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Rock Mars: cross-industry collaboration on a rich media educational experience

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Abstract

Rock Mars is a transmedia-experience produced for educational use. The project is the educational arm of the Discovery Channel Canada "Race to Mars" initiative: an exhaustively-researched, hard-science-based documentary and mini-series. Rock Mars blends an episodic graphic-novel storyline and Alternate Reality Game-inspired approach with video games, curricular content and commercially-produced media to make a formal, in-school experience. The project uses a six-episode storyline to motivate students through a scalable collection of Flash games, group-work puzzles, design/artwork, debates and cross-curricular engagement drawn from the Pan-Canadian Science and, more generally, the Ontario intermediate-grade guidelines. This paper will discuss Rock Mars as project that cuts across educational, academic, commercial and industrial modalities, and will explore transmedia as a tool for integrating commercial media with educational content.

Keywords: Serious Games; Transmedia; Education; Graphic Novels; Education; Collaboration; Alternate Reality Games; Transmedia; Storytelling

1. Project Overview

In 2007, Discovery Channel Canada launched the hard-science documentary mini-series "Race to Mars", earning its highest television ratings for any original Canadian production. Consisting of a six-part documentary series, a high-production-value documentary miniseries and an extensive online and outreach program, the project won the 2008 Canadian Gemini Award for Best Cross-Platform as well as a Official Honouree from the Webbys. Using this realistic and compelling depiction of a human mission to Mars as its starting point, Rock Mars is an immersive and highly interactive learning experience that combines existing multimedia content with original curricular-based puzzles, activities and a graphic-novel. The project brings a compelling rich-media story together with curriculum-based areas of science, history, geography, mathematics, art, media and communications to create an online game simulation environment. Using an inquiry-based model, students are tasked to employ communications and critical thinking skills, working in teams to solve online puzzles, codes and conundrums that form a vital part of the story they are following.

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Students teams employ collaborative techniques on an online wiki, posting information and answers to puzzles and clues, working collaboratively online with others as they pool their knowledge over a broadband network. The thematic emphasis explores online community building, citizenship values and online collaborative working relationships. As student teams plan and execute their Mars mission they are immersed in an interactive, collaborative learning experience based on significant learning outcomes. The puzzles use existing Race to Mars videos and games as a starting point, pushing curricular connections with additional puzzles, web-content/resources, a community-based problem-solving website, an original graphic-novel-based storyline, and a host of original educational content. A suite of curriculum-based learning resources connected to science-based learning outcomes as well as other curriculum areas are attached to the Rock Mars project to enhance the depth of knowledge students will attain. Additional resources are also included to assist teachers in preparations and evaluation.

2. Motivation

Many organizations are increasingly seeing the need to integrate Science, Technology, Engineering, Mathematics (STEM) content with innovations in problem-based, group-based and technologically-mediated learning. From NASA's recently-announced launch-date for their own Massively Multiplayer Online Game (Moonbase Alpha 2010), to Serious Games used to teach economics (Budget Hero), social justice (ICED) and international development issues (Ayiti), games are being used to teach through immersion, problem-solving and innovative thinking. The International Game Developers Association notes the interest in using Alternate Reality Games in education as a small but developing area of research (ARG Whitepaper 2006). Their whitepaper cites the use of Alternate Reality Games in elementary through undergraduate education, citing benefits in self-directed learning, student engagement, and information literacy, as well as domain-specific knowledge. With Rock Mars, students in grades 6-9 participate in a human space mission to Mars through a compelling, character-based story and a connected series of games and puzzles. The intention of the project is to get students invested in the curricular content through storytelling and gameplay – to establish situated cognition by giving the story a meaningful link to the content (Van Eck 2006) We hope that the interactive-media aspects of gameplay will encourage participation by a diverse group of students, and that by increased participation we will see an increase in learning-outcomes (Garris 2002). By linking our exploration of gaming/storytelling in learning to commercially produced media, we hope to sidestep the oft-cited risk of making overly-educational games that aren't as compelling as the non-academic variety (as some authors put it, "sucking the fun out of" (Gibson 2007) game-play by adding instructional elements). Indeed, Van Eck states that using professionally-produced games for learning "is the future of [Digital Games Based Learning]" (Van Eck 20060, as opposed to the more common alternative: games developed primarily by academics or educators. In this particular case, our use of commercially-linked media is from a respected and successful science documentary series, which neatly avoids some parental or pedagogical concern around, as Gibson indicates, videogame violence (Gibson 2007). As a repeatable model, the project speaks to the trend among documentary producers to seek new output-streams for their documentary production work (Davis 2008). It should be also noted: the Rock Mars project is and will be available without cost in Ontario, but may be commercialized in other markets.

Students involved in the Rock Mars project will:
• Gain experience in working in an online collaborative learning environment;
• Understand the Earth Sciences/Space Exploration curriculum while developing scientific thinking and reasoning;
• Stimulate the development of high level thinking and reasoning while using critical thinking skills to solve puzzles, codes and conundrums;
• Engage in team building and group interaction in an online environment;
• Learn to use new technology tools and resources like ARGs, wiki applications, and online video;
• Benefit from an integrated curricular approach;
• Enhance their media literacy and Internet safety skills and knowledge;

• Develop high level communication and presentation skills in the areas of reading, writing, visual and digital communications;
• Apply knowledge in a cross-media platform;
• Track the progress of their team online; and
• Develop high level research and documentation skills and processes.

3. Description of Content

3.1. Graphic Novel

The main storyline involved in Rock Mars is told through an episodic graphic novel. The six-part novel follows two teenage students in the year 2030; the students are contacted by a mysterious correspondent, given insider-access to the computer-systems of the ongoing human Mars mission, and asked to help track down a saboteur. At each cliff-hanger ending, the students are asked to solve a particular problem in order to advance the story.
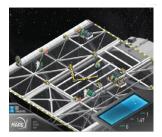

Figure 1. Sample panels from Rock Mars graphic novel

3.2. Games

There are four Flash-base, professionally-built games used as part of the Rock Mars project. Each game is inspired by the rigorously-researched Race to Mars mission plan, and allows competitive play and multi-level challenges. The games serve as both a compelling reward for student-investment in the module, a chance for cooperative and competitive engagement, an immersive experience with some of the terminology and details of the space-mission, and a rich-media form of direct-engagement with content. In *OnOrbit*, the player controls a robotic-arm based on the design of the Canadarm2 to assemble payloads in Low Earth Orbit. In *MADV*, students pilot a Mars Ascent/Descent vehicle simulator through the true-to-life stages taking humans from orbit to the surface of the red planet. *Mission Commander* is a strategy card-type game in which users assemble a crew with specific skills/strengths and then pit them against the hazards and exigencies of the 1-year mission from Earth to Mars. The game brings the question of psychological stress and social dynamics into the equation, with players managing work assignments, stress levels, rest periods and team-composition for their crew. *SatScan* lets users mark regions of Mars for deep-range scans.
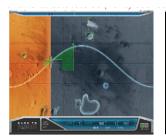
Figure 2 OnOrbit, MADV, SatScan, Mission Commander

3.3. Puzzles

There are additional activities which are directly based on the events of the graphic novel storyline. Students have to solve these web-based puzzles, either individually or in collaboration with one another, in order to advance the storyline. The puzzles are tied into an understanding of the curricular content or an ability to read and comprehend on-screen instructions in order to make the right choices.

3.4. Blogs

Each of the Astronauts in the graphic novel also maintains a blog; as the storyline develops, the blog gives insight into the developing mission, but also provides human insight into the feelings, experiences, motivations and thoughts of the explorers. In addition to these blogs, the space agency AXS issues press-releases that reflect the actions of the students as they solve puzzles and fix problems.

3.5. Lesson Plans

Mars Rocks contains six Lesson Plan. The lesson plans contain experiments, activities, reference-links, background information and notations of how the content ties into the Ontario curriculum (where applicable). The plan also includes evaluation criteria and rubrics to aid in student assessment. Finally, there are a collection more broadly-based activities drawing from the arts, civics and social responsibility as it relates to the mission.

3.6. Wiki and Online Collaboration System with Video

The Content Management System which runs Mars Rocks is built on a Wiki platform, which allows teachers running the simulation to share notes/ideas with one another, students in the same class to share ideas/media/images, and updates to be managed via email or the web. Teachers can also use the system to manage their class' progress through the storyline, advancing and unlocking content as they choose. There are also 12 mini-documentaries on particular topics of the mission available through the Wiki.

4. Transmedia Educational Production

Rock Mars represents one element of a large, multi-partner cooperative experiment in production. Originating as a media-property, the original Race to Mars project itself was a cross-industry endeavor; the originating broadcaster, Discovery Channel Canada, brought together Galafilm (a television and documentary producer) and Snap Media/QuickPlay Media (a new-media developer) to create what was, from inception, a multi-platform initiative. All three elements of the original project (a documentary series, more dramatic mini-series and interactive) drew from the same extensively-researched body of knowledge, with over 175 scientific advisors, space-agencies, and researchers. The project also spawned two books: "Race to Mars" by Dana Barry explored the details of the mission-plan and background research in a heavily illustrated and very accessible fashion; and "Journey to Mars" by Jonathan Webb, which discussed the Mars mission for young readers.

As can be expected, the expectations and cultures of the various institutions involved in the production were significantly different. However, the broadcaster, Discovery Channel Canada, provided a strong mandate to ensure scientific validity which drove the entire production and gave it the credibility to engage with space agencies, learning institutions, and space-advocacy organizations. Whereas some commercial media-projects might veer towards sensationalism, dramatics or other market-driven end-points, Race to Mars was founded on principles which made it ideal for educational purposes. Wero Creative and Teach Magazine joined the Rock Mars educational project after the conclusion of the series on-air as a way to use the rich-media created for an extended purpose. With the scientific credibility of the content assured, they could safely approach learning institutions with compelling content to drive curricular explorations.

Working with so many organizations led to some difficulties, however. In particular, timelines for each production-industry were radically different. While new-media production-timelines might need (say) decisions a year in advance in order to facilitate game-design and 3D graphic production, the television-side put such concerns in a post-production-phase and could cut entire scenes from the series days before shooting. The book industry might need even longer timeline-projections as far as international sales and territories in order to make publishing deals – typically a concern for TV broadcasters only in the final stages of production. Communication became paramount, with all partners meeting regularly and kept in-the-loop about scheduling, script, research or marketing changes. The large number of industries/partners is ultimately what gave this project the momentum to keep opening doors; however, it also required a mandate from the very top in order to equivalently prioritize all elements of the final project. A small-scale field-trial of the Rock Mars simulation was conducted in 2009/2010. The Institute for Research on Learning Technologies at York University was engaged to conduct an evaluation of this field-trial, and is under review.

5. Acknowledgements

References

2006 Alternate Reality Games Whitepaper. IGDA ARG SIG. Retrieved May 15, 2010 http://igda.org/arg/resources/IGDA-AlternateRealityGames-Whitepaper-2006.pdf,
Ayiti- the Cost of Life. UNICEF. Retrieved May 15, 2010 http://www.unicef.org/voy/explore/rights/explore_3142.html
Budget Hero. Amercian Public Media. Retrieved May 15, 2010 http://marketplace.publicradio.org/features/budget_hero/]
Davis, Charles. Valdica, F. (2008). Business Innovation and New Media Practices in Documentary Film Production and Distribution: Conceptual Framework and Review of Evidence, 8th World Media Economics and Management Conference, Lisbon, May 2008
Garris, R., Ahlers, R., & Driskell, JE. (2002). Games, motivation, and learning: A research and practice model. Simulation & Gaming, 33, pp 441-467
Gibson, David. (2007). *Games and Simulations in Online Learning: Research and Development Frameworks*. Hershey, PA [u.a]: Information Science Publ, 2007. http://www.loc.gov/catdir/toc/ecip0615/2006019128.html: ix, 178
ICED: The Immigration Game. Breakthrough. Retrieved May 15, 2010 http://www.icedgame.com
Moonbase Alpha. NASA. Retrieved May 15, 2010 http://ipp.gsfc.nasa.gov/mmo/
Van Eck, Richard. (2006). Digital Game-Based Learning: It's Not Just the Digital Natives Who Are Restless. *EDUCAUSE Review*, Vol. 41, No. 2.