**HPS203/773 Assessment Task 1: Lab Report Introduction**

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**Author Declaration**

I, Michael Alford, declare that I am the sole author of the following work submitted as part of the assessment in HPS203/773. Particularly, I have not colluded with other students in the completion of this work; I have not duplicated work of my peers or from sources such as books, journal articles,

or websites without adaptation and due citation; and I have not contracted a

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**Introduction**

Considerable interest has arisen regarding the impact of video games (VG) on cognitive development due to their widespread popularity. Previous research on this topic has primarily focused on negative outcomes that can impact users during various stages of their development, as noted by Choi et al., (2020). Their review of existing evidence analysed the development of problem solving abilities in conjunction with other cognitive functions (i.e., attention, working memory, visuo-spatial function, probabilistic calculation, problem solving, and language). Typically, studies examining the relationship between VG playing and cognitive development have examined attention, working memory and visuo-spatial function with minimal investigation into the benefits made to problem solving.

Although the gaming industry is predominantly driven by commercial interests, it has been recognized that VG consumption may inadvertently offer potential cognitive benefits. This phenomenon has been highlighted by Choi et al., (2020) in their review of cognitive advantages associated with gaming, applicable to both novice gamers (NG) and expert gamers (EG). Additionally, Shute et al., (2015) suggests in their study that despite the current lack of emphasis, the development of problem solving skills should be a fundamental aspect of education. Building on these ideas, the relationship between strategic video games (SVG) or role-playing games (RPG), problem solving skills, and academic success has been further investigated (Adachi & Willoughby, 2013). While the findings from these studies have confirmed the positive impact of VG consumption on cognitive abilities, particularly in relation to the style of game play required, the existing body of evidence remains insufficient in addressing an effective method of developing problem solving skills.

Choi et al., (2020) sought to offer an objective overview of current research on cognitive development through VG consumption, but it is evident that there is insufficient evidence concerning problem solving skills in this field of study. In their analysis of 28 studies encompassing various VG styles and their impact on cognitive functions, including attention, working memory, visuo-spatial skills, and probabilistic learning, the findings revealed benefits in these areas (mediated somewhat by age and gender). However, the investigation into problem solving skills was limited, with only 4 out of the 28 studies examining this specific aspect.

Shute et al., (2015) aimed to explore the connections between VG play and cognitive skills. The authors proposed that problem solving is a multi-faceted cognitive function comprised most importantly of rule application and cognitive flexibility. It was hypothesised that problem solving skills (IV) would be developed based on the VG being engaged, so leading to an improvement in scholastic achievement (DV). The benefits identified in their study were cognitive and pro-social in nature, and were examined both before and after 8 hours of game play. The method employed by the authors served to act as a more stringent and control inclusive analysis, including separate testing instruments for the sub-domains of problem solving (rule application and cognitive flexibility), which have been lacking in the evidence. The findings published here (replicating the findings of previous studies, with a more stringent scientific method) suggest that the cognitive skill or problem solving can be improved through the selection of VGs targeting particular cognitive benefits.

The third analysis (Adachi & Willoughby, 2013) aimed to investigate the correlation between self-reported improvement in problem solving skills (IV) over the course of four years in high school and academic performance (DV). The study suggested that even though video games have a primary commercial purpose, engaging with them is beneficial to cognitive development, and regular engagement encourages the practice of cognitive development. The participants were surveyed at four 12 month intervals to evaluate their self-reported problem solving skills, while considering factors such as the number of computers in the home, gender and parental education. The study revealed a positive, indirect correlation between video game consumption and academic grades, indicating a potential link between video game consumption and the transfer effect on academic performance. The study also found evidence that problem solving skills are individualized and more challenging to acquire in a classroom setting, and that players are not advanced before they are ready, allowing them to continue practising. Additionally, the study suggests that developing problem solving skills in earlier years (Year 9 and 10) is advantageous to academic performance in later years (Years 11 and 12).

This paper aims to investigate the development of problem solving skills by comparing transfer effects between experienced gamers (EGs) and non-gamers (NGs). The current study reviewed evidence that demonstrates the plausibility of transfer effects through academic achievement, albeit indirectly, as shown by Adachi and Willoughby, (2013), and the immersion of participants in Portal 2, as indicated by Shute et al., (2015). However, there remains a scarcity of empirical evidence specifically indicating a relationship between VG engagement and problem solving skills. Further, Choi et al., (2020) notes the absence of confirmation regarding whether participants in previously conducted studies are EGs or NGs, as only a baseline is established. Additionally, the available evidence on problem solving skills in university aged groups has small sample sizes. We hypothesise that engagement with strategy video games (SVGs) or role-playing games (RPGs) as an EG (IV) improves problem solving skills (DV) compared to NGs.

# References

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