
47.

The Assessment Game

Moving Beyond Traditional Measures

Barbara Chamberlin (New Mexico State University Learning Games Lab), Jodi Asbell-Clarke (EdGE at TERC), Michelle Riconscente (Designs for Learning), & Allisyn Levy (BrainPOP)

Abstract

Educational and serious games can facilitate a wide variety of transformations in learners, such as changes in knowledge and behaviors to changes in beliefs, attitudes and values. Despite a substantial body of innovations around assessment of game-based learning, many game-based evaluations include only knowledge-gain measures. This panel of game assessment experts brought their diverse perspectives to a group discussion, helping game developers think beyond traditional assessments. They played *The Assessment Game*, proposing a variety of assessment strategies for games predicted by a dice roll.

Introduction

It's no secret that evaluating the impact of educational and serious games is a complex and challenging undertaking. The community needs new methods for evaluating the effectiveness and impact of these dynamic and sophisticated games, beyond simple pre-post multiple-choice tests of knowledge. During the GLS Panel session, the panelists offered a brief overview of their experiences, then played, *The Assessment Game*, proposing assessment strategies for randomly generated, fictional games, and engaging the audience in discussion.

The Panel Barbara Chamberlin, PhD, directs development and research at the Learning Games Lab. Most recently, their team has completed a five-year project, *Math Snacks*, (6 animations, 5 games and extensive teaching materials) and is developing assessment measures for the next round of games. In sharing her approach, Chamberlin offered referenced their pre-post knowledge measure (Wiburg et al., 2016), as well the various additional measures they used in assessing the *Math Snacks* games (Trujillo et al., 2016). She emphasized the value of using different measures in having data that complements each other, and paints a broader picture. She emphasized that the value of the panel was in allowing attendees to *see* the thought processes of the panelists regarding assessment and understand how they work through the process of designing evaluations.

Michelle Riconscente, PhD is president of Designs for Learning, a consulting firm specializing in the design and research of interactive learning experiences. Throughout her career, Michelle has translated her passion for technology and learning into innovations to redesign how we teach, assess, and set priorities in educational settings. Most recently she served as managing director of learning and

assessment for GlassLab. In discussing her approach to the panel, Riconscente said she has become especially interested in the formative assessment process.

Jodi Asbell-Clarke, PhD is the director of the Educational Gaming Environments group (EdGE) at TERC. EdGE is a team of game designers, educators, and researchers who builds game-based assessments of implicit STEM learning. EdGE designs games grounded in STEM phenomena. They have used learning analytics on data logs to identify patterns of gameplay that are consistent with implicit understanding about the STEM phenomena addressed by the game. In her opening comments, Asbell-Clark defined implicit learning as knowledge that was unexpressed by the learner.

Allisyn Levy is Vice President for GameUp, and leads outreach efforts for BrainPOP’s online learning games portal, a collection of top cross-curricular game titles from leading game creators. Allisyn is a National Board Certified Teacher who spent 11 years as an elementary education teacher. She is passionate about helping educators find creative ways to make assessment meaningful in a playful learning environment. Levy mentioned BrainPOP’s *SnapThought®* assessment tool, which makes it easy to tie assessment and reflective thinking into gameplay (Gardner, 2014).

The Assessment Game *The Assessment Game* was designed to reveal the thinking behind assessment design and the process evaluators go through in developing assessment strategies. Dice are rolled three times, with the first roll setting a *desired transformation*, the second prescribing the *audience*, and the third establishing the *environment or device*, from a preset list of options. The challenge of the game is not for the players to brainstorm a game that meets the requirements, but to propose a way to assess *this type of learning*, with *this kind of audience*, based on *this kind of device or environment*.

<u>Die Roll</u>	<u>Desired Transformation</u>	<u>Audience</u>	<u>Environment or devices</u>
1	Algebra	6 th grade students	Classrooms
2	Weight loss	Adults over 50	Mobile devices/wearables
3	Voter participation	English-Language Learners	Public environments
4	The water cycle	K-3 Students	Augmented or virtual reality
5	Reasoning	College students	Board or card game
6	Reading	Employees	Wildcard

Table 1. Determining the fictional game for assessment.

The challenge issued to the panelists and the audience was to generate at least two different ways to assess each of the randomly rolled games. The dice were rolled, and each game announced. Panelists were given first option to respond, and then the audience was invited to participate. Chamberlin clarified that, for the purpose of discussion, participants should assume that “assessment” is defined in a broad way, and could include efficacy, knowledge gain, or other types of changes in the game player; assessment designed to help teachers or other helpers guide the game player; data to help the player reflect on their own performance; or assessment that drives future activities within the game, based on the performance of the player. She also reminded the audience of different *sources* of data, such as the player, observations, or embedded data.

	<u>Desired Transformation</u>	<u>Audience</u>	<u>Environment or devices</u>
Game 1	Weight loss	English Language Learners	Augmented or virtual reality (AR)
Game 2	Reasoning	K-3 Learners	At home (audience wildcard)
Game 3	Water cycle	College students	Mobile or wearable device
Game 4	Algebra	Employees	Card game

Table 2. Games presented to panel for assessment

Discussion on the games was initially led by panelists who presented several different strategies for assessing each game, and also identified themes or key issues as they arose. It is likely that, without feedback from the audience, the panelists could have proposed assessment for 8-10 games; however, the discussion from the audience made the experience richer, and likely contributed to a more valuable experience for the participants. The panel leader ensured discussion focused on *assessment* of a given game — rather than just the design of a game — and helped moderate discussion from the audience. The game could easily be replicated — and proved to be an effective way to reveal the thinking behind assessment.

References

Gardner, A. (2014, March 3). The SnapThought® Tool: Reflection, Communication and Assessment [Blog post]. Retrieved from <http://educators.brainpop.com/2014/03/03/reflection-communication-assessment-snapthought-tool/>.

Trujillo, K., Chamberlin, B., Wiburg, K., & Armstrong, A. (2016) Measurement in Learning Games Evolution: Review of Methodologies Used in Determining Effectiveness of Math Snacks Games and Animations. *Technology, Knowledge and Learning*, 1-20.

Wiburg, K., Chamberlin, B., Valdez, A., Trujillo, K., & Stanford, T. (2016). Impact of Math Snacks Games on Students' Conceptual Understanding, *Journal of Computers in Mathematics and Science Teaching*. 35(2), 173-193. Chesapeake, VA: Association for the Advancement of Computing in Education (AACE).

Acknowledgements

Special thanks to Pamela N. Martinez for taking notes during the session. *Math Snacks* materials were developed with support from the National Science Foundation (0918794) and (1503507). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.