Within the perspective of full inclusion, which recognizes diversity as an essential human principle, special education aims to find new ways and new teaching strategies to support the teaching-learning process and foster school achievement of all students. Transmedia digital storytelling, that is the narration supported by new technologies and distributed across different multimedia platforms, could be a possible didactic methodology to foster learning because it meets students’ cognitive styles and attitudes, increasing their participation and motivation and improving their different skills, allowing the effective personalization of the school curriculum. Starting from a review of the scientific literature that highlights the effective didactic value of transmedia digital storytelling also in the presence of special educational needs, the aim of the present theoretical study is to suggest a possible use of transmedia digital storytelling to support special teaching, in a pedagogical perspective oriented to create personalized pathways targeted to widen students’ cognitive potential in the full respect of their cognitive learning styles. Specifically, it has been suggested a specific transmedia digital storytelling architecture to experiment in school settings to avoid the dangers of the cognitive load.

KEYWORDS: Special Education, Inclusion, Transmedia Digital Storytelling, Cognitive Styles.
Introduction

The proposal of full inclusion adopted by the Italian school system leads to recognize the value of diversity as an inescapable element of a society embracing and valuing the singularity as a universal human principle. This perspective has led to adopt didactic-educational choices to facilitate the formative success for one and all through open classwork, also in small groups, using peer tutoring or cooperative learning strategies, together with a series of activities to foster metacognition. Presently special didactics is enriched by new modalities of knowledge construction which meet the differences and the natural inclinations of pupils, without leaving behind students with special educational needs and considering the individual cognitive styles.

Human beings have different learning styles. Each subject has a way to access information through a specific sensory canal. Some can assimilate received information in a visual way, others through the auditory canal or through the kinesthetic one. Cognitive styles refer to the choice of cognitive strategies used to solve a problem or a task and have to be considered as preferences in the use of one’s own abilities (Messick, 1984). Many theories and studies affirm that students learn more easily when their learning styles match the teaching style (Bajraktarevic, Hall, & Fullick, 2003; Felder & Silverman, 1988; Graf, Lan, Liu, & Kinshuk, 2009; Hayes & Allinson, 1996). Felder and Silverman (1988) put in evidence that students with a strong preference for a specific learning style have difficulties when this style is not supported by the teaching-learning environment. This clash may lead to school failure.

Indeed, it has been shown that if the teaching style matches the learning style during the process of knowledge acquisition, learning becomes easier and more natural, the results improve and the learning time is reduced (Rose, 1998). Dunn’s studies (1989) already evidenced the importance of teaching using methods that match students’ conceptual attitudes. Moreover, Cabrero’s research (2006) showed how teaching strategies can affect even the quality of the teaching action, not only from an individual point of view, but also from the collaborative perspective of the entire group. Clark, Hosticka, Schriver, and Bedell (2002) confirmed that the didactic action, which is key for learning, should organize contents in relation to students’ cognitive styles, in order to achieve teaching objectives.

To promote learning in the most effective way, also teachers should know and explore their own cognitive and learning styles, to become aware of their preferences. The choice of their teaching strategy should then be oriented to facilitate students’ reflection to identify their own cognitive and learning styles to valorize individual differences which can become strong points upon which to act (Stella, 2011).

In the context of a society characterized by the evolution of technologies and by the increasing possibility to use a great number of electronic media, the idea to match technological tools with adequate teaching and learning styles has been explored since the end of the nineties. There are lots of studies which document the effectiveness of the combination of multimedia and hypermedia with learning styles within the educational systems (Najjar, 1996; Liao, 1999). These studies aim to associate the specific characteristics of e-media to the different categories of learners and propose tools and methods for the assessment of learning styles.
Most of these studies are based on the Inventory Learning Styles (ILS) in Kolb (Kolb, 1984) and on the Index of Learning Styles (ILS) elaborated by Soloman and Felder (Soloman & Felder, 1993). Moreover, the creation of a multimedia didactic environment, open to the expression of individual learning modalities, is necessary in all those learning situations where the relation between cognitive and affective-relational domains has to be increased. Such situations include: (a) when different forms of intelligence and specific operational characteristics have to be increased in value; (b) when we decide to interpret knowledge as a process to share and to transform and not as a given and unalterable datum (Ascione et al., 2012).

Much research in the educational field confirm the importance of considering the way in which someone acquire knowledge particularly in special education, showing that cognitive styles have a predictive power as regards the school achievement, overcoming abilities and initial prerequisites (Sternberg & Zhang, 2001). To meet students’ needs it’s clear that the use of a variety of educational strategies has to be included in the formative process, in order to support students who are considered gifted/talented as well as those who have a difficulty or disability that affects learning (Banister et al., 2005).

In recent years, the acknowledged didactic value of transmedia digital storytelling has created all the premises to start a series of research work even in the special didactics field, being an effective tool to elaborate knowledge and to equip special needs students with the necessary skills. For example, an experimental study conducted by Sansosti, Powell-Smith and Kincaid (2004) has underlined that the use of digital stories can provoke positive effects on children with autism, revealing itself as a didactic tool with a high effective potential.

As concerns sensory disabilities, instead, research show how the use of sound in digital narration allows children with visual impairments or with reading difficulties to access to multimedia stories autonomously (More, 2008). Furthermore, the results of a pilot study conducted using storytelling and digital media with children involved in programs of special didactics (Botturi et al., 2010) confirmed their high degree of participation, as a pre-condition for learning. These children, indeed, experienced the possibility to express themselves in different ways and to be protagonists of a multimedia story which allowed them to interact with the external world, creating the basis for the integration through relation and learning.

Starting from this review of literature it could be advisable to propose in school setting teaching-learning strategies to support special didactics, in a pedagogical perspective oriented to the individuation and realization of suitable didactic tools which can foster personalized pathways, enlarging students’ cognitive potential in the full respect of their cognitive styles and supporting the learning process. Within this perspective, transmedia storytelling can be thus considered as a strategy since it authentically meets the students’ different cognitive styles and their different educational needs, allowing to operate deviations (Berthoz, 2009; Sibilio, 2013) to organize learning process in an individualized way. At the same time, however, transmedia storytelling makes the acquisition of knowledge more effective, by offering the opportunity to use a wide range of media tools able to support the different cognitive styles in learning process.
1. Didactic Potential of Transmedia Digital Storytelling

Narration is the first interpretative and cognitive tool that man, as a socially and culturally situated subject, experiences in his life (Bruner, 1986, 1990). Through narration man gives sense and meaning to his experience, generating a lot of interpretative coordinates of events, actions and situations where he then builds forms of knowledge which orient him in his acting. The aspect that characterizes human experiences is, indeed, the re-elaboration of narrative thought within a knowledge which is functional for living in a socio-cultural context that can be interpreted and gain meaning only if located within a cognitive and experience-related (personal and collective) continuum. Through narrative thought, man can generate a complex network of events and situations, using stories and putting in relation experiences in the form of a tale, actualizing them and making them object of possible interpretations and processes of elaboration, interpretation, comprehension, and construction of experiences. These are then actualized in a specific context, making them meaningful, inscribing them within a network of culturally-shared meanings, thus giving them continuity and unity (Striano, 2008). Hence, each narrative continuum gains a united meaning inside the experience of a person. This is known as “narrative unity” (Connelly, Clandinin, 1997, 2000). Therefore, knowledge goes through narration and it’s not surprising that this word derives from the Sanskrit word *jn~a:na* which means exactly knowledge. In this perspective, storytelling, that is the narration of stories, takes on a leading role in processes oriented to the acquisition of knowledge. In particular, the formative value of storytelling was and still is an object of study and research in the didactic-pedagogical field, becoming a tool for promoting learning.

In this sense, storytelling gains a main role in the reflective learning process (Maturana et al. 1987) and in participative activities (Petrucco & De Rossi, 2009), because it’s able to enhance the capacity of making hypothesis and symbolic projection of students (Jenkins, 2010).

The narrative approach in didactics facilitates moreover the integrated use in the different dimensions of intelligence, in particular those related to linguistic, interpersonal and intrapersonal intelligence (Gardner, 1999).

Some studies have highlighted the experience-related aspect of storytelling as a vehicle of socio-cultural contents, which generate a learning process that is situated and active (Mc Drury & Alterio, 2003), through the use of techniques such as the role-playing and the problem-solving, where intentionality, conceived as a motivating element, awards meaning to the learning process (Jonassen, 2000).

As a result of the evidence of the effectiveness of storytelling in teaching-learning processes during the last years the digital component has actualized and enlarged the didactic potential, thanks to the inevitable progress of new technologies and of the digital and interactive era which characterizes the contemporary society. Digital storytelling is thus every combination of narration with images, sounds and new technologies which allow the sharing of the story.

The concept of digital storytelling was developed in the Nineties at the Center for Digital Storytelling in California, where Joe Lambert (1994), the director of the Center, after a multimedia theatrical project began to develop and spread digital storytelling. Lambert focuses his attention on the personal interpretative dimen-
sion, emphasized in relation to other persons, to a place, to an interest or to everything that can give a personal touch to the story, in order to activate the emotional and empathic component of the digital story user.

The meta-cognitive and generating meaning potential of narration associated to the digital element, indeed, acts on the perceptive elaboration making the reflection and the subjective interpretation of reality more concrete.

The creation of digital stories, together with their fruition, fosters participation and attention, becoming an effective way to meaningful knowledge construction, even through the contextualization of the narrated contents.

The narrative ability of man is also given by his necessity to remember events and experiences. Lambert believes that digital stories support our mind and that “Stories are the large and small instruments of meaning, of explanation, that we store in our memories” (Lambert, 2003, p.1).

Digital storytelling is thus a tool for supporting thought in its cognitive articulations, enlarging the same potentialities of the language faculty thanks to different symbolic contributions which can intervene when language is not sufficient, offering nuances, explanations or analysis of the narrated story, giving shape to a new complex text created by a multimedia cooperation (Lutas, 2011).

The didactic value of digital storytelling is thus traceable in the capacity of fostering cognitive processes, increasing the motivation to learn, activating memory and allowing those who learn to hold the learned information and to develop the interaction among students (Bruner, 1996; Zull, 2002) with the following improvement of the school performance of students (Schank, 1990).

During these years, in the wake of the studies which have underlined the positive effect of digital storytelling on knowledge construction and on the motivational aspect of learning, a specific field of research has been developed concerning its didactic value.

Burmark (2004) reported that digital storytelling is an effective approach to help students in gathering information, creating new ideas and organizing their knowledge, hence improving the comprehension of the contents to learn.

Robin (2008) put in evidence that digital storytelling engages students in the discussion of the themes narrated in the story and helps them to organize their concepts in a more structured and understandable way.

Lowenthal and Dunlap (2010) developed a Community of Inquiry based on the approach of digital storytelling to give teachers and students a means of communication and sharing of knowledge in Internet.

These studies supported the use of digital storytelling in educational and school contexts. For example, Emily N. Skinner and Margaret C. Hagood of the Charleston College proposed the use of digital storytelling to develop literary identities with English language students (Skinner e Hagood, 2008), indicating it as “a venue for helping English language learners to acquire more than just English as a second language, foundational literacies or informational technologies skills, but also to use English to make sense of their lives as inclusive of intersecting cultural identities and literacies” (Skinner & Hagood, 2008, p.29).

Other studies stressed how digital storytelling can become a tool to integrate traditional literacies with contemporary literacies (Gregori-Signes, 2008).

Bran (2010) suggested that digital storytelling, thanks to the combination of images, sounds and texts, can contribute to catch the eye of students and allows their school achievement.
In this perspective, digital storytelling represents an alternative valid didactic strategy which offers a great support to learning, involving students in “situations” and engaging them in the activities of problem solving and decision making, supporting processes of meaning construction and of interpretations of events and experiences (Wakefield et al., 2013).

As a result, the use of the digital element has facilitated the passage from monomediality, which characterizes the traditional narrative form, to multimediality, which, “is semiotically built on the combination of a multiplicity of codes and languages (written and oral words, sounds, images)” (Rivoltella, 2008, p.203), allowing integration and interaction on a sensory, linguistic and technological level among word, sound and image, facilitating the management of new communicative channels.

In this way, the written and oral forms of traditional narration overcome their sequential, linear and closed nature (typical of press and books) and enter the realm of hypertextual narration, constituted by a reticular structure, open and flexible, able to create relations and links between texts, images and sounds (Diaz Noci, 2003), offering different didactic opportunities.

Through the involvement of other perceptive channels and of different cognitive capacities, this new process of narrative and thought construction, thus increase the human sensory system (De Kerckhove, 1999) and becomes an imitation of human reasoning process because it proceeds with the association of ideas (Garcia de Torres, Pou Amerigo, 2003), endorsing the selective function of the brain, which allows to distinguish and select the information offered by digital narration, stimulating new forms of reasoning, as making inferences. The high degree of participation reached by students represents the main change caused by digital media. Jenkins, indeed, talks about participatory culture to indicate the overcoming of the user’s passive reception of messages and contents, students in the case of didactics, towards more collaborative and co-constructive processes for the production of new meanings (Jenkins, 2006).

Another component which can contribute to the didactic value of storytelling is the transmediality. Transmedia stories “are stories told across multiple media” (Jenkins, et al., 2006, p. 46). Characterizing element of this narrative style is therefore the development of a single story through narrative objects of various nature. Hence, transmedia story telling is “a particular narrative structure that expands through both different languages (verbal, iconic etc.) and media (cinema, comics, television, video games, etc.). It is not just an adaptation from one media to another” (Scolari, 2009, p.587) and, in this context, “Transmedia story telling “can be seen as a new dimension of the multimodal discourse”(Scolari, 2009, p.589). Narrative structure of this kind are commonly found in brands such as “Pokemon”, “Matrix”, “Marvel”, “DC Comics” etc. The narrative universe of the brand “Matrix” integrates, for example, “multiple texts to create a narrative so large that it cannot be contained within a single medium” (Jenkins, 2006, p. 95).

In this sense, transmedia stories do not necessarily imply the use of digital narrative objects (for example, the story may develop through narrative objects and textual narrative objects based on images, without making use of digital technologies). Therefore, it will be used herein the locution “trans-media digital storytelling” to refer to the narration of stories that involve the development of a narrative universe through digital narrative objects (video, video games, audio).
From this point of view the digital trans-media storytelling is understood as a subset of the larger concept of trans-media storytelling. Transmedia thus tends to the creation of an augmented narrative (Jenkins, 2007) which implements narrative pedagogy through the creation of interactive story-worlds able to sustain student’s engagement and the development of concepts and skills related to different disciplinary domains, its didactic implication is a fundamental element of the current pedagogical reflection (Scolari, 2009; Pence, 2011; Teske & Horstman, 2012).

2. Suggestions for Special Teaching

Considering the outlined characteristics of transmedia digital storytelling, it appears as a potentially effective teaching tool that can increase the engagement of students, making each student an active participant of his/her own educational pathway through processes that require to build and manage the representation of the narrative universe of the story “told”.

The peculiar type of a narrative structure, however, would require the users to master all the media used in the “story” regardless of their own cognitive characteristics.

For example, analyzing the structure of the narrative universe of the brand “Matrix” proposed by Jenkins (2006), it is clear that, since this is spread across three movies, an animation movie, some comic books and videogames, the user must reconstruct the story, collecting, integrating and unifying information from media of different nature.

Therefore it would seem that, in order to have a full understanding of the narrative universe, the student is required to master many different kind of media regardless of his/her cognitive preferences and to adapt his/her own cognitive style to all the media that will be implemented in it. This would make some contents inaccessible to those who need special answers to their educational needs because of their specific cognitive characteristics. For example, a user with reading deficits could not use the media of the “cartoon”, so giving up a full understanding of the story.

To personalize the educational pathways and to overcome these problems, teachers are required to structure narrative universes in a modular way so that each section of the story will be exhaustively enjoyed through narrative objects based on different media but designed to convey the same contents. In this way, interacting only with the most proper media, users may follow a pathway suited to their cognitive style.

In this way, trans-media digital storytelling could be experimented as an effective tool for special teaching aimed at identifying appropriate strategies able to meet the cognitive styles of users, without incurring in the “effect of redundancy” which, according to the theory of the cognitive load (Sweller et al., 1985; Paas et al., 1993), postulates that learning worsens if the student has to process simultaneously multiple sources of information that have the same content (Landriscina, 2012).

From this perspective, the structure of digital transmedia storytelling, characterized by the presence of narrative objects of different nature, seems to be the
natural result of a teaching planning which takes into account the individual differences, curbing at the same time the dangers of the cognitive load. Suppose, for example, to tell a story divided into 7 narrative objects (figure 1), the integration of these objects will form the narrative universe, while the individual objects will contain only part of the information.

By providing different versions, both multimedia and not, of any single narrative object so that it can be enjoyed through various media (text, video, audio, images), the users may only follow a path of enjoyment suited to their own cognitive style, interacting with the most appropriate media. In addition, a structure of this type would allow students to trace back the narrative process several times from different perspectives, gradually bringing them closer to the different media used and allowing them to appreciate and understand the specific literacy.

It is not the simple enjoyment of the same content found in multiple media, but rather, the ability to appreciate how the use of different media may change the unitary perception of the story and how they talk to each other in different ways according the route of use below.

![Figure 1](image.png)

**Conclusions**

In summary, transmedia digital storytelling seems to be a proper teaching strategy for special education because it can engage actively all students in adequate didactic environments that meet the students’ needs, stimulating their interest and their active participation during the construction of knowledge. In light of this conceptual scenario, it leads to the creation of an environment where educational experiences take place through the research and the exploration, activating playful learning strategies by situated problems and needs and by shared objectives (Varisco, 1999; Rivoltella, 2003).

The multiform and multimodal nature of the digital and transmedia elements, together with the evocative power of the narration, make transmedia digital storytelling a didactic tool able to meet the different cognitive styles of students,
requiring at the same time teachers’ competence to structure its architecture in order to be really suitable for those students who have specific cognitive preferences.

References


