Using Digital Games to Engage Science Students: The Case of Minecraft

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What are digital games?

- Interactive programs played on digital devices (computers, consoles, smartphones) by one or more players.
Why use digital games in education?

• More people are gaming now than ever before

• Engages and motivates students

• Encourages strategic thinking and problem solving

• Promotes collaboration and cooperation amongst students
“Thus, designers face and largely solve an intriguing educational dilemma, one also faced by schools and workplaces: how to get people, often young people, to learn and master something that is long and challenging – and enjoy it, to boot.”

(Gee, 2003)
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<tr>
<th>Principle</th>
<th>Description</th>
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<td>Co-Design</td>
<td>In Minecraft, players can change the world around them as they see fit. They can also create their own versions of the game through modding.</td>
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<td>Customize</td>
<td>Minecraft allows for different modes of play within the game, and many of the different mods allow for very different styles of play.</td>
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<td>Identity</td>
<td>Players can customize their characters and environments to a great extent, so that it is easy to create deep and consequential stories and histories in the game world for the characters they play.</td>
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<td>Manipulation</td>
<td>Digital games inherently involve action at a (albeit virtual) distance. Minecraft offers the player intricate, effective, and easy manipulation of the world’s objects, which become tools for carrying out the player’s goals.</td>
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<td>Well-Order Problems</td>
<td>The tools that you craft in Minecraft start from simple tools for survival and increase to more complicated tools for creation of complex structures (e.g. logic gates). Thus the problems are well-ordered.</td>
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<td>Pleasantly Frustrating</td>
<td>Not only does Minecraft have different difficulty levels, but it is also very easy to learn from mistakes since your character can never “truly” die – you always come back and remember what not to do next time.</td>
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<td>Cycles of Expertise</td>
<td>While this is not inherent within the game of Minecraft, the different mods allow for the rules of the game to be changed, thus challenging the players which have already mastered other versions of the game.</td>
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<td>Information “On Demand” and “Just in Time”</td>
<td>Minecraft is a very intuitive game and can be learned easily without reading a manual or too much preparation ahead of time. The game provides information in forms of visual and auditory clues when the players need it.</td>
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<td>Fish Tanks</td>
<td>The “creative mode” in Minecraft allows the player to experiment with all aspects of the game without risk of dying, and gives them unlimited resources.</td>
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<td>Sandboxes</td>
<td>Minecraft is described as a “sandbox game” and is a good simulation of the real world.</td>
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<td>Skills as Strategies</td>
<td>In Minecraft players need to learn skills in order to survive in the world. They need to find food, shelter and resources.</td>
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<td>System Thinking</td>
<td>Minecraft gives players a good feel for the overall world and game system they are in. It allows players to develop good intuitions about what works and about how what they are doing at the present moment fits into the trajectory of the game as a whole.</td>
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<td>Meaning as Action Image</td>
<td>The whole world of Minecraft is a world of actions and experience. The possibility of creating different mods means that the experiences the players can be subjected to are limitless.</td>
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Minecraft

Figure 1. Screenshot of a typical scene in a Minecraft simulated world (http://dylrocks95.deviantart.com/art/Minecraft-Screenshot-Ocean-210050937)
Minecraft and Science Education

- Design of the game
- Modding
- Online support
The Next Step

- Introduce digital games into classrooms
- Educate teachers
- Integrate into the curriculum


