The open innovation paradigm: can Digital Storytelling generate value for the educational field?

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ABSTRACT
The aim of this chapter is to shed a light on an emerging educational and business paradigm, stemming from the digital revolution and the opportunities disclosed by Open Innovation. The central idea behind Open Innovation is that, in a world of widely distributed knowledge, companies cannot afford to rely entirely on their own research, but should instead buy or license processes or inventions from other actors. In addition, internal inventions not being used should be taken outside the company. Such paradigm could be extremely useful in education. After pointing out the potential benefits of digital storytelling and of web 2.0 and 3.0 for promoting pedagogical and organizational innovation, the authors present an application of the Open Innovation Paradigm in education: the Value Generating Framework. The chapter offers empirical evidence of the benefits of this paradigm through an in-depth analysis of the alliance between the Italian Zoo "Parco Natura Viva" and the Italian foundation "Radio Magica". Nowadays a knowledge-intensive, collaborative, value network paradigm has demonstrated to be more successful than the previous firm-centric paradigm.

KEYWORDS
Open Innovation, Value Generating Framework, Digital Storytelling, Networked structure, Italy, zoo, new media, media education.

INTRODUCTION

The experience of learning is the opposite of fun for many children around the world, but new technologies and the so-called web 2.0/3.0 have turned learning into an imaginative, creative and pleasurable activity. Nowadays one has to take into account that receivers tend to be more active and creative, thus the border between production and reception is blurred, leading to an overlapping between the roles of the producers and receivers. The emergence of technologies such as the internet and its interactivity are not unknown phenomena; and concepts like convergence and networks are the main players in the construction of a new communication paradigm in different industries. In the last decade there has been an impressive take off of social computing, from blogging to social networking and social tagging. Researchers have pointed out that digital technologies have transformed learning patterns, coping with the different learning styles of the younger generation made up of the digital natives (McLester, 2007). All these fast growing and fast evolving digital experiences have radically transformed the

traditional approach, and have traced the route for a new communication paradigm in (media) education. Digital natives are continuously connected with their peers and "always on" (Olbinger & Olbinger, 2005; Pedrò, 2006), thus their learning styles are affected by ubiquity, accessibility and ease of use of resources. Educational agencies are at the crossroads of a number of innovative trends characterized by the use of the internet in the classroom and at home. Tools such as e-books, e-learning software, e-libraries, and Wikipedia are dramatically changing the traditional approach. Studying the evolution of the child's literacy in digital environment since the early ages is the core of a fast growing scientific literature. When adults adopt sound teaching methodologies, children can benefit from the availability of digital tools as they expand the opportunities for learning by visual, interactive, and narrative supports unforeseeable a few years ago.

The aim of this chapter is to shed a light on an emerging educational and business paradigm, stemming from the digital revolution and the opportunities disclosed by Open Innovation. The chapter is organized as follows. In the first session the authors present the Open Innovation paradigm that lies at the foundation of the emerging educational and business paradigm presented in the following sessions. The second session focuses on the evolution of media and media education, emphasizing the effects at educational level of the transition from traditional to social and semantic media. Based on the identification of the four educational challenges, the third session shapes and describes the framework of intervention and analysis: the Value Generating Framework, that leverages the opportunities disclosed by the Open Innovation paradigm through a "wise" application of digital storytelling. The fourth session focuses on the alliance between the Zoo "Parco Natura Viva" and "Radio Magica", a non-profit organization devoted to children education. Finally, the last session discusses the benefits of the application of the Open Innovation paradigm both in profit and non-profit contexts, pointing out how the digital revolution can create avenues for new strategies and solutions in the formal and informal educational realms.

OPEN INNOVATION PARADIGM

Nowadays a particular form of collaboration for innovation has rapidly taken off, named Open Innovation: it "is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology" (Chesbrough, 2003). This scenario leads to collaborations sharing risk and reward. The boundaries between a firm and its environment have become more flexible thus innovations can easily transfer inward and outward. The rationale of Open Innovation is that, in a world of widely distributed knowledge, intellectual property must be managed openly to encourage synergies among firms. Firms typically protects through patents the output of innovation. However, empirical evidence shows that thousands of patents are stored and never transformed into products as firms have limited resources. Therefore, internal inventions not being used in a firm's business should be taken outside the company (e.g. through licensing, joint ventures or spin-offs). In addition, as companies cannot afford to rely entirely on their own research, they should buy or license processes or inventions (i.e. patents) from other companies. The open innovation paradigm encourages a radical change in the use, management, and employment of intellectual property. It is a systematic encouragement and exploration of a wide range of internal and external sources for innovative opportunities, the integration of this exploration with firm capabilities and resources, and the exploitation of these opportunities through multiple channels.
The ability to successfully leverage economies of scale, diversity of platforms, and customization of content in service of sustainable corporate expansion is determined by economies of synergy. The configuration of the internal and external network organization is critical. Networked forms of organization within companies or strategic alliances rather than horizontal integration of properties appear to be the most successful business model (Arsenault & Castells, 2008). The system is based on "co-

opetition rather than competition". In sum, a knowledge-intensive, collaborative, value network paradigm has demonstrated to be more successful than the previous firm-centric paradigm.
Times are mature to expand the Open Innovation paradigm beyond the business world. As networked mentality is embedded in digital natives, one must design digital educational environments capable to optimize synergies among external and internal school's resources. The Open Innovation paradigm can be extremely useful to suggest new avenues of collaboration among educational institutions. Schools boundaries, as firms' boundaries, must be permeable and flexible to maximize innovative learning opportunities and accelerate knowledge dissemination. In order to allow new generations benefit from this educational paradigm shift, networks have to embrace a multidisciplinary mindset and adopt rules for participatory and synergic collaborations.

THE EVOLUTION OF MEDIA EDUCATION: TOWARD A NEW PARADIGM

The relationship between media and education has been creating an area of fruitful studies (Media Education) since the 1930s with the establishment of traditional media. This relationship has been affected by the technological evolution, socio-cultural and geo-political changes, the growing role of communication (Masterman, 1997) and the new media development, with the increasing educational and teaching opportunities offered by Web 2.0 and the Semantic Web. Media education is an ideal bridge between the formal education system and all external organizations, between communities and educational institutions (Buckingham, 2006).

In the mid-1990s media education was understood as a set of practices primarily focused on the comprehension of media in order to reveal the false naturalness and educate students to a critical autonomy about the media (Masterman, 1997; Buckingham2006). Today, this predominantly defensive attitude is partially spotted towards new media, both in formal and informal educational contexts (Rivoltella & Ferrari, 2010).

Since the end of the 20th century, revolutionary and interconnected phenomena such as economic and socio-cultural globalization, the spread of the Internet and the development of ICTs have originated great changes in all areas, not least in education. Today new media occupy most of people's leisure time as they act as primary source of information and affect consumption and lifestyles, shaping the quality of democracy. Digital technologies offer opportunities and set new challenges to all educational agencies (Smeets, 2005; Turvey, 2006; Casey & Bertram, 2011; Rivoltella & Ferrari, 2010). The need to move to a new media education paradigm is growing. In the new paradigm, media education should focus on developing an active and creative participation and production of media (Buckingham, 2006; Parola 2008, 2012; Anderson & Dron, 2011; Gutiérrez & Tyner, 2012), recognizing equal importance to the two souls of media education (interpretation and production). The educational perspective - based on a more reflective and collaborative learning process in terms of multimedia analysis and production - has to be student-focused and characterized by social constructivism and connectivism (Buckingham, 2006; Rivoltella & Ferrari, 2010; Anderson & Dron , 2011; Fedorov, 2011; Gutiérrez & Tyner, 2012; Vivanet & Vercelli, 2012).

In this new paradigm contributions from *media culture* play an important role. Media education aims to enable new generations to exploit their digital skills in order to create critical people and conscious creators of meanings (Tolić, 2011). The birth of a new media education paradigm is certainly a logical consequence of the emergence of new media with their peculiar features and the appearance of generations with new educational needs (see next paragraph). Since the late 1980s the concept of literacy has dramatically changed because of the pervasive effect of ICTs. This concept has moved from a "monoconceptual" (one language, one culture, only one way to learn, communicate and educate) to a "pluriconceptual" nature (multilingualism, multiculturalism, multimedia,...) (New London Group, 1996; Coiro, Knobel, et al., 2008; Banzato, 2011). Consequently a new conception of literacy and the transition to the concept of *multiliteracies* (New London Group, 1996), *new literacies* (Lankshear & Knobel, 2003) or *multiple literacies* (Kellner, 2002) occur. Today, literacy has to rely on «a larger mindset and the ability to continuously adapt to the new literacies required by the new technologies that rapidly and

continuously spread on the Internet» (Coiro, et al., 2008, pp.23-24). In this perspective we should consider all different literacies such as computer literacy, information literacy, internet literacy, media literacy, and others, as the expressions of a phenomenon that can be traced back to the same root: the face of new literacies. It is clear that such a heterogeneous phenomenon lends to a multiplicity of approaches and to a great variability in the definition (Cervetti, Damico, & Pearson, 2006; Coiro, et al., 2008).

Recently, there has been a shift in favor of *digital literacy* (Glister, 1997; Banzato, 2011; Gutiérrez & Tyner, 2012; Ng, 2012), that is «the awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrated, evaluate, analyze and synthesize digital resources, construct new knowledge, create media expressions, and communicate with others, in the context of specific life situations, in order to enable constructive social action, and to Reflect upon this process» (Martin 2006). In this context, digital literacy becomes a kind of "theoretical umbrella term" which welcomes other literacies such as library literacy, information literacy, computer literacy, media literacy, pho-visual literacy, reproduction literacy, social-emotional literacy and so on (Eshet-Alkalai, 2004; Banzato 2011). This definition attributes the same importance to the acquisition of skills and knowledge to decode the media and the ability to take advantage of the new digital tools (especially those of Web 2.0 and Web 3.0) to produce multimedia products coherently with the above media education paradigm.

Another unique aspect is that knowledge derives from multiple sources and not just from the Web (Glister, 1997). Indeed, the concept of digital literacy refers to "participatory and convergence culture" (Jenkins 2007), "collective intelligence" (Lévy, 1996) and the existence of interactive technologies. It is a kind of literacy naturally evolutionary and adaptive with respect to the continuous changes of the new technologies. It is able to absorb and metabolize future literacies as well.

New media and educational opportunities

For a full understanding of the challenges that all educational agencies are called to grasp, it is necessary to identify the characteristics of the antecedents of this global revolution (new media) and their natural recipients and consumers (the younger generations).

New media are "technologies of meaning" and they are rapidly changing the way people think, communicate and collaborate (New London Group, 1996). Digital media have some specific characteristics (Ferri, 2004, 2011; Jenkins et al., 2006; Buckingham, 2006; Myssika, 2007; Banzato, 2011; Rivoltella & Ferrari, 2010; Mingrino, 2010; Prunesti, 2013): the easy availability, the richness of the content and the simplicity of its use; the fluidity of the visual imagery; the transmedia and the interactivity; new models of authorship; the sense of play; the creation of a “full immersion” experience; a peculiar communicative logic, as the centrality of the devices is replaced by the centrality of the subjects; knowledge organization according to the database and – in the Sematic Web - through ontologies; the need for users to acquire new skills, to develop a multi-sensory approach, to develop multitasking skills and to cover the dual role of consumer-producer. All of these aspects can be found in the typical tools of Web 2.0 and – in different terms – of Web 3.0.

Tim O 'Reilly coined the term Web 2.0 as opposed to Web 1.0 in 2005. Web 2.0 is an important and substantial conceptual change, though not radical (Alexander, 2008): it is «a platform of applications accessible via the Web, based on interactive technologies which enable the active participation of users and permit a high level of interaction among the users themselves to connect, communicate, share and collaborate online» (Clerici, De Pra, & Salviotti, 2012, p. 3). In the Web 2.0 ecosystem there are different tools and applications such as Wiki-based platforms, blogs and micro-blogs, instant messaging programs, video/photo sharing systems, and social/professional networks. Many Web 2.0 tools and applications have been considered valuable resources in education. The *four fundamental characteristics* of the Semantic Web are: *intelligence*; *personalization*; *interoperability*; and *virtualization* (Rajiv and Manohar Lal, 2011). Among the Web 3.0 applications, tools and services, some of them have implications for education and research, such as 3d, 3d virtual worlds and avatars, online 3-D virtual labs, educational labs and simulations or 3d web; intelligent search engines (Devedzic, 2004; Rajiv & Lal, 2011).

Teaching 2.0 reinterprets teaching methods and implies the overcome of classic dichotomies as theory or practice and new or traditional media; a rethinking of the roles according to more flexible dynamics, the recognition of a central role of communication and sociability and a co-construction of knowledge through dialogue, participation, collaboration and, therefore, a return to reflective practices and laboratories (Rivoltella, 2010). However the future seems to belong to Web 3.0.

The coexistence of Web 2.0 and Web 3.0 leads to the concept of *Social Sematic Web*, a digital ecosystem in which one creates a profitable circular relationship between the wide accessibility of contents and data and their continuous expansion generated by interactions among users. The Sematic Social Web seems to be an ideal digital learning environment, in a socio-constructivist pedagogical perspective, where, at the same time, some strengths are enhanced and some weaknesses minimized (Rajiv & Lal, 2012; Vivanet & Vercelli, 2012).

Who are the digital natives/Millenials?

Digital natives are immersed in the new digital age and have developed new perceptions, new ways of experiencing the world (Ferri, 2011). To quote the philosopher Serres «the young generations live in the virtual [...], they are able to assimilate a lot of information at the same time. Through the phone, they can connect with everyone, [...] with the Network they can have complete knowledge [...].Not having the same mind of their parents, he or she learns in a different way.» (2013, pp. 14-15). Digital natives have a communication and learning style based on playing, focused on the expression of self, highly personalized and at the same time oriented to the constant sharing of information with peers (Ferri, 2011; Ng, 2012). In particular, they learn primarily through experiencing and "having a go", treating information in a discontinuous rather than a linear way (Pedrò, 2006; Buckingham, 2006; Ferri, 2011), taking advantage of the contribution, support and help of virtual communities to which they belong or to which they refer.

In the co-construction of knowledge, Millenials give preference to digital over paper sources, to images and multisensory stimuli over text-only sources (Pedrò, 2006). They learn starting from the horizontal skills that each generation naturally accrues with respect to the media. And there is no doubt that the horizontal skills of digital natives are much more extensive (though often unconscious) than the ones of the previous generations. Despite this, one should avoid to overestimate these skills' breadth and depth, otherwise one risks to ascribe to the so-called "digital natives" skills and abilities away (Rivoltella, 2001; Buckingham, 2006; Ferri, 2011).

They learn in a different way because they are totally immersed in a "participatory culture" (Jenkins, 2007) where they are "prosumer". Thanks to new media, this informal culture is primarily a sharing culture (Jenkins, 2007; Petrucco & Rossi, 2009). Finally, the Millenials are immersed in a world that is absorbed «in "make-believe", in which appearances are not just on the screen through which the experience is communicated, but they become part of the experience» (Castells, 2002, p. 431). For digital natives the boundaries between real and virtual are blurred: these two different planes of reality frequently interact in a natural way (Grollo & Nardo, 2007; Ferri, 2011).

Since digital natives acquire most of these skills and knowledge on their own, they need a "guide", a "support" or a "facilitator" for learning how to use new technologies for meaningful purposes. Although it may seem paradoxical, even – indeed especially – the digital natives need to be educated in order to become digital literate in a full and broad sense (Ng, 2012).

DIGITAL LITERACY AND FOUR EDUCATIONAL CHALLENGES

As mentioned above, digital literacy is a theoretical concept that includes many other literacies. In a single framework, it integrates several registers and semantic codes (Martin, 2006). Extending the concept of digital literacy within the wider context of participatory culture and trying to define its content, we can identify some skills and abilities which are crucial for the digital native (Jenkins *et al.*, 2006):

- *play*: the capacity to experiment with one's surroundings as a form of problem-solving;

- *simulation*: the ability to interpret and construct dynamic models of real world processes;
- *performance*: the ability to adopt alternative identities for the purpose of improvisation and discovery;
- *appropriation*: the ability to meaningfully sample and remix media content;
- *multitasking*: the ability to scan one's environment and shift focus onto salient details on an ad hoc basis;
- *distributed cognition*: the ability to interact meaningfully with tools that expand our mental capacities;
- *collective intelligence*: the ability to pool knowledge and compare notes with others towards a common goal;
- *judgment*: the ability to evaluate the reliability and credibility of different information sources;
- *transmedia navigation*: the ability to deal with the flow of stories and information across multiple modalities;
- *networking*: the ability to search for, synthesize, and disseminate information.
- *negotiation*: the ability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative sets of norms.

Digital natives acquire some of these skills in an unconscious way: just to name a few capturing information, or locating using global positioning system and downloading/uploading music and video files. Most digital literacy skills and knowledge accrued outside the formal education (Ito et al., 2008; Ng, 2012). As members of online communities, they are able to use different language styles that every social network require.

We can identify three dimensions in digital literacy: a *technical dimension* (technical and operational skills to use ICTs), a *cognitive dimension* (the ability to think critically, evaluate and create cycle of digital information; the knowledge of ethical, moral and legal issues associated with online trading and content reproduction) and a *social-emotional dimension* (the use of Internet and Web services and tools in a responsible way for communicating, socializing and learning according to the "netiquette"). These abilities and knowledge are essential for interacting in the Sematic Web, but they are not enough. A crucial competence is to learn to *use images to think* because digital environments and the software interfaces are based on the semantic graphic-visual communication. It is also important to *think in multi-domains* or *transmedially*, namely the ability to use software applications across multiple devices and to develop visual-interpretative skills in order to interact with the media in an analytical way. Because of the continuous increase of virtual communities, discussion groups, and other collective learning tools it becomes essential to know *how to identify, understand, evaluate maps and networks of social relations* (Eshet-Alkalai, 2004). Finally, it is essential the ability of *manipulation and representation of the symbols* in order to «give order and meaning to the dialogue with unpublished text and images» (Banzato, 2011, p. 161).

For all these aspects, digital literacy and its instances are the coherent expression of the new media education paradigm. The pedagogical references are s*ocio-costructivism* and *connectivism*. The former refers to a *cooperative* and *interactive process*, where educators act as facilitators in the research of knowledge through a learning by doing process (Dewey, 1999a, 1999b; Garrison, 1997; Kanuka & Anderson, 1999; Anderson & Dron, 2011; Vercelli & Vivianet, 2012). Connectivism is crucial to fully capture the learning revolution produced by Web 2.0 and 3.0: knowledge is mainly a process of building networks with different "virtual" communities, data, and resources (Vercelli & Vivanet, 2012). Moreover connectivist learning is based on both production and consumption of educational content (Anderson & Dron, 2011). Finally, in both pedagogical approaches students are at the center with their own horizontal skills, knowledge, life experiences, predilections and expectations (Anderson & Dron, 2011; Vercelli & Vivianet, 2012).

Now we can identify some of the main challenges for educational agents. A *first* challenge is to identify which horizontal skills a digital native actually has (Rivoltella, 2001; Buckingham, 2006; Grollo

& Nardo, 2007; Ng, 2012). There is a clear risk in taking for granted embedded skills. *A second* challenge is the fading distinction between appearance and reality (Grollo & Nardo, 2007) with a more and more frequent overlap in terms of attribution of value and meaning. This situation has important educational implications, as it generates a continuous acceleration and compression of time and a sense of frustration because the world is represented, as more attractive and rewarding than it really is (Nardo & Grollo, 2007). This crucial challenge requires a responsive approach, such as creating paths and projects shared by digital natives and educators in order to provide digital products able to lead back to reality in a new encounter with the natural world. The *third* challenge concerns the role of prosumers. Forming a conscious and critic author is without a doubt one of the prerogatives of the education in the twenty-first century (Rivoltella & Ferrari, 2010). This also means to breed future citizens who are able to supervise the media, rather than to be supervised by them (Buckingham, 2006; Grollo & Nardo, 2007; Tòlic, 2011). A *fourth* challenge refers to the different ways in which digital natives learn within a participatory culture characterized by the prospect of a collective (Lévy, 1994) and connective (De Kerckhove, 1997) Intelligence. All educators are called to give up the rigid pattern of vertical distribution of knowledge and embrace a relationship of shared learning (Grollo & Nardo, 2007): they harness the technologies that students use outside of school to engage them in finding and analyzing resources themselves.

Storytelling and digital storytelling

Because of its breadth and depth of action, storytelling, in its digital evolution, is one of the most interesting educational strategy (Bumgarner, 2012; Robin & McNeil, 2012; De Rossi & Petrucco, 2013).

According to Barthes (1987), narration (although with different methods and languages) is central and constitutive of human experience and is represented in various forms (individual or collective), generating connective patterns of thought and culture. When we tell a story, we have to collect data and information, rework and consequently activate processes of knowledge and learning that allow us to shape our experiences (Kaneklin & Scaratti, 1998; Malita & Martin, 2010; De Rossi, 2013). The narrative is thus the first "device of interpretation and knowledge" used by humans to give meaning to their life experience (Petrucco, 2013). The narrative stimulates «the ability to relate internal states with external reality, to reconnect the past with the present in a projection into the future [...]: substantially, the narrative would help to make learning actually distributed and located» (Petrucco & De Rossi, 2009). Our brain seems to have evolved to transform information into stories to the point that the narratives would have the same influence on our *forma mentis* as personal experiences (Restak, 2004).

Thus, between storytelling and learning there is «an inextricably intertwined because the process of composing a story is also a process of meaning-making» (Malita & Martin, 2010, p. 3061) that encourages critical thinking, developing cognitive skills and organizing knowledge (Bruner, 2002). The natural transformative power of the narration has in the emotional engagement one of its essential components for activating attention and learning motivation. All "good" stories have the incredible ability to provoke emotions and cognitive participation, to facilitate understanding of complex events, to stimulate reflection and open prospects for change (Pennac, 2008; Petrucco & De Rossi, 2009; Blezza Picherle, 2013; Gaeta et al., 2014).

These observations show the validity of this methodology to grasp some of the educational challenges of the twenty-first century. New media lead to further expand the possibilities of creation, dissemination and meeting narratives (Robin, 2008; Petrucco & De Rossi, 2009; Schank, 2013; Gaeta et al., 2014). In the participatory culture, the digital storytelling (hereafter DST)is as a method to recreate ties, sense of community and a kind of cultural glue among people (Lambert, 2006; Robin, 2008; Hall, 2012; Boscolo Nale & Colombo, 2013).

DST is «a personal experience represented in narrative form. A script, or the essence of the story, is extracted from the narrative and then amplified by including video, music, still-frame imagery, and the author's voice. […] The inclusion of multimedia makes the story come alive and takes the story to a place that could not be achieved by writing alone» (Jakes, 2007, p. 43). Given its undoubted educational functions, DST can be related to different academic disciplines (Robin, 2008; Robin & McNeil, 2012),

can be fiction or (and) no-fiction (Alexander & Levine, 2008), linear or no-linear (Liua et al. 2010), adaptive/interactive or mobile/ubiquitous (Gaeta et al., 2014). In all case, digital stories further co-constructed learning in a multidisciplinary, interdisciplinary and socio-constructivist prospective (Jenkins, 2007; Petrucco & De Rossi, 2009; Rivoltella & Ferrari, 2010; Bumgarner, 2012; Dibattista & Morgese, 2012; Parola, 2012; Yang & Wu, 2012; De Rossi, 2013).

One of the most structured and articulated DST models is the five-step ADDIE (Analysis, Design, Development, Implementation, Evaluation) Model. In the preliminary *analysis* phase learners have to identify the topics, the main purpose, the script and the target audience of the story (considering age, gender, cultural background and other defining features), and the perspectives in order to tell the story in an interesting way (Robin & McNeil, 2012; Yang & Wu, 2012). This is a first moment of critical awareness on the production of a media text and on the crucial role of the target audience (Buckingham, 2006; Bumgarner, 2012). In the *design* phase, learners and educators complete the script and the storyboard. This is a very crucial step that implies elaboration and sharing of new ideas, discussions on the storyboard and the media organization (Robin, 2006; Liua et al. 2010; Yang & Wu, 2012). In the media education prospective, participants learn to analyze the different media, their communicative potential and how they can affect the story comprehension. As not all media support and strengthen the digital stories in the same way, it is necessary to create a "good" story. In the *development* phase, the story is actually created. Selected elements are linked and combined in order to form the digital story (Robin, 2006, Shneiderman et al., 2006; Liua et al, 2010; Yang & Wu, 2012). Learners are made aware of the real problems of creating a media product, the need to accept (sometimes) different solutions because of external factors (Production), to reflect on the effectiveness of selected media and the opportunity of a more functional use of media (Language and Representation). Sematic Web apps and tools may be important especially with regard to the story development in 3D. In the *implementation phase,* the creators decide how to use the multimedia product and if it is necessary to create additional resources to improve and expand the visual experience (Robin, 2006; Shneiderman et al., 2006; Liua et al. , 2010; Robin & McNeil, 2012). In the last phase, digital story creators use different tools and applications to assess whether they have achieved all communicative goals. Obviously, the evaluation is carried on during all stages (Robin & McNeil, 2012).

The *features* and *advantages* to use DST are manifold. Studies demonstrate that DST activates the attention of learners, motivates them to explore new ideas and to develop proposals, and engages them in the learning and problem solving (Druin & Solomon, 1996; Robin, 2008; Castoldi, 2013; De Rossi, 2013). Through the different phases, the learners become *creative* and *productive* (Robin, 2008; Malita & Martin, 2010) and *think critically* (Malita & Martin, 2010; Yang & Wu, 2012). In respect to the socio-costruttivist prospective, DST is *learner-centered* (Boscolo Nale & Colombo, 2013) and the digital story creators are motivated in a collaboration process for the co-construction of social meaning, ideas, and capabilities (Liua et al., 2010), and for the reconstruction of their own beliefs thanks to intercultural and intergenerational interactions (Malita & Martin, 2010; Hall, 2012; Yang & Wu, 2012). DST is a reflective and active method (De Rossi, 2013) that stimulates an open and flexible behavior. Finally, DST is a bridge between digital natives and immigrants/educators (Robin, 2008; Hall, 2012; Boscolo Nale & Colombo, 2013), school and society, individual and community, oneself and the others, and among different subjects and topics. For all these reasons, DST needs to *go out of the classroom:* for *opportunities* (to get in touch with external reality, to create a connection with the community and to explore issues and topics from other points of view) (Petrucco, 2013) and *coherence* (the increasing ubiquity and pervasiveness of new media push towards a model of *storytelling just in time*) (Schank, 2013).

Value Generation Framework

Compared to traditional methods, storytelling is based on metaphors and emotions that enforce the learning experience. Any learning activity can be enforced by storytelling. DST can stimulate students' attention, create curiosity around, and trigger desire to deepen knowledge through personal study. In our

framework, digital storytelling is the core of four complementary actions that generate value for the entire network of involved institutions. Let us suppose, for instance, that a class is involved in a Roman Art project. The network of possible institutions are museums (both local and international ones), schools, libraries, and non-profit organizations in the education field. A museum may invest in digital storytelling to create learning paths for children. Such products are outputs of a multidisciplinary creative team, involving art experts, writers for children's book, multimedia productions' professionals, and the school itself, and they generate advantages at two levels. First, children can augment their learning experience through participation with the creative team in the co-creation of digital resources based on a sound educational methodology, such as storytelling. DST can enforce their learning experience both before and after the visit. It also generates a positive externality for those that, due to geographical or other impediments, cannot visit the museum. Secondly, DST might become a driver for an innovative museum's communication strategy, with translation in different languages. DST has the potential to attract to the museum the broad segment of families with children. The museum's offer might also include labs and hands-on activities targeted to different ages. Worldwide known museums such as Louvre, Guggenheim, and MOMA have invested in kids' education since a long time ago, contributing to revolutionize the old fashion reputation of museums as places available to selected persons. Digital media and social platforms can now expand the potential of museums' communication, through on line educational and informative resources that can be created in participatory manners.

The core of our framework is the Open Innovation paradigm applied to the co-creation of digital storytelling. In figure 1, based on the amount of resources available, a museum might invest in the production of complementary documents (quadrant 2), such as free, downloadable educational kid's friendly material, useful also for special needs (i.e., big font for those with dyslexia), or video-storytelling (quadrant 3). At the same time, museums and organizations collaborating with the creative team, can exploit revenues from products and services derived from the original storytelling. Labs and training courses can be sold as a complement to a specific learning project of the museum, while DST might evolve into the production of books, ebooks and merchandizing.

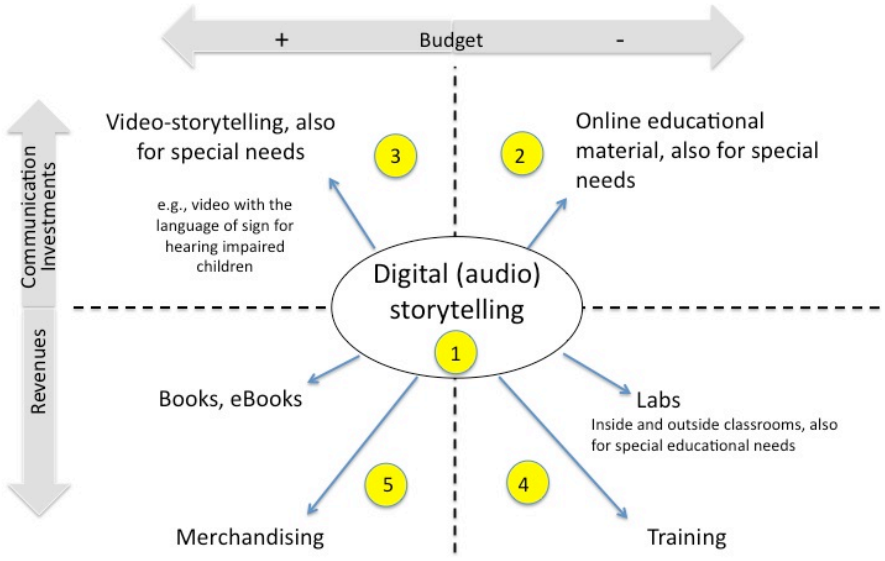

Figure 1. The Value Generating Framework

THE ALLIANCE BETWEEN A ZOO AND A WEB RADIO

We consider how the new opportunities generated by the digital media evolution, the drawing up of a new media education paradigm and a specific method (such as DST) can be applied in an unusual educational context such as a modern zoo. Our case study concerns a "new concept" zoo (Parco Natura Viva, PNV) and a digital media (the university spin off Radio Magica, RM), a children web radio whose services are Web 2.0 oriented. The meeting of these two companies allows to develop a proposal for innovative, integrated and diversified educational activities in the Social Semantic Web. A proposal that is able to create value for PNV, Radio Magica and the communities involved. In particular, we consider the contribution that the web radio can provide to the park helping to overcome some of its critical aspects (see the SWOT analysis) and take advantage of its points of difference.

"Parco Natura Viva"

Parco Natura Viva is a 42 hectares zoological garden created in 1969 by the architect Alberto Avesani. It is located in Bussolengo, a little town between Verona and Garda Lake, two important touristic sites in Northern Italy. PNV is divided into two areas: the Safari Park and the Fauna Park, which is for pedestrians only (www.parconaturaviva.it). It has achieved high quality standards in various areas (conservation of endangered species, research projects in-sintu and ex-sintu, environmental education). PNV has been admitted to the European Association of Zoos and Aquaria (EAZA) and the World Association of Zoos and Aquaria (WAZA). PNV pursues three goals: environmental education, protection and breeding of endangered species, and research. This threefold mission characterizes all modern zoos and implies a radical rethinking of the organization and the infrastructure (e.g. building exhibits to ensure the welfare of animals through natural-like environments which are also suitable for immersive visits). Despite its scientific achievements, PNV suffers from the large misperceptions caused by being a zoo. The negative opinion and the lack of a communication strategy capable to disseminate correct information through traditional and new media have contributed to keep the number of visitors quite low (under 500.000 visitors in the last years).

PNV has grown to more than 140 employees/external collaborators. It is a private company and does not receive any public funding. Among the Italian zoos, PNV presents the broader education sector with five employees (all part-time) with different school training (natural sciences, biology, psychology and educational sciences). The offer is wide and moves from activities and workshops offered during the weekend to all kind of visitors, guided tours for groups and schools within the Park, to occasional events and ad hoc proposals for people with disabilities, up to the weekly summer camps (depending on group age). The education sector is also responsible for the communications tools inside the park, the production of offline and online scientific documents. Customers are mainly people from local or neighbor regions; and extra-regional audience relies on "word of mouth" rather than on appropriate marketing and communications strategies.

The qualitative and quantitative data collection for the SWOT analysis was based on primary (participant observation and interviews) and secondary sources.

PNV presents the following *points of difference*: the location; the overall quality of the structure (in particular the Fauna Park) in terms of care, cleanliness and professionalism of the staff; the scientific authority; the wide variety of animals, in particular conservation and reintroduction of some of the most rare and endangered species (strong element of differentiation); and the emphasis on the welfare of animals (a sensitive aspect). PNV has to involve the younger users, on a wider, prolonged and deep level, enhancing the extensive training opportunities through a more focused and aware use of the Web 2.0 and 3.0resources and tools. Referring to the model of Open Innovation (Chesbrough, 2006, 2011) and the Blue Ocean Strategy (the simultaneous pursuit of differentiation and low-cost to create new market space, Kim & Mauborgne, 2005), the Park could get out of the compelling logic of a continuous renewal of the offer with the creation and the opening of new exhibits and attractions (typical of the competitors) in

order to focus on the existing resources and capabilities intercepting new market segments. Moreover, it is crucial to involve the audience, especially young audience, before and beyond the experience of the visit. This paradigm represents an optimal solution to realize and support the mission of a modern zoo (with a focus on environmental education), and to respond creatively to the serious consequences of the current economic crisis.

"Radio Magica"

Radio Magica is a non-profit foundation born to support children education. Its educational services are mainly performed through a web digital platform that supports a radio and an on-line library for children and teens from 0 to 13. The web radio broadcasts 12 hours a day and seven day a week music, stories and kids programs that stir imagination and entertain the young generations by stimulating listening skills and fantasy. The editorial staff works side by side with a Scientific Committee, composed by experts in developmental childhood (paediatricians, neuro-psychiatrists, teachers, psychologists, etc.) in order to select contents for children of varying ages and with different needs. RM is organized as a Village with four houses, designed to allow access to the content of increasing complexity, but without a strict regard to age, because each child goes through different personal development stages. It begins with the Water house (birth) symbolized by the Minnow, it follows the Earth with Hedgehog (exploratory phase) , the Air with the little Eaglet (phase of abstract thought), and finally to the Fire with the little Cub. A close look at this library allows understanding part of this radio's mission. RM places at the centre of its philosophy and projects a culture of inclusion. Every paperback book introduced into the digital library might get an audio format for all, but essential for children who are blind or visually impaired; a video narratives with Italian Sign Language for hearing impaired children and with Symbols Language for those who cannot or are not able to use the letters of ' alphabet (i.e. children with language problems connected to issue of autism, for pre-school children who are learning to read and for foreigners).
Finally, in the RM portal, a tool shed is designed to offer information, suggestions and good practices related to childhood and special needs to adults like teachers, educators, and families.
The mission of RM is: to promote culture and the pleasure of active listening among children and their families; to sensitize adults to the importance of reading aloud; to instil strong listening habits at an early age; and to collaborate with institutions in order to promote initiatives that disseminate the benefits of good listening.

Managerial Implications

As DST is considered one of the best practices for learning promoting, the collaboration with RM could be a solution to appraise PNV's cultural and natural resources and to give more visibility to its triple mission. DST could realize these goals in two ways.

The creation of no-fiction and fiction stories related to PNV, written by professional children authors can stimulate the curiosity of listeners, who can integrate and re-elaborate the digital product: an activity that can be done freely and independently by users or developed in an educational context with the support of RM media experts. These types of interventions – properly calibrated, structured and organized –help to broaden the experience of the park visit, creating that bridge between school and society, individual and community that is a hallmark of DST and that is one of the educational issues raised above (*fourth educational challenge*). Digital products can be related to educational guides containing different paths, materials and information for independent use by the children, for children with special needs, and for children supported by an adult. Digital natives would be the "real" producers of "authentic" User Generated Content because they respect certain publication requirements, make a creative effort and create outside of professional routines. The digital product creation implies: the development of critical thinking; the stimulation of the interpretative attention; the acquisition of skills to process remixes and mash-ups; and the meditations on authorship problems (*first and third educational issues*). Audios, photos and videos can be taken either from secondary sources or from primary sources: for example, making

photos and videos directly on the place where story is setting, the park. In this way one restores clear boundaries between the real world and the fiction (*second educational question*). The other interesting aspect is that in this way users live, consciously and explicitly, a condition that they are used to live in an unconscious way: the double dimension of consumer and producer (*third educational question*). Radio Magica can create a product (the audio storytelling) which then can be appropriated by listeners who share, process, and enrich it becoming co-creators and innovators; it is a perfect example of the carrying out of the Open Services Innovation paradigm (Chesbrough, 2011). Finally, the resulting media product represents a perfect fusion of the trinity information-education-entertainment: in the contemporary communication context the three essential characteristics of the modern zoo increasingly merge and mingle with each other (de Maurissens, 2013).

A second option is the creation of a DST by a group of digital natives in collaboration with the educators, the RM digital media professionals and PNV staff. In this case, the educational potential of DST would be fully realized, allowing to deal with the four educational issues in an even more accomplished way. As Schank (1990) said, human beings are naturally inclined to listen, remember and tell stories, but the real problem is to find interesting stories to tell. However, the park contains a lot of fascinating and amazing stories to tell. Because DST acts as «a form through which the community represents its problems through the eyes of the children, in an attempt to resolve them» (Petrucco & De Rossi, pp. 90-91), the DST authors are not only part of a process of learning and changing their false beliefs about the modern zoo, but they become PNV spokespersons: they sensitize visitors about situations of environmental education. These latter aspects are central in the "Strategic Plan 2013-2016. Eaza moving forward in the a decade of biodiversity" (2013). Finally, digital products created through the involvement of multiple actors (children and teens, educators, PNV and Radio Magica experts) represent a teaching format able to absorb logics and dynamics of the participatory and sharing culture of the current digital age. These digital products, once shared on social networks and on the web, naturally lead the park outside regional borders gaining a national and international visibility.

RM roots on the culture of inclusion and modern zoological parks offer more and more places with high educational potential for people with special needs. There are sensory stimulations and high emotional involvements that can arouse thanks to animals. Transforming video storytelling into products for persons with different disabilities would allow to have access in a different way to an audience already reached by specific proposals and activities. Therefore the park experience would extend, prolong, complement even for the disabled.

Thanks to Radio Magica, PNV will be able to completely exploit the value of its product/service, in particular by optimizing its performance and visibility of all events and educational proposals. This would allow the park to fulfill the "Global Strategy of the parks" (EAZA 2010-2012), and the requirements of the European Directive (1999/22/EC) and the Italian law (DL 73/2005) about, the educational dimension of zoos.

Future Directions

Radio Magica represents a win-win situation: it pursues educational goals by satisfying simultaneously the interests of a consistent group of educators in search of material for the emerging scholastic needs, and the interests of content providers who can make this material available on line with a small economic effort and get a huge benefit in terms of visibility and (in the long run) profit in return. Different partners offer tailored contents for the RM multimedia platform, and get a new channel to develop more effective communication strategies in return, increasing their profits.

As at the beginning it is crucial to invest in a critical mass of content in order to attract users, PNV has to invest in regular updates as a key success factor for online learning environments. It is well known that a highly relevant success factor is the support of all organisations, in terms of financing, equipment, personnel, or the readiness to adapt organisational structures (Normann, 1977). Indeed, both companies

(RM and PNV) are characterised by a flexible organisational structure and a general openness to pedagogical innovation.
RM has invited PNV to become active member providing content for the Radio. The goal is to involve Parco Natura Viva in producing the innovative products it is specialized to create (educational material for children, virtual tours and explanations) and broadcast them through a multimedia platform. On its side, RM is specialized in crafting communication strategies to schools, parents and educators. PNV can gain two types of benefits. First, visitors will develop a more realistic perception of the role of the park. Second, the park will attract new visitors beyond the local territory.
Thanks to the deal between RM and PNV, new ways of collaborative creation and exchange of content have been introduced. Moving away from traditional environments, where user activities are usually limited to communication about the content, PNV communicate to users in Web 2.0-enriched environments, where they act directly on the content itself.

Conclusions

This chapter tries to build bridges between Media and Education, and could be a valuable contribution for the twenty-first century learning environments. To gather evidence, we use a case study approach focusing on Parco Natura Viva and Radio Magica.
While a number of barriers to full social media adoption across the education system were discussed, what became clear is the potential power that digital technologies have: 1) to empower teachers and students, 2) to act as tools through which learning occurs, and 3) to democratise learning at a global level. The peculiarity of Radio Magica is that it can be defined as a "field experiment" that applies the paradigm of Open Innovation to Education. Indeed, RM's goal is to exploit digital storytelling and the new communication paradigm to launch a collaborative platform: it provides effective solutions for schools' educational needs (for students with and without special needs), and allows educational content providers to develop new communication strategies by making their resources available to educational agencies and increasing profits. Therefore, this interesting case study has allowed us to discuss the role of web in relation to social entrepreneurship and education.

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KEY TERMS SECTION

Digital natives: this expression has been strongly criticized for the deterministic implications on both digital immigrants and digital natives generations (Jenkins, 2007; Rivoltella & Ferrari, 2010; Ng, 2012); however, the term has entered common language.

Open innovation: is «…the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation respectively» (Chesbrough, 2006). Nowadays, a large number of profit organizations (Procter&Gamble, Xerox, STMicroelectonics, …) leverages the Open Innovation paradigm to create new products (often the so-called customer centric products), shorten the time to market and reduce risks. Open Innovation encourages the diffusion of ideas to optimize their application in a wider arena.

Web 3.0 or Semantic Web: is a new form of web content, an environment where software agents roaming from page to page can readily carry out sophisticated tasks for users. We can define it as an extension of the current web, in which information is given well-defined meaning, better enabling computers and people to work in cooperation (Bearners-Lee, Hendler, & Lassila, 2001).The term "Web 3.0" appears on the pages of the New York Times in an article by John Markoff in 2006, however the term Semantic Web was used for the first time by Tim Berners-Lee in 2001.

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