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Artificial Intelligence, Games, and Education

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Summary

Video games have emerged as one of the most interesting media of the turn of the century. The peculiar characteristic of video games is the biunivocal interaction between the computer and the human player. This dissertation starts by exploring the historical development of games and video games as media for serious purposes. Then, it dives into the traditional intersection of video games and education, with a specific focus on computer science and the development of computational thinking skills. We analyse current research in the field, reporting on its limits and trying to draw conclusions on the impact of video games in scientific education. Moreover, we highlight the affordances between video game play and computational thinking skills. We see that computer science education can greatly benefit from game elements.

The biunivocal interaction fostered by video games becomes particularly fascinating with the rise of artificial intelligence. We illustrate how video games have defined the development of intelligent systems since the beginning. Moreover, generative artificial intelligence creates new opportunities for video games as complex interactive environments for humans and AI. We explore some of these opportunities and how humans can be influenced by artificial intelligence in video games.

Finally, we bring together all the elements we introduced, analysing the impact of generative AI on education and singling out its limits and dangers. Although unrestricted AI is particularly problematic for students' learning, video games can moderate it, creating complex interactive learning environments. While technology is not necessarily developed enough to allow for the mass production and use of AI-powered educational video games, we highlight how the rapid progress we are currently experiencing can soon make this a reality.

The thesis analyses the impact and opportunities for game research in the era of human-AI interaction studies. Specifically, looking at the potential for a better and positive impact of AI in education.

