Effects of Video Games on Mental Concentration

SHRIYA PANDEY
Birla Institute of Technology, Mesra, Noida, India
shriyapandey@gmail.com

***Abstract* - In modern age, technology has dominated our life so deeply that libraries have shrunk to computer servers and playgrounds have shrunk to gaming consoles. The latter has influenced the mind and body. Present study which is based on the method of questionnaire surveys young people who have been playing computer games. Here we attempt to find out if there is any positive or negative impact on the mental concentration power of the gamers. It has been found that there is a positive effect on the power of concentration, but signs are also there of the other way round. Within the limits of this study, it shows some direction for further studies.**

Keywords - Video Games, Mental, Cognitive, Neuro, eye-hand-coordination

I. Introduction

Performance requires mental concentration where the mental concentration is a mental process performed in the brain and reflected in thought process of mind. Our brain is made up of billions of neurons which gather and transmit signals which originate our thoughts and motor functions. The cerebral cortex is the part of the brain where our memory, thought, attention, awareness, and consciousness base. [1]

Brain process is nothing but like input-output processing of the computer. Our brain receives and processes the sensory data, and this is transformed into the thought. This process is related to the IQ level, emotive stability and the neurons in the brain are restructured with practise. It can be said that if any one person has a high level of concentration, their intelligence level would also likely be high. Attention, focus, thought, and concentration are interdependent. Without one, it would be difficult to utilize the others. This study is an attempt to reach a conclusion by conducting a questionnaire-based survey from the respondents.

Since this study has been focussing upon the impact of gaming on the mental concentration ability of the player, the aspects which has been touched upon may be summarised as [2] –

- Value attentiveness
- Live in the now
- Be more aware
- Notice the little things
- Set goals, and monitor your progress
- Identify your targets of attention
- Shut out distractions
- Fight boredom
- Make emotion work for you
- Practice attentiveness

II. Literature Review

Video games are electronic games that provide an entertaining way to escape from reality. It has been found that video games can have many benefits, it changes your brain, according to University of Wisconsin psychologist C. Shawn Green. It alters the brain's structure in the same manner as it occurs in learning, navigation using a map, or playing a musical instrument. For example, in shooting games like PubG, the character may be running and shooting at the same time.

This requires a multifaceted task like a real-world player. It requires to keep track of the position of the character, where he or she is heading, speed, aiming the enemy, looking for the enemy and saving himself and so on. These are some factors once taken into account, the player must then coordinate the brain's activity to evaluate the situation and then react through the movement in his hands and fingertips. This method requires a great deal of eye-hand coordination and visual-spatial capability to succeed." [3]

It is also said that playing video have only harmful effects on an individual and ignore the positive effects it showcases.

According to a study, action shooter games have a solid and powerful effect on the brain. The ability of a player to follow objects around the world is better as

compared to non-gamers. It is believed that action video game players have an attention span of six to seven objects rather than an attention span of four to five objects as observed in youngsters.[4]

Numerous changes are observed in the mind of a video game player especially in the networks that control attention. According to a study, the parietal lobe, which control orientation of attention, frontal lobe that controls maintaining attention and anterior cingulate which allocates and regulates attention and resolve conflicts are much more efficient in action video game players as compared to non-gamers.

Another study shows that dyslexic children who play video games regularly read faster and more effectively due to improved attentiveness.[5]

An award-winning Swiss scientist, Bavelier conducted a research to test the brain's capacity to adapt and learn depending on changes in the subject's environment. Young gamers were observed to detect new information faster and become better at multi-tasking. It was a significant finding, "because it illustrates how skilled performance in a variety of processing domains can be enhanced by a single training regimen, that is action video game play." To put it differently, "action video game play not only results in greater action video game play expertise, but also in better performance on other cognitive tasks," [6]

To explore the cognitive aspects in gaming, C. Shawn Green and Aaron R. Seitz found that 'the games that feature quickly moving targets, include large amounts of clutter, requiring the user to make rapid, accurate decisions.' The cognitive impact they found were particularly positive. Researchers observed that, the action video games have been linked to improved attention skills, brain processing as well as cognitive functions, and low-level vision through high-level cognitive abilities. Many other types of games do not produce similar impacts on perception and cognition.

Researches show that total time in action video game play predicts poorer attention in the classroom.[7] There have been many scientific studies on impact of gaming and its relation to functioning of brain and mind. Binet [8] studied on children and found that fast action-packed games improved attentional control.[9] Dye and Bavelier [10], while studying the impact on visual search in gaming found that children outperformed in attention and concentration.

It is important to note that various components of attention are not equally affected by action video game plays. whereas attentional control was found to improve, the automatic pull on attention remained unchanged by action video games. [11] [12] [13]

Based on a design developed by NASA to study on Monkeys, it was found that there was no significant behavioural change [14], "Top down attention appears, therefor, highly plastic during development making it both vulnerable and also powerful target for intervention." [15]

III. Research Design

This study is based on responses from the respondents of age above fifteen. Most of the respondents were young and tech savvy. We have used the questionnaire method to conduct the survey. Our questionnaire was straight forward comprising ten questions. The dimensions touched in the questionnaire were age, sex, time, and frequency devoted to games and the self-assessment of the respondents relating to the impact of games on their ability to concentrate and social interaction.

IV. Data Collection

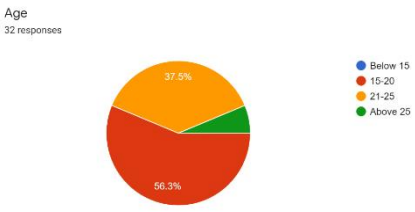

Fig. 1 Age of Respondents

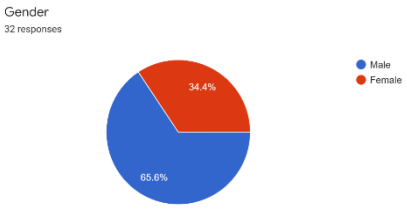

Fig. 2 Gender of Respondents

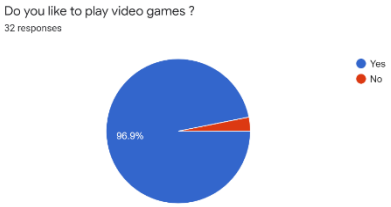

Fig 3 Liking for Video Games

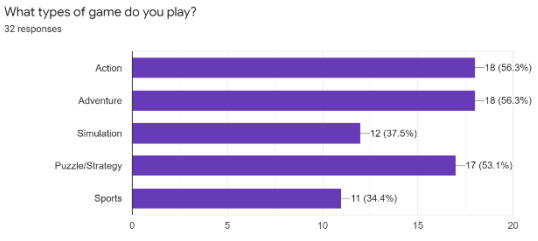

Fig. 4 Types of Games Played

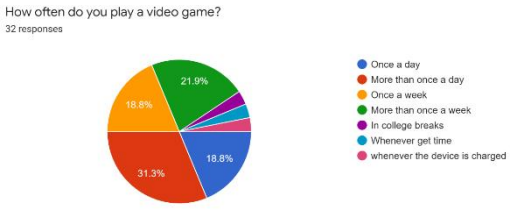

Fig. 5 How Often Played

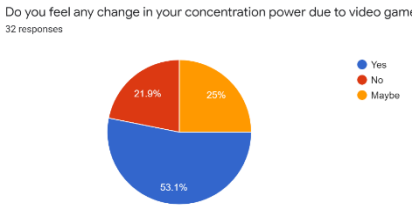

Fig. 6 Changes in Concentration

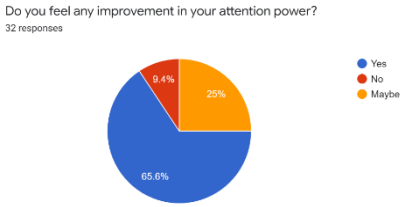

Fig. 7 Changes in Power of Attention

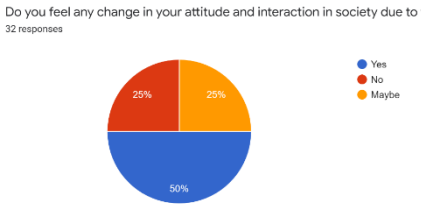

Fig. 8 Change in Attitude Towards the Society

Age Group	Frequency	Yes	No	Maybe
Below 15	0	0	0	0
15-20	18	10	3	5
20-25	12	7	3	2
Above 25	2	0	1	1
Total	**32**	**17**	**7**	**8**

Age Group	Frequency	Yes	No	Maybe
Below 15	0	0	0	0
15-20	18	12	2	4
20-25	12	8	0	4
Above 25	2	1	1	0
Total	**32**	**21**	**3**	**8**

Age Group	Frequency	Yes	No	Maybe
Below 15	0	0	0	0
15-20	18	6	5	7
20-25	12	9	3	0
Above 25	2	1	0	1
Total	**33**	**16**	**8**	**8**

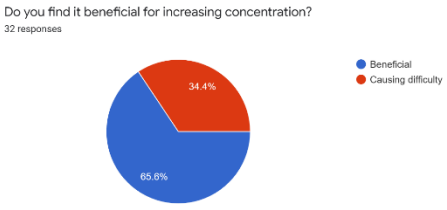

Fig. 9 Is it Beneficial for concentration?

TABLE I
CHANGE IN CONCENTRATION POWER

TABLE II
IMPROVEMENT IN ATTENTION POWER

TABLE III
CHANGE IN BEHAVIOUR TOWARDS SOCIETY

TABLE IV
BENEFICIAL OR CAUSING DIFFICULTY FOR CONCENTRATION POWER

Age Group	Frequency	Beneficial	Difficulty
Below 15	0	0	0
15-20	18	12	6
20-25	12	9	3
Above 25	2	0	2
Total	**30**	**21**	**11**

V. Conclusion

For this study, a questionnaire method was adopted for data collection. A total fifty questionnaire were distributed by e-mail out of which only thirty-two responded. As our study relates to technology and above all with gains, the respondents were chosen to be youngsters generally below the age of thirty years. Data so collected has been presented in tables (1),(2),(3) and (4) in which table (1) focuses on change in concentration power, table (2) focuses on improvement in attention power, table (3) focuses on change in behaviour towards society and table (4) focuses on whether it is beneficial or causing for concentration power. Our sample size even at thirty-two cannot be considered as a small sample. Even then the attribute considered were selected on rule of thumb and could not be finely tuned.

It is interesting to note that eight out of thirty were too busy enjoying the game and could not give attention to know if there was any change in them due to the games.

It is observed that out of thirty-two, twenty-one respondents felt an improvement in their attention power, three out of thirty observed no significant change in their concentration power

and eight out of thirty were not sure whether there has been any improvement in their attention power or not. It is observed further that out of thirty-two, sixteen respondents observed a change in their behaviour towards society by playing games. Eight out of thirty-two felt that there was no change. Further, out of thirty-two, eight could not give attention to know if there was change in them due to the games. We wanted to know if gaming was beneficial or harmful with respect to concentration power. Twenty-one out of thirty respondents reported that they were benefited for their concentration power by playing video games which comprises two-third of the total sample and eleven out of thirty reported that gaming has been harmful.

Finally, as the literature cited and the conclusions drawn from this study reveals, results have been coming from both sides, positive and negative, in some cases, it is positive or negative, may be due to the choice of variables or referent behaviours. This says that further studies with large sample base and finely tunes variables should be done to reach to an acceptable level.

References

[1] The Brain's Ability to Concentrate https://www.universalclass.com/articles/psychology/the-brain- ability-to-concentrate

[2] 12 Ways to Improve Concentration https://www.psychologytoday.com/us/blog/memory-medic/201102/12-ways-improve-concentration

[3] How does PubG affect your life in real? http://homeopathyrecovery.com/how-does-pubg-affect-your-life/

[4] Your brain on video game- Daphne Bavelier https://www.youtube.com/watch?v=FktsFcooIG8

[5] Can Video Games Make You Smarter? https://www.youtube.com/watch?v=OOsqkQytHOs

[6] Prof. Daphne Bavelier https://jacobsfoundation.org/en/daphne-bavelier-receives-2019-research-prize/ https://www.swissinfo.ch/eng/award-winning-research_computer-games--improve-attention-span-/45083096

[7] C. Shawn Green and Aaron R. Seitz, The Impacts of Video Games on Cognition (and How the Government Can Guide the Industry) https://journals.sagepub.com/doi/10.1177/2372732215601121 https://www.sciencedaily.com/releases/2015/10/151001093837.htm

[8] Binet A. ***Les id{e´}es moderns sur les enfants*** [Modern concepts concerning children]. Paris: Flammarion; 1909.

[9] Green CS, Bavelier D. "Learning, attentional control, and action video games" [Internet]. ***Cur Biol*** 2012; 22: R197–R206.

[10] Dye MWG, Green CS, Bavelier D. "The development of attention skills in action video game players" [Internet]. ***Neuropsychologia*** 2009; 47:1780–1789.

[11] Dye MWG, Green CS, Bavelier D. "The development of attention skills in action video game players" [Internet]. ***Neuropsychologia*** 2009; 47:1780–1789.

[12] Hubert-Wallander B, Green CS, Sugarman M, Bavelier D. "Changes in search rate but not in the dynamics of exogenous attention in action videogame players" [Internet]. ***Atten Percept Psychophys*** 2011; 73:2399–2412.

[13] West GL, Al-Aidroos N, Pratt J. "Action video game experience affects oculomotor performance" [Internet]. ***Acta Psychol*** (Amst) 2013; 142:38–42.

[14] Rueda MR, Checa P, Co´mbita LM. "Enhanced efficiency of the executive attention network after training in preschool children: immediate changes and effects after two months" [Internet]. ***Dev Cogn Neurosci*** 2012; 2
(Suppl. 1): S192–S204.

[15] Video game play, attention, and learning: How to shape the development of attention and influence learning? Current opinion in neurology, DOI: 10.1097/WCO.0000000000000077