonstrate that constant playing of video games might lead to positive long-term changes in the way the information is processed in the brain and in aspects such as neural plasticity. In general, the more you "train" through play, the longer the benefits generally last, when it comes to the cognitive advantages of video games. However, it is impossible to estimate how long these benefits will remain in particular settings and when multiple areas of cognition are involved in a complex interaction between time spent plays and the degree of cognitive progress. As far as the benefits of video playing are concerned, there is a similar variety in terms of how long these benefits last in terms of aspects such as motivation, social behaviour and emotional well-being. However, even when playing video games only has short-term impacts, the advantages can still be significant enough to generally make it worth playing these games.

### **CONCLUSION**

Does the study conclude that brain training games positively affect the augmentation of other cognitive abilities? Accepting this conclusion would be premature. As a pedagogical tool, video games offer tremendous potential. Although video games provide many benefits, particularly in developing cognitive skills, they should be played in moderation because anything done in excess can be hazardous. Shorter bouts of games each day or on specific days of the week may be more useful than longer ones. Furthermore, choosing the proper games for improving cognitive skills is critical, since not all games will produce the intended results. When choosing video games, the age element should also be addressed. Children under the age of six should not be permitted to play violent video games. Future studies would examine not just whether playing a brain training game enhances performance on lab-based tasks, but not how well the brain training game performs in terms of regular cognitive functions and practical activities. not how well the brain training game performs in terms of regular cognitive functions and practical activities. Also, while video games cannot substitute

an instructor or a curriculum, they can supplement an educational programme if used appropriately.

According to the findings of this study, game-based learning should become an important tool and e-resource for future learning in universities, particularly in academic libraries. The GBL is applicable for almost all subjects like Science, Management, Economics, social etc., which is not only applicable in the academic but also in the organisation environment of any area, for instance, according to Prasad, K. D. V., Mangipudi, M. R., & Vaidya, R. (2022). The gamification mechanics framework can be applied in any workplace or corporate setting to boost performance and increase employee engagement. Depending on the organisation and the business, the sub-elements may differ. The organisation should assess the framework and its business goals before putting it into use, and then determine the best course of action. This research backs up previous findings that game based will play an important role in learning in the future. More studies on game-based learning will be conducted in the future in order to produce an effective learning environment based on credible frameworks and ideas.

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