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## **DIGITAL STORYTELLING IN MUSEUM EDUCATION CONTEXT: HOW TO PROMOTE CRITICAL THINKING SKILLS THROUGH DIGITAL TOOLS WITHIN SECONDARY SCHOOL PUPILS**

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### **Abstract**

The present paper aims to analyse the use of Digital Storytelling (DST) methodology in museum education context for the development of Critical Thinking (CT) skills within secondary school pupils. Starting from a brief literature review about CT promotion and cultural heritage education, an overview of active learning methodologies used in museum education for CT development is introduced. Moreover, the paper presents the first data obtained from a quasi-experiment carried out at the Galleria Lapidaria in the Capitolini Museums in Rome, which is focused on the use of DST for the promotion of CT skills for secondary school pupils within an integrated formal and informal education path.

### **Critical thinking and Heritage Education**

Given the inclusion of Critical Thinking (CT) as a fundamental transverse competence for the cognitive and personal growth of the learner and the contemporary citizen (Dewey, 1910; OECD, 2005; P21, 2007; Trilling & Fadel, 2009, Griffin et al., 2012; Poce, 2018), formal and informal education has become interested in the definition of strategy, methodologies, experiences and tools useful for the above-mentioned competence, developing, also, diversified and interdisciplinary forms and learning experiences within different education contexts. For some years, heritage education, in particular museum education, has implemented a series of empirical experiences in which the work of art has been placed at the centre of sensory and intellectual experiences aimed at soliciting analysis, reflection, interpretation, both individual and group, skills as well as personal and creative reinterpretation.

The relationship between humanist and artistic culture and the promotion CT skills in formal education is well discussed by Martha Nussbaum in her work *Not for profit: Why Democracy Needs the Humanities* (2010). The interference of the economic profit in the field of education has led, according to the author, to a scientific shift in the educational

paths of the globalized world, which identify in the development of technical-scientific knowledge and skills the most important tool to technological, economic, and social development. On the contrary, the strong limitation in the educational field of humanist culture hinders social development, especially in a democratic sense: “intellectual capacities for reflection and critical thinking are fundamental to keep democracies alive and well” and to allow them to “face, in a responsible way, the problems that await citizens as parts of an interdependent world” (Nussbaum, 2010; pp.42-43). The emphasis in Nussbaum’s study on the connection between the education of the critical citizen and the enjoyment of the arts, literature, and music, defined as essential in any educational system, consolidates the relationship between individual’s well-being and humanist education and determines its urgency from a pedagogical point of view.

The literature on the promotion of CT skills in museum education contexts confirms how museums are to be considered as places of learning suitable for the acquisition of knowledge in a critical way, “because they seem to be places that naturally encourage people to do the kind of things that characterize constructivist learning theory: explore and discover their own interests, interact with numerous stimuli and use their background and previous knowledge as explicit reference frameworks for building knowledge” (Tishman et al., 2007; p.3). The museum and the works of art have an impact on the pupils’ cognitive capacities for reflection, as well as on their affective abilities (Terrassa et al., 2016; p.13): the aesthetic experience allows for continuous and reasoned reflection, comparative analysis of information, construction of solutions to complex problems. The relationship with a new museum object activates knowledge already acquired in order to interact with it and build reasoned and as correct inferences as possible (Ritchhart, 2007).

In the field of museum education, the promotion of CT is often link to the promotion of creative thinking (Foley, 2014), although the differences between the two constructs are still substantial: the imaginative and the unexpected are the prerogative of creative thinking, logic, rationality and analysis are typical characteristics of CT (Forrester, 2008). Encouraging the development of CT can prevent the user from being manipulated, thus allowing his/her intellectual independence and the development of creativity and innovation (Browne & Keely, 1993; Mayfield, 1997; Paul, 1995).

Although the definitions of CT used in museum education contexts are different, artistic education and cultural heritage education agree on the need to promote these skills both through activities aimed at a specific audience and by generally stressing their function within the educational role of museums (Smith, 2007).

## **Effective learning methodologies for CT promotion through museum objects**

In the museum context, the learning methodologies defined more congruent with the new idea of transverse skills promotion, especially CT, are those concerning interactivity, both in terms of relationship with the object (hands-on methodology) and with other users (cooperative learning) (Macdonald, 2006; p.322). Marstine (2006) states how the changes in the design of educational paths in museums have led to the new definition of the visitors' experience, now describable in social, immersive and participatory terms: "In educational terms, all this indicates the objective of creating a space for participatory experience, which can lead to moments of self-realization by the visitor" (Marstine, 2006; p.135).

Since Willingham's definition (2008), for which CT implies "thinking in a detached way, demanding that statements be supported by evidence" and also "seeing all parts of a problem and being open to new evidence that does not confirm one's ideas" (p.21), museum and heritage education experiences highlight the need to use discussion groups to improve important cognitive skills, such as interpretation, comparison between different points of view and information, reflections review (Terrassa et al., 2016; p.23). The detailed planning of the educational experience, especially if aimed at promoting reflection and analysis skills, is essential in an educational environment that, not being the traditional classroom environment, could lead to a series of problems, especially logistical ones (Behrendt & Franklin, 2014).

Hands-on and Object Based Learning (OBL) are particularly effective for the promotion of CT skills, especially in artistic and cultural heritage contexts (Hubard, 2011). In the last two decades, OBL has been widely used as a learning strategy from secondary school to adult education contexts (Wiley, 2000; Paris, 2002; Lane & Wallace 2007). However, as Poce (2018) points out, even in primary education, hands-on object manipulation is quite widespread, despite numerous studies demonstrating its efficacy, especially in terms of deeper knowledge acquisition (Triona et al., 2005, Kroutiris-Litowitz, 2008).

A further learning strategy defined effective by the literature in the field is Visual thinking (VT), linked to group discussion activities and Inquiry-based learning approach (Hubard, 2011). Although generally associated with STEM education (Audet & Jordan, 2005), Inquiry-based learning allows pupils to get involved in the discovery and construction of new knowledge, promoting a range of cognitive skills and mental dispositions that support this acquisition. Teachers and museum educators promote a critical observation of the museum object, asking pupils to dwell on certain details, to make inferences and to arrive at interpretations, thus promoting VT. Housen showed that the use of VT for CT promotion is associated with creative and aesthetic thinking development (Housen, 2001).

## **Digital Storytelling in Museum Education Context: How to Promote Critical Thinking Skills through Digital Tools within Secondary School Pupils**

Storytelling can also be an excellent strategy for promoting CT in cultural heritage education context: works of art, such as paintings and sculptures, can be defined as tools through which the artist has deployed his need to recount events and emotions. Storytelling pedagogy places communication at the centre of the educational process: the understanding of messages of different genres and complexity takes place using various languages (verbal, symbolic) and through different media (paper, computer and multimedia). From these assumptions, the classic action of storytelling has further developed into an innovative learning strategy, Digital Storytelling (Meadows, 2003), which involves the creation of a story through technological tools. The methodology of Storytelling foresees a close relationship with the museum object that supports the motivation of pupils participating in learning (Grever et al., 2012). The involvement of the museum users is long-term, whether the museum is narrated directly (Storytelling about the museum), indirectly (Storytelling about a museum object or collection) or participatory (Storytelling created by a group of visitors and entered into the museum display).

Starting from these assumptions, the following paragraph will present the research questions, methodologies and results of a part of the research project *Nomina sunt consequentia rerum* which has seen the realization of Digital Storytelling activities to encourage the stimulation of CT and creativity within the context of Galleria Lapidaria of Capitolini Museums in Rome.

### **The quasi-experiment “*Nomina sunt consequentia rerum*” and the realization of Digital Storytelling products**

#### ***Research questions and methodology***

The project *Nomina sunt consequentia rerum* was designed and realized for secondary schools pupils who are not studying the Latin language as part of their educational path. It has been defined by starting from the particular characterization of the Latin inscriptions: the combination of artistic, historical and textual values contained in the epigraph makes this object potentially effective for the promotion of CT. The quasi-experiment was conceived starting from the following research questions:

- Can CT be developed in an epigraphic museum context?
- Does contact with the Latin inscription facilitate the promotion of language skills, analysis and reflection?
- Can active learning methodologies support the acquisition of Latin inscription knowledge and the promotion of CT skills?

Two upper secondary schools in the province of Rome participated in the experimentation, including a total of 144 pupils. This group was then split with 86 pupils participating in the

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empirical activities and 58 pupils taking part in the control group. Part of the experiment was carried out at the Lapidary Gallery in the Capitolini Museums in Rome, where the experimental classes participated in educational activities on site aimed at the interpretation of selected Latin inscriptions.

The educational path for the promotion of CT skills has been constructed on three main activities:

- a first meeting, realized at school, using the methodology of VT and deploying inductive and cooperative learning strategies, placed the pupils in relation to Latin inscriptions;
- a second meeting, at the Lapidary Gallery of the Capitolini Museums, was carried on through OBL methodology, thus developing activities of reading, analysis and interpretation of selected Latin inscriptions;
- a third meeting, which took place at school, was defined as a mini-workshop of DST and was addressed to collaboratively realize a digital storytelling video.

More specifically, during the third meeting, the pupils, divided into groups, selected one of the Latin inscriptions analysed during the museum-based activities. The inscriptions were made available to the pupils through a shared Google Drive folder: the pictures of the inscriptions were accompanied by the transcription of the Latin text and its translation into Italian. The pupils were also provided with a *Storyboard template* in which they wrote the collaborative creative narrative. Depending on the digital tools provided by the schools, the pupils' groups wrote on digital support (tablets) or paper. The choice to create a mini workshop on DST is aimed at promoting pupils' CT skills, as well as soliciting other transverse skills associated with the activity, such as communication, through different types of support (digital and paper), creativity, through the creative narrative writing activity, and collaboration, given the group activity (see Liguori & Bakewell, 2019).

In total, 13 short stories and 13 DST videos were realized within the project. Participating pupils showed great interest in the activity, finishing the task in time and producing a video linked to the indications set out at the beginning of the task.

### ***DST evaluation tool***

The DST videos were evaluated through an evaluation grid designed ad hoc for the learning activity. The evaluation tool, adapted from the one presented in Poce (2015), is composed by eight different indicators for a maximum of 20 points in total, as follows.

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Table 7: The DST evaluation grid

Indicators	Descriptors	Scores
Relevance of the topic	Deep and reworked content development	High – 3
	Relevant and substantially content development	Average – 2
	Lack of relevance and/or content	Low – 1
Narrator and focus	The choice of the narrator is consistent with the structure of the story and focus	
	The use of focus and the choice of the narrator are not always consistent	High – 2 Average – 1
	The use of focus and the choice of the narrator are not consistent, the relationship between them is too confusing or wrong.	Low – 0
Structure	The structure of the story is clear, and the stages of narration have a purpose within the story.	
	The structure of the story is a bit chaotic but still defined in different stages.	High – 2 Average – 1
	The structure lacks definition, the phases are confused, and the purpose is unclear.	Low – 0
Setting	There is a description of the place, adequate and related to the content of the story.	
	The description of the place is not very definite and is poorly linked to the content of the story.	High – 2 Average – 1
	Within the story there is almost no description of the place in which the narrative takes place.	Low – 0
Characters	The characters are accurately described and their role in the story is well defined.	
	The characters are described fairly flat and evenly, without the right weight being given to their role.	High – 2 Average – 1
	The characters are almost totally lacking in description.	Low – 0
Form and expression	Always correct form and smooth propensity. Rich and functional language	
	Form and expression with some errors. Generic but rather functional language.	High – 3 Average – 2
	Numerous errors in morphology, syntax, punctuation, spelling; expression not fluent. Neglected and improper language.	Low – 1
Originality and creativity	Processes the topic with confidence, accuracy, high creativity and provides valid personal interpretations	
	The elaboration is essential and summary. It presents discrete elements of originality and creativity	High – 3 Average – 2
	Lacks originality, creativity and reworkability.	Low – 1
Quality of digital production	The sounds, images and video effects are of good quality, appropriate to the content of the elaborated story and consistent.	
	The sounds, images and video effects are sometimes randomly inconsistent with the text or not very functional for use.	High – 3 Average – 2
	Sounds, images, and video effects do not support the enjoyment of digital production and/or are inconsistent	Low – 1

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All the videos (No. 13) made by the groups of pupils participating in the empirical activities of the project were evaluated using the above grid by one external evaluator.

### Analysis and results

From a first data analysis, all the evaluation indicators reach or exceed the sufficiency score for each digital product realized. The central trend measurements of the 8 indicators show a position of the mode, mean and median scores at the top of the distribution and a presence of the standard deviation contained or absent.

Table 2: Central trend measures of evaluation indicators

	Relevance	Narrator and focus	Structure	Setting	Characters	Form and expression	Originality and creativity	Quality of digital production
Mode	2.62	2.00	1.69	2.00	1.62	2.46	2.92	2.69
Mean	3	2	2	2	2	2	3	3
Median	3	2	2	2	2	2	3	3
Dev.St.	0.51	0.00	0.48	0.00	0.51	0.52	0.28	0.48

The frequencies of high scores tend to be higher than those of medium scores. No low scores at all: this data confirms a satisfactory achievement of the objectives by the pupils in terms of consistency, digital processing, use of the language and personal interpretation of DST video. The content macro-indicator sees high scores assigned to all the papers evaluated in relation to *Setting* and *Narrator and Focus* indicators. The groups of pupils participating in the experiment have realized storyboards that are exhaustive from a narrative and content point of view, with particular attention to the key elements of the narrative.

### Conclusion

The definition, realization, evaluation and implementation of museum education paths aimed at stimulating transverse competences are currently some of the most urgent priorities in terms of Lifelong learning promotion through heritage. The realization of the quasi-experiment *Nomina sunt consequentia rerum* is aimed at identifying learning strategies, tools and methodologies effective in terms of Latin inscriptions understanding for CT development within secondary school pupils. The mediation of museum objects that are complex from the point of view of content and interpretation is also a contemporary challenge, because of the solicitation of skills and dispositions that are pivotal in the complex globalized world in which secondary school pupils operate.

The first results from the DST workshop carried out within the research demonstrated the activity was generally successful: pupils were able to combine elements of creative storytelling, linguistic expression and digital tools and realize DST videos. Participating pupils showed that they were able to interpret the information linked to Latin inscriptions

in an critical and original way, elaborating accurate and coherent narrative texts. The achievement of these results in a collaborative way underlines the effectiveness of DST methodology for the group re-elaboration of artistic and cultural heritage, supporting the realization of a common and shared construction of new interpretations of museum objects. Data analyses highlight that pupils' CT skills was solicited through DST activity also within the Lapidary Gallery in the Capitolini Museums in Rome: the mediation of Latin inscriptions contents through specific active learning methodologies facilitated analysis, reflection and language skills within not-specialized users, together with collaboration and creativity.

Although, given the project characteristics and evaluation methods, generalizations are not possible: the research results suggest the need for more experimentation in the field of CT development within heritage education context, in order to promote and stimulate transverse competences, knowledge and skills, which could be used in different educational contexts and for different category of users.

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