How to Measure 21st Century Thinking in Games

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In an age of global competition brought about in part by digital media, economic success, cultural literacy, and civic participation require more than the traditional basic facts and basic skills emphasized in current curricula and standardized tests. Digital literacy requires new kinds of thinking and digital media provides new ways of learning. Thus digital education creates new challenges for assessment. [1-3]

Digital learning environments emphasize learning in action. Games, simulations, and other digital tools help learners understand phenomena by working with them from the start in complex situations rather than by first mastering isolated facts and skills and later assembling these conceptual building blocks to solve more elaborate, more complete, more realistic, and more sophisticated problems. [1,4,5] In such environments, mastery of basic facts and skills are not an effective measure of expertise. Therefore assessments of digital learning need to focus on performance in context rather than on tests of abstracted and isolated skills and knowledge. [6-9]

Fortunately, digital learning environments also provide the potential to assess performance in context, because digital tools make it possible to record rich streams of data about learning in progress. Hardware and software can record actions students take in a digital medium as well as interaction between learners and between learners and mentors. These data can be recorded dialog and chat, reflective conversations, notebooks, and intermediate work products. Steps have been taken in this direction with simulation-based performance assessments in professional training, certification, and licensure [10,11]. But these tools are expensive to develop and use, targeted at very specialized forms of learning, and do not have an established methodology that would make them readily adaptable to the assessment of learning in games and other digital learning environments.

So what assessment methods will use the rich data from digital tools to measure mastery of complex problem solving that takes place in digital learning?

My answer starts with the recognition that a game is fundamentally a culture [1,2,12]. Playing a game—and certainly playing a game well—requires a certain way of thinking about and being in the world: a set of skills, knowledge, values, ways of making decisions, and ways of seeing oneself and being seen by others that “work” in the game. The players of any game form a community of practice: a collection of people who share a common identity (as players of the game), and common ways of solving shared problems. Thus, one powerful way to analyze the experience of players of a game is through some model of enculturation.

What do I mean by a “model of enculturation”? A model of enculturation is some way of describing how people learn to be part of a community of practice. It links individuals, groups of individuals, and the context around them: that is, it is “situated” in the sense that it provides a way of talking about how and why people do things in particular times, places, and situations.
And it has to give not only a description of what people do, but make predictions about what people and groups are likely to do at other times and in other situations.

To do that, a model of enculturation has to look not just at isolated skills and knowledge, but at the connections that someone makes between skills and knowledge, and among skills, knowledge, values, identity, and ways of making decision and justifying actions of some community of practice. It has to account for the culture of some community as a network of relationships: conceptual, practical, moral, personal, and epistemological.

Modeling enculturation in this sense is no small task. But compared to other settings in the world, games record a great deal of what players say and do: players’ choices, actions, and even (in good games) dialog with other players and non-player characters. Some games are more “open-ended” than others—a multiplayer online role playing game has more going on than a game like Tetris, for example—however, the things that can happen in a computer game are still bounded in predictable ways. Relative to everything that people do in the world, a game has a limited set of things someone could say or do. So it is easier to create a model of what a player does and why than it would be in many settings in the world outside of the game. The organization of the game into set levels, scenes, non-player characters, and other features—not to mention formal rules through which these game works—makes it possible to develop a model that “works” in terms of measuring the kind of thinking that goes on.

The argument here is that games are fundamentally cultural in nature. They provide a rich record of players’ discourse. And they have the potential to provide standardized elements of situations in which players interact. All of these features, in turn, suggest that models of enculturation are particularly powerful—and perhaps essential—tools for measuring the kind of 21st Century thinking that games are so good at developing.

One key feature of any successful model of enculturation, however, will be that it is based on a 21st Century theory of learning. Any assessment system is based on some idea of what learning means, what matters in what we learn and how we learn it. There is certainly more than one way to model how someone learns to play a game well—or become part of any community of practice that matters in the world. But any model that will be effective has to measure more than merely the basic facts and skills that are captured in our current assessment regime.

Indeed, any successful model will have to capture learning as it happens while people are solving complex problems, working with others, utilizing complex skills, tools, and strategies, and making the kind of connections that experts do between what they know, what they can do, what they care about, and how they make decisions and justify their actions.
References


