

Quandary: Building Capability in Ethical Decision Making

Scot Osterweil, MIT Education Arcade, Cambridge, MA, scot_o@mit.edu
Marina Bers, Tufts University, Boston, MA, marina.bers@tufts.edu

Abstract: Children, particularly middle-schoolers, need opportunities to engage with ethical issues and develop skills to deal with them. These skills, including perspective-taking and ethical decision-making, will better prepare them when they encounter difficult issues in their day-to-day lives. The Learning Games Network, with funding from a private family foundation, is working with experts from Tufts University to create a game that addresses these challenges. The goal of the game is to provide players with foundational skills in age-appropriate ethical thinking. Players are encouraged to recognize ethical issues and increase their competence in dealing with them, helping empower them to act ethically in their own lives. *Quandary* reflects real-world issues where there is no easy answer. The game is in production and a beta version will be available to play during the GLS 8.0.

A unique game for young learners

The Learning Games Network (LGN) is developing a game for young learners to consider the subtleties of ethics and build their own moral reasoning capability. *Quandary* is funded by a private family foundation and developed with experts from Tufts University and technical producers at FableVision.

The need for moral guidance

Research has shown that pre-teens and teens are in need of moral guidance. In 2010, the Josephson Institute's Center for Youth Ethics conducted a nationwide survey of more than 40,000 American high school students. The study found entrenched habits of stealing, lying, and cheating. Despite their own responses detailing their dishonest habits, 92% of students said that they "were satisfied with their personal ethics and character." According to the Josephson report, "the gap between what students believe and their actions does not bode well for future generations." Though some excellent programs have been created by non-profit organizations, middle schools and high schools are generally failing to provide moral instruction to adolescents when they need it most. Clearly, pre-teens and teens are in need of opportunities to engage with ethical issues and develop the skills to deal with them so that they will be better prepared when they encounter ethical issues in their day-to-day lives.

Market niche

There is a gap in the market for games that are specifically designed to promote moral development. Although many games have design elements that engage players in perspective-taking, decision-making and conflict resolution—all foundational skills for moral development—we know of no game purposely developed, in both its design and content, to promote these skills and competencies.

Game design challenges

The following design challenges have been identified:

- How do you design an engaging learning game that encourages children to recognize ethical issues, and increases their competence in dealing with ethical issues?
- How do you create a playful space where learners can investigate how a complex community with different perspectives reacts to dilemmas in their world?
- And how do you facilitate the all-important discussions that such a game inspires, fostering reflection on the decision-making process?

Game approach

Using age-appropriate scenarios, the game introduces players to the idea that members of a community have different needs and different viewpoints. The player must investigate the varying perspectives within a community facing a tough situation. They build their competency in making ethical decisions by learning to see other people's points of view, separating fact from opinion, and filtering emotion from reasoning. The game is about ways of approaching ethical issues rather than telling players what to think.



Figure 1: Initial artwork from Quandary.

The game engine allows for future scenarios to be plugged-in, including the potential for content generated by both students and facilitators. A set of support materials will facilitate players in discussing and reflecting, therefore solidifying their understanding.

Results and discussion

The game is in production and a beta version will be available to play during the GLS 8.0 Educational Game Arcade. Results and feedback from play-testing will also be available. Play sessions will offer an opportunity to reflect and discuss the effectiveness of this unique approach.

Atlantis Remixed: Advancing Research into Sustainable Designs

Brenden Sewell, Sasha Barab, Center for Games and Impact, Arizona State University, 1475 N. Scottsdale Road, Scottsdale, AZ 85257

Email: brenden.sewell@asu.edu, sasha.barab@asu.edu

Design

Atlantis Remixed is a 3D multi-user education platform that immerses children, ages 9-16, in educational play. *Atlantis Remixed* is the result of over a decade of research with *Quest Atlantis*. It synthesizes the theory of transformational play (Barab, Gresalfi, & Ingram-Goble, 2010), lessons learned through years of implementation inside of hundreds of classrooms, and modern video game design standards to create an educational product that can offer a sustainable and transformative impact on education systems internationally.

Atlantis Remixed allows students to investigate fully realized virtual worlds where they participate in educational adventures and narratives. Within these worlds they can create unique personas, chat with other users, interview characters, observe and manipulate systems that respond to their choices, and even create entirely new adventures and worlds. The game invites students into worlds where they act as active protagonists in narratives that situate them to acquire and execute expertise in curricular subjects—knowledge that when combined with social awareness can be used to cause significant change in the virtual spaces. By doing so, students strengthen their awareness of the connection between their identity, the knowledge they learn, and the way in which that knowledge can be used to shape the world around them (Barab, Pettyjohn, Gresalfi, Volk, & Solomou, 2011).



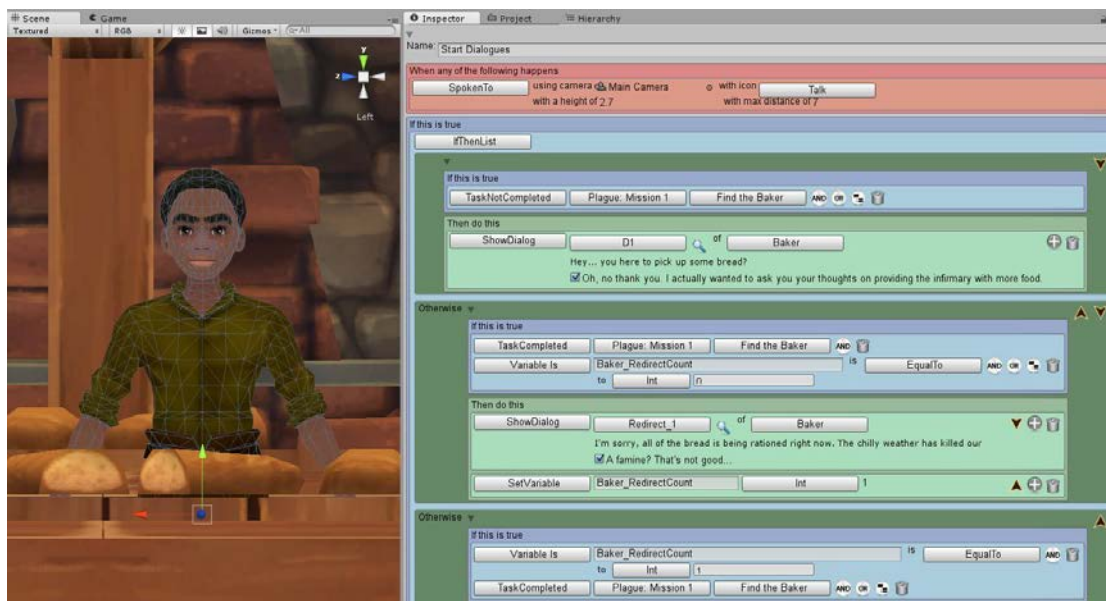
Implementation

Atlantis Remixed utilizes the Unity 3D game engine to allow the latest developments in the cognitive and learning sciences to be integrated into a video game that contains industry competitive production values. Professionals from the gaming industry were brought together to work with curriculum experts with the aim of creating an experience that is visually engrossing, mechanically fluid, and academically rigorous.

One example of the curricular experiences is a language arts unit that teaches persuasive writing skills. Students are positioned as investigating reporters who must write an argumentative essay for a newspaper that will determine the fate of a village. The students must interview townsfolk and analyze complex textual sources in order to accumulate evidence for their argument. The choices the students make with each interaction with a character is preserved and reflected in that character's willingness to give the student the information they seek. While out collecting evidence, the students continually experiment with the connections between their thesis, reasons, and supporting evidence.



In addition to developing curriculum units for mathematics, science, and language arts, development has focused on iterating the design tools with the aim of releasing a powerful but simple to use toolset for user-generated content. These tools scaffold narrative construction as a motivational foundation upon which logical structures and game programming can be built. Engagement with these construction tools has the potential to be an educationally rich experience (Games, 2009). Eventually, players will earn access to increasingly complex and rich tools that they can use to modify and create the kind of spaces and narratives they experienced in their classroom.



References

- Barab, S. A., Gresalfi, M. S., & Ingram-Goble, A. (2010). Transformational play: Using games to position person, content, and context. *Educational Researcher*, 39(7), 525–536.
- Barab, S. A., Pettyjohn, P., Gresalfi, M. S., Volk C., & Solomou, M. (2011). Game-based curriculum and transformational play: Designing to meaningfully position person, content, and context. *Computers & Education*, 58, 518-533.
- Games, I. A. (2009) *21st century language and literacy in Gamestar Mechanic: Middle school students' appropriation through play of the discourse of computer game designers*. (Doctoral dissertation, University of Wisconsin at Madison). Retrieved from http://cdn.gamestarmechanic.com/1.25b/pdfs/Games_PhD_Gamestar.pdf

Past Present: A 3D Role Playing Game to Teach Social History

Bert Snow, Muzzy Lane Software, Inc., 260 Merrimac St. Newburyport, MA 01950,
bert@muzzylane.com,

Louis Alvarez, Andrew Kolker, Peter Odabashian, Center for New American Media,
222 West 37th St., 16th Floor, New York, NY 10018-6606

Email: louis@cnam.com, andy@cnam.com, peter@cnam.com

Experience History from the Inside Out...

Past/Present is an irreverent, surprising, and fresh approach to teaching social history to secondary schoolers created by the Center for New American Media and Muzzy Lane Software, Inc. *Past/Present* is an immersive digital video game where players live the lives of Americans from eras past. Imagine a learning experience where students are thrust into the everyday hustle and bustle of a century or two ago. They might find themselves enslaved in an antebellum town, or caught up in a strike in a Massachusetts textile mill, or riding the rails in the Depression. Students will need to have all their wits about them to survive in these unfamiliar environments.

This excitement is at the heart of *Past/Present*, a suite of immersive 3D first-person computer games (formerly known as *American Dynasties*) that conveys the vibrancy of American history to secondary-school students. Each game portrays an important moment in U.S. history—such as the fight against slavery in 1855, the riots around the Stamp Act in 1765, or New England labor unrest of the early 1900s—and allows players to assume the roles of a diverse cast of characters, each representing someone from a different economic, racial or ethnic background living at that time.

The now completed first *Past/Present* Game Era, is an exciting adventure set in 1906 in the fictional New England mill town of Eureka Falls. Players will have a choice of playing one of two avatars: Anna Caruso, a young Italian-American weaver who works at the Boylston Mills and has to decide where she stands when labor conflict comes to town, and Walter Armbruster, a young manager in the same mill who has to decide the best way to handle the labor disruption and keep the mill running.

In each role, players face challenges and decisions that their character might have faced, and see the consequences. As they journey through a day in their character's life, players will face difficult choices, moments of joy and sadness, exciting adventures, and plenty of colorful incidental characters to keep them company

Past/Present is tightly aligned with secondary school state and national history standards and has been developed with support from a grant from the Corporation for Public Broadcasting and the National Endowment for the Humanities.



Luisa: Oh, let's read the funny papers! It's only one more penny, Anna.



- Okay, I'll buy it...
- I don't think so...

16:25

Value:	Pay/pt	Yards	Earned	Buttons	Cost	Defects	Penalty	Total	Net Pay	TOTAL PAY
Cotton duck	\$0.36	0	\$0.05	1	\$0.10	0	\$0.02	\$0.00	\$-0.05	\$1.02
Peelin	\$0.72	0	\$0.00	0	\$0.00	0	\$0.02	\$0.00	\$0.00	
Fancy Twill	\$1.08	0	\$0.00	0	\$0.00	0	\$0.02	\$0.00	\$0.00	

Exploring a Studio Critique Model for STEM Evaluation

Cary Staples, School of Art; Susan Riechert, Department of Ecology and Evolutionary Biology; Vittorio Marone, LEEDS Program; Katherine Greenberg, Department of Educational Psychology and Counseling; University of Tennessee
Email: staples@utk.edu, sriechert@utk.edu, vmarone@utk.edu, khgreen@utk.edu

Abstract: Through the principles of “leveling up” and “epic win,” gaming builds assessment into the process of learning (Gee, 2003). Gaming provides a model to evaluate the user’s quest for knowledge as well as the synthesis of material beyond the accumulation of time on task. These ideas of progression parallel the non-linear aspects of visual accomplishment that studio educators seek to quantify. This paper seeks to explore the connections between game theory, studio/lab practice, and the ways that educators are framing the component aspects of a complex learning experience. The goal will be to propose methods of formal evaluation and rubric generation to facilitate accountability for these highly complex learning environments.

In her paper, *Semiotic Pedagogy and Art Education*, (1995) Deborah L. Smith-Shank suggests that the current teaching dynamic “...assumes that there is a correct body of knowledge for a teacher to communicate to students. These models assume a hierarchical architecture of facts and ideas with higher forms of knowing built through some concatenation of simpler forms. In order to move away from the dominant hierarchical model, it is necessary to develop an entirely different framework.” The notion of “student as receiver of information” needs to evolve to “student as author of understanding”.

Design Thinking and The Scientific Process

Recent studies indicate that complex and immersive games can contribute significantly to student understanding of difficult concepts in the sciences because they entertain and motivate students to engage in complex thinking and problem solving. Applying modern game paradigms to STEM learning promotes several learning principles, including the achievement principle where players earn intrinsic rewards from learning, the material intelligence principle where they use objects in their reasoning efforts, and the transfer principle where they are given multiple opportunities for practice and applying learning to novel contexts (Gee, 2003). In a comparative study, Barab et al., (2009) found an immersive gaming experience to produce significantly higher learning outcomes than other science learning experiences.

Virtual Biology in a Box

The proposed *VBioBox* game series leverages the Biology in a Box K-12 outreach project’s mission of understanding STEM through scientific inquiry/practice to a global audience. Under this learning strand project we specifically will test the idea that an immersive video gaming experience that employs successful gaming paradigms and is deployed online (apps and web), can successfully engage students in learning STEM subjects and gain their interest in STEM fields. We have chosen evolution by natural selection as the theme for our first game entitled *Epoch Traveler Challenge* (ETC), because this difficult concept provides a unifying framework to understanding and integrating the immense body of knowledge available on biological systems. ETC is designed to immerse students in STEM (science, technology, engineering, and mathematics) educational experiences where they will function as biologists gaining the practices, tool sets, and understanding of concepts needed to meet single player virtual world traveling and multi-player shark design challenges.

This project represents a quantitative examination of the potential benefits of edutainment to student learning and perception of STEM disciplines. Can immersion in a role-playing game infuse in students an understanding of the process of science, draw their interest towards STEM fields and, in this particular ETC game, provide them a deep understanding of the factors underlying biodiversity? Role-playing (Riechert et al. 2011) allows students to explore evolutionary processes for themselves. Including the mathematical, physical science, and geological underpinnings of biology in our ETC and future *VBioBox* games illustrates to the students the inherent quantitative nature of biology and allows them to make connections between concepts taught in biology and other STEM courses. In evaluating this game, we will examine the relationship between student progress through the game environment and their corresponding gain in knowledge of concepts and practices achieved during the course of play. We are most interested in whether a student’s level of understanding of ideas and practices they are exposed to makes the progression beyond *knowing that* to *knowing how* and from

being able to explain (*declarative knowledge*) to being able to actually do (*procedural knowledge*) (Schaffer, 2006).

The *VBioBox* game, targeted to high school students, fosters the formulation and testing of hypotheses (reflectivity; scientific inquiry; and trial-and-error learning), based on available data and observations (exploratory learning), promoting deep understanding through agency (Murray, 1997). The game features a seamless integration of *iterative* (Salen and Zimmerman, 2004) and *incremental* (Schell, 2008) design, implementing meaningful progressive steps to success. In fact, players can reformulate hypotheses applying new understanding and knowledge acquired through in-game challenges tailored to their level of expertise, made visible through continuous assessment and feedback. The goal is to offer the appropriate amount of challenge to the players, stimulating their curiosity and promoting active learning in their Zone of Proximal Development (Vygotsky, 1978).

The game, as opposed to a traditional approach of *learning science*, is a *doing science* experience. In fact, it puts the player in the role of an apprentice in a science lab, whose ultimate mission is to ensure survival of the human race over time. The knowledge acquired through the game (e.g., collecting and analyzing fossils) constitutes *evolutionary building blocks* that will be used to create the “fittest” shark, and, finally, acquire knowledge that will benefit mankind. This process stimulates the transfer of scientific knowledge across evolutionary domains (from fossils to sharks to human beings), advancing scientific thinking and promoting a comprehensive approach to STEM learning.

This learning trajectory requires a form of assessment capable of identifying and valuing, rather than measuring, the efforts and progress of each player. In this context, the *VBioBox* research team is working on two entwined assessment features: 1) a *rubric*, considering the multifaceted dimensions described above, in relation to the subject (science/biology) and the targeted audience (high school students); 2) a *representational model*, which includes visual and graphic elements to represent the learning process, and to communicate and situate the progress to both teachers and students, in a meaningful way (rather than providing letters, numbers, or general comments). Through this approach, the game makes the integrated assessment relevant and visible, in order to advance the understanding about student’s knowledge, attitudes, and perceptions toward biology and STEM disciplines.

References

- Barab, S. A., Scott, B., Siyahhan, S., Goldstone, R., Ingram-Goble, A., Zuiker, S., and Warrant, S. (2009). Transformational play as a curricular scaffold: Using videogames to support science education. *Journal of Science Education and Technology*, 18: 305-320.
- Gee, J. P. (2003). What video games have to teach us about learning and literacy. New York, NY: Palgrave Macmillan.
- Murray, J. (1997). *Hamlet on the Holodeck: The future of narrative in cyberspace*. New York, NY: The Free Press.
- Riechert, S. E., Leander, R. N., and Lenhart, S. M. (2011). A role-playing exercise demonstrating the process of evolution by natural selection: Caching squirrels in a world of pilferers. *The American Biology Teacher*, 73: 208-212.
- Salen, K. and Zimmerman, E. (2004). *Rules of play*. Cambridge, MA: MIT Press.
- Schaffer, D. W. (2006). *How computer games help children learn*. New York, NY: Palgrave Macmillan.
- Schell, J. (2008). *The art of game design, a book of lenses*. Burlington, MA: Morgan Kaufmann.
- Smith-Shank, D. L. (1995). Semiotic pedagogy and art education. *Studies in Art Education*, 36(4). http://www.uic.edu/classes/ad/ad382/sites/AEA/AEA_06/AEA_06a.html
- Vygotsky, L. S. (1978). *Mind in society: Development of higher psychological processes*. M. Cole, V. John-Steiner, S. Scribner, and E. Soubberman, Eds. Cambridge, MA: MIT Press.