

Better Than Business-as-Usual: Improving Scientific Practices During Discourse and Writing by Playing a Collaborative Mystery Game

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Critical thinking, an important concept dating back to Dewey, is still poorly taught and poorly assessed, particularly in science education. The ability to think critically is important in scientific careers, yet such expertise is not promoted in schools. Recently, the National Research Council outlined eight scientific practices as guidelines for science education reform. These practices include interpreting data, constructing explanations, and arguing with evidence—all aspects of critical thinking. This study used a multiple case study approach to assess critical thinking in the form of science writing and collaborative discourse; student teams playing a collaborative mobile science game and teams participating in a business-as-usual activity were compared. Science writing from game teams exhibited stronger data interpretation, more detailed hypotheses, and more thorough definitions of the problem. Gamers' discourse revealed higher levels of scientific practices, engaged responses, and communal language. Discourse among control teams revealed lower levels of scientific practice along with higher levels of rejecting responses and commands. Overall, game teams demonstrated that scientific knowledge can be advanced through effective collaborative discourse while control teams demonstrated that knowledge construction is hindered when discourse patterns are ineffective.

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