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Promoting Geographical Competences in Primary School through Active Learning and Digital Storytelling. Results of a Study from Genoa, Italy

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Abstract

In this contribution, the role of active learning and digital technologies, namely Digital Storytelling, in promoting geographical competences within primary school education is explored. A study is presented, conducted in the specific setting of a fourth-grade primary class in Genoa, a metropolitan city in the Italian region of Liguria, exemplifying the application of this educational approach. The theoretical foundations for this study encompass three key pillars: preserving the epistemological and content-based features of Geography in primary education, recognizing the value of pedagogical dimensions and strategies in developing geographical competences, and leveraging digital technologies, including non-specialized ones, to support the design of learning activities that employ innovative methods and exploit the potentials of narrative techniques. Within this framework, Digital Storytelling is critically evaluated for its capacity to stimulate fruitful learning dynamics, and to encourage the development of geographical, creative, and digital competences. The findings of the study highlighted that the active and creative use of Digital Storytelling markedly enriched Geography education. The implemented approach contributed enhance geographical competences related to pupils' understanding and articulation of their place in the world, while also fostering a positive attitude towards the subject.

1. Introduction

Geography holds a significant role in primary education, providing pupils with an understanding of their world, their connections to it, and their shared geographical space (Giorda, 2014). Over the past two decades, Geography education has undergone a substantial transformation, impacting not just teaching methods and conceptualization but also curricular structures and teacher training, extending its influence on the initial stages of

teacher education (Catling, 2004). This shift has led to a redefinition of the role of Geography educators, signifying its evolving stature in the realm of primary education (Martin, 2006).

Lambert et al. (2015) underscored enduring challenges facing Geography education, including the necessity to effectively express Geography's fundamental contribution to the education of all students. They also discussed the need to reconcile the differing approaches to Geography in educational settings and its research-oriented counterparts. With an aim to address these challenges, the authors emphasized the need for a universally accepted framework to communicate Geography's goals in schools, considering the substantial diversity in national standards and disciplinary affiliations.

In addition to this, Geography education also needs to prepare students to understand and respond to global challenges, such as climate change. A salient example of this can be found in Chang's (2017) study on Singapore's school Geography, which showcased the gradual and comprehensive learning approach applied to climate change education from primary to post-secondary levels. This integrated approach to Geography education underlines the crucial role that Geography plays in helping students comprehend and navigate an increasingly complex world.

The change of paradigm in Geography education is particularly noticeable in the realm of primary education, where some aspects of Geography's epistemology gained prominence. These included the conceptualization of Geography as a holistic discipline (Bouchat, 2009), the significance of maps and spatial thinking (Castellar and Juliasz, 2018; Juliasz and Castellar, 2019), the importance of fieldwork and observation methods, and the need for an interdisciplinary approach (Živković et al., 2017).

With reference to Italy, these changes resulted from a more extended overhaul of the general education system that impacted all subject areas. In the early stage of this process, Geography was redefined as the discipline studying the interaction between humans and the environment, thus moving beyond the traditional regional approach (Ministero della Pubblica Istruzione, 2004). It was later characterized as the science exploring the humanization of the planet, focusing on processes triggered by communities in their interaction with nature. This redefinition underscored the importance of an integrated, interdisciplinary approach to teaching (Ministero della Pubblica Istruzione, 2007).

This transformation in Geography has led to an active pedagogical approach, fostering student engagement with concepts and research-inquiry-based methods, as opposed to mere fact learning (De Vecchis and Staluppi, 2007). This trend of active and participatory learning has grown over the years (Ministero dell'Istruzione, dell'Università e della Ricerca, 2012 and 2018), emphasizing Geography's key role in nurturing essential citizenship skills such as environmental sustainability, conscious citizenship, and social cohesion.

Geography has become a critical interdisciplinary link between humanities and sciences. Notably, Pasquinelli d'Allegra (2017) advocated for Geography's contribution to the development of cross-disciplinary competencies, proposing a pedagogical approach that engages both teachers and students in a cyclical process covering cognitive, operational, and metacognitive stages.

Hence, the new perspective on Geography extends beyond considering it as a mere repository of facts. Instead, it is now promoted as an investigative field encouraging active student engagement with concepts, thereby fostering a more dynamic learning environment. This evolution spotlights the shift in Geography education towards a skills-based and active learning approach, positioning teachers as facilitators rather than mere providers of information.

Pasquinelli d'Allegra (2017) proposed a vertically aligned Geography curriculum, applicable from nursery school to higher levels, underpinned by principles like location, region, transcalary perspective, and human-environment interactions. She highlighted three key competencies for primary school students: recognizing and analyzing physical and human-made landscape elements; understanding

human-environment interactions and potential transformations; and acknowledging the negative impacts of these interactions and proposing protective measures. To actively cultivate these skills, she recommended methods like direct and indirect observation, problem-based learning, and role-playing games.

In such epistemological and pedagogical context, geographical competence is primarily linked to pupils' understanding and ability to deal with their geographical space in the world and is realized in its application to real-world contexts (Zanolin, 2019; Giorda and Zanolin, 2020). Thus, if finding one's place in the world is a geographical problem, this would be precisely demonstrated by the need to actively develop geographical competences to deal with it. As such, active learning methods assume a pivotal role in primary school Geography education, as already mentioned above.

From an instructional viewpoint, having a clear understanding of the epistemological level of Geography is a relevant step for primary teachers, as it helps them understand how to teach Geography in a way that is age-appropriate and engaging for young learners. Furthermore, such disciplinary conceptualization suggests a competency-based approach to Geography education rather than knowledge-based where this type of approach facilitates curriculum development for problems and meaningful learning (Caruso, 2015; Zanolin et al., 2017).

Drawing on this theoretical background, this paper presents the results of a study involving 20 fourth-grade pupils from a primary school in Genoa, a metropolitan city situated in the Liguria region of Northwestern Italy. The study incorporated Digital Storytelling (DST) as an active learning strategy to enhance the teaching and learning of Geography, thereby promoting geographical competences. More specifically, the main objective of this study was to develop basic geographical competences related to pupils' understanding and ability to deal with their geographical space in the world, as well as their ability to apply such knowledge to real-world contexts. Simultaneously, as the teaching intervention was based on DST, a sub-objective of this study was to promote DST competences at the dual level (i.e., creative competence and digital competence) among pupils.

2. Active learning and digital stories for Geography teaching

In educational settings, the adoption of various strategies to promote active learning among students is a subject of great interest. As stated in Manganello et al. (2019), active learning is grounded in constructivist learning and is tightly linked to learning through discovery and meaningful reception. With reference to Geography teaching and related topics, Jovanović et al. (2016) reported significant linear correlation of active learning strategies applied in the classroom with the intensity of study of environmental topics, as well as with the implementation of an interdisciplinary approach leading to the formation of students' conceptual and procedural knowledge.

In recent years, one active learning strategy gaining attention involves the use of DST, which entails creating engaging narratives that encourage student interaction in the learning process. Previous research, including studies conducted by Sadik (2008) and Mittiga (2018), has extensively explored the efficacy of DST in educational contexts. The findings from these investigations showcased students' exceptional performance in DST projects, meeting vital pedagogical and technical criteria. Despite encountering certain challenges, teachers demonstrated a positive inclination towards integrating DST into the curriculum.

Smeda et al. (2014) brought to light the powerful impact of DST as a tool for seamlessly embedding instructional messages into learning activities, leading to highly engaging and stimulating learning environments. This pedagogical approach paves the way for a constructivist learning setting, founded on novel principles of teaching and learning. As a result, it possesses the potential to significantly augment student engagement and ultimately yield enhanced educational outcomes for learners. In light of these findings, the study presented in this contribution aims to further explore the use of DST as a tool to promote active learning and enhance students' comprehension of curricular content.

In the context of Geography teaching, DST is a strategy that supports creativity, imagination, and a deep sense of connection and belonging to diverse geographic places, contributing significantly to students' comprehensive understanding of the world around them. A perspective that combines geography and literature, places and narratives, enables the capture of the expressive and evocative potential of the environment (Ogliari and Zanolin, 2017; Gavinelli and Zanolin, 2019; Ogliari and Zanolin, 2019). Giorda (2014) highlighted how the theme of connection with the places of one's life allows one to define a link between lived space and autobiography. In this sense, narratives make it possible to represent and describe this connection, thus triggering a mechanism of critical reflection and sharing.

Several researchers have delved into the use of DST in the context of primary school Geography teaching. Skavhaug and Andersen (2013) studied the use of digital stories as an adjunct to fieldwork activities. These activities encompassed the interpretation of maps and photographs, alongside the creation of digital stories in a computer lab. Grigoriou (2016) highlighted that incorporating digital stories in primary school Geography instruction could stimulate innovative pedagogical methods, nurture active learning, and aid in the development of attitudes and skills. Notably, in both studies, digital stories were produced using general-purpose tools like Microsoft Photo Story, Scratch, Alice, and JClic, rather than tools specifically designed for Geography education.

Similarly, a recent study by Ryan and Aasetre (2021) provided valuable insights into the integration of digital storytelling in Geography teaching and learning. The research revealed how digital stories enhance deep learning, encompassing understanding and creative knowledge application. The findings suggested the potential for fostering interactive and ethical learning outcomes in Geography. However, it should be worth mentioning that the study focused on higher education. The digital stories were created using the general-purpose tool Windows Movie Maker, not specifically designed for Geography education.

Other studies have explored the use of more "specialized" tools for enacting DST in Geography teaching. Marta and Osso (2015) explored the opportunities offered by storytelling with maps in Geography teaching using Story Maps by ESRI, reporting positive effects on students' motivation and learning processes. The same tool was also used in the context of a narrative approach to Geography teaching, with a focus on territorial storytelling and the city's cultural heritage (Mauro et al., 2021). Giannakou and Klonari (2019) investigated the influence of Story Maps implementation, highlighting its potential to enhance teaching methods and develop spatial and critical thinking, as well as inquiry skills among students. In a more recent study, Story Maps were used to prepare students for field courses (Cyvin et al., 2022). Another experience of using maps and storytelling in Geography teaching is reported by Zamperlin and Azzari (2017), where the ArcGIS Online platform allowed students to analytically reflect on their city through the guiding principles of the Smart City concept, thus synthesizing and displaying their newly acquired knowledge. It is worth noting that a common feature of all these experiences is that they target older students, typically secondary school students.

In Geography classrooms, DST activities conducted in an active learning context should begin by focusing on students' familiar living environment. The objective is to raise their awareness and broaden their perspectives. These DST activities, in various formats, can effectively foster the development of competences related to territories. This includes enhancing geospatial analysis skills and promoting environmental awareness on both local and global levels. Students can engage in creating digital journeys, envisioning educational outings, or creatively narrating stories about their own city and daily experiences, encouraging in-depth discussions and exploration.

Moreover, to produce appropriate DST activities with a geographical background, attention should be paid to the environmental and social characteristics when constructing individual stories. Depending on the age of the students, the message to be conveyed, or the objective to be pursued with related work, it is

crucial to know how to choose among different digital tools according to their characteristics. It is vital to choose digital tools that align with the desired learning outcomes and encompass the necessary skills, including digital literacy, to ensure effective implementation and engagement.

3. Methodology

As previously outlined, this study aimed to explore pupils' geographical understanding and competence through a DST project. The project involved collaborative expression of significant geographical aspects, with a focus on Genoa. Pupils engaged in spatial orientation, self-awareness of their living environment, and emotional involvement through dramatization, culminating in the creation of a cartoon-style digital story using the Animaker web platform. The study's theoretical foundation integrated three interconnected dimensions, as described below.

First, the epistemological dimension, which characterizes the didactics of Geography in the context of primary education, was defined in terms of both knowledge and competences. For this study, based on the teaching and learning context in which it took place, the focus was on activating pupils' awareness of the geographical places of their everyday reality, with the aim of collectively and collaboratively defining and representing the characteristics of their place in the world. In particular, the pupils were engaged by their teacher in an exploration of their city's territory, being able to critically reflect on the role of maps, locations, distances, and, more in general, spatial thinking.

Second, the pedagogical dimension that should offer guidance in the design of active learning pathways in the domain of Geography, was carefully designed by the teacher. In particular, the focus was on designing a set of learning activities ensuring that the pupils consciously practiced the required competences requested by the curriculum at that cycle of education. As such, the activities conducted with pupils during the study were aligned with the curricular program, and the activities were evaluated not only formatively, but also contributed to the summative evaluation at the end of the school year. Thus, a specific evaluation tool was defined (see Section 3.2.4).

Third, the technological dimension that should facilitate pupils not only in accessing the disciplinary knowledge of the subject, but also in developing a positive attitude toward it, was defined with a special focus on those aspects of geographical competences requiring some degree of fieldwork as well as indirect observation that cannot be easily practiced in a traditional classroom setting. To support the exploration of the city's territory and to practice mapping and spatial thinking, the pupils were asked to use digital iconographic tools appropriate for their level of expertise and knowledge. Specifically, they used digital photography and digital cartography, such as Google Maps, Google Earth, and Bing Maps. In addition, from the point of view of the digital skills required to create digital artifacts, the choice of the most appropriate tool (i.e., Animaker) was made by considering the opinions expressed by the pupils themselves.

3.1. Participants

This study employed a non-probabilistic convenience sample, which is frequently utilized when the implementation of probability sampling is unfeasible (Ary et al., 2010). This aligns with the real-world scenario of a classroom, such as the one in this study, where the sample comprised twenty pupils. This study, with its qualitative nature, emphasized in-depth data collection and analysis. Consequently, the selection of these 20 participants was optimal for gaining a comprehensive understanding of individual experiences and the impact of DST on competences. The size of this sample, common in educational research, reflects the constraints of authentic educational settings and supports a naturalistic and transformative research approach, thereby ensuring a balance between rich insight, practical implementation, and authenticity.

The class involved in this study was a fourth-grade group at the Istituto Comprensivo Barabino. The school was chosen due to its unique socio-demographic characteristics, being situated in Sampierdarena, one of the most

populous neighborhoods in Genoa. Since the early 2000s, this area has been characterized by a strong presence of foreign communities, particularly from South America, contributing to its rich cultural diversity. This socio-demographic backdrop is mirrored in the class composition. Out of the 20 students, eight had a migratory socio-cultural background, reflecting the diverse and multicultural nature of the community they belong to. Particularly, one newly-arrived student from Bangladesh did not speak Italian, and was receiving language assistance from a classmate, who was also of Bangladeshi descent but had been born and raised in Genoa, and was therefore proficient both in Italian and Bengali. Despite these challenges, and considering the absence of specific learning disabilities or special educational needs, the class represented a balanced and dynamic educational environment. In terms of gender distribution, the class consisted of 8 girls and 12 boys.

From a technological viewpoint, the class was already accustomed to working with technology, as the Italian teacher always ensured that the full potential of multimedia was exploited. In fact, learning activities integrating the use of tablets or computers have already been proposed so that from an early age, digital competence could be developed among pupils. Moreover, the school environment was equipped with excellent digital tools used throughout the various phases of the study, which facilitated its implementation.

3.2. Description of the activities

In this study, pupils engaged in a project that entailed creating a digital cartoon set in their city (i.e., Genoa), allowing them to integrate geographic knowledge with personal narratives. The output was a digital story highlighting significant local places, intertwining personal experiences, geographical skills, and digital competencies. The purpose was to enhance understanding of space, place, and environment, facilitating the development of real-world geographical competencies.

Activities were executed with each pupil utilizing a Chromebook, though a computer or tablet could serve as an alternative. The use of an Interactive Multimedia Whiteboard was incorporated when required. Due to logistical constraints of managing a large group, it was essential to establish a secondary classroom for asynchronous work, with groups of five students separated from the main class at each juncture. Regardless, activities were structured to ensure that all groups underwent every phase of the work.

The study's design aimed for a compact execution timeline of the intervention, maintaining a tight coherence across lessons. The project spanned a total of nine lessons over four weeks, with the final week, culminating in the ninth lesson, dedicated to evaluating the final product and discussing the pupils' learning experiences. The overall process of this study included the following three stages.

3.2.1. Step 1. Training session

During the initial lesson, the pupils were introduced to the project's objective: the creation of a cartoon set within their city. Before delving into the narrative aspects, they were introduced to various applications useful for creating such artifacts. Specifically, they explored Stop Motion Studios in the first lesson, and Animaker in the second. By the conclusion of the second lesson, the pupils found Animaker to be a more user-friendly tool. Its realistic graphics proved helpful in creating artifacts reminiscent of their favorite cartoons. Furthermore, the capability of Animaker to create characters from scratch by incorporating videos and images was deemed highly functional, thereby enhancing the artifact's relevance concerning the centrality of places and the pupils' character identification.

3.2.2. Step 2. Study and design of the DST

During the third lesson, the pupils, divided into pairs and each equipped with a Chromebook, were instructed to select two or three locations within their neighborhood or city that held particular significance for them. The places were then shared with digital posts on the Interactive Multimedia Whiteboard using Google Jamboard

(Figure 1). Through this activity, the pupils produced considerable insights into their own city, inevitably choosing their favorite places that they usually frequented. Particularly, this activity engaged the pupils, the pupils to critically analyze the places in their lives under the teacher's guidance. They explored questions such as: What are these places? Where are they located? What features do these locations have? Why are they significant? What memories are associated with these places?

After engaging in a guided discussion about the places they highlighted as relevant in their own lives, the pupils were divided into four groups of five each and asked to brainstorm to hypothesize an initial situation from which to construct an incipit to start the story. Each group presented their ideas, leading to a collective decision to create a digital story about a young girl newly moved to Genoa and beginning at their school. The lesson concluded with an assignment for the pupils to contemplate independently on the physical and personality traits of this young girl.

The fourth lesson centered on defining the characteristics of the main character, named Chiara, who was brought to life using Animaker on the Interactive Whiteboard based on the pupils' suggestions. Once again, the students, divided into four groups of five, started to shape a story that aligned with the locations previously discussed.

3.2.3. Step 3. Production of the DST with Animaker

As part of the fifth lesson, four sequences of the story were defined for which each group created a digital narrative, including the various dialogues. Specifically, the four scenes were: 1) Chiara arrives in town, goes to school, and meets Sara; 2) Chiara goes with Sara to get an ice cream at the ice cream shop near the city cathedral. Sara tells Chiara why she does not like her classmates; 3) Chiara wants Sara to be friends with her classmates again and tries the best strategies; 4) Chiara manages to convince Sara to go to a park near the school to play with her classmates and, in the end, Sara decides to be friends with her classmates again. These

scenes were designed and developed over the next three lessons.

Furthermore, from lessons five to eight, pupils had the opportunity to explore the story's locations using digital iconographic tools, including digital photographs taken by them or sourced from the Internet, along with digital mapping tools like Google Maps and Bing Maps. The integration of these tools, especially Bing Maps, offered a visualization combining orthogonal and 3D images, enabling students to reflect on the places from organizational and relational perspectives. This approach allowed them to delve into each element and context, facilitating a comprehensive understanding of the geographical spaces involved (De Vecchis and Pesaresi, 2011).

Using these basic geographical digital tools, the pupils were able to critically retrace the places in their living environment, create mental maps, orient themselves, and calculate distances and routes between one place and another. In particular, during scene two of the digital story, the pupils used Google Maps to calculate the distance between the school and two possible ice cream shops for Chiara and Sara. Upon measuring the distance on the map, they discovered that the first option was much farther away than anticipated, both on foot and by bus (Figure 2). Consequently, the pupils opted for the ice cream shop closer to the cathedral, which was in proximity to the school (Figure 3).

In the seventh and eighth lessons, the pupils focused on scene four of the digital story. First, the location to set this scene (i.e., the park near the school) was chosen because of the emotional value it held for the pupils, as it was considered to be the place that most of them recall outdoor fun (Figure 4). Moreover, by starting with a local analysis of the physical characteristics of the park, the pupils were able to expand their study to a general analysis of the city. In doing so, they noticed the park's continuous undulations, reflective of the city's development both longitudinally and vertically. This observation highlighted the value of individual comparisons that can bring to light details that may not be observed by a single person. Consequently, following the thoughtful collaborative discussion, some images obtained

from the internet were selected and then incorporated as "backgrounds" in the digital story, offering a stage for the characters to move within (Figure 5).

During the final lesson (lesson nine), the digital artifact was assembled and finalized and then presented to all pupils in a plenary session. In the final debriefing, the pupils reported that it was very interesting to reflect on places belonging to their own city and, more importantly, to create a cartoon set in their own reality of life. They also considered it very useful to use Google Maps to get somewhere without knowing the way.

Figure 1. Google Jamboard created by the pupils during the third lesson.

Figure 2. The pupils using Google Maps to calculate the distance between the school and the first possible ice cream shop for Chiara and Sara to go, which turned out to be much farther than they thought. Photo: M. Rampulla.
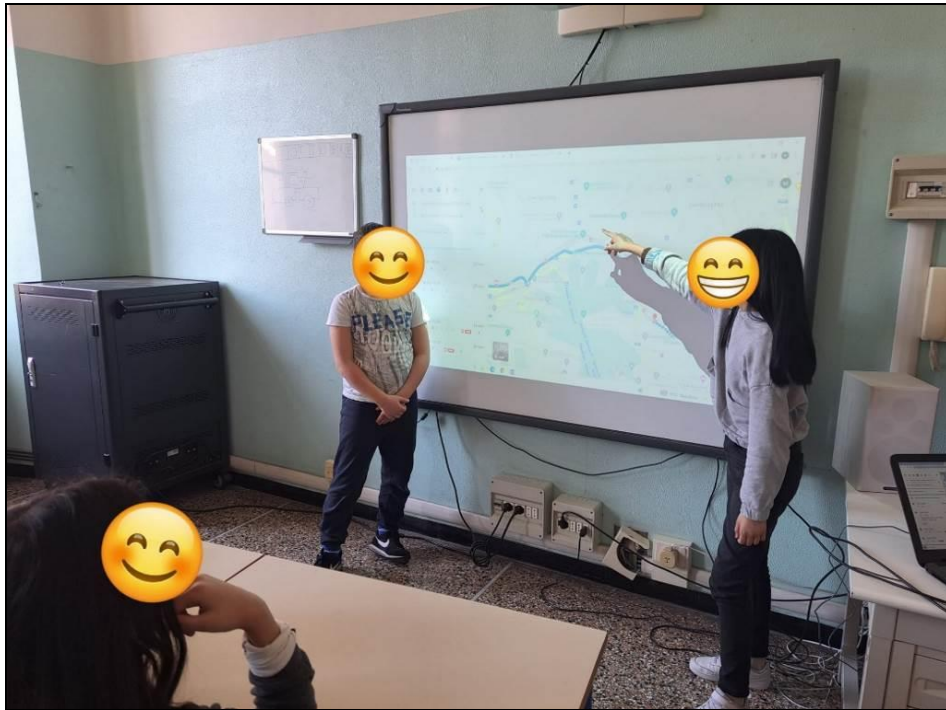
Figure 3. The pupils using Google Maps to calculate the distance between the school and the second ice cream shop for Chiara and Sara to go, closer to the school. Photo: M. Rampulla.
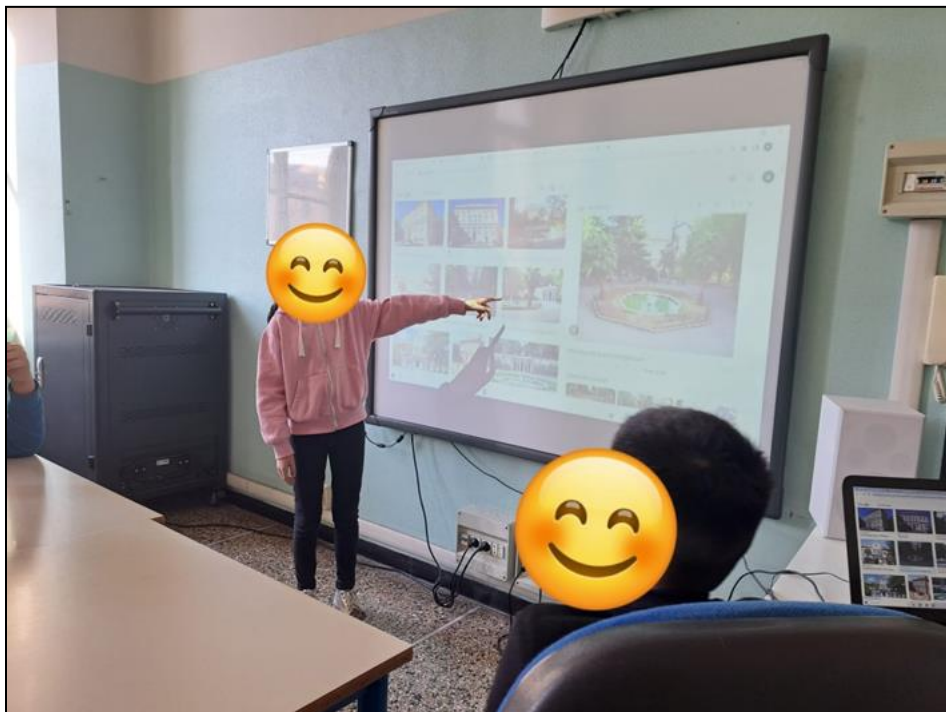

Figure 4. The pupils viewing some digital photographs of the park near the school to select the ones they thought best represented it according to their personal experience. Photo: M. Rampulla.
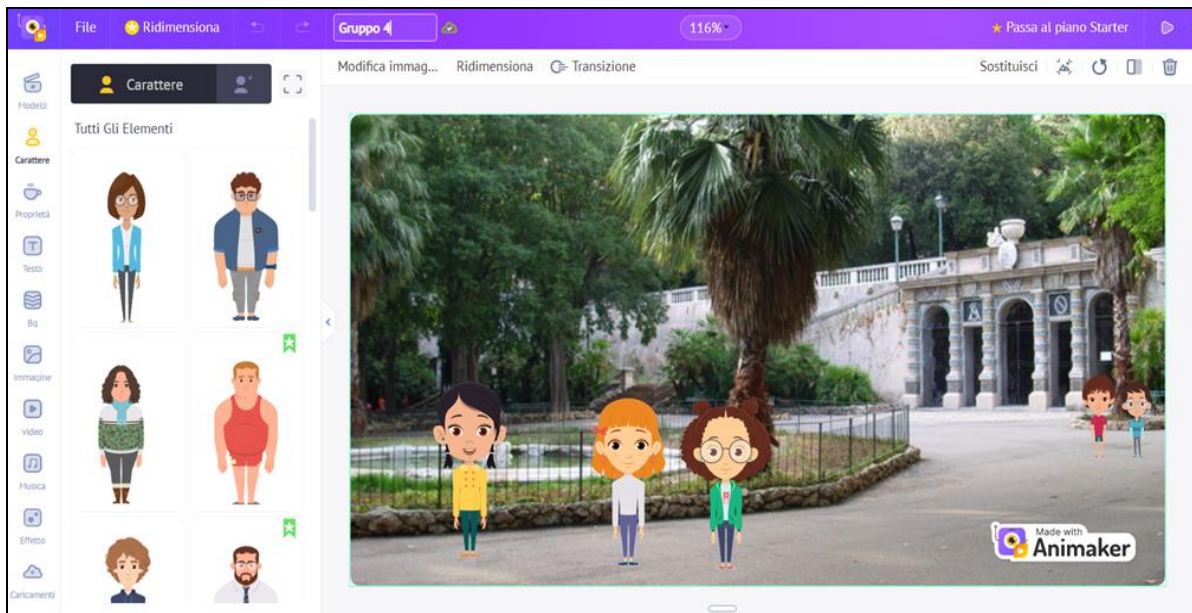
Figure 5. A screenshot of Animaker with the digital story implemented by the pupils. Notably, the characters are depicted within a real photograph of a park, selected by the pupils themselves, which is located near their school.

3.3. Data collection and evaluation

To evaluate the efficacy of this DTS-based intervention, a comprehensive evaluation rubric was prepared, reflecting the methodologies applied in prior research. This rubric utilized a qualitative assessment approach designed to measure the acquisition of competencies, as suggested by earlier studies such as those conducted by Giannakou and Klonari (2019). Through this evaluation, the study sought valuable insights into the pupils' abilities to critically analyze places, comprehend spatial attributes, and proficiently employ DST techniques to convey captivating narratives.

The two dimensions of competences, namely Geographical Competence and DST Competence, will be elucidated in the subsequent sections, providing a detailed understanding of the criteria used to assess the pupils' performance and engagement in the DST project.

3.3.1. Dimensions of Competences

Geographical Competence, as defined in this study, encompassed two dimensions. Firstly, it entailed the ability to critically analyze places in one's life, comprehending their spatial attributes and contextual implications. This dimension also involved the conscious retracing of surrounding spaces using digital cartography and mind maps. The two dimensions of Geographical Competence in this study draw inspiration from the framework proposed in the "Example of a vertical curriculum for competences" with reference to Primary School (6-10 years of age), proposed by Pasquinelli d'Allegra (2017). This framework served as a valuable reference for this study, ensuring alignment with established international guidelines for geographical education and shaping the competences addressed in this research.

The first dimension of geographical competence focused on the pupils' capacity to critically analyze places in their life, specifically focusing on the neighborhood of Sampierdarena, the surrounding areas, and the broader city of Genoa. This encompassed the pupils' ability to identify and comprehend the physical and anthropic elements characterizing these locations. Through this analysis, the student gained insights into the unique features, spatial attributes, and contextual implications of these

areas within the larger urban context of Genoa.

The second dimension of geographical competence involved consciously retracing the surrounding space using digital cartography and mind maps. It dealt with spatial thinking, including autonomously placing oneself in the surrounding space and using mental maps and digital cartography to orient oneself in their living space and establish effective routes to specific places. This competence encompassed the use of both direct observation methods, such as land excursions, and indirect methods, like utilizing maps, modern and historical photographs, satellite images, etc., for studying the landscape.

Similarly, DST Competence involved proficiency in two different dimensions: creative and narrative skills, as well as competence in using digital tools. Specifically, it encompassed the ability to design and create creative and coherent storytelling, showcasing imaginative and compelling narratives (creative dimension). Additionally, it entailed the skill of generating digital artifacts through platforms like Animaker, demonstrating adeptness in effectively utilizing digital tools to produce engaging and interactive content (digital dimension). These dimensions were assessed based on nine criteria derived from the study of Smeda et al. (2014): Purpose, Plot, Pacing of Narrative, Dramatic Question, Story Content, Emotional Content, Grammar and Language Usage, Technological Competence, and Economy of Content.

To simplify the evaluation process and establish a coherent framework, these nine criteria were thoughtfully associated with the two dimensions. In the creative dimension, the criteria focused on the narrative and creative elements of storytelling, such as the purpose of the narrative, the plot, pacing, the presence of a dramatic question, and the emotional content conveyed in the story.

On the other hand, in the digital dimension, the criteria were centered on the technical aspects of the DST process, including the usage of grammar and language, technological competence in handling digital tools like Animaker, and the economy of content, referring to the effective and efficient use of digital resources.

This systematic categorization enabled a comprehensive assessment of the pupils' DST Competence, considering both their creative and narrative abilities as well as their proficiency in utilizing digital tools to convey captivating narratives.

3.3.2. Development of the "Evaluation Rubric"

The evaluation rubric was prepared with the aim of measuring the competences according to two dimensions: Geographical Competence and DST Competence. This approach ensured the consistency and reliability of the evaluation process, allowing for meaningful comparisons and a deeper understanding of the impact of the DST activities on the pupils' learning experiences.

Each dimension comprised two indicators, and for each indicator, four proficiency levels were defined, as illustrated in Table 1.

Geographical Competence (GEOCOMP)	Level of competence			
	Low	**Basic**	**Intermediate**	**Advanced**
Being able to critically analyse places in one's life	Recognizes places in her own life but is unable to argue their importance.	Recognizes places in her own life but argues their importance only when prompted appropriately.	Recognizes the places in one's life and argues the relative characteristics.	Recognizes places in one's life and argues relative characteristics, bringing a personal contribution to the description.
Consciously retracing surrounding space using digital cartography and mind maps	Is unable to retrace the surrounding space using mind maps or digital cartography unless prompted by peers or an experienced adult.	Can retrace the surrounding space using digital cartography but does not have a mental map for immediacy.	Can independently retrace the surrounding space through digital cartography, easily constructing a mental map.	Can independently retrace the surrounding space with immediacy through mental maps, orienting herself with digital cartography when she does not recognize places accurately.
Digital Storytelling Competence (DSTCOMP)	Level of competence			
	Low	**Basic**	**Intermediate**	**Advanced**
Designing creative and coherent storytelling (creative)	Is unable to create a creative and coherent narrative.	Can create a narrative although not always creative and coherent.	Can create a creative and coherent narrative even if it needs some adjustments.	Can create a creative and coherent narrative.
Creating digital artifacts through platforms such as Animaker (digital)	Is unable to construct a digital artifact.	Can create digital artifacts only when supported by someone more experienced.	Can create digital artifacts while not paying attention to all the necessary details.	Can create digital artifacts finding the best strategies to deal with any doubts or novelties.

Table 1. Rubric of Geographical Competence (GEOCOMP) and Digital Storytelling Competence (DSTCOMP). Authors' elaboration.

4. Results

At the activity's completion, the two participating teachers filled in the evaluation rubric for each pupil, utilizing insights from the observation notes they recorded in their diaries during each lesson.

Table 2 presents the distribution of frequencies (percentages in parentheses) for the four levels of the two dimensions considered for geographical competence for the entire class group. The results indicate that 75% of pupils have reached an advanced level of competence in the geographical ability to critically analyse places in one's life, and 60% achieved the advanced level of competence in the geographical ability of consciously retracing surrounding space using digital cartography and mind maps.

Table 3 presents the distribution of frequencies (percentages in parentheses) for the four levels of the two dimensions considered for DST competence for the entire class group. The results indicate that 60% of pupils have reached an advanced level of competence in the DST creative competence of designing creative and coherent storytelling, and 45% achieved the advanced level of competence in the DST digital competence of Creating digital artifacts through platforms such as Animaker.

	Low	**Basic**	**Intermediate**	**Advanced**
Being able to critically analyse places in one's life	0 (0%)	0 (0%)	5 (25%)	15 (75%)
Consciously retracing surrounding space using digital cartography and mind maps	1 (5%)	1 (5%)	6 (30%)	12 (60%)

Table 2. Geographical competence. Authors' elaboration.

	Low	**Basic**	**Intermediate**	**Advanced**
Designing creative and coherent storytelling	0 (0%)	3 (15%)	5 (25%)	12 (60%)
Creating digital artifacts through platforms such as Animaker	0 (0%)	3 (15%)	8 (40%)	9 (45%)

Table 3. Digital Storytelling competence. Authors' elaboration.

Likewise, between 25% and 40% of pupils have reached the intermediate level on the four dimensions, observing difficulty in the abilities of creating digital artifacts through platforms such as Animaker.

It is important to note that only one student (5%) ranked low on only one of the four dimensions considered, that is the geographical competence of consciously retracing surrounding space using digital cartography and mind maps.

5. Discussion

Overall, the DST activity resonated profoundly with the pupils, as evidenced by their high level of engagement. This outcome aligns with the findings of other studies conducted in similar contexts and using similar approaches. Notably, the previously cited works of Skavhaug and Andersen (2013), as well as Grigoriou (2016), reported comparable results, further underscoring the efficacy of DST activities in primary school setting.

The results pertaining to Geographical competence suggest that the pupils adeptly navigated to advanced levels, particularly within the first dimension of the competence. They demonstrated an ability to understand and interpret geographical places, largely influenced by peer discussions and personal connections to these places. As evidenced in Skavhaug and Andersen's (2013) research, the role of social interaction was pivotal in the development of complex knowledge, showcasing the need for active teacher involvement during pupil interactions. The design of the activity stimulated deep reflections among pupils, promoting insights that might not have emerged otherwise. This process underscored the value of mutual pupil exchanges in fostering in-depth understanding and valuable considerations.

Regarding the second dimension of Geographical competences, the challenges encountered by the pupils were more complex than those within the first dimension. To ensure all pupils achieve advanced levels more uniformly, it may be advantageous to spread the activities over a longer period in the school year, incorporating direct territorial activities bolstered by digital tools. Echoing the suggestions by Skavhaug and Andersen (2013), integrating the creation of digital stories as a follow-up to fieldwork could be particularly useful. Encouragingly, even those pupils initially struggling to develop a travel hypothesis managed to devise an appropriate route to the relevant destinations, fostered by peer interaction and digital cartography.

Moving on to the discussion of the DST competences, the first dimension of these competences put pupils' creativity and narrative coherence to the test, presenting them with significant challenges. Our findings align with Skavhaug and Andersen's (2013) observation that their pupils' digital stories were somewhat disjointed with an unclear focus, possibly due to a fragmented fieldwork approach and a hurried production phase which required group cooperation. Unlike their scenario, however, in our case the technological aspect of the task enhanced pupil engagement, fostering innovation beyond what traditional storytelling might allow. Furthermore, the continuous feedback and group collaboration enabled the identification and resolution of ambiguities in their stories, promoting the co-creation of engaging narratives.

Proceeding to the second dimension of DST competence, which deals with digital proficiency, the majority of the pupils reached high competence levels. This emphasizes the need for equipping students with multimedia skills, due to its omnipresence in contemporary life and work. The possibility of creating cartoons using platforms like Animaker ignited a special motivation and creativity among pupils. Furthermore, the decision to use non-specialist software for creating digital stories resonated with the approaches recommended in previous literature (Skavhaug and Andersen, 2013; Grigoriou, 2016). This approach serves as a preliminary step towards utilizing more specialized tools that students are likely to encounter in higher educational levels, echoing the findings of other studies on the use of digital stories in Geography education (Cyvin et al., 2022; Giannakou and Klonari, 2019; Marta and Osso, 2015; Mauro et al., 2021; Zamperlin and Azzari, 2017).

Despite these positive results, the results suggest extending such activities throughout the academic year for students to fully grasp the process of creating digital artifacts and efficiently navigate these platforms. Planning for a serial cartoon project across the school year, or even extending into the next, could yield a more enriching learning experience. Regular assessment via comparisons of initial and final digital artifacts can offer insights into student progress. With adequate time, it is anticipated that most students would achieve advanced competence levels, testifying to the effectiveness of these educational strategies.

6. Conclusions

In this contribution, we detailed a study involving 20 fourth-grade pupils in a primary school setting, utilizing DST as an active teaching strategy aimed at bolstering Geography education. The core objective was to enhance basic geographical competences, with a focus on pupils' understanding and engagement with their global geographical space, and their capacity to apply this understanding in real-world scenarios. Alongside, leveraging DST also aimed to cultivate pupils' dual competences – creativity and digital proficiency – as an inherent sub-goal of the intervention.

The results collected within the study carried out allowed to observe how the four competences considered were adequately explored through the DST activity. It can be concluded, therefore, that realizing Geography teaching by making use of learning methods that deviate from the traditional frontal lecture is not only necessary in theory, but also feasible in practice, although it requires a different role than the idea of the teacher.

Particularly, narrative learning made it possible, on the one hand, to work on disciplinary competences and, on the other hand, to develop a positive approach to Geography. Getting children to develop an appropriate attitude toward the discipline, in fact, was the first approach to constructing an activity in which they really felt that they were at the center of their own learning, building it through peer-to-peer discussion that allowed them to delve into certain localization issues not only from an objective but also a subjective point of view.

Reflections arising during and after the DST activity also revealed the pupils' ability to construct mind maps and retrace spaces through the use of multimedia tools and digital cartography; this important possibility can be particularly useful for a teacher, as it allows them to simulate real situations, thanks to various software, when direct observation on the ground is impossible.

With respect to the design carried out in the classroom, learning was measured only through empirical observation by the teacher without a comparison of measurable analytical data between before and after the activity. This aspect did not allow for the quantification of differences and improvements due as a result of what was accomplished; therefore, although it was evident in the eyes of the teacher how the comparison and the possibility of using certain tools had been useful in building mental maps of the surrounding area together, there is no data documenting these observed improvements. In the future, therefore, it would be appropriate to provide questionnaires as well as other measures of learning achievements to evaluate the various aspects considered at the analytical level as well, so that tangible evidence and objective data are kept that cannot be questioned. It is also clear that by enhancing digital skills, the use of more complex and professional tools related to Geography and DST software can also be further promoted.

Finally, the present study must be viewed considering certain constraints, including its specificity to a given context, determined by factors such as the sample size, considered variables, and the timeframe of execution. Thus, the conclusions drawn, though substantial within this particular context, cannot be generally applied. This underscores the importance of further research in this domain, particularly with regard to the methods, tools, and procedures used in this study, and their pertinence to the Italian educational system.

The study has certainly unveiled potential areas for development; nevertheless, we recommend more exhaustive qualitative and quantitative studies in primary school environments to identify the most favorable conditions that mesh with the organisational and structural characteristics of the relevant school system.

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