

257. GAMING AS A MEDIUM OF STUDYING

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The aim of the paper is to explore the potential of gaming as an effective medium for education and cognitive development. It reviews several research works demonstrating how gaming environments enhance problem-solving skills, information processing, and decision-making abilities through immersive scenarios. The examples of games of the kind are provided and revised in the publication. The article highlights the uprising potential of implementing the process of studying gamification in modern educational institutions.

It is commonly assumed that extensive engagement with computer games leads to detrimental effects, including visual impairment, social withdrawal, and the development of violent tendencies. This perspective often culminates in the assumption that gamers are prone to antisocial behavior and hostile behavior. However, such views may represent a misconception, failing to align with empirical findings in the field of cognitive neuroscience.

In the field of cognitive psychology, the major phenomenon of interest is neural plasticity and the enhancement of information processing. The very significant areas of most concern are the development of attentional control and perceptual skills. The literature that would tackle a problem of cognitive enhancement at a level of functional neuroanatomy indicates that gaming can, in fact, be beneficial. Assuming that interactive digital environments demand rapid and adaptive responses, it is obtained that they serve as potent training grounds for the brain.

For instance, a 2018 study by Yao and colleagues utilized MRI to compare amateur and expert gamers [1]. The findings revealed that expert players possessed a higher volume of grey matter and demonstrated superior functional connectivity, parameters directly linked to accelerated information processing. Furthermore, research conducted by Shawn Green, PhD, at the University of Rochester investigated the impact of gaming on decision-making. Since video games require players to interpret constantly-moving peripheral images, Green hypothesized that action gamers would exhibit enhanced proficiency in translating sensory data into accurate decisions [2]. In his study, volunteers aged 18 to 25 were divided into two groups: one played fast-paced games, while the other engaged with slow-paced games. Subsequent testing, involving both visual and auditory tasks, confirmed that the action gaming group performed significantly better. This suggests that the low-level perceptual functions involved in sensory processing are directly augmented by the high-stakes, rapid-decision-making environment characteristic of action-oriented games.

A recent study was conducted to investigate the primary sources from which individuals acquire new English vocabulary. The research involved a quiz presented to a group of participants. The quiz required students to identify the origins of recently learned English words, selecting from a range of predetermined categories including games, books, films, videos, courses and other mediums. Upon completion, the collected data were analyzed to determine prevailing patterns in vocabulary acquisition among. To visually represent the findings, the pie chart in Figure 1 illustrates the percentage contribution of various learning mediums.



Figure 1 – Results of Inreaching English vocabulary quiz

The sample population consisted of 43 first-year students from three different academic institutions and 4 high schoolers. Participants were instructed to reflect honestly on their vocabulary learning over the preceding three months. The quiz was designed with clear definitions for each category to minimize ambiguity; for instance, “games” encompassed both digital and traditional formats, while “books” included fiction, non-fiction texts.

Following data collection, responses were tabulated and converted into percentages, forming the basis for the visual representation.

The pie chart reveals that the most dominant source of vocabulary learning is Games, accounting for nearly a half of all responses at 43 %. This figure suggests that interactive entertainment has become a powerful tool for language development, likely due to its immersive nature and repetitive exposure to contextualized language. Books, traditionally considered a cornerstone of language learning, secured the second-largest portion with 22 %, confirming their enduring value. Following these, audio-visual media such as Videos, Films, and Series contributed 12 %, indicating that passive entertainment also plays a notable, albeit smaller, role.

In contrast, formal educational settings comprised a much smaller fraction of the total. Tutor Classes or Courses accounted for only 9 %, while traditional School settings contributed a mere 7 %. An additional 7 % was attributed to "Other" unspecified sources. This distribution implies that for the surveyed population, English vocabulary is predominantly acquired through self-directed, leisure activities rather than structured, academic environments. The findings underscore the evolving landscape of language learning, where engagement and entertainment appear to be key drivers of vocabulary expansion.

Moving from controlled studies to applied examples, the game Reentry exemplifies the educational potential of the medium. This space-flight simulator is meticulously based on NASA's space programs, requiring players to apply principles of astrophysics and orbital mechanics. The game's design includes an in-game Space Flight Academy and detailed flight manuals, transforming it from a simple simulator into a comprehensive training course. However, other components of the gaming experience also play an important part in the achievement of its educational goals, since they indicate the immersive conditions and influence the interaction between theoretical knowledge and practical application. For example, the ability to control spacecraft systems and witness the sunrise from orbit at speeds exceeding 25,500 ft/s creates an immersive context that reinforces the theoretical content. This demonstrates that a vital role in making an aircraft function properly in such a simulation – and by extension, a real one – is played by the precise modeling of aerodynamics and flight control systems, which the player must learn to manage.

Similarly, Plane Crazy, a sandbox game on the Roblox platform, requires players to internalize the laws of aerodynamics. Novices often find that their initial creations fly poorly, compelling them to consider variables such as wing placement and mass distribution to achieve stable and agile flight. The game's mechanics are thus structured around the physical principles governing real-world aviation. Beyond these complex simulations, even games built within simple frameworks can yield remarkable cognitive achievements.

A notable case is that of a 16-year-old who constructed a fully functional scientific calculator within a block-based environment, the Minecraft game. This intricate creation boasts a 25-digit display, processes square roots and fractions, and incorporates advanced circuitry including multiple decoders, adders, a multiplier, and a memory bank. This calculator is demonstrated in Figure 2.

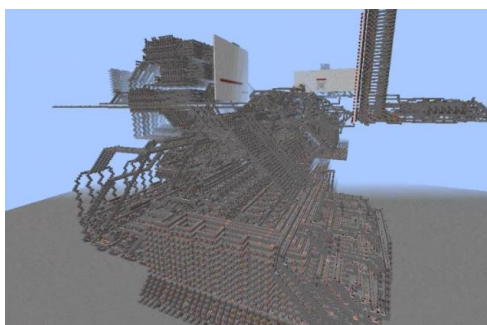


Figure 2 – The full-functioning calculator in Minecraft

This feat of virtual engineering underscores the medium's capacity to foster logical reasoning, mathematical understanding, and complex problem-solving skills.

In conclusion, the integration of gaming into educational paradigms presents a promising perspective for development. The prospects of gaming as a medium of studying extend beyond mere content delivery; they offer a dynamic, interactive space where theoretical knowledge is applied. This could lead to a future where complex subjects are taught not through passive instruction, but through active, simulated experience, making learning more effective and deeply engaging. The bright future of this approach lies in its ability to transform abstract concepts into tangible, interactive challenges, fostering a generation of learners equipped with both knowledge and the practical skills to apply it.

References:

1. Rapid Improvement in Visual Selective Attention Related to Action Video Gaming Experience // *Frontiers Media SA*. – URL: <https://www.frontiersin.org/journals/human-neuroscience/articles/10.3389/fnhum.2018.00047/full> (date of access: 26.02.2026).
2. Improved Probabilistic Inference as a General Learning Mechanism with Action Video Games // *Cell Press Publisher*. – URL: [https://www.cell.com/current-biology/fulltext/S0960-9822\(10\)00942-5](https://www.cell.com/current-biology/fulltext/S0960-9822(10)00942-5) (date of access: 27.02.2026).