CEDIS

Circular Economy in DIgital Storytelling

Desk Research

Italy

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1. The context

The CEDIS project, which stands for Circular Economy in Digital Storytelling, aims to rethink key concepts such as 'circular economy', 'sharing', 'efficiency', 'sustainable development' and 'everyday behaviour' across Europe. The aim is to reduce the impact of climate change on participants' lives. Inclusion and diversity, environmental concerns, circular economy principles, digital storytelling methodology and digital conversion approach are the core pillars of the project.

In recent years, climate change has affected many regions of the world, resulting in various impacts.
The Digital Storytelling School Education Methodology promoted by CEDIS emphasises collaboration and trust. It encourages teachers and students to consider forms of sharing and co-ownership within their protected contexts, as well as sharing assets based on their interests and living environments.

Digital Storytelling has emerged as an important aspect of contemporary education, especially in secondary schools. It provides an interactive tool for expression and learning, combining traditional storytelling methods with digital media. In classrooms, the process begins with the selection of a topic relevant to students, ranging from historical events to personal reflections. Students engage in critical thinking and collaborate with peers, refining their stories until they are engaging and impactful.

2. The desk research

The main objective of this working paper was to research and compile general and national data, information, and resources related to Digital Storytelling (DST) as a learning methodology and Circular Economy (CE) as a topic for secondary education.

Project partners investigated previous experiences of using DST to teach Circular Economy across different fields and sectors. The collected material provided an up-to-date overview of digital tools and software, particularly mobile applications, suitable for DST. These tools were analyzed in terms of accessibility for students, ease of installation and use, cost-effectiveness (preferably free), and relevance to current trends in media consumption, such as the shift among young people from platforms like YouTube to TikTok. This analysis contributed to improving teachers' and students' media literacy, including awareness of open-source versus proprietary software and platform-based economies.

Partners selected and documented a set of Best Practices (three per country) related to DST and Circular Economy education, including national initiatives and learning materials available in each partner's language. The research also examined how Circular Economy and Sustainability topics were addressed across different national school curricula, acknowledging country-specific priorities and practices (e.g. plastic waste, electronic waste, sharing economy).

In addition, six video interviews with national experts or activists (one per partner country) were conducted to provide professional insights into DST and Circular Economy. An exemplary list of potential topics for student-produced digital stories and a list of suitable digital tools for their dissemination were also developed.The desk research consists of 4 different sections

- **DST in the Secondary School Context.**

Report on up-to-date, existing digital tools and devices to apply DST in schools, descriptive types of Digital

Stories and their current use in secondary schools and usability in the Classroom.

- **Collection of Best Practices.**

Collection of Best Practices of Digital Storytelling on Circular Economy in any field or sector.

- **National Reports about Education.**

Six National Reports about Education on Circular Economy in Secondary Schools (English and the six project's national languages).

- **Interview with a national expert.**

Collection of high-quality Video Interviews to national experts/activists on Digital Storytelling and on Circular Economy. 1 for each partner

3. Key Findings on DST in the Secondary School Context

3.1 The use of DST in the Secondary School Context.

Digital Storytelling has emerged as a powerful educational tool in the secondary school context in Italy, offering a dynamic approach to engage students in learning across various subjects. Integrating multimedia elements such as images, videos, audio, and interactive features, digital storytelling fosters creativity, critical thinking, and digital literacy skills among students. In the Italian secondary school curriculum, digital storytelling finds application across multiple subjects including language, arts, history, science, and even mathematics. By allowing students to construct narratives using digital tools, educators can enhance traditional teaching methods and cater to diverse learning styles. For instance, in language arts classes, students can create digital narratives based on literary works, exploring themes, characters, and plot development through multimedia presentations.

Furthermore, digital storytelling serves as a platform for students to express their ideas, perspectives, and cultural heritage. In Italy, where rich historical and artistic traditions abound, digital storytelling offers students the opportunity to delve into local history, folklore, and contemporary issues, thereby fostering a deeper connection to their cultural identity.

Moreover, digital storytelling aligns with the objectives of the Italian educational system to promote 21st-century skills such as collaboration, communication, and media literacy. By working collaboratively on digital storytelling projects, students develop teamwork and interpersonal skills while honing their ability to communicate effectively in a digital environment.

The use of digital storytelling in secondary schools in Italy not only enriches the learning experience but also empowers students to become active creators and contributors in the digital age. As technology continues to evolve, educators must harness the potential of digital storytelling to nurture the next generation of critical thinkers and storytellers.

3.2 Types of Digital Stories

In the Italian secondary school context, various types of digital stories are utilised to enrich learning experiences across different subjects:

- Narrative Stories: These digital stories follow a linear narrative structure, often created by students to retell a story from literature, history, or personal experiences. In language arts classes, students may compose narrative stories based on literary texts they have studied, while in history classes, they might create historical narratives to depict significant events or periods.
- Documentary Stories: Documentary-style digital stories involve research and factual content, presenting information in a visually engaging format. In secondary schools, students may produce documentary stories to explore topics in science, geography, or current events. For example, students might investigate environmental issues and create documentaries to raise awareness or propose solutions.

- Personal Stories: These digital stories focus on personal experiences, reflections, and perspectives. Students may share their own stories related to cultural identity, family history, or social issues. In language arts or social studies classes, personal stories can serve as a means for students to connect with others, foster empathy, and promote understanding of diverse perspectives.
- Expository Stories: Expository digital stories aim to explain concepts, processes, or ideas using multimedia elements. In subjects like mathematics or science, students may create expository stories to demonstrate problem-solving techniques, illustrate scientific principles, or explain historical developments. These stories enhance comprehension and retention of complex subject matter through visual aids and narration.
- Interactive Stories: Interactive digital stories engage viewers by allowing them to make choices that influence the narrative outcome. In Italian secondary schools, students may develop interactive stories using branching narratives or multimedia quizzes. These stories promote active learning and critical thinking as students navigate different paths and consequences within the storyline.

Educators integrate these types of digital stories into their teaching practices in various ways:

- Assignments: Teachers assign digital storytelling projects as part of class assignments or assessments, providing guidelines and objectives for students to follow.
- Collaborative Projects: Students collaborate in groups to plan, research, and produce digital stories, fostering teamwork and communication skills.
- Multimedia Presentations: Digital stories serve as multimedia presentations during class discussions, presentations, or exhibitions, allowing students to share their work with peers and educators.
- Reflection and Feedback: Students reflect on their digital storytelling process, evaluate their learning outcomes, and receive feedback from peers and teachers to improve their storytelling skills.

3.3 Usability of DST in the classroom.

There are different experiences that involve or have involved the use of Digital Storytelling in educational settings across Italy, wth the aim of enhancing learning experiences, foster creativity, and develop essential skills among students. Here are some usability examples:

- Digital Storytelling Lab by Fondazione Mondo Digitale: the Fondazione Mondo Digitale (Digital World Foundation) in Italy hosts a Digital Storytelling Lab aimed at promoting digital storytelling as a tool for education and social inclusion. The lab offers workshops, training programs, and resources for educators and students to learn how to create and share digital stories on various topics.

- Digital Education and Narrative Creativity (Educazione Digitale e Creatività Narrativa - EDUCAN): EDUCAN is an educational project in Italy that focuses on digital education and narrative creativity. Through workshops and online resources, EDUCAN empowers teachers to integrate digital storytelling into their teaching practices, fostering creativity, critical thinking,

and digital literacy skills among students.

- MiRacconti.it: MiRacconti.it is an online platform in Italy dedicated to digital storytelling in education. The platform hosts a collection of digital stories created by students, teachers, and educators from across the country. It serves as a repository of inspiring examples and resources for educators interested in incorporating digital storytelling into their curriculum.

- Digital Storytelling Competition by Indire: Indire (Istituto Nazionale di Documentazione, Innovazione e Ricerca Educativa - in English, National Institute for Documentation, Innovation and Educational Research) organises a digital storytelling competition for schools in Italy. The competition encourages students and teachers to create digital stories on specific themes or topics related to curriculum subjects, contemporary issues, or cultural heritage.

- ProgettoNarrare.it: ProgettoNarrare.it is an initiative in Italy that promotes narrative-based learning and digital storytelling in schools. The project provides training and support for teachers to integrate digital storytelling into their lesson plans, with a focus on enhancing communication skills, creativity, and empathy among students.

- DIST: This was an Erasmus+ funded project (2017-2019) among different European Partners (among which, one was Italian) that aimed to overcome stereotypes and promote social inclusion in the school context using digital storytelling. In this project, the students had to tell and show their own stories in videos on various overarching themes.

3.4 Digital tools and devices

1.	
Name	**WeVideo**
Description (up to 500 characters)	WeVideo is a cloud-based video editing platform for web, mobile, Windows and MacOS that empowers users to create professional-quality videos with ease. Offering a range of editing tools and collaboration features, WeVideo simplifies the video creation process for individuals and teams.
Keywords	Video editing, Cloud-based, Collaboration
Language(s)	WeVideo is available in multiple languages, including English, Spanish, French, German, Italian, Portuguese, and more, making it accessible to users worldwide.
Best suited for (name comma-separated tasks that can be achieved with the use of this tool)	WeVideo is ideal for tasks such as creating marketing videos, educational content, social media clips, and personal projects. It caters to a diverse range of users, from students and educators to businesses and content creators.
Ease of use (provide a rating of 1 = very easy to use, 5 = extremely hard to use)	2 WeVideo offers a user-friendly interface with intuitive drag-and-drop functionality, making it accessible even to beginners. Its straightforward editing tools and

1.	
	extensive library of templates and stock media further enhance usability.
Price (put 0 for a free tool)	WeVideo offers various pricing plans, including a free version with limited features and paid subscriptions starting at $4.99 per month. Pricing depends on factors such as storage capacity, video quality, and collaboration options.
Logo of the tool	
Link	https://www.wevideo.com/

2.	
Name	**Toonly**
Description (up to 500 characters)	Toonly is a user-friendly animation software designed for creating engaging and professional animated videos without the need for extensive technical skills. With a vast library of characters, props, and backgrounds, Toonly enables users to bring their stories to life through customizable animations.
Keywords	Animation, User-friendly, Customizable
Language(s)	Toonly is primarily available in English, catering to a global audience.
Best suited for (name comma-separated tasks that can be achieved with the use of this tool)	Toonly is best suited for tasks such as creating explainer videos, animated presentations, and promotional content. It is widely used by businesses, educators, and marketers to convey information in a visually appealing and engaging manner.
Ease of use (provide a rating of 1 = very easy to use, 5 = extremely hard to use)	1 Toonly offers a simple and intuitive interface with drag-and-drop functionality, allowing users to create animations effortlessly. Its pre-made templates and ready-to-use assets streamline the animation process, making it accessible to users with varying levels of experience.
Price (put 0 for a free tool)	Toonly operates on a subscription-based model, with pricing starting at $39 per month for the standard plan. There is no free version available, but Toonly offers a 30-day money-back guarantee for new users.

2.	
Logo of the tool	
Link	https://www.voomly.com/toonly

3.	
Name	**StoryMapJS**
Description (up to 500 characters)	StoryMapJS is a web-based tool for creating interactive, multimedia-rich story maps that combine maps, images, videos, and narrative text to tell compelling stories. It offers a user-friendly interface and customization options to craft immersive digital narratives.
Keywords	Interactive, Multimedia, Storytelling
Language(s)	StoryMapJS primarily supports English, but users can create content in any language by inputting their own text and media.
Best suited for (name comma-separated tasks that can be achieved with the use of this tool)	StoryMapJS is ideal for creating interactive storytelling experiences, educational presentations, historical tours, and geographical narratives. It is commonly used by educators, journalists, museums, and organisations to engage audiences with spatially-oriented content.
Ease of use (provide a rating of 1 = very easy to use, 5 = extremely hard to use)	2 StoryMapJS provides intuitive tools for creating and editing story maps, with straightforward features for adding content and configuring map settings. While some familiarity with map-based interfaces may be beneficial, users without technical expertise can still create compelling narratives with ease.
Price (put 0 for a free tool)	StoryMapJS is free to use for individuals and organisations, with no subscription fees or premium versions. Users can access all features and resources without any cost, making it accessible to a wide range of users.

3.	
Logo of the tool	
Link	https://storymap.knightlab.com/

4.	
Name	**Animoto**
Description (up to 500 characters)	Animoto is a cloud-based video creation platform that enables users to easily produce professional-quality videos using customizable templates, music, and multimedia content. It simplifies the video creation process for individuals and businesses, offering tools for creating marketing videos, slideshows, and more.
Keywords	Video creation, Templates, Multimedia
Language(s)	Animoto primarily supports English, but users can create content in any language by adding their own text and media.
Best suited for (name comma-separated tasks that can be achieved with the use of this tool)	Animoto is best suited for tasks such as creating marketing videos, social media content, slideshows, and presentations. It is commonly used by businesses, educators, photographers, and marketers to showcase products, share stories, and engage audiences.
Ease of use (provide a rating of 1 = very easy to use, 5 = extremely hard to use)	2 Animoto provides a user-friendly interface with drag-and-drop functionality, allowing users to create videos quickly and effortlessly. Its pre-designed templates and customizable themes streamline the video creation process, making it accessible to users with minimal technical skills.
Price (put 0 for a free tool)	Animoto offers a range of pricing plans, including a free version with limited features and paid subscriptions starting at $5 per month. Pricing depends on factors such as video quality, storage capacity, and access to premium templates and music.

4.	
Logo of the tool	
Link	https://animoto.com/

5.	
Name	**ThingLink**
Description (up to 500 characters)	ThingLink is an interactive media platform that allows users to create and share immersive content by adding interactive hotspots to images, videos, and 360-degree media. It enhances engagement by enabling viewers to explore and interact with content in a dynamic and informative way
Keywords	Interactive media, Hotspots, Immersive
Language(s)	ThingLink supports multiple languages, including English, Spanish, French, German, Italian, Portuguese, and more, catering to a diverse global audience.
Best suited for (name comma-separated tasks that can be achieved with the use of this tool)	ThingLink is best suited for tasks such as creating interactive presentations, virtual tours, educational content, and marketing materials. It is commonly used by educators, marketers, publishers, and content creators to engage audiences and convey information effectively.
Ease of use (provide a rating of 1 = very easy to use, 5 = extremely hard to use)	2 ThingLink offers an intuitive interface with drag-and-drop functionality, allowing users to add interactive elements seamlessly. Its user-friendly editor and extensive library of customizable hotspots make it accessible to users with varying levels of technical expertise.
Price (put 0 for a free tool)	ThingLink offers a range of pricing plans, including a free version with basic features and paid subscriptions starting at $20 per month. Pricing varies based on factors such as usage limits, branding options, and access to premium features.

5.	
Logo of the tool	
Link	https://www.thinglink.com/

4. Collection of Best Practices of Digital Storytelling on Circular Economy

4.1 Introduction to the selection of the best practices

To ensure effectiveness and relevance for the CEDIS' project topic, four principal criteria were used to select the three Italian best practices of use of the Digital Storytelling methodology for teaching Circular Economy and, more in general, sustainability, in any sector and environment. The criteria followed are the following:

1. Innovation: the selected practices should demonstrate innovative approaches to digital storytelling, utilising multimedia elements such as videos, interactive graphics, and animations to convey complex concepts related to sustainability and circular economy in engaging ways.

2. Engagement: the practices should prioritise audience engagement by employing interactive storytelling techniques that encourage active participation and critical thinking. This may include gamification elements, user-generated content, or immersive experiences to captivate learners and foster deeper understanding.

3. Scalability: the chosen examples should have the potential for scalability, allowing for widespread adoption and adaptation across different educational settings and target audiences. Scalability ensures that the benefits of digital storytelling in sustainability and circular economy education can reach a broader audience and have a lasting impact.

4. Impact: lastly, the best practices should demonstrate measurable impact in terms of knowledge acquisition, behaviour change, and attitude shifts towards sustainability and circular economy principles. Evidence of positive outcomes, such as increased awareness, adoption of sustainable practices, or measurable reductions in environmental footprint, reinforces the effectiveness of digital storytelling as an educational tool.

4.2 Best practices

1	
Case study name	**Italian Atlas of Circular Economy**
Description of the context in which the best practices have been developed	A hundred stories of virtuous companies represent the starting nucleus of the first Italian Atlas of Circular Economy, which collects experiences based on reuse, reduction of waste, re-introduction into the production cycle of secondary raw materials. The project is promoted by Ecodom (Italian consortium for the WEEE management) and CDCA (Documentation Centre on Environmental Conflicts). It is a geo-referenced and interactive web platform, an archive that shows economic and associative realities

	able to apply the principles of the circular economy. At the same time, a competition was also launched for journalists, videomakers, photographers, writers and storytellers to tell stories of circular economy, already present in the Atlas or new. The competition is patronised by the Ministry of the Environment and the Protection of the Territory and Sea. **Poliedra** (consortium of the Polytechnic in Milan that carries out researches in the areas of environmental assessment and sustainability), **A Sud** (independent association engaged in the environmental protection), **Ecosistemi** (foundation specialised in strategies for the sustainable development), **Banca Popolare Etica** (bank inspired by the principles of transparency and equity) and **Zona** (association of internationally renowned reporters and photo editors) also contributed to the creation of the Italian Atlas of Circular Economy.
Location	Italy
How the methodology of DST has been used to develop contents related to the Circular Economy	The objective of the Atlas of Circular Economy is to build a network of Italian companies and associations working in the field, in order to create potential synergies and increase their visibility. Users can freely browse through the experiences collected, searching through regions and/or the main category of products or services offered. The Atlas is regularly updated with new experiences and the mapping process is participatory. Digital Storytelling is an important part of the competition launched through the interactive platform. The competition was launched for journalists, videomakers, photographers, writers and storytellers, to tell stories of circular economy. The competition is open to professional or amateur storytellers who have to depict a circular economy experience through a video, photo, audio or written reportage. The objective is to raise awareness and promote sustainable consumer behaviour among Italian citizens of all ages.
Target groups involved	Journalists, videomakers, photographers, writers as scavengers and storytellers of virtuous stories about sustainable and circular companies and experiences included in the Atlas; Sustainable companies throughout Italy, as subject of the stories told; Italian citizens, as fruitors and public for the stories.
Three most important issues the case study addresses	The Atlas aims to be an awareness-raising, information and documentation tool addressed to all those who care about the balance between economy and ecology and who wish to orient their consumption in a responsible way. Among the objectives of the Atlas is the networking of companies and associations that can connect with each other and increase potential synergies and visibility. By navigating between regions and categories, users can consult free of charge the

	descriptive cards and stories/ articles, videos, interviews, reportages, etc.) of the individual realities mapped. The circularity of each experience is assessed through a series of indicators that take into account all phases of the production process: from the choice of raw materials to design, from energy efficiency to logistics, from waste management to the creation of shared social value, from territorial valorisation to the analysis of the entire supply chain.
Outcomes of the case study (link)	The Italian Atlas of the Circular Economy is an interactive web platform that censuses and recounts the experiences of economic realities and associations committed to applying the principles of the circular economy in Italy. The platform is designed to be a continuously updated participatory mapping tool: users can directly enter other virtuous experiences through a form prepared and edited by the technical team in collaboration with the Scientific Committee, composed of experts in the sector. More than 100 stories and experiences of Circular Economy in Italy are already included in The Atlas of Circular Economy. The companies and associations mapped work in different fields: 18% provide waste collection services, 15% produce clothing and accessories, 14% furniture and construction, 10% are in the food sector. Among the mapped experiences, Lombardy is at first place with 23% of the total and then Lazio (15.9%), Tuscany (12.7%), Emilia Romagna (7%) and Veneto (7%). Liguria, Trentino Alto-Adige, Piedmont (4%), Puglia and Marche (3%) follow. Rome is at the top of the ranking with 15 virtuous examples, Milan is second with 12. www.economiacircolare.com
Key words (or hashtags) related to the case study	#CircularEconomy #AtlasofCircularEconomy #InteractiveWebPlatform #ParticipatoryMappingTool #CircularityIndicators #GeoreferencedStories #StorytellersCompetition #SustainableConsumerBehavior

2	
Case study name	**DIGITAL STORYTELLING WORKSHOP IN PRIMARY SCHOOL** **Media Education and Collaborative Work to promote awareness on environmental issues** by CHEMELLO, LISA, Sperimental MA Thesis (2021/2022) and Project – University of Padua

Description of the context in which the best practices have been developed	The "S. Giovanni Bosco" primary school is the plexus, belonging to the Istituto Comprensivo di Marostica (VI), which welcomed the aspiring teacher and researcher, to allow her to carry out this experiment in the application of the Digital Storytelling Methodology in the field of Environmental Education, and specifically about “reducing” practices.
Location	Marostica (VI), Italy
How the methodology of DST have been used to develop contents related to the Circular Economy	Narration is at the base of human’s history, it has a place in human’s life, and it affects experiences across time and space, it forges thought and culture. With the advent of technology, narrations became 2.0 as well, and amid technological narrations, Digital Storytelling can be found. This is a teaching method that is still not substantially practised and recognized in Italian schools; practising this method in an elementary school aims at emphasising the educational significance of digital narrations, which can be useful instruments for schooling. The narrative mode that characterises the methodology, in addition to encouraging and spreading abstract concepts and contents, boosts the students’ involvement and motivation, favouring a significant and effective education. Regarding theoretical approaches, surveys of pedagogy pioneers such as Bruner and Dewey were taken into consideration, the research on the implementation of technology in teaching along with international and national analysis on storytelling and its digital versions in various fields, underlining especially the educational field. In this project, the hypothesis suggests demonstrating the educational validity of the Digital Storytelling methodology, the capability of extension of the products of digital narration, in a hands-on environment, where the students are active subjects and authors of the digital projects while cooperating with the teachers. The methodology can be adopted in every subject and class and was applied for trial in a Teaching Unit in subjects such as Science, Arts, Italian, Computer Science and Maths.
Target group involved	The inquiry involved fourth grade students from “S. Giovani Bosco” Elementary School of Pianezze (VI). The Digital Storytelling methodology was applied in every phase of this research.
Three most important issues the case study addresses	The learning experience proposed to the class consisted in the realisation of a workshop to promote and raise awareness in the ecological sphere of the importance of separate waste collection, and the importance of quantitative reduction of waste production. Starting situation: the class consisted of 12 pupils, 5 boys and 7 girls. The pupils had already addressed the topic several times, and were very sensitive with regard to waste (water, food, energy) and waste/recycling.

	Problem situation: nowadays, every person on planet Earth recognises the importance of separate waste collection and recycling. Therefore, given the consequences of pollution on our planet, the starting question for the project was: "What can I, in my own small way, do to make a difference?" This was a question that arose spontaneously from the pupils themselves after watching a video about environmental pollution and the consequences on the planet and the animal world. To reinforce the knowledge they already had, and to disseminate it to the other classes in the plexus, the pupils created a digital storytelling product.
Outcomes of the case study (link)	https://hdl.handle.net/20.500.12608/29968 The evaluation of the educational process considered the data developed during the test of qualitative and systematic observations and through objective tests that involved the creation of a storytelling video. In the light of the results obtained thanks to the involvement of students, after the circulation of a video produced through digital storytelling, it emerges how the methodology can be challenging and effective for teaching.
Key words (or hashtags) related to the case study	#DigitalStorytellingWorkshop #MediaEducation #EnvironmentalEducation #RecyclingAndReducing #PrimarySchoolEducation

3	
Case study name	**Digital Storytelling: il riuso del calzino spaiato (English name: "Digital Storytelling: the reuse of the mismatched sock")**
Description of the context in which the best practices have been developed	The activity "Digital storytelling: the reuse of the mismatched sock" took place in the fifth grade classes of the Istituto Comprensivo di Sigillo in November 2013. The experience is part of the Eco-Scratch project realised, in a network with associations and schools, during the European Week for Waste Reduction 2013, to educate on waste reduction, reuse and recycling, and to create innovative teaching resources using Scratch, a visual programming software. Pupils were encouraged to think about the creative reuse of objects that would otherwise have become rubbish. Off they went to play with yoghurt pots, cardboard boxes, newspaper paper and unused socks! With these, Christmas balls were created; afterwards, each pupil narrated the experience with an animation created using coding. The projects were published in a gallery in the Scratch community, created to collect the teaching resources of the Eco-Scratch project.

Location	Project designed and carried out by teacher Caterina Moscetti in a primary school (financed as a PON project - European Structural Funds) in Sigillo (PG), Italy
How the methodology of DST have been used to develop contents related to the Circular Economy	The specific Digital Storytelling experience: “The Reuse of the Mismatched Sock”, carried out in the Sigillo Primary School, was designed in presence by the teacher Caterina Moscetti in collaboration with a secondary school mathematics teacher. The first project phase was very 'physical': they looked for objects to be thrown away that could be creatively reused instead. In the second phase, they experimented with the reuse of discarded objects themselves, and then tried to narrate the transformation with coding, through Scratch, a visual programming software. "Visual programming systems are the first approach to programming, because instructions are presented as graphic elements in the form of coloured blocks that, when interlocked, bring the code to life, creating animations and video games. (...) Scratch can be used online, but it is also possible to install it on one's own computer for use without a network. There has recently been a junior version (...) which, unlike the original programme, has instructions that do not use written words but only symbols (arrows, circles, etc.), so it can also be used by children who have not yet learned to read and write.” (Caterina Moscetti).
Target group involved	5th grade students (primary school)
Three most important issues the case study addresses	The amount of waste we produce is notoriously large, as is the possibility of recycling and reusing much of what we throw away. There is a great need to raise pupils' awareness of waste reduction through activities that depart from the frontal lesson: a workshop method in which we use our hands, minds and technology in a creative, divergent and fun way. Pupils need to be stimulated to think in a divergent way in order to solve problems and create new knowledge. The teaching method used and the contents of the activity were important for achieving the interdisciplinary objectives planned for the project: encouraging pupils to change their point of view by thinking about how to give objects another life; raising awareness of waste reduction; contributing to the formation of divergent and creative thinking; developing the ability to analyse situations by not stopping at the evidence and the first hypothesis; using coding for the narration of lived experiences; improving problem solving skills and encouraging the development of computational thinking. The learning objectives of the project were multidisciplinary: - To develop creative and divergent thinking;

	- To narrate facts experienced, respecting chronological order and explaining the information necessary for the story to be comprehensible; - Write short, simple texts in English to give instructions; - Have attitudes of care towards the natural environment; - Plan and implement actions to reduce waste; - Creatively transform the use and function of known objects; - Develop computational thinking; - Use technology in creative and personal ways. The learning objectives contribute to the development of the following competences: - Communication skills in the mother tongue and in English; - Competence in Science and Technology, Mathematics, and in the digital, social and civic fields; - Learning to learn
Outcomes of the case study (link)	http://forum.indire.it/repository/working/export/6657/i/R3moscetti_Template.pdf The animations programmed by the students (title "The reuse of the mismatched sock") were shared in the EWWR (European Week on Waste Reduction) online community, and were all uploaded to Scratch. Examples of videos made by 5th grade students: https://scratch.mit.edu/projects/14646116/ https://scratch.mit.edu/projects/14695700/ https://scratch.mit.edu/projects/14644738/
Key words (or hashtags) related to the case study	#DigitalStorytelling #PrimarySchools #ReductionReuseRecycle #ScratchSoftware #Coding #CreativeReuse #DivergentThinking #CircularEconomyEducation

5. National Reports about Education on Circular Economy in Secondary Schools

5.1 Introduction

The traditional "take-make-dispose" economic model is putting a strain on our planet. In response, Italy, like many European countries, is embracing the Circular Economy (CE) – a system that prioritises resource efficiency and minimising waste. This shift requires informed citizens, and schools play a crucial role in equipping future generations with the knowledge and skills to navigate this new economic landscape.

Circular Economy Education is emerging as a critical component of the national educational agenda for secondary schools in Italy, aiming to equip young students with the knowledge and skills necessary for sustainable development. This aligns with the broader European Union's commitment to sustainability and the transition towards a circular economy, which emphasises the importance of recycling, reusing, and reducing waste to create a more sustainable and resource-efficient society.

In Italy, the integration of circular economy principles into secondary education is supported by various governmental and non-governmental organisations. These efforts are part of a strategic approach to foster environmental awareness and responsibility among students. The Italian Ministry of Education, in collaboration with environmental agencies and industry partners, has been instrumental in developing curricula that incorporate topics such as sustainable resource management, waste reduction, and the environmental impact of consumer habits.

The educational framework for Circular Economy in Italy includes both theoretical and practical components. Students are introduced to the concept through classroom instruction that covers the principles and benefits of a circular economy. This theoretical foundation is complemented by hands-on projects and activities that encourage students to apply what they have learned in real-world contexts. Examples of such activities include recycling projects, sustainable product design, and community-based environmental initiatives.

Moreover, partnerships with local businesses and environmental organisations provide students with opportunities to observe and engage with circular economy practices outside the classroom. These collaborations not only enhance the educational experience but also help to bridge the gap between academic learning and practical application.

Overall, Circular Economy Education in Italian secondary schools aims to cultivate a generation of environmentally conscious individuals who are equipped to contribute to sustainable development. By embedding these principles into the educational system, Italy is taking significant steps towards achieving long-term environmental sustainability and economic resilience.

5.2 From Linear to Circular Economy, the directive of the Ministry of Education

While there isn't a single, overarching document outlining every step for the transition to circular economy,

the Italian government is actively guiding the shift through several key initiatives:

- National Strategy for the Circular Economy: approved in June 2022, this strategy sets the framework for the transition. It focuses on creating a market for recycled materials, fostering innovation, and strengthening producer responsibility – meaning companies take on more of the lifecycle costs of their products.

- National Waste Management Programme: this program, also launched in June 2022, complements the National Strategy. It tackles waste reduction at the source, promotes efficient separate collection systems, and aims to improve recycling rates.

- Policy and Regulatory Measures: the Government is revising regulations to incentivize circular practices. This could involve tax breaks for businesses that design eco-friendly products or invest in recycling technologies.

In general, the Italian Government has established some priorities, lines of actions and initiatives to facilitate the transition from a linear to a circular economy, aiming to create a sustainable and resilient economic model. These appear to be aligned with the European Union's Circular Economy Action Plan, and are designed to minimise waste, promote resource efficiency, and encourage sustainable consumption and production practices.

For instance, to stimulate investment in circular economy practices, the Italian government offers financial incentives and funding opportunities. This includes grants, subsidies, and tax relief for businesses that implement circular economy strategies, such as recycling technologies, waste-to-energy projects, and eco-design practices. The government also prioritises education and awareness to foster a cultural shift towards sustainability. This involves integrating circular economy concepts into educational curricula at all levels, from primary schools to universities, and conducting public awareness campaigns to inform citizens about the benefits of a circular economy.

Research projects are funded by the Ministry of Education, University and Research, and different collaborations are being carried out between universities, research institutions, and industries to develop new technologies and methodologies that promote resource efficiency and waste reduction. Moreover, the Italian government promotes collaboration between public and private sectors to drive the circular economy agenda. These partnerships aim to leverage the expertise and resources of both sectors to implement large-scale projects, such as sustainable urban development, green infrastructure, and circular supply chains.

5.3 Conceptual Background of Circular Economy in Italy

The conceptual framework of the circular economy in Italy is designed to create a sustainable economic system that minimises waste and maximises the efficient use of resources. This framework is grounded in the principles of reducing, reusing, and recycling, aiming to transition from the traditional linear economy model of "take, make, dispose" to a more regenerative and restorative approach.

Italy's vision for a circular economy revolves around three core principles:

1. Closing the Loop: minimise waste generation by extending product lifespans. This involves practices like repair, reuse, and remanufacturing. For instance, encouraging consumers to buy refurbished electronics instead of new ones.

2. Cascading Materials: extract maximum value from resources. After a product reaches the end of its first life, its materials are cascaded down into new applications. For example, using recycled plastic bottles to create clothing fibres.

3. Regenerating Natural Systems: minimise environmental impact. Biodegradable materials are composted to return nutrients to the soil, while renewable resources like solar and wind power are prioritized.exclamation

These principles translate into specific actions across different sectors. Italy excels in recycling compared to the EU average (with a few, geographically restricted exceptions). However, there's also a push for eco-design, where products are designed for easier disassembly and re-use of components. The Government is also looking at fostering a "sharing economy" where access to goods takes precedence over ownership, further reducing resource consumption. By implementing these strategies, Italy aims to create a more resilient economy, reduce reliance on virgin materials, and ultimately, contribute to a healthier environment.

5.4 Circular Economy and Sustainable Development

Italy tackles the development of the circular economy and sustainable development through a two-pronged approach:

1. Top-Down Strategies:

- National Level Planning: the Italian Government plays a key role by outlining national strategies. The National Strategy for Circular Economy (2022) sets the direction, focusing on market creation for recycled materials, innovation, and extended producer responsibility. The National Waste Management Programme (2022) complements this strategy by promoting waste reduction and improved recycling rates.

- Policy and Regulation: the Government is revising regulations to incentivize circular practices. This could involve tax breaks for businesses that design eco-friendly products or invest in recycling technologies.

2. Bottom-Up Initiatives:

- Education and Awareness: schools are increasingly integrating circular economy principles into their curriculum, empowering future generations to be responsible consumers and informed decision-makers. Projects like "Everything is transformed" raise student awareness about waste management and resources.

- Stakeholder Involvement: platforms like the Italian Circular Economy Platform (ICESP) foster collaboration between government, businesses, and NGOs. This collaborative approach ensures diverse perspectives are considered when developing and implementing circular economy practices.

- Regional and Local Actions: many Italian regions and cities have their own circular economy initiatives. These can range from promoting composting programs to supporting local businesses that embrace circular practices.

By combining national leadership with local action and public awareness, Italy aims to achieve a smooth transition towards a circular economy that fosters sustainable development.

5.5 Italian perspectives On Circular Economies

Italy views the Circular Economy (CE) as a strategic necessity and a key driver for a more sustainable future. The national perspective focuses on the following:

- Resource Scarcity: Italy, lacking abundant natural resources, recognizes the importance of resource efficiency. CE offers a way to minimise reliance on virgin materials and create a more resilient economy.

- Environmental Sustainability: Italy is committed to reducing its environmental footprint. CE principles like waste reduction, cascading materials, and using renewables all contribute to a healthier planet.

- Economic Opportunity: the transition to a CE presents business opportunities. Innovation in eco-design, recycling technologies, and the sharing economy can create new jobs and drive economic growth.

- Leadership: Italy strives to be a leader in the European CE movement. Their strong performance in recycling and focus on policy development positions them as a frontrunner.

- Societal Shift: The CE is not just about waste management; it's a cultural shift. Italy recognizes the need to educate younger generations and promote responsible consumption habits for a successful transition.

Overall, it can be said that Italy sees the CE as a win-win proposition. It addresses resource scarcity, environmental concerns, and economic opportunities, while promoting a more sustainable future for

generations to come.

6. Interview with a national expert on Digital Storytelling and/or Circular Economy.

6.1 Introduction of the expert

The interviewed expert in the Digital Storytelling Methodology is Lisa Chemello, a primary school teacher. Her professional experience as an educator has focused on digital storytelling within the context of primary education and environmental education for the past few years. Lisa's expertise in these areas made her an ideal candidate for this interview, as her work exemplifies the practical integration of innovative methodologies like digital storytelling into educational curricula.

6.2 Interview highlights on Circular Economy

The interviewed expert's experience is particularly relevant to the topic of Circular Economy and Environment, given the growing emphasis on environmental education and the need for engaging pedagogical approaches that can resonate with young learners. Moreover, her involvement in a hands-on project that combines digital storytelling with environmental awareness underscores her practical knowledge and ability to implement theoretical concepts in real-world classroom settings. This blend of academic and practical experience provides valuable insights into how digital storytelling can be effectively utilised to foster environmental consciousness among students, making her a fitting expert for discussing the intersection of these fields.

In the interview, Lisa Chemello emphasised the potential of digital storytelling to raise awareness about environmental issues among students. Her project focused on environmental pollution and its impact, particularly on the animal world, which resonated strongly with the children. Through storytelling, students were able to engage deeply with the topic, illustrating scenes and narrating stories that highlighted the importance of environmental stewardship.

6.3 Interview highlights on the use of Digital Storytelling

Digital storytelling, as described by Lisa Chemello, is a versatile and cross-disciplinary methodology that can be effectively integrated into various subjects within the school curriculum. In her experience, Digital Storytelling not only engages students creatively but also allows them to internalise complex topics like environmental sustainability and Circular Economy. She detailed a comprehensive approach, starting with setting a learning objective, followed by researching the topic, and then progressing to the creation of digital stories. This process involves multiple stages, such as drafting a story, organising scenes, and finally, producing a digital narrative using drawings, images, and recorded voices.

Lisa highlighted the importance of structuring these activities carefully, especially when dealing with younger students, to ensure the methodology is approachable and effective. She also pointed out that digital storytelling empowers students by making them active participants in their learning process. For instance, in her project, students were responsible for creating and narrating a story aimed at raising environmental awareness among their peers. This responsibility not only increased their engagement but also helped them develop a deeper understanding of the subject matter. Furthermore, Lisa noted that digital storytelling can be adapted to different age groups and skill levels, with younger students focusing more on basic tasks like drawing and narrating, while older students can take on more complex roles, such as video editing. The hands-on nature of this methodology, combined with the use of digital tools, makes it an appealing and effective way to teach important themes like environmental sustainability and Circularity.

6.4 List of the main topics to develop during the school lessons

1. **Waste Management and Recycling:** students can create digital stories that illustrate the importance of reducing, reusing, and recycling materials. This can include narratives about how different waste products are processed and the impact of recycling on reducing environmental pollution.

2. **Sustainable Consumption:** through storytelling, students can explore the concept of sustainable consumption, focusing on how choosing eco-friendly products and reducing consumption can help conserve resources and protect the environment.

3. **Renewable Energy Sources:** digital stories can be used to explain the benefits of renewable energy sources like solar, wind, and hydroelectric power, emphasising their role in reducing carbon emissions and combating climate change.

4. **Biodiversity and Ecosystem Protection:** students can create narratives that highlight the importance of preserving biodiversity and protecting ecosystems, exploring the interconnectedness of species and the impact of human activities on natural habitats.

5. **Circular Economy Principles:** a broader topic could involve creating stories that explain the circular economy concept, focusing on how products can be designed, used, and recycled in ways that minimise waste and make the most of resources. This can include examples of products with a long lifecycle and how businesses and consumers can adopt more sustainable

practices.

7. Conclusion and recommendations

The integration of Digital Storytelling (DST) in Italian secondary schools has demonstrated significant potential to enrich educational experiences by fostering creativity, critical thinking, and digital literacy among students. As shown by various examples and initiatives, DST not only supports diverse learning styles but also allows students to explore complex topics, such as cultural identity and sustainability, in a personalised and engaging manner. Moreover, DST aligns well with the educational objectives of promoting 21st-century skills and nurturing environmentally conscious citizens capable of contributing to a circular economy.

To fully harness the benefits of DST, it is recommended that educators receive comprehensive training on DST tools and methodologies, ensuring they are well-equipped to guide students through the storytelling process. Additionally, schools should invest in accessible digital tools and platforms, enabling all students to participate in DST activities regardless of their technical expertise. Collaborative projects and cross-curricular integration should be encouraged to maximise the interdisciplinary potential of DST, allowing students to connect knowledge across subjects.

Furthermore, ongoing evaluation and adaptation of DST practices are crucial. Schools should establish mechanisms for reflecting on the effectiveness of DST projects, collecting feedback from students, and adjusting approaches to better meet educational goals. By fostering an environment that values innovation and creativity, educators can ensure that DST remains a dynamic and impactful element of schools curriculum in Italy. This will not only enhance student engagement and learning outcomes but also prepare them to navigate and contribute to an increasingly digital and sustainable world.

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