

Playing with the data: Developing digital supports for middle school science teachers using game-based formative assessment

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Playing with Data is a three-year NSF DRK-12 research and development project. The study is investigating whether an online digital dashboard that provides teachers with data from video gameplay, and that includes additional “educative materials,” can help teachers improve how they engage in formative assessment and differentiated instruction.

The study is guided by the following questions:

1. How do teachers make sense of and use the gameplay data, and what factors enable or limit their use of data?
2. Is there promising evidence that teachers who have access to the revised dashboard interface and the accompanying educative materials are able to improve one aspect of their data-driven decision-making practice in the classroom—engage in differentiated instruction—compared to their peers who did not have access to the educative materials?
3. Is there promising evidence that students whose teachers have access to the revised dashboard interface improve their argumentation skills?
4. Is there evidence that school climate is associated with teachers’ ability to engage in data-driven decision-making practices?

We are using the following methods to collect data:

1. *Classroom observations:* Researchers are observing a subset of teachers’ classroom instruction for three days during their implementation of the game and argumentation unit. The purpose of these observations is to better understand teachers’ formative assessment practices and how they are using the dashboard to inform their instructional decisions.
2. *Interviews:* Researchers will collect feedback on the game’s dashboard through think aloud sessions with teachers as they explore its interface. Teachers will respond to questions about their interpretation of the data and how they might plan subsequent instruction based on what they learn through their review of the dashboard.
3. *Pre- and post-assessments:* Teachers will complete an assessment at the beginning and end of the study that measures their ability to engage in data-driven decision making for the purpose of formative assessment and to inform instructional decisions.
4. *Pre- and post- student assessments:* Students will complete an assessment at the beginning and end of the study that assesses argumentation skills targeted in the game.
5. *Surveys:* Teachers will complete the A-GAMES survey, which collects information about teachers’ formative assessment practices using games. Teachers will also complete the 5Essentials survey, which collects data about five factors found to be critical for school improvement efforts. Teachers also complete weekly implementation logs and final reflection surveys.
6. *Think-aloud protocol:* Teachers will complete two think-aloud sessions as they review data from the dashboard and use the Report Helper.