

Multimedia Design and Transmedia Storytelling: Content Production for Microtrainings

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Abstract

This article presents an outline of model of the educational microcontent production for micro-training, built from the point of view that learning is a relational, intentional and experiential process, and, as such, it results from social interactions that also occur in labour spaces. The model, entitled “production cycle of pedagogical contents (microcontents)” is conceptually anchored in the theoretical precepts of transmedia storytelling and multimedia design, which in turn, are based in aspects of language, communication and cognition, bringing innovative elements capable of favouring leanings. In order to develop the model proposed and presented in the article, inherent conceptions to transmedia storytelling, multimedia design and education, are bound and articulated. Furthermore, one promotes the dialogue between non-formal education in the context of continuous formation and in the interest of technology transfer actions (TT) and of rural extension and technical assistance, for the formulation of microtraining activities via mobile devices. The essence of the model lies in the proposition of a sequence of steps that culminate in the production and organization of technological contents that incorporate pedagogical paths. Those paths serve as learnings favouring routes. It is accepted that this way of producing and organizing contents increases the chances of the subjects involved in the microtraining reflect upon and investigate their practices, abilities and experiences, thus helping them to resignify their realities and to build new rationalities to address their problems. The model “production cycle of pedagogical contents (microcontents)” was built to potentialize the chances of making microtrainings via mobile devices into massive actions that favour the TT process of Brazilian Agricultural Research Corporation (Embrapa), under a constructivist learning approach.

Keywords

Transmedia Storytelling, Multimedia Design, Microtraining, Microcontent, Non-Formal Education,

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Production of Contents

1. Introduction

Brazilian Agricultural Research Corporation (Embrapa) is an institution of research, development and innovation (RD&I), linked to the Ministry of Agriculture, Livestock and Food Supply of Brazil. For the fulfilment of its mission, which is to generate knowledge, technologies and information for the Brazilian agricultural sector, new challenges and constantly presented to Embrapa. One of those challenges is the constitution of stocks of technical-scientific contents for divulgation in channels and multiplatforms of digital mobile media, reaching fruition the results of the research obtained in the research developed by Embrapa, mainly to the rural extension segment. Another challenge is related to the necessity of offering continuous formation to rural extensionists, under the perspective of non-formal education, via mobile devices. Concerning this particular issue, microtraining¹ actions to professionals of technology transfer (TT) and rural extension are purposefully presented here because they adequate their needs of knowledge update, bringing opportunities of learning beyond the formal educational system. Founded theoretically and conceptually, the production of Embrapa's contents-traditionally elaborated in technical language-would start to be produced under the perspective of mobile learning², microlearning³, microcontents⁴ and transmedia storytelling⁵.

In face of such challenges, and in the context of intensifying the use of mobile devices, there is the need of establishing a process of content production that is careful about aspects such as didactic-pedagogical, communicational and semiotic. Producing educational content for mobile devices requires appropriate methodology, considering the specificities and restrictions related to mobile devices. Small screen, lack of keyboard, speed, and the price of connection, among other issues, are limiting factors in the creation of any content for mobile devices. Educational contents, specially, the learning objects require micro size, i.e. microcontents (Souza, 2013; Souza & Amaral, 2014). Moreover, educational contents should be built under pedagogical and didactic intentionality, so that they facilitate the comprehension and resignification (Souza, Torres, & Amaral, 2010).

In the business field, specially in RD&I institutions such as Embrapa, the production of contents to disseminate the results of scientific research in transmedia language is still incipient. It is noticeable the need of theoretical input of disciplines, such as Pedagogy, Communication, Semiotic, Design, among others, to base and lead these new approaches to content production. The introduction of the concept of transmedia storytelling to the development of contents to non-formal education is an innovative action that reinforces the importance of TT as a space of exchange and interaction, which beyond informing and communicating, promotes the coparticipation of its diverse audiences in the act of knowing (Freire, 1977). Under this viewpoint, one can notice the inextricable connection between the acts of educating and communicating, since educating is, in itself, a particular way of communicating. Thus, one strengthens the TT role in Embrapa in the face of the possibility that the social actors appropriate the contents and change their behavioral patterns (learning) in order to develop new methods and techniques of agricultural production. This means going beyond the mere divulgation, dissemination and communication of the technical-scientific information. Therefore, the concept of transmedia storytelling can be explored as both a way of dissemination of information as well as a way of learning, since it possesses potential to enable people to acquire the new technological contents, generated by the company in a participative and active

¹Microtraining is a training method that is applicable to the reality of companies to implement actions that generate new learnings to their employees. (This topic will be resumed in chapter 4).

²Mobile learning is defined by O'Malley et al. (2005: p. 6) as "Any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of learning opportunities offered by mobile technologies". The definition given by Saccol et al. (2009: p. 103) considers: "M-learning is taken [...] as meaning those learning processes that depends on using mobile and wireless information and communication technologies and that involve the mobility of the learners, who may be physically or geographically distant from each other or from the physical arenas of formal education, such as classrooms, training rooms, or work place".

³Microlearning is defined as being that learning that involves aspects of teaching and education, whose focus is directed to the micro level, specially microcontents (Hug, 2007; Hug & Friesen, 2007; Souza, 2013).

⁴Microcontents, particularly educational microcontents are understood as contents adequate to microlearning activities, which occur in learner mobility conditions, considering the restrictions of screen size, lack of keyboard, speed and connection, among others. (This topic will be resumed in chapter 4).

⁵Transmedia storytelling is a concept used to designate that type of narrative which elapses via multiple media channels, each one of them contributing in a distinct way to the comprehension of the narrative universe (Jenkins, 2003). (This topic will be resumed in chapter 2).

way. Furthermore, in Embrapa, the incorporation of transmedia storytelling concept in the processes of content production for TT would open possibilities to broaden the spectrum of options of new communication channels to access information as well as it would propitiate the diversification of languages, favouring the construction of new learnings. Therefore, research results could be communicated in the perspective of transmedia storytelling, potentializing the chances of propagation of such deeds to different levels of audiences and interests. From this viewpoint, Embrapa's producers of content would start to make use of the concept and structure of transmedia storytelling to tell the stories that enmesh the technical nature content, with the purpose of widening the dissemination and the communication in multiple media and languages.

This article brings a contribution to this possibility, presenting a draft model that makes use of transmedia storytelling and multimedia design to produce pedagogical contents (microcontents). Such model is based in a matrix that articulates the concept of transmedia storytelling as a propitiating source of learning, aligned to the perspective of education as a relational, intentional and experiential process, resulting from social interactions. The model represents a mainspring cycle technical contents production of Embrapa, differentiating it of the conventional way applied up to present.

In Section 2, the article conceptualizes transmedia storytelling, highlighting its linkage to the education processes and as a basis for the draft model entitled "production cycle of pedagogical contents (microcontents)" to be presented in Section 4. Section 3 situates non-formal education in the context of continuous formation and in the interests of TT and rural extension actions, committed to the production of microtrainings, discussing the concept of microcontent, and its importance to the production of didactic-pedagogical contents based in transmedia storytelling. The fourth and last chapter presents the production cycle of pedagogical contents (microcontents) that is anchored in the precepts of transmedia storytelling aligned to the educational and technological conceptions (multimedia). The production cycle of contents envisages potentializing the chances of turning microtrainings, via mobile devices, into massive actions that favour the TT process of Embrapa under a constructivist learning approach.

2. Transmedia Storytelling and Education: Conceptual Frameworks

2.1. Transmedia Storytelling

Transmedia storytelling is a concept first coined by Henry Jenkins (2003) in order to base the development of a story through multiple media platforms, where each medium contributes to the whole in a distinct way. It can be understood as stories that are told using multiple media and distinct languages, such as occurs in marketing and publicity campaigns. However, transmedia storytelling cannot be summarized as mere adaptations of one same story to different media and languages. On the contrary, transmedia storytelling is a type of textual storytelling structure which is expanded in a way to accommodate the development of one same story in different languages (visual, verbal, and sound), and in distinct media (web, mobile devices, audio, video, image, film, hypertext, CD-ROMs, games, videogames etc.). Nevertheless, the story told in a certain medium (video, for example), is not the same as the one told in another medium (audio, for example). It follows that different media and languages acting upon one same story, turning it into another one, generating what is named transmedia storytelling, as explained by Jenkins (2003: p. 2):

[...] each medium does what it does best-so that a story might be introduced in a film, expanded through television, novels, and comics, and its world might be explored and experienced through game play. Each franchise entry needs to be self-contained enough to enable autonomous consumption. That is, you don't need to have seen the film to enjoy the game and vice-versa.

Since this terminology is still recent there is still no consensus concerning the transmedia storytelling definition. According to Jenkins (2007: p. 1; 2011: p. 1): Transmedia storytelling represents a process where integral elements of a fiction get dispersed systematically across multiple delivery channels for the purpose of creating a unified and coordinated entertainment experience. Ideally, each medium makes its own unique contribution to the unfolding of the story.

However, other authors define transmedia storytelling as being an only story told through multiple platforms. There are still the authors who regard it as many stories based in one world (von Stackelberg, 2011). Gomez (2010) proposes a broader definition of transmedia storytelling as a process of transmitting messages, themes or stories to a mass audience through the astute and well-planned use of multiple platforms. Jenkins (2011), in turn,

highlights that the transmedia concept needs a sophisticated definition so that it can encompass the diversity of examples and situations that it is capable of, highlighting:

Transmedia refers to a set of choices made about the best approach to tell a particular story to a particular audience in a particular context depending on the particular resources available to particular producers (Jenkins, 2011: p. 5).

However, the number of stories told has been used as important criteria to define transmedia storytelling. Therefore, according to Kinke (2010), transmedia storytelling has at least three plots set inside one only fictional universe, using platforms such as: film, television, short film, comic strips, animation, wide band, web, digital mobile technologies, publications, DVD, CD-ROM, blu-ray.

Transmedia storytelling is predominantly spread by big media conglomerates, specially by content producers for entertainment, in genres such as fiction, thriller, horror and phantasy (example: Lost, Pokemon, The Best, Game of Thrones, Breaking Bad etc.). According to von Stackelberg (2011), integrating different media in a concise and coherent is a great challenge since it requires the creation of an information design that involves a transmedia project. This requires a history core and the constructions of a set of sequences of new stories, circumscribed to the story core, that are propagated in diverse media. Four are the principles that identify a project as transmedia: the narrative has to be told in more than one medium; the narrative has to be partially interactive; the different narrative components have to be used in order to expand the story's core; the different components of the narrative have to be closely integrated (Miller, 2008).

Narrating is telling events, experiences, perceptions or situations, true, fictional or hybrid⁶, that interest or move the people (Miller, 2008). Narratives shape human perceptions touch our unconscious, create patterns and structures that guide our lives, provide a reference framework, which helps us to reflect upon our unconscious needs. Narratives are essential part of all cultures (von Stackelberg, 2011; McClean, 2007; Simmons, 2006; Szulborski, 2005). Particularly, transmedia storytelling considers von Stackelberg (2011), is a powerful approach when it comes to using it to create knowledge, share information and experiences, develop rationalities and new knowledges. For Bruner (2001), the narrative has an intrinsic educational value as it organizes the experience lived by people, helping them to incorporate in their rationalities the diverse points of view and to exert the critical capacity. In the Education field, narratives are "used both to investigate the knowledge that people express as well as to help the processes of building knowledge" (Almeida & Valente, 2012: p. 63).

According to Murray (2003), digital narratives, also called digital storytelling, still propitiate to people the pleasures of immersion, agency and transformation. This means that they enable people to plunge into a fictional world without leaving their places, to act in this world verifying the results obtained, and to change history due to the technology plasticity. Torres & Souza (2011) shimmered in these characteristics the assumptions to anchor the organization of pedagogical contents, under the transmedia perspective, as shown is Table 1. The authors signal that the use of transmedia storytelling in education enables the students to construct new meanings, perceptions and cognitions about the contents, specially if they are organized in a complementary, interdisciplinary and integrated way and adapted to diverse languages, taking into account the different media supports.

Transmedia storytelling creates a unique world and fills it with characters, objects, events (habitual or accidental/casual), in a timeline that enables people to interpret and reconstruct the narrated facts from the fluidity in which they occurred and the meaning they give to them (Ryan, 2004). Therefore, narrating is a particular way of organizing and presenting to people a livingness, experience or situation. The central object of transmedia storytelling it to make it possible for people to engage and submerge in the story told, using all the cognitive and perceptive apparatus they possess to comprehend the reality of the situation being narrated. It is necessary to build bridges so that people follow these routes, feeling as agents capable of mobilizing their knowledge and skills to obtain answers to the worries raised by the story told. These characteristics, according to Jenkins (2007), make people become performing interagents since it demands their creativity, critical analysis, world perspective, imagery perspective etc.

Transmedia storytelling, according to von Stackelberg (2011), involves people in two distinct cognitive processes: in content viewing (that is expressed in different matrices of languages: text, images, sound); and in the information track processing that lead people to navigate throughout history. It is noteworthy that both processes have the capacity of mobilizing people in the construction of new knowledges, but this power is

⁶The term hybrid is used in place of panfictionality, term proposed by Ryan (1997) to describe the merging of fiction and non-fiction.

Table 1. Assumptions for the organization of pedagogical contents, under the transmedia perspective.

Assumptions	Description	Form of organization of contents
Immersion	This assumption has to make the developers of digital pedagogical contents to conceive situations that enable the learners to feel constructors of meanings and significance to the contents. For this purpose, one needs to elaborate an architecture to distribute them in different resources/media, creating numerous paths to dispose the contents, treating them under different conceptual perspectives. The organization of contents under the complementary and interdisciplinary viewpoint, using the languages and formats compatible with the technological potentialities of each resource/ media, prompt the students to distinguish conceptual nuances and to develop policomprehensions that helps them to interpret those in an integrated way. The different languages possibilited by the resources/media used to store the contents offer the learners, still a chance to do some thinking associating new meanings and significance to the contents.	It has to be organized in a way that propitiates in the learners the idea that the contents merge and complement each other. It also needs to offer the opportunity of multiplying their experiences of information exchanges. For this purpose, one can use resources/media, such as hypertexts, videos, blogs, conceptual maps, infographs etc.
Agency	This assumption has to make the developers of digital pedagogical contents elaborate activities that lead the learners to perceive themselves as a constituent part of the construction of new knowledge and/or solutions that might be created from them. For this purpose, one should elaborate perceptive scripts that enable them to produce reflections considering not only the cognitive capacity and the conceptual background that they have to articulate the different languages used in the diverse media/resources to capture the contents, but, mainly, their potential of becoming the main agents and key players in the constructions of new knowledge.	It has to be organized in a way that enables learners to be mobilizing agents and constructors of new knowledge from the cognitive routes previously elaborated to reflect upon the contents that they searched for in the different media/resources. Technological media/resources such as conceptual maps, educational videos produced by learners, collectively authored texts, among others, enable them to reconstruct the logic of significations they produced when immersed in the contents inserted in those media/them. This favours the experience of learners feeling themselves as constructor agents and transformers of the reality surrounding them.
Transformation	This assumption has to make the developers of digital pedagogical contents make way so that the learners make their own analysis about the new knowledge they produced from the contents they accessed in the diverse media/resources. For this purpose, new paths have to be structured so that they reflect collectively with their peers and teachers about the tacit processes occurred during the experience of capturing the contents and constructing new significance and meanings.	It has to be organized in a way that enables learners to pursue a non-linear path in order to capture it. This favours their active and conscious participation in the process of reflection in the “action” and “about the action”, enabling them to develop the metacognitive capacity. Media/technological resources such as conceptual maps, wikis blogs etc. make it possible for learners to reconstruct the logics they produced.

Note: Source: [Torres & Souza \(2011\)](#).

greater when there is an educational approach and pedagogical method of content production that feeds itself on the experience and livingness of learners to favour the open and exploratory learnings. These are aspects that are considered in the draft model entitled “production cycle of pedagogical contents (microcontents)” for micro-trainings, serving as a foundation in the context of non-formal education for TT in Embrapa.

2.2. Education

The 21st century has brought great challenges for all fields of knowledge, specially for the field of Education. In this field, learning has been happening in environments of rapid changes permeated by technologies of information and communication (TIC), which are increasingly interactive, participative, ubiquitous and immersive ([Yang & Wu, 2012](#)). These characteristics, inherent to current digital technologies, have increased people’s capacity of perceiving the world, providing them with new forms of learning, propelling the collaborative work, the production of new knowledge and the negotiation of meanings. To [Almeida & Valente \(2011\)](#), these technologies have the potential to reconfigure the pedagogical practice specially because the offer openness and plasticity to the curriculum of a course and possibilitate co-authoring among teachers and students, students and students, and students and community. It is through the mediatisation process, favoured by digital Technologies,

that one articulates formation and learning contexts with authentic experiences situations together with the learners. These technologies, according to the authors, propitiate reconfiguring the pedagogical practice specially because they offer openness and plasticity to the curriculum of a course and possibilitate co-authoring among teachers and students, students and students, and students and community. It is by means of the mediatisation process, favoured by the digital technologies, that one articulates formation and learning contexts with the situations of authentic experiences together with the learners.

This reconstructive process is supported by contents from distinct sources, and represented in mediatic languages and technological media, that offer to the participants of the educative act the opportunity to integrate systematized knowledge with knowledge from their experiences. (Almeida & Valente, 2012: pp. 60-61)

Robin (2006) clarifies that in the digital technology era, the area of Education needs to reconsider what it means to be literate, once this implies developing in the learners the abilities that enable them to comprehend and communicate through several languages and manners. In this respect, the digital Technologies reinforce the idea of education as a relational and communicational act of sociointeractionist character (Vigotski, 2009). Therefore, they can also be perceived as instruments that facilitate the interaction among the people serving as transformation agents, conducting wires favouring the capture of new rationalities and significances about the reality. The digital technologies have been considered as a technological device of vital importance for the education because they facilitate the co-construction of knowledge among the students, especially if associated to a social interactionist theory (Ayas, 2006). This signals that the educative processes that occur via digital technologies and tools have to be centered in the possibility of people building knowledge based in the practices, skills, experiences and culture of the collective of people who integrate the situation lived (Mayes & de Freitas, 2004). Therefore, digital Technologies, specially mobile technologies of wireless connection and with potential of interaction, authorship and collaboration are appropriate to support the construction of pedagogical projects, whose aim is to help the learners build knowledge from his/her own life experience and in the context that he/she acts (Almeida & Valente, 2012).

An educative process that involves such characteristics takes it for granted that learnings are tangled from the interaction that the people make among each other and the environment where they are inserted. Thus, it is a fundamental condition for the achievement of success in this process that there is the “multimodal learning”⁷, which is that one that involves the people in several representations of meaning based in different modes and means of language. Multimodal learning presents a challenge to educators who need to draw routes of plural learnings, interdependent, complementary and open to promote in the learners engaging experiences and interactions that enable them to explore the situations or concepts the observation or the collaboration activities. According to de Freitas & Neumann (2009), multimodal learning involves the learners in different elements of the learning cycle; favouring transparency of behaviour patterns from one context to another. The approach of multimodal learning is the one that best aligns to the idea of making of the conception of transmedia storytelling an intensifying source of learning in the context of non-formal education. Firstly, because in multimodal learning people can build, share and explore the several representations of meanings through a narrative which is essentially framed in the context of practical situations common to the learners. Secondly, in multimodal learning it is possible for the learners to examine new conceptual routes, mobilizing their resources and cognitive strategies in order to obtain policomprehensions about the experience they are living. In third place, multimodal learning makes different media understood, in the context of an educative process, not just as channels, but, above all, as instruments of interaction promoters of learnings, since they make the most of what each of them provides best to represent significantly the history being narrated (Kress & Van Leeuwen, 2001; Jenkins, 2011).

Each medium, isolatedly, might alter the understanding of the narrative as a whole; as well as, in its set and in an interdisciplinary and complementary way; the use of transmedia storytelling in educative processes might produce new learnings and knowledges.

[...] that different technologies do have unique pedagogical affordances and that the effects of these affor-

⁷The term “multimodal learning” derives from studies of Kress & Van Leeuwen (2001) and refers to a learning founded in a new form of communication, that arises from the potential that current digital media bring with themselves of carrying meanings through the synchronization of modes. These different modes of representing meanings, inherent to each medium, contribute for the learning to occur through the discovery, exploration and experimentation, people being the key players. Multimodal learning activates different ways of thinking, specially if the contents are produced to seize the affordances of medias in a complementary and interdisciplinary way.

dances can only be understood in the context of a specific content area (and related learning outcomes) and a specific pedagogy”. (Schrum et al., 2007: p. 3)

For this to occur, it becomes necessary to elaborate a multimedia design that explores, in the interior of the transmedia storytelling, the several alternatives of multimodal learning routes that are to be reached as a result of the educative process.

3. Non-Formal Education and Microtrainings

The production of contents for microtrainings for TT and rural extension professionals is a practical activity that is inserted in the field of continuous formation, under the perspective of non-formal education. One starts from the understanding that education prepares the human being for the development of his/her activities throughout life. This preparation requires a permanent education in order to support the various aspects, being economical, social, scientific and/or technological, imposed by a globalized world. In this scenery, emerges the idea that one of the responsibilities of the education is to prepare people to learn constantly. There are, according to Unesco, three categories of learning systems: formal education, informal education and non-formal education. The first is understood as a system of education hierarchically structured, with chronology that goes from primary school to university (including the specialized programmes and technical and professional training). Informal education is defined as the true process of education that is realized throughout life. Non-formal education is that education that is obtained through activity organized outside the formal system of education. Non-formal education, as a general rule, is destined to serving the interests of specific groups of audiences, specially the corporative world. It can be realized in a separate manner or as part of a broader activity, serving audiences previously identified (learners) and that possess specific learning objectives (Marandino et al., 2004).

With formative continued character, non-formal education is potentially adequate to the actions geared to the promotion of technological innovations, applying itself completely to the needs of TT professionals and rural extensionists, specially, with respect to microtrainings.

In turn, producing under demand, contents for professionals of TT and rural extension, possessors of mobile devices (MD), it is necessary to have the theoretical-conceptual input of mobile learning, microlearning and microcontents. These areas provide the comprehension and guidance needed to the production of microtrainings, with educational microcontent. For this reason, microtrainings are unities of learning based in educational microcontent.

Considered as a training method, microtraining is based on theories of learning and in contents of constructivism, aiming at supporting learnings, individual as well as collective, in organizations. They are applied to the realities of companies, serving as a means to concretize actions geared at generating new learnings to their staff. It is also common the utilization of microtrainings to divulge information contents that need to be used or improved, or still, to propagate some information of immediate use in people’s day-by-day (de Vries, Lukosch, & Overschie, 2009; Overschie, Lukosch, & de Vries, 2010; Souza et al., 2015).

The concept of transmedia storytelling is extendable and adherent to the logics of production of pedagogical and communicational contents (mediatic) to support the didactic activities of microtraining in non-formal education for mobile devices. The production of transmedia storytelling in itself is founded in the intentional organization of a content corpus in different digital media to enable people to immerse in distinct pieces of information that are structurally disposed in an interdisciplinary and complementary way. Therefore, as occurs in the educational context, in the construction of transmedia storytelling the main idea is to position people so that they are active agents of their own process of building knowledge.

In this respect, transmedia storytelling is conceived as a concept, which takes advantage of the potentiality of digital technologies to produce new knowledges, also being appropriate to the area of Education. The use of digital resources such as mobile Technologies, the applications of web 2.0 and the social media tools have been promoting learning in contexts of formal, informal and non-formal education (Multisilta, 2012). Niemi et al. (2014) give a description of the educational experience carried out in Finland, the United States of America and Greece that used digital storytelling (DST) as a pedagogical method. In this experience, the authors noticed that the DST contributed to improving the students’ learning in many ways. They further concluded that the DST favoured the collaboration and sharing of pieces of information among students, besides having made them able to be aware of their own knowledge, reflect collectively about topics of common interest and build new logics to think a certain phenomenon.

Microcontents

Processes of production of didactic-pedagogical contents based on transmedia storytelling for microtrainings are founded in the concept of microcontents, which in turn is inserted in the scope of microlearning and mobile learning. Microcontents are defined as structured pieces of self-contained indivisible content, which have a unique focus and exclusive address so that they can be found (Leene, 2006: p. 25). Microcontents appear as innovative elements of pedagogical practices in mobile learning and microlearning, aiming at meeting the demands of the dynamic and fast rhythm of life and of the interlacing of aspects of multiplatform and multitask of mobile devices (Leene, 2006). Microcontent as part of microlearning, according to Buchem and Hamelmann (2010: p. 25), is a counterpoint to:

Traditional models of instruction that many times are not enough for continuous abilities of updating and improvements, since they are heavy and confine the students in prescribed and closed systems. Microcontent and microlearning provide a viable solution to fast rhythm patterns and multitask oriented of learning, enabling learning in small steps and with small units of content, through social interaction.

Contents for microtrainings via tablets and cellphones produced through a methodology of appropriate production, might favour both learning as well as the dialogical process among people (Souza, Torres, & Amaral, 2010). From this understanding, microcontent with educational purpose is a micro-object of learning, i.e., a regular object of learning and as such, likely to be applied to microtrainings activities. Furthermore, it is assumed that the production of didactic-pedagogical contents to serve the interest of professionals of TT and rural extension has to be based on the transmedia storytelling under the constructivist perspective so that it enables people to build knowledge and perceptions.

4. Content Production under the Transmedia Storytelling Perspective

When it comes to content production, in the transmedia storytelling perspective, it becomes necessary to interact and interconnect what is being transmitted (contents) to how the transmission will be carried out (pedagogical process/multimedia design) to the technologies (multimedia) that will be used to shelter the transmedia storytelling. This integration has to follow an educational/pedagogical conception centered in the people, or more specifically, in the forms of interaction that occur among them and between them and the technologies that are used to mediate this relationship.

Shulman (1986) states that in the production of content it is necessary to have “pedagogical knowledge of the technological content (TPCK)”, which implies in saying that the mediations of any nature, specially the ones of digital aspect. It requires planning on the part of the content producers so that it is possible to take advantage of the unique characteristics that the different media offer.

It is assumed “that different technologies have the unique pedagogical affordances and the effects of these affordances can only be understood in the context of a specific content area (and related learning outcomes) and a specific pedagogy” (Schrum et al., 2007: p. 3).

In the context of Embrapa, the use of the concept of transmedia storytelling for content production aiming at continuous formation of rural extensionists under a perspective of non-formal education has to enable TT to be explored as a way for learning and not just as a space of dissemination, communication and transfer of technologies. For this purpose, content production has to be, on the one hand, based in “freireana pedagogy, of constructivist conception, which emphasizes the social aspects of learning and considers the student more than an isolated individual, having him/her as a member of a social group” (Souza, 2013: p. 43) and on the other hand has to be intentionally planned to mobilize in the people the capacity to build collaboratively, new knowledge and abilities. The interaction of people with the produced contents, under the transmediatic perspective, has to favour the promotion of new learnings.

Under the perspective of transmedia storytelling, a model has been developed of the cycle of production of pedagogical contents (microcontents), which is aligned to a constructivist conception of education and to a multimediatic technological platform (Figure 1).

This cycle is composed by the pedagogical axis and by the multimedia design axis. Both are interdependent axes and complementary between them. The pedagogical axis is responsible for carrying out the pedagogical organization of contents defined for the microtraining to be taught via mobile device applying the transmedia

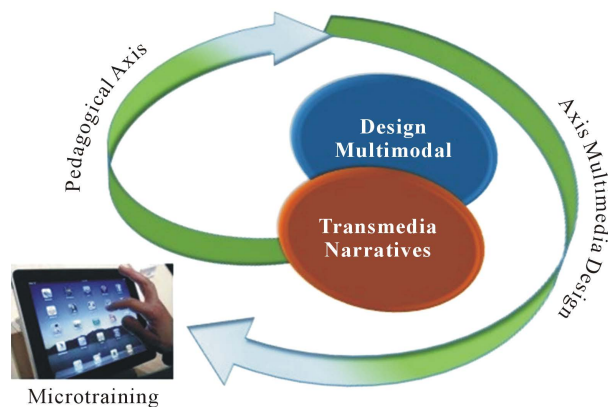


Figure 1. Cycle of production of pedagogical contents.

storytelling in the microcontents. This pedagogical organization is carried out from a survey of the needs of training, whose purpose is the elaboration of the “microtraining program”. This program refers to a set of contents to be worked from the didactic-pedagogical point of view in the model of the cycle of content production. It is from this didactic-pedagogical treatment, carried out considering the established program for the microtraining, that are to be developed the microcontents which will integrate the implicit plots to the transmedia storytelling. Thus, once the contents are known, one can start the first phase of the cycle of production of microcontents, which is named “pedagogical axis”.

This phase of the cycle of production of contents which refers to the pedagogical organization of programmatic contents established for the microtraining is an action of extreme importance in the context of production of transmedia storytelling since it enables the participants in the microtraining to sharpen their perception about the contents that have to be known/learned to favour the continuous formation under a constructivist, interactive and participative perspective.

In order to accomplish the pedagogical-didactic organization one has to carry out the following steps: 1) identifying one or more main theme(s) underlying the defined contents in the microtraining program; 2) identifying in the scope of the main theme(s) other affluent themes that inter-relate and complement the main theme(s); 3) building, from the main theme(s), the core narrative and the parallel narratives, considering the pedagogical-didactic treatment to be developed with the pieces of information selected in the archive of technical-scientific production Embrapa (see item 5 below); 4) incorporating in the construction of core and parallel narratives (step 3), interdisciplinary, complementary and transversal approaches to treat the defined contents in the program, using as a basis the element(s) of convergence(s); 5) accomplishing the didactic-pedagogical treatment in the information/publications selected in the archive of technical-scientific production of Embrapa that have interrelation with the underlying contents to the element(s) of convergence(s) that serve as a basis for the production of microcontents which will be incorporated in the transmedia storytelling (core and parallel).

Steps (1 and 2) of identification of the main and affluent themes are input for the construction of transmedia storytelling (core and parallel) and for the incorporation of an interdisciplinary, complementary and transversal approach of contents (steps 3 and 4, respectively). Therefore, it is fundamental that in this identification adequate criteria are defined to facilitate the choice of themes. For this purpose, the following criteria are proposed: 1) social interest: the themes need to have a strong appeal aiming at the agriculturist’s interests, 2) demand of target audience of microtraining: the themes should cover in extension and depth of conceptual approach the identified interests in the survey about the needs of training, consubstantiated in the programmatic content; 3) transversality: the themes have to contain elements of convergence and transversality, so that they can be treated under several perspectives of knowledge fields; 4) conceptual consistency: the themes need to possess a vast bibliographic corpus, preferably in multimodal format, so that it can, on the one hand, facilitate the interdisciplinary complementary and transversal treatment of the contents that are to be shelter in the transmedia storytelling; on the other hand, contributing for the identification, among diverse media, of those which possess greater capacity of favouring learning in function of its affordances. The definition of main and affluent themes culminates with the establishment of one or more “elements of convergence” which are defined as the key contents around which will circulate all the other contents to be treated in the steps of construction of transmedia storytel-

ling and of incorporation of the interdisciplinary, complementary and transversal treatment of the contents (3 and 4).

The example, represented in **Figure 2**, shows how a convergence element might be treated in an interdisciplinary, complementary and transversal way to lead the construction of transmedia storytelling: main theme: environment; convergence element: water; points of tangency (interdisciplinary, complementary and/or transversal): biological aspects—the “water” element might be discussed as an essential resource to human and animal life, environmental aspects—the “water” element might be articulated with a public wealth which requires collective care, economical aspects—the “water” element might be presented as an economical resource, scarce and expensive; geopolitical aspects—the “water” element might be debated as a construct promoting disagreement an inequality among the nations.

In order to favour the development of “learning routes”, the construction of transmedia storytelling (core and parallel), has to incorporate, together with the convergency element(s) established in the steps (1 and 2), interdisciplinary, complementary and transversal routes (step 4). The didactic-pedagogical construction outlined together with the underlying contents to the convergency elements that will compose the transmedia storytelling (core and parallel) aims at weaving the “plot of contents” which will offer the participants of the microtraining an interpretative, comprehensive and wideranging grid of how the several contents of the microtraining program are linked and articulated. This will make it possible for the participants to develop poli-comprehensions and new rationalities about the reality they deal with day-by-day, enabling them to see the competences they need to develop to serve the agriculturists’ needs more competently. Moreover, during the microtraining journey, this will make it possible for them to engage and participate in the construction of new knowledge as the key players of the learning process unfolded by means of transmedia storytelling. The results in steps 3 and 4, respectively, the content routes that will be used in the transmedia storytelling (core and parallel) and the detail breakdown of how they should be worked, under the interdisciplinary, complementary and transversal perspectives, to favour the learning of microtraining participants. These results will serve as guides to lead the actions to be executed in the axis of multimedia design of the proposed model.

Step 5 refers to the didactic pedagogical treatment of selected contents in the Embrapa’s archive of information/publications. This step serves as substrate for the execution of steps 3 (construction of core and parallel narratives) and 4 (incorporation of interdisciplinary, complementary and transversal approaches in the construction of core and parallel narratives). In order to accomplish the didactic-pedagogical treatment one has to identify pedagogical strategies in the selected material in the Embrapa’s archive. These strategies make the microtraining participants engage in the context of narratives favouring the learning of the contents inserted in them. Didactic-pedagogical strategy is understood as any action proposed in the context of the construction of narratives that challenges or enables the learners to comprehend the concepts inserted in the diverse microcontents incorporated in the narratives. Therefore, the construction of such strategies is of fundamental importance, once they organize

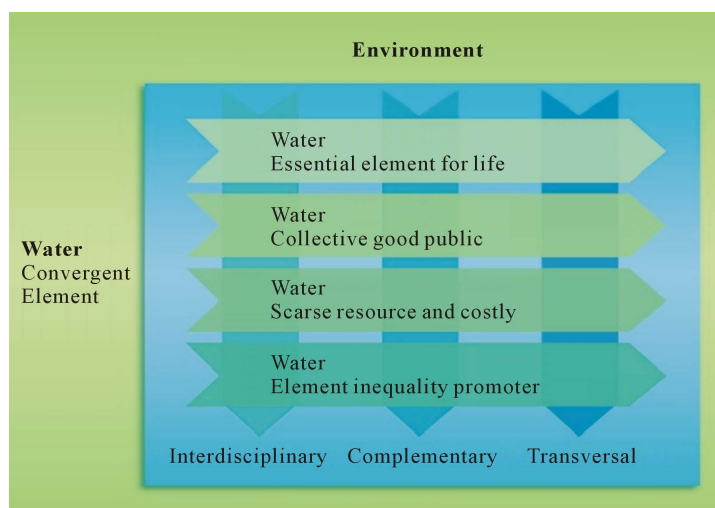


Figure 2. Example of interdisciplinary, complementary and transversal treatment of contents starting from a convergence element.

the mental processes, which make the participants capture the information/contents that will be carried in the transmedia storytelling. These strategies help people to wake up, exercise, build and improve flexibility in terms of ideas/thoughts, breaking mental barriers, which deter them from having new rationalities about the convergence elements chosen to circumscribe the narratives. The strategy(ies) chosen must necessarily be approached in the scope of a constructed script for the transmedia storytelling using one or more medium as addressed in the axis of multimedia design of the proposed model.

The multimedia design axis is responsible for providing the microcontents defined in the script of transmediatic narratives to the different media following the potentialities they have to favour the interactions among the participants as to improve the capacity of learning from them. Therefore, it contributes to give synergy to the narratives chaining, uniting, integrating and giving intelligibility to the microcontents in a multimodal way. The challenge of multimedia design is to capitalize the microcontents in the different media in function of the affordances that each one of them possesses to express in the most appropriate way possible the microcontents expressed in the core and parallel narratives, i.e., it is the multimedia design that prepares the contents to be embarked in the different media.

It can be stated that multimedia design is a planning instrument because it enables the educators to organize and prepare the contents to be approached in diverse media, considering their affordances as well as their learning routes that have been deliberately outlined to favour the capture/assimilation of them. Moreover, the multimedia design also helps to plan, in the context of the transmediatic narrative, the instances of interaction, collaboration, participation, engagement and teamwork, increasing the chances of the experiences lived in the educative process being the result of a personal realization/achievement produced in the middle of a collective action. Many educators involved in educational projects are unanimous in admitting that the transmediatic narrative as a source of learning brings gains that are more significant.

[...] to higher-order thinking and problem-solving skills, including synthesizing, analyzing, evaluating, and presenting information. When students use technology such as digital storytelling, they learn to “convert data into information and transform information into knowledge” (Robin, 2008: p. 225).

Multimedia design can be understood as a requirement to produce a transmediatic narrative, since it must favour the idealized conception of how to chain and unite a narrative to the diverse media in which it will circulate (von Stackelberg, 2011). This design must be capable of proposing the structuring of contents inside a logical chain, matching a proposal of transmediatic narrative to a pedagogical method. The multimedia design prepares the auditory, verbal and visual information consonant to a pedagogical planning intentionally oriented to people in the task of building new knowledge (Horn, 2000). The challenge of building the multimedia design under the perspective of transmedia storytelling is to make a selection, organization and integration of sonorous, verbal and imaging elements that are relevant to the context of narratives to increase the learning of contents embarked in them without overloading the cognitive system of people.

Therefore, it is the multimedia design that leads the narratives, positioning sounds, images and words next to the corresponding screen, aiming at highlighting the information it wants to emphasize. It is also this design that signals to the participants of the microtraining how each part of the narrative is being forwarded, developed in distinct media, offering explanations segmented in smaller pieces to facilitate intelligibility (Mayer, 2008). The multimedia design is concentrated in organizing the relation between the history core, the essential contents that this history engenders, as well as the derivations and unfoldings, which originate from it in different media. Thus, the design is understood as a planning instrument, whose function is to ensure the unity of the narratives and to favour the immersion of the people in the route built to give intelligibility and completion to the history.

The general structure of multimedia design has to be thought under a systemic perspective (Thwaites, 2000), in interdependent parts/components to the transmediatic narrative of the history to be told. This segmentation forms a structure or “skeleton” of essential contents, giving evidence of a sequence of organized facts, in a way as to favour their comprehension by the people. For this purpose, it is also necessary that the multimedia design of the transmediatic narrative analyzes the history to be told under the perspective of hybrid languages, originated from the matrices and mixtures of languages (sonorous, visual and verbal) (Santaella, 2009). In this respect, the multimedia design has to distribute meaning in more than one semiotic code seizing the affordances (media capacities) of

[...] producing distinct significations intrinsic to their modes and technological possibilities of production of

meaning, whether imagetic, textual (written), spacial or sensorial to produce the weavings of the text. It can be inferred, therefore, that all transmedia storytelling uses the multimodal capacities, i.e., different platforms to produce meaning and coherence in the narrative. (Comentários..., 2015: p. 1)

The analysis of these aspects of the languages offers to the multimedia design an understanding about the social and esthetic conventions and of necessary codes to the comprehension and the attribution of meanings to the histories told in the media that compose the project of transmediatic narrative (Sturken & Cartwright, 2009).

Multimedia design starts with the identification of the input information, which will act as a catalyzer of other mental and cognitive processes together with the receivers. This input information is responsible for building a chain of information that will lead the transmediatic narrative. Such chain is composed by three interdependent elements, information source, conditions of transmission and recipient's response (Thwaites, 2000).

An important aspect to be considered in the multimedia design is the social interaction, present in the both the learning and in the transmediatic narrative. In the conception of Niemi et al. (2014), the transmediatic narrative is pedagogical method based on student-centered approaches, which might contribute to the improvement of the learning. In this respect, Niemi et al. (2014: p. 658) quoting Vigotski (2009), states "[...] learning is seen as a socially and culturally related process that takes place in the interaction between a learner and material tools, psychological tools, or other human beings". All these forms of interaction are likely to occur, as exemplify these authors:

Learners have a central role in exploring and building knowledge by using different kinds of material tools, such as mobile phones, computers, and the Internet. Additionally, students interact with psychological tools when using language, brainstorming, or creating stories. Learning together with others can take place when using collaborative methods and watching stories those other students have made. When planning and making digital stories together, students can become aware of their own knowledge and experiences, reflect on, and share these with others. Watching other students' stories can also bring new perspectives to the topic and promote understanding about a certain phenomenon. (Niemi et al., 2014: pp. 658-659)

According to Primo (2007), interaction is understood as an action that occurs "among" the subjects of a communicational process (human interagents and technological artefacts; human interagents among themselves or technological artefacts among themselves). Thus, interaction is the engagement and connection established during relational events, so the emphasis is not in the components of the relation, but in what occurs among them. In the scope of the transmediatic narrative, the interaction has to be understood as a systemic phenomenon, which incorporates, generates changes and mobilizes technological resources in an intentional way to favour the participation of the interagents in the communicational process. Preece, Rogers, & Sharp (2013) argue that in virtual environments, the interaction supports the way as people communicate, serving as a stimulus to creativity, among other things.

In the context of transmediatic narrative, the interaction has to be balanced. This is to say that, at the same time that it is necessary to give the receivers the freedom to influence the narrative flux of the history, it is also necessary to have an authorial control over this flux. von Stackelberg (2011) defines control as the receiver's capacity of influencing the course of history, sometimes making decisions in important moments, sometimes controlling one the characters. Authors as Mulholland & Collins (2002) are in favour of limiting the interference of the receivers in the flux of the history so that it does not lose its coherence. In transmediatic projects of educative character, one has to adopt preferably the concept of hub narrative, which consists in presenting the end of the history to the receivers and then making them explore alternative routes made by the characters involved in the plot during the construction of that end. The question of interaction gains importance when the transmediatic narrative is produced for digital media such as web, tablets, smartphones etc. In these media, the receivers possess the role of agents, are more active and might solve problems, make space navigation, play in the transmediatic narrative, transit among media to dig information that helps them comprehend the history, learning the content.

5. Conclusions

The aim of this article was to present a draft model that uses transmedia storytelling and multimedia design to produce pedagogical contents (microcontents) for microtrainings, under the perspective of non-formal education and continued formation, in support to the actions of technology transfer, rural extension and technical assistance

developed by Embrapa and partner institutions.

For this purpose, two analytic paths were developed: 1) the concept of transmediatic narrative was linked to the processes of education with the aim of creating the conceptual framework to base the proposed model; 2) one discussed the pertinence of the adoption of the modality of non-formal education, under the perspective of continued formation, to attend the interests of Embrapa with regards to the TT actions, technical assistance and rural extension.

The proposed model gives evidence of its pertinence inasmuch as it recognizes that, beyond the TT, rural extension and technical assistance actions, there are educative processes, which unfold in the digital media and are able of contributing for the formation of knowledge and transformation of the reality. This perspective makes it possible to understand the model as an innovative proposal because it inserts the logics of transmediatic narratives to produce pedagogical intentionality. Therefore, the essence of the model is the production and the organization of technological contents that incorporate pedagogical paths, which favour learnings. Learning routes outlined in the production of narratives and in the organization of technological contents develop in the subjects involved in the microtraining: reflections, analysis, forethoughts and investigations about their practices, abilities, experiences and collective culture, helping them to re-signify the reality in which they are immerse and build new rationalities to deal with their problems.

Furthermore, the model brings in itself the merit of using mobile devices as a facilitating means to promote microtrainings of systematic and continuous character. The technological characteristics of these resources allied to the convergence of services, portability, wireless connectivity, multifunctionality and the capacity of access at any time and space facilitate and increase the interactions among the participants of microtrainings. This is a specially powerful advantage inasmuch as the digital Technologies favour the multiple use of the human cognition and create a set of concrete situations, which contribute for the learners to build new knowledges.

Although the proposed model is founded on a consistent theoretical construct and is rooted in the promotion of learnings in non-formal education contexts, it is necessary to overcome the challenge of implementing, testing and validating it.

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