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Transmedia dynamics in education: the case of Robot Heart Stories

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ABSTRACT

This article discusses the potentiality and risks of applying transmedia storytelling strategies in the realm of education. The empirical approach is used to analyze the experiential education project Robot Heart Stories, developed in 2011 in Canada and the United States. The theoretical framework focuses on the conceptualization of transmedia storytelling in the scope of education and the examination of the implications of gamification in this scenario. The methodological approach of the case study is based on the transmedia project design analytical model and applied to Robot Heart Stories to depict how the project was developed and demonstrate how transmedia strategies can potentially enhance education. The research findings point out that the transmedia strategies in the project placed the students in the center of the learning process and motivated them to learn. As the students were actual characters in the story, they had the opportunity to experience it, instead of just listening or reading it. The project nurtured skills, such as multimodal literacy, critical literacy, digital literacy, media literacy, visual literacy, information literacy, and game literacy, in addition to interpersonal communication skills and experiential learning.

1. Introduction

This article discusses the potentiality and risks of applying transmedia techniques in the realm of education. The empirical approach is used to analyze the experiential education project Robot Heart Stories, developed by the renowned writer, director, and experience designer Lance Weiler. The theoretical framework focuses on the conceptualization of transmedia storytelling (Gambarato, 2013; Bolin, 2007; Jenkins, 2006) in the scope of education (Fleming, 2013; Jansen, 2013; Pratten, 2012a, 2012b) and the examination of the implications of gamification in this scenario (Deterding, Dixon, Khaled, & Nacke, 2011; Lee & Hammer, 2011; Werbach, 2013). The methodological approach of the case study is based on Gambarato's (2013) transmedia project design analytical model and is applied to Robot Heart Stories to depict how the project was developed and demonstrate how transmedia strategies can potentially enhance education.

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Transmedia storytelling involves the unfolding of a storyworld (Jenkins, 2006) in which installments of the narrative are distributed across different media platforms to engage the audience and offer a meaningful experience. One of the pioneering transmedia projects in the realm of education, Robot Heart Stories incorporates transmedia strategies in a mediatized environment, while pursuing educational aims. The Robot Heart Stories transmedia project is an experiential education endeavor, which strived to ignite imagination and spark interest in learning among two underprivileged classrooms of fifth graders: one in Montreal, Canada, and the other in Los Angeles, United States. The project included offline activities in the classrooms and comprised print media (book) and online activities spread on the Internet (websites, Tumblr, Vimeo, Twitter, and Facebook). The storyworld revolved around the adventures of Laika, an alien robot who was seeking her way back home.

Our research question is: How can transmedia dynamics enhance education? The argument draws on the Robot Heart Stories project, which embraces multiple media platforms along with offline activities, expands the content, and engages the audience inside and outside the classroom, serving as an appropriate example of the application of transmedia storytelling in the realm of education. The research findings point out that the transmedia strategies in the project placed the students in the center of the learning process and motivated them to learn. As the students were actual characters in the story, they had the opportunity to experience the story, instead of just listening or reading it. Moreover, the mediatized environment of Robot Heart Stories developed multiple digital literacies, interpersonal communication skills, and knowledge in various fields, such as geography and arts. In the age of participatory culture, such an approach in education has the potential to contribute to a more effective learning process, which has to be more thoroughly investigated.

2. Transmedia storytelling as a strategy for enhancing education

The term transmedia gained visibility with Kinder (1991), who claimed that "home video games, and their intertextual connections with movies, commercials, and toys, help prepare young players for full participation in this new age of interactive multimedia – specifically, by linking interactivity with consumerism" (p. 6). The new age mentioned by Kinder was characterized by Jenkins (2006) through "the relationship between three concepts – media convergence, participatory culture, and collective intelligence" (p. 2). According to Jenkins, these elements promote a shift in cultural logic, impacting the media audience and, therefore, changing the way audiences interact with media content production and consumption. This new mode of interaction between consumers and media content implies behavior in which consumers are "encouraged to seek out new information and make connection between dispersed media content" (Jenkins, 2006, p. 3). This type of consumer performance, as the participatory culture establishes, distinguishes itself from the more traditional model of interaction between the media audience and the media content as the audience's consumption behavior cannot be reduced to the role of a passive viewer. In this context, Jenkins (2003, 2006) coined the term transmedia storytelling, which presupposes the expansion of content across multiple media platforms, such as broadcasting, Internet, mobile and print media, engaging the audience in the story.

Education has been affected by the impact of immersive technology and the corresponding sociocultural changes in participatory culture. Under these circumstances, transmedia dynamics can potentially serve as a powerful tool for enhancing education. Transmedia

storytelling provides a large space for learners to produce content, construct meanings and worlds, as well as build communities and networks.

Stories convey not only information and facts; they also evoke emotions and construct certain connections between the author and the audience. Neuroscientists Stephens, Silbert, and Hasson (2010) examined the brains of those who tell a story and those who listen to it. The authors concluded that the brains of listeners and speakers are synchronized. Describing the results of the brain activity of a female storyteller and her audience, the authors observed that while her insula, an emotional brain region, was activated, the same area was activated in the brains of the listeners. The authors deduced that the storyteller could plant ideas, thoughts, and emotions in the listeners' brains (Stephens et al., 2010). Stories can activate not only certain areas responsible for language but also several other areas of the human brain. This is why the experience of reading, for instance, produces a vivid simulation of reality and can feel quite alive (Paul, 2012). Therefore, stories represent natural and powerful tools for conveying learning content, which is capable of engaging and providing richer experiences for learners.

2.1. *Transmedia format of storytelling*

The transmedia format of storytelling invites the audience to participate in creating and expanding stories further. In transmedia projects that fully embrace participation, the audience has the opportunity to become a co-creator. Participation, in this scenario, refers to the process in which producers and consumers share decision-making abilities to determine the outcomes of the story (Carpentier, 2015). Participating in the creation of the story reinforces a personal connection to the storyworld, and while developing a narrative, the audience submerges deeper into the whole story universe. Thus, "stories not only enable self-authorship, self-agency, and self-expression but stories also provide students with an opportunity to engage emotionally and socially, in addition to cognitively" (Wankel & Blessinger, 2013, p. 10). In the midst of participatory education, transmedia storytelling can become a favorite educational tool. When engaging with a given text in a more participatory manner, learners develop "inquiry, critical thinking, problem solving, creativity, contemplation, and critical discourses" (Warren, Wakefield, & Mills, 2013, p. 67).

The non-linear nature of transmedia stories "provides exposure to multiple and diverse perspectives" (Coiro, 2003, pp. 459, 460), which enables students to envision the existence of "new paths and new ways of searching the answers" (Kopka & Hobbs, 2014). Thus, the transmedia experience fosters deeper communication with a text as well as developing learning and literacy skills. Hovious (2013) proposed seven literacies developed through transmedia projects: (1) multimodal literacy (transmedia dynamics implies a story narration on multiple media platforms and audience engagement throughout these platforms), (2) critical literacy (participation within transmedia projects involves co-creation, thus, the audience must have a deeper understanding of the storyworld), (3) digital literacy (this terms "refers to the navigation, evaluation and creation of information using digital technologies. Transmedia storytelling requires navigation of the story, and evaluation of the digital elements"; Hovious, 2013), (4) media literacy (it presupposes the evaluation and creation of media messages), (5) visual literacy (transmedia projects are abundant in terms of visual content, and thus, this essential literacy is related to the interpretation of images), (6) information literacy ("The interactivity of transmedia storytelling enhances information literacy

skills. Actions drive the story and require information seeking to solve problems and make decisions" Hovious, 2013), (7) game literacy (gamified applications along with games are frequently incorporated in transmedia projects, and this specific literacy deals with the use of logical and strategic thinking applied to problem solving).

In 2012, Inanimate Alice (http://www.inanimatealice.com), a multiplatform educational project, was named Best Website for Teaching and Learning by the American Association of Librarians. Inanimate Alice is recognized as a transmedia project (Fleming, 2013) and encompasses Twitter and Facebook accounts, an official website, and a webzine. The project embodies one of the earliest attempts of transmedia projects in the realm of education, which "has inherent transmedia features like a non-linear mode of reading, evolving storytelling and user's interactivity that spans across multiple media platforms…The reader becomes a part of the story, by participating rather than just consuming the content" (Vasile, 2011).

The project consists of 10 interactive episodes and tells the story of a girl from childhood to adulthood. Inanimate Alice was exported to classrooms around the world (these stories were translated into French, German, Italian, Spanish, Japanese, and Indonesian) with the goal of fostering students' digital literacy skills.

Another transmedia project in education, Cosmic Voyager Enterprises (http://cosmic-voyageenterprises.com/), which was launched in 2012 in Florida in United States, presents "a simulation of real-life scenario" (Pratten, 2012a). More than 600 students aged 12–17 years were given a chance to learn about ethics and economics via a transmedia story. This project involved a fictional space cargo company, Cosmic Voyager Enterprises. One of the company's rockets crashed into a small town in Florida, causing serious environmental damage. The students, organized in groups, tried on C-level executive roles and were supposed to experience all responsibility for making decisions and formulating responses to the environmental issues and economic problems caused by the crash.

As the students gained diverse information based on their roles in the company, they collaborated and shared information with each other to have an understanding of the entire storyworld. According to Kevin Schachter, a high school business teacher involved in the project, getting information from multiple sources instead of a single source (a book, for instance) mimicked a real-life situation (Transmedia Storyteller, 2012). According to Rex Hall, the initiator and creator of Cosmic Voyager Enterprises, the philosophy of the project was "a relatively realistic storyworld that stays true to the story and characters and didn't try to 'teach' but let the kids learn through experience" (Pratten, 2012b).

When complex concepts are to be explained, transmedia storytelling can be especially helpful (Kopka & Hobbs, 2014). In this case, students were exposed to abstract and complex ideas related to ethical and business dilemmas and experienced these issues as more tangible. The project was technically managed by the Conducttr platform (http://www.conducttr.com/), which organized the interactivity on various media outlets, encompassing YouTube, emails, Facebook, Twitter, and Whatsapp. The students were awarded badges and points for participation during the development of the project. Because the creators used an environment common to the digital natives' generation, such as social media networks, the Cosmic Voyager Enterprises storyworld felt real. The transmediality involved in the project contributed (1) to a more realistic experience, (2) engaged and challenged the students, (3) connected students emotionally within the storyworld, (4) taught students to cooperate in problem-solving activities, and (5) offered a more interesting and meaningful experience.

3. Potentiality and risks of gamification within transmedia strategies applied to education

Although gamification has been applied as a technique throughout the course of history, the term is relatively new. It was coined in 2002 by computer programmer Nick Pelling and documented by Brett Terrill in 2008 (Fitz-Walter, 2013). According to Deterding et al. (2011), gamification denotes the use of game elements in non-game contexts. Werbach (2013) suggested a slightly different definition of gamification and stated, "Gamification is the use of game elements and game design techniques in non-game contexts." Game elements include points, quests, avatars, resource collection, social graphs, progression, levels, badges, etc. Game design techniques, which have shifted from entertainment to the creation of games with more meaningful purposes (Gangadharbatla and Davis (2015), involve game design thinking and a non-game context comprises applications that are not games.

Gamification implies the use of game elements instead of full-fledged games (Deterding et al., 2011), which does not mean turning everything into a game (Werbach, 2013). According to Huizinga (1980), game spaces are separated from the real world with a so-called magic circle. The term magic circle denotes an either materially or ideally created playground, which sets its own rules. Following these rules, "temporary worlds within the ordinary world" (Huizinga, 1980, p. 10) function, and consequently, the magic circle provides an escape from the real world. In contrast to games, gamified applications, which are applied to increase motivation and engagement, do not pull users from the real world but improve the experience (Werbach, 2013).

Gamification provokes discussions and criticism, such as that the term game "implies that the entire activity will become an engaging experience, when, in reality, gamification typically uses only the least interesting part of a game – a scoring system" (Nicholson, 2012). Another issue related to gamification is that playing a game presupposes the intention to extract fun from the process. However, when a person plays in order to achieve some other goals (for instance, learn something), the game and the fun can be degraded. On one hand, a gamified application may eliminate entertaining and fun aspects, which accompany good games. On the other hand, a gamified application does not have to be about learning at all. Thus, instead of combining and, therefore, reinforcing educational and entertaining aspects, a gamified application can withdraw both. In addition, Wiggins (2016) pondered that "[t]he argument that gamification in education is merely a repackaging of established strategies remains a consistent criticism" (p. 27).

Lee and Hammer (2011) discussed the benefits and risks of gamification in education. Regarding the risks, the authors emphasized that gamification "might absorb teacher resources, or teach students that they should learn only when provided with external rewards" (p. 4). As benefits, the authors highlighted the following:

> Gamification can motivate students to engage in the classroom, give teachers better tools to guide and reward students, and get students to bring their full selves to the pursuit of learning. It can show them the ways that education can be a joyful experience, and the blurring of boundaries between informal and formal learning can inspire students to learn in lifewide, lifelong, and lifedeep way. (Lee & Hammer, 2011, p. 4)

Transmedia storytelling is about audience engagement, meeting the challenges of participatory culture and satisfying the demands of the new generation of prosumers. According to Toffler (1980), a prosumer (contraction of producer and consumer), in contrast to a passive

consumer who tends just to absorb products, strives to participate in the production process. Gamification can be considered a powerful tool for engagement, which facilitates the transformation of serious projects into engaging experiences. Furthermore, transmedia storytelling and gamification can offer prosumers interesting experiences. Transmedia storytelling creates engagement with compelling narration that unfolds across multiple platforms, while gamified applications implement reward systems and other gaming elements to motivate the audience to remain engaged.

Resnik (2004) criticized the application of entertainment to education (edutainment) in the sense that entertainment can be applied as a reward to compensate what could be considered an unpleasant experience, in this case, the learning process. However, gamification can be more appropriately associated not with edutainment but with what Resnik (2004) called playful learning. Playful learning is connected to intrinsic motivation in opposition to extrinsic rewards. Intrinsic motivation represents a stronger type of motivation, which "is at the heart of creativity, responsibility, healthy behavior, and lasting change" (Deci & Flaste, 1996, p. 9). In this respect, Resnik mentioned Csikszentmihalyi's theory of flow. Flow, also called optimal experience, is a specific state of consciousness and is tightly connected to intrinsic motivation: "Self-consciousness disappears, and the sense of time becomes distorted. An activity that produces such experiences is so gratifying that people are willing to do it for its own sake" (Csikszentmihalyi, 1990, p. 71).

When a game or gamified application is incredibly engaging, it may cause flow. For a gamified application to be able to create flow, according to Csikszentmihalyi (1990), certain preconditions should be provided: (1) there has to be clear goals; (2) there has to be immediate unambiguous feedback for a taken action; and (3) the task should be sufficiently challenging. In addition, a gamified application should create the following: (1) action–awareness merger, (2) lack of anxiety and fear of losing or failing (i.e. self-control), (3) loss of self-consciousness, (4) time distortion or transformation; (5) total concentration on the task, and (6) autotelic experience (i.e. an activity becomes rewarding, as it represents the end in itself). Thus, when a gamified application, incorporated into a transmedia educational project, contributes to creating intrinsic motivation and favor flow, the application can be recognized as an effective tool for enhancing education.

4. Transmedia project design analytical model

Gambarato's (2013) transmedia project design analytical model, which reveals the essential features behind transmedia projects, was applied to the case of Robot Heart Stories aiming to help decompose the project through 10 distinctive dimensions. This practical method is an appropriate tool for examining the case study. The analytical model is organized based upon 10 comprehensive dimensions, such as narrative, extensions, and engagement, and followed by practical questions. For other analyses that apply this analytical model, see Gambarato (2014) and Gambarato and Medvedev (2015). Figure 1 displays the schematic representation of the analytical model.

5. Transmedia analysis of Robot Heart Stories

The 2011 Robot Heart Stories transmedia project is the first part of a trilogy of experiential learning projects (Wish for the Future and My Sky Is Falling are the two other parts) initiated by Lance Weiler and Janine Saunders.
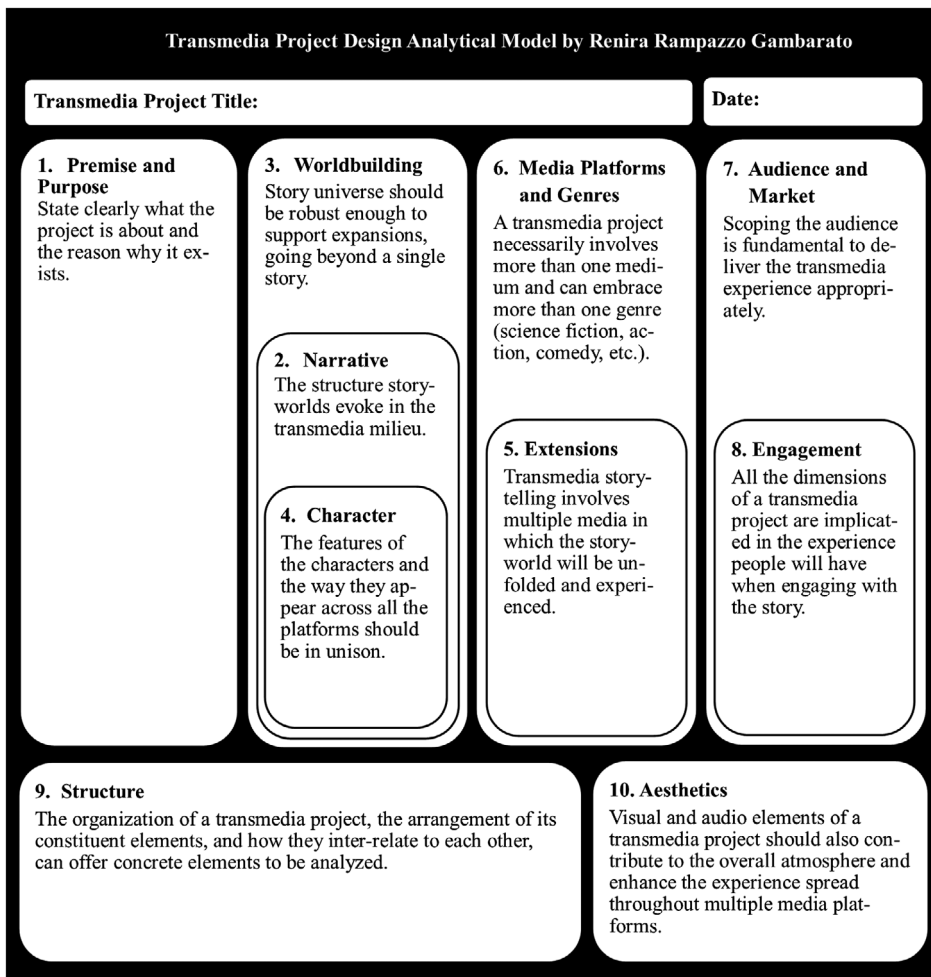
Transmedia Project Design Analytical Model by Renira Rampazzo Gambarato

Transmedia Project Title: | Date:

1. Premise and Purpose
State clearly what the project is about and the reason why it exists.

3. Worldbuilding
Story universe should be robust enough to support expansions, going beyond a single story.

2. Narrative
The structure storyworlds evoke in the transmedia milieu.

4. Character
The features of the characters and the way they appear across all the platforms should be in unison.

6. Media Platforms and Genres
A transmedia project necessarily involves more than one medium and can embrace more than one genre (science fiction, action, comedy, etc.).

5. Extensions
Transmedia storytelling involves multiple media in which the storyworld will be unfolded and experienced.

7. Audience and Market
Scoping the audience is fundamental to deliver the transmedia experience appropriately.

8. Engagement
All the dimensions of a transmedia project are implicated in the experience people will have when engaging with the story.

9. Structure
The organization of a transmedia project, the arrangement of its constituent elements, and how they inter-relate to each other, can offer concrete elements to be analyzed.

10. Aesthetics
Visual and audio elements of a transmedia project should also contribute to the overall atmosphere and enhance the experience spread throughout multiple media platforms.

Figure 1. Schematic representation of the transmedia project design analytical model.

5.1. Premise and purpose

Robot Heart Stories exemplifies an experiential education endeavor, which strives to ignite imagination and spark interest in learning among two classrooms of fifth graders. The actual goal of the project was "to reboot education through experiential learning, empower imagination, creativity, cando attitude and collaborative problem solving" (Jansen, 2013, p. 7).

Two classes were involved in the project. One was a French-speaking class in Montreal, and the other class was a mostly Spanish-speaking class in Los Angeles, California. Through the eyes of the main character, Laika (as she was called in Montreal, or Lyka in the United States), the project exposed students to the unknown reality of a different country, culture, and language. The purpose of the project was tied to the philosophy of experiential education, in which educators engage students in direct experiences. The students were placed in the center of the learning experience and developed their own learning path, gradually unfolding knowledge.

In addition, the producers of the transmedia project, Lance Weiler and Janine Saunders, founded Connected Sparks company, which uses the storyworld of the Robot Heart Stories project as the company's first product for sale. In 2015, they launched Lyka's Adventure (http://www.welovelyka.com/) as a learning platform for students along with a toy and a book. Thus, the initial Robot Heart Stories transmedia project became a means of promoting the subsequent commercial product.

5.2. Narrative

The core story is about an alien robot, who happened to crash land in Montreal and who had to travel to Los Angeles, in order to reach a space station and return to her planet. However, as the alien robot did not have any knowledge about Earth, students were called on to help her to orient herself and learn about the unfamiliar world.

Finally, the robot reached the station in Los Angeles (a high-altitude balloon) and headed back to her planet taking with her the students' artwork and stories. The loose structure of the storyworld served as a negative capability, as the open structure of the story invited fifth graders to lead the storyline. Negative capability refers to the art of building strategic gaps into the story to motivate the audience to get to know more about it (Gambarato, 2015). Thus, the storyline dramaturgy was presented through the problems Laika encountered during the course of her adventure on Earth. However, the further development of the story depended on how the students solved the problems that occurred. For instance, as Laika entered Earth's atmosphere, her fuel depleted. The students were asked to invent an alternative source of energy. The students also defined concrete destinations to be visited by the robot. Lance Weiler explained:

> One example I've been using is, say the kids want the robot to visit Mount Rushmore and have tea with unicorns. Our team, a photographer and a documentary filmmaker, both of whom are traveling with the robot, would actually take it to Mount Rushmore and take pictures. We have teamed with a community called Design Related, whose illustrators would bring to life the other elements like the unicorn, and those materials would eventually be collected into a book. As the students track the robot's progress, they encounter these narrative, collaborative problem-solving challenges. (Ouellette, 2011)

As a result of the journey, the project team accompanying Laika "visited 56 cities, traveled 2010 miles, and generated 397 photographs" (Lewis, 2011). The photographs were immediately posted on websites, creating the feeling of a live event and, therefore, a closer connection between the students and the story.

5.3. Worldbuilding

Robot Heart Stories unfolded from Montreal to Los Angeles in 2011. Laika travelled through North America visiting cities, such as Toronto, Chicago, and Las Vegas and reached diverse spots of interest like the Grand Canyon, the Mount Rushmore National Memorial, and the San Luis Valley. During the course of the 11-day journey, intrinsic motivation and flow were favored, while the students were teaching Laika about our planet's environment. Thus, they were also learning "about sustainability, geography, math and creative writing. By creating images, videos and messages for Laika and the other class across the country, they trained their digital skills and literacy. The kids' imaginations determined the Robot's journey" (Jansen, 2013, p. 4).

5.4. Characters

The primary character in the project was a friendly alien robot, Laika. The given name was not accidental, as the students named the robot after one of the first animals in space, a dog. Laika was fueled by the students' passion; therefore, the students' creations provided Laika with energy for her trip across North America. During the journey, the students in the two schools involved in the project acquired the status of heroes who, with their effort, helped Laika achieve her goal. The students became the protagonists of the story and the learning process. The project involved a total of 42 students and two teachers (Lewis, 2011).

A global audience was also involved in the project, although in a much smaller role. The audience was invited to create heartpacks, which would provide Laika with energy. They could print heartpacks from the website, and all the creations were supposed to be uploaded on the project's website.

In addition, Robot Heart Stories had a sort of spin-off: a group of young students in Australia was given the opportunity to ask their older counterparts – teenage students in Wales, United Kingdom – questions such as, how does Earth turn? Initially, the Australian students created a large robot and collected questions to be asked by the robot (voiced by an Australian teacher) and filmed it. The group of teenage students in Wales also created their own robots, and the answers were also filmed. At the end, both videos (https://vimeo.com/32392853) were mashed up by the students and uploaded to the project's website. The intent of the spin-off was "to give students a chance to communicate across geographical and age boundaries" (Jansen, 2013, p. 29) and to inspire other classes to follow the students' example.

5.5. Extensions

The extensions involved in Robot Heart Stories were (1) offline classroom activities (e.g. problem solving, creation of the heartpacks, definition of destinations); (2) communication with Laika and between the two classes via digital technologies; (3) Laika's journey log, comprising her stories and the photographs taken by the team of photographers following her journey; (4) animated videos, photos, and drawings made by the students and posted on websites; (5) video introductions created by the firm Story Pirates for the class in Los Angeles with information on how they could help the robot; (6) heartpacks created by the global audience; (7) a book with illustrations and stories; (8) a space launch, which was actually the launch of a high-altitude balloon; (9) a spin-off created in Australia and Wales; and (10) Lyka's Adventure project.

The numerous extensions contributed to expanding the storyworld, fostering communication between the classrooms and the general audience, and forging the experiential learning experience. However, the overall storyworld was linearly and chronologically built, minimizing opportunities for the emergence of extra details within the story.

5.6. Media platforms and genres

Robot Heart Stories involved offline activities in the classrooms and comprised print media (book), online activities across the Internet (websites, Tumblr, heartpacks activity), and social media (Vimeo, Twitter, Facebook). The devices involved in the project encompassed tablets,

projectors, a GPS sensor in the plush toy (Laika), computers, and mobile phones. Tablets, projectors, and the GPS plush toy were used in the two classrooms, aiming at moving the story forward and communicating with other students. The other gadgets were mainly used by the global audience in order to follow the progression of the story and to participate in it.

In order to spread information about the transmedia project, various websites were utilized. For instance, http://robotsjourney.tumblr.com/ documented Laika's progress, her explorations and discoveries, whereas http://rebootstories.tumblr.com/ aimed to inform the audience about the project's objectives and experiential learning (Jansen, 2013, p. 24).

Although social networks were used to publicize the project, Robot Heart Stories did not become widely known. Notwithstanding, it gave the general audience the opportunity to become active participants in and contributors to the project. The book consisted of artwork, which was created by the students and the audience (user-generated content), as well as all the stories about Laika's journey.

5.7. Audience and market

The target audience of the project can be divided into two major groups: the students in the two classrooms, who were involved in the project first-hand and got a chance to lead the storyline, and the global audience, which could contribute to the project. However, the global audience could not affect the storyworld in the same relevant manner as the chosen classrooms could. The global audience was invited to witness how two classes developed this experiential education project and to be inspired by this example. The project also drew the audience's attention to the philosophy of the project and informed them about the advantages of experiential learning.

Robot Heart Stories attracted a real-time audience – kids from around the globe. Seven hundred heartpacks were submitted by students in different parts of the world. The project also aimed at professionals, such as educators and decision-makers, who evaluated the effectiveness of experiential leaning.

In comparison to the Inanimate Alice project, for instance, Robot Heart Stories had a different educational purpose: Inanimate Alice developed digital skills, whereas Robot Heart Stories, in addition to teaching digital skills, incorporated the development of interpersonal communication skills and knowledge of various subjects, such as geography and the arts. As a non-profit project focusing on social good, Robot Heart Stories was created by Workbook Project (http://workbookproject.com/). The project attempted crowdfunding through an IndieGogo campaign (https://www.indiegogo.com/projects/robot-heart-stories#/) but did not succeed. Furthermore, the project counted on the volunteer contributions of the creative community and the global audience. In 2012, Lyka's Adventure was awarded a Tribeca Film Institute New Media Fund grant. Robot Heart Stories was offered for free, although Lyka's Adventure became a commercial product in 2015.

5.8. Engagement

The project provided a large space for audience participation, which implies co-creation between producers and audience, or co-deciding, in Carpentier's (2015) terms. Two classes filled the gaps in the storyline – they led it further by solving the problems encountered by

the main character. They also received Laika's messages and responded to the robot as well as defined some of her next destinations (some destinations had been planned in advance by the producers). The global audience was provided less lavish opportunities for direct participation but contributed with user-generated content.

The creators of Robot Heart Stories claimed that the learning purpose with transmedia storytelling was achieved due to three components: (1) interest, (2) information, and (3) interaction (Jansen, 2013, p. 11). Interest was evoked through "finding a theme that is abstract enough to reach a diverse group, yet specific enough to make it easy for them to identify with it" (Jansen, 2013, p. 12). Regarding information, each lesson comprised knowledge and corresponding activities focused on energy, science, arts, mathematics, food, and space, for instance. The students instantly interacted with Laika and informed her how to avoid dangers on Earth and, most of all, interacted with each other. Interaction was facilitated through various media. According to Carpentier (2015), interaction presupposes a socio-communicative relationship in which the audience selects and interprets content together as a group or community. We add participation to the mix of aspects that collaborated to achieve the project's learning goals. The decision-making opportunities in the midst of participatory behavior that Robot Heart Stories offered to the students led the experiential dimension of the learning process.

5.9. Structure

Robot Heart Stories was a proactive project, which was planned to be transmediatic from the beginning of the process. The project was a complex transmedia experience (Author, 2013), which offered independent media platforms (franchise) and welcomed the involvement of multiple platforms contributing to a single experience (portmanteau). Some extensions, such as the book, or the heartpack activity could exist independently. However, the fact that the students received messages from Laika on a daily basis and were guided from one task to another resembled the mechanism of an alternate reality game (ARG). An ARG covers a single narrative across numerous platforms, but each installment of the story is insufficient to stand alone, configuring a set of pieces of a puzzle that do not make sense separately. An "ARG is an interactive narrative that blends real life treasure hunting, interactive storytelling, and online community" (Author, 2013, p. 86). The project culminated in the metaphoric launch of a balloon into the higher layers of the atmosphere, representing Laika's achieved mission to head back to her planet.

5.10. Esthetics

Laika, a GPS plush toy, represented the main element of the overall esthetics of Robot Heart Stories. The softness of the material as well as the combination of gray and light pink colors in the toy denoted the friendliness of the alien creature and appealed to boys and girls. The drawings (created during the heartpacks activity) portrayed Laika with a waving hand with a special focus on the big size of her heart, which resonated with students.

Laika was photographed in real-world locations, which epitomized the beauty and, at the same time, largeness of our planet. This activity probably underpinned two ideas of learning: our world is worth investigating, and the process of learning never ends. In addition to photographs, videos and animated videos became important parts of the project. The

focus was on the curiosity and friendliness of the creature, demanding the use of bright colors and toy-like elements.

6. Conclusion

Such transmedia projects in the realm of education as Robot Heart Stories exploit fiction for non-fictional purposes. In this context, fictional components enriched the experience of reality and neither tended to replace reality with fictionalized storyworlds nor promoted escapist practices. Laika, the protagonist, as well as the fictitious circumstances in which she was inserted, "layered" reality: reality was not replaced but highlighted by the fictional storyworld. In contrast to games, gamified applications do not draw out the audience from the real world but improve people's experience (Werbach, 2013). Transmedia techniques along with gamification allow a fictitious storyworld to more effectively deal with the challenges presented in the real world. In order to conceive a transmedia project, audiences have to interpret it. "In the transmediatic space both media industries and media users are not just able, but compelled, to collaborate and co-create, which includes the generation of signs/interpretants according to the interests and goals of the parties involved" (Alzamora & Gambarato, 2014, p. 9). This characteristic involving interpretation and co-creation resembles participatory learning practices.

The transmedia analysis of Robot Heart Stories indicates the relevance of the project especially regarding its primary target audience, which encompassed two classrooms in North America. However, the social network penetration aiming to reach global audiences was much less successful. To better reach and engage global audiences, providing more opportunities for them to participate in the educational activities, promoting a closer connection to and intrinsic motivation for the storyworld, would be appropriate.

Nevertheless, Robot Heart Stories organically combined educational tasks, transmedia strategies, and gamified applications. Among the gamified elements of the project, Laika provided students with a clear learning goal. The more coherent the reason to learn, the more motivated students are, and therefore, the more they will learn. The ultimate measurable goal in this case was Laika reaching the space station in Los Angeles. Laika, along the journey, motivated students to solve learning challenges related to her mission to go back home. The mission's success was directly dependent on how efficiently the students completed their tasks.

Robot Heart Stories incorporated school subjects, such as geography and mathematics, which propelled the story further. Probably, the photographs of Laika played one of the most critical roles in rewarding students, showing that she was always closer to her final destination. The students' internal motivation in this project was increased through informational rewards (Deci, Koestner, & Ryan, 2001), which were presented through Laika's immediate feedback on students' decisions. Moreover, the transmedia project nurtured skills distinguished by Hovious (2013), such as (1) multimodal literacy, (2) critical literacy, (3) digital literacy, (4) media literacy, (5) visual literacy, (6) information literacy, and (7) game literacy.

Another important aspect highlighting the opportunities transmedia techniques brought to Robot Heart Stories was that the pupils were placed in the center of the story and the learning process. Laika was an ideal character for educational transmedia projects because she let the students shine. As the students turned into characters of the story, they had the chance to experience it, instead of just listening to or reading it.

 Although it is not simple to determine whether the students in this case were exposed to autotelic experience (Csikszentmihalyi, 1990), according to which learning becomes motivating by itself, it is possible to depict that the students did not perceive this educational experience as demanding. Thus, transmedia features and gamification contributed to the engagement achieved by the two classes involved in the process. Furthermore, within the concept of participatory learning culture, education is called to foster skills and motivate students to learn instead of teaching certain facts. As learners become responsible for the learning process, motivation becomes one of the most pivotal purposes of educational projects. Transmedia storytelling and gamification can facilitate the experience of learning in a more tangible way. The idea of increasing motivation through clear understanding of the reasons for learning distinctive topics is also peculiar to the reforms taking place in the Finnish education system, known as one of the most progressive in the world (Taylor, 2012). According to the reforms proposed in 2015, Finnish schools are replacing traditional teaching by subject with what the Finns call "phenomenon" teaching – or teaching by topics (Garner, 2015). The goal is to teach students in a more applicable manner, which should help learners better adjust to contemporary circumstances. Robot Heart Stories, which has a similar understanding of educational purpose, is a project that applied gamified elements and transmedia dynamics to enhance education, as the analysis revealed.

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References

Alzamora, G., & Gambarato, R. R. (2014). Peircean semiotics and transmediatic dynamics: Communicational potentiality of the model of semiosis. *Ocula: Semiotic Eye on Media, 15,* 1–13.

Bolin, G. (2007). Media technologies, transmedia storytelling and commodification. In T. Storsul & D. Stuedahl (Eds.), *Ambivalence towards convergence: Digitalization and media change* (pp. 237–248). Göteborg: Nordicom.

Carpentier, N. (2015). Differentiating between access, interaction and participation. *Conjunctions: Transdisciplinary Journal of Cultural Participation, 2,* 9–28.

Coiro, J. (2003). Reading comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *The Reading Teacher, 56*, 458–464.

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York, NY: Harper and Row.

Deci, E., & Flaste, R. (1996). *Why we do what we do: Understanding self-motivation*. London: Penguin Books.

Deci, E., Koestner, R., & Ryan, R. (2001). Extrinsic rewards and intrinsic motivations in education: Reconsidered once again. *Review of Educational Research, 71*(1), 1–27.

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining "gamification". In *Proceedings of MindTrek 2011* (pp. 9–15). Tampere: ACM. Retrieved from https://www.cs.auckland.ac.nz/courses/compsci747s2c/lectures/paul/definition-deterding.pdf

Fitz-Walter, Z. (2013, January 24). *A brief history of gamification*. Retrieved from http://zefcan.com/2013/01/a-brief-history-of-gamification/

Fleming, L. (2013). Expanding learning opportunities with transmedia practices: Inanimate Alice as an exemplar. *Journal of Media Literacy Education, 5*, 370–377.

Gambarato, R. R. (2013). Transmedia project design: Theoretical and analytical considerations. *Baltic Screen Media Review, 1*, 80–100.

Gambarato, R. R. (2014). Transmedia storytelling in analysis: The case of Final Punishment. *Journal of Print and Media Technology Research, 3*(2), 95–106.

Gambarato, R. R. (2015, July 20). From Alice in Wonderland to transmedia storytelling. *Four Screens*. Retrieved from http://www.fourscreens.org/from-alice-in-wonderland-to-transmedia-storytelling/

Gambarato, R. R. & Medvedev, S. (2015). Fish Fight: Transmedia storytelling strategies for food policy change. *International Journal of E-Politics, 6*(3), 43–59.

Gangadharbatla, H., & Davis, D. (2015). *Emerging research and trends in gamification*. Hershey, PA: IGI Global.

Garner, R. (2015, March 20). Finland schools: Subjects scrapped and replaced with 'topics' as country reforms its education system. *Independent*. Retrieved from http://www.independent.co.uk/news/world/europe/finland-schools-subjects-are-out-and-topics-are-in-as-country-reforms-its-education-system-10123911.html

Hovious, A. (2013). The 7 literacies of transmedia storytelling. *Designer Librarian*. Retrieved from https://designerlibrarian.wordpress.com/2013/11/21/the-7-literacies-of-transmedia-storytelling

Huizinga, J. (1980). *Homo ludens: Study of the play element in culture*. London: Routledge.

Jansen, E. (2013). Robot Heart Stories: An experiment in experiential learning through co-creative storytelling. *Learn Do Share*. Retrieved from http://learndoshare.net/wp-content/uploads/2013/07/Case-Study_Robot-Heart-Stories-1.0_Ele-Jansen.pdf

Jenkins, H. (2003, January 15). Transmedia storytelling. *Technology Review*. Retrieved from https://www.technologyreview.com/s/401760/transmedia-storytelling/

Jenkins, H. (2006). *Convergence culture: Where old and new media collide*. New York, NY: New York University Press.

Kinder, M. (1991). *Playing with power in movies, television, and video games from Muppet to Teenage Mutant Ninja Turtles*. Berkeley: University of California Press.

Kopka, S., & Hobbs, R. (2014, May 7). Transmedia & education: Using transmedia in the classroom with a focus on interactive literature. *Sekopka*. Retrieved from https://sekopka.wordpress.com/2014/05/07/transmedia-education-using-transmedia-in-the-classroom-with-a-focus-on-interactive-literature/

Lee, J. J., & Hammer, J. (2011). Gamification in education: What, how, why bother? *Academic Exchange Quarterly, 15*(2), 1–5.

Lewis, M. (2011, December 7). Robot Heart Stories sends kids on cross-country trek fueled by imagination. *ARGNet*. Retrieved from http://www.argn.com/2011/12/robot_heart_stories_sends_kids_on_cross-country_trek_fueled_by_imagination/

Nicholson, S. (2012, June). *A user-centered theoretical framework for meaningful gamification*. Paper presented at Games+Learning+Society 8.0, Madison, WI. Retrieved from http://scottnicholson.com/pubs/meaningfulframework.pdf

Ouellette, J. (2011, October 17). Education reboot: Plushie robot crashes in Quebec. *Discovery News*. Retrieved from http://news.discovery.com/space/robot-heart-stories-111017.htm

Paul, A. (2012, March 17). Your brain on fiction. *The New York Times*. Retrieved from http://www.nytimes.com/2012/03/18/opinion/sunday/the-neuroscience-of-your-brain-on-fiction.html?pagewanted=all&_r=0

Pratten, R. (2012a, June 10). Transmedia storytelling in the class room. *Transmedia Storyteller*. Retrieved from http://www.tstoryteller.com/transmedia-storytelling-in-the-class-room

Pratten R. (2012b). *Transmedia in education* [Presentation slides]. Retrieved from http://www.slideshare.net/ZenFilms/transmedia-in-education

Resnik, M. (2004). Edutainment? No thanks. I prefer playful learning. *MIT Media Laboratory*. Retrieved from https://llk.media.mit.edu/papers/edutainment.pdf

Stephens, G., Silbert, L., & Hasson, U. (2010). Speaker–listener neural coupling underlies successful communication. *Proceedings of the National Academy of Sciences of the United States of America, 7*, 14425–14430.

Taylor, A. (2012, November 27). Why Finland's unorthodox education system is the best in the world. *Business Insider*. Retrieved from http://www.businessinsider.com/finlands-education-system-best-in-world-2012-11

Toffler, A. (1980). *The third wave: The classic study of tomorrow*. New York, NY: Bantam.

Transmedia Storyteller. (2012, March 12). *Transmedia in education* [Video file]. Retrieved from https://www.youtube.com/watch?v=gRE4E6mBsiY&feature=youtu.be

Vasile, A. (2011, September 22). Inanimate Alice: A cross-platform educational project. *Transmedia Lab*. Retrieved from http://www.transmedialab.org/en/the-blog-en/case-study-en/inanimate-alice-a-cross-platform-educational-project/

Wankel, L., & Blessinger, P. (2013). Inventive approaches in higher education: An introduction to using multimedia technologies. In L. Wankel, P. Blessinger, & J. Stanaityte (Eds.), *Increasing student engagement and retention using multimedia technologies: Video annotation, multimedia applications, videoconferencing and transmedia storytelling* (pp. 3–16). Bingley: Emerald.

Warren, S., Wakefield, J., & Mills, L. (2013). Learning and teaching as communicative actions: Transmedia storytelling. In L. Wankel, P. Blessinger, & J. Stanaityte (Eds.), *Increasing student engagement and retention using multimedia technologies: Video annotation, multimedia applications, videoconferencing and transmedia storytelling* (pp. 67–94). Bingley: Emerald.

Werbach, K. (2013). *Gamification* [Video file]. Retrieved from https://class.coursera.org/gamification-004/lecture

Wiggins, B. E. (2016). An overview and study on the use of games, simulations, and gamification in higher education. *International Journal of Game-Based Learning, 6*, 18–29.