Integrating Computational Thinking and Science Learning in Minecraft

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Motivation & Approach

Future societal challenges will require strong STEM knowledge and an ability to think creatively and computationally. Our approach integrates coding within middle school informal science learning using Minecraft. Problems are inspired by real-world challenges – hard to solve, engaging, and designed for computational approaches. Coding instruction (Lua) occurs in science problem solving contexts, with gradually increasing difficulty and open-endedness.
Integrating Computational Thinking and Science Learning in Minecraft

Dr. Jeff Ginger (Research Scientist, UIUC)

Brian Guerrero (PhD Student, UIUC)

Middle school students at Western Center Academy (Hemet, CA)
Minecraft as a STEM “vehicle”

Pros:
• Minecraft provides many inherent links to STEM.
• Extremely high familiarity for most middle schoolers
• High level of customization (for learners, educators, + researchers)
• Online camps were just as successful!

Cons:
• Minecraft capabilities ↔ learning goals
• Some incoming misconceptions about what our camps are about
• For experienced players, Minecraft “mode” > academic goals
• Educators need a high tolerance for “off-task” play & exploration
Results

• Consisting gains in coding skills/knowledge (CTT)
• Some negative transfer from block-based coding to text-based
• Agricultural problems is our most consistent favorite challenge
• Many examples of creativity in student solutions
• Most students adopted a trial-and-error approach to debugging
THANK YOU!

hclane@illinois.edu
https://publish.illinois.edu/stemc-minecraft/
http://hchadlane.net