



CEDIS

Circular Economy in Digital Storytelling

Desk Research
Portugal



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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.

The use of Digital Storytelling in the Portuguese Secondary School has been increasingly integrated as an innovative educational tool to promote social, emotional and academic competences in young people. In recent decades, the number of programmes aimed at promoting digital storytelling skills in children and young people has multiplied. In the Portuguese school context, there are currently several examples of their implementation, although there's more incidence in elementary or higher education levels.

In Portugal, the Ministry of Education published the Education Programme Manual in the 1990s, a pioneering initiative, the result of a decade of research with primary and secondary school students, which would lead to the more systematic and empirically validated promotion of digital storytelling competences in the following decades. The programme's main vectors were the importance of a preventative and skills-promoting nature, the usefulness of these skills being promoted in a school context and the need for teacher training to implement the programme (Matos, Programa de promoção de competências sociais: manual de utilização, 1997).

Within the educational policy measure "Educational Territories of Priority Intervention" (TEIP), educational agents have been trained in the dynamics of collaborative intervention between the various players in the continuous improvement of school results through various methodologies, including DST education. With activities such as the activity "Digital Stories in TEIP Schools" the aim is to engage students from TEIP schools in creating digital stories that reflect their personal experiences, cultural backgrounds, and aspirations (Andrade, 2012).

In 2013, within the education community, from a psychologist perspective was promoted innovative strategies integrating the entire school community, increasing student wellbeing and promoting a healthy relationship with the school. The aim was to include the entire educational community: families, students, educators, leaders, teachers, other health and social service technicians through the use of digital storytelling (Matos, Gaspar, & Ferreira, Aventura Social no CED: Intervenção numa Comunidade Educativa, 2013).

3.2 Types of Digital Stories

In Portugal, professors use the different formats for different purposes. For example, for personal narratives, stories that recount significant events in the narrator's life, such as the examples in "Tell us a story!" in a podcast format (Elementary level).

Other types of digital stories are the instructional and training narratives, a way of approaching curricular content and transmitting knowledge in a particular area of expertise, used quite often in the language classes specifically in the teaching of English as non-native language.

Besides this, it's used digital stories regarding thematic narratives and historical events, where students recount historical events, and include photographs, newspaper headlines, audio recordings and videos. (Marie, Réquão, & Laranjeiro, 2022)

In this way, the participants explored this multimedia tool to creatively illustrate curricula, manage different learning styles, facilitate the organisation and structuring of ideas and enhance the sharing of opinions and critical and reflective thinking, as well as developing projects to work on later with students in their schools.


3.3 Usability of DST in the classroom.

In a Portuguese literature class, students use digital stories or are tasked with creating digital stories based on classic literary works such as from the poet Fernando Pessoa. Students use digital media tools to illustrate key scenes, analyse character motivations, or explore thematic elements (Escola Secundária Afonso Lopes Vieira, 2021).


In a foreign language class, students use DST to practice language skills by creating digital stories in the target language. For example, producing short films or animations that tell a story, incorporating dialogue, narration, and subtitles. Some schools have implemented initiatives, such as "Tell us a story!", to encourage students to develop projects related to the act of storytelling that put students in challenging educational situations (Conceição, 2014).


Furthermore, initiatives like PROPS - Interactive Narratives Propose Pluralist Discourse, guided students in producing interactive digital stories within the classes of Citizenship and Development based on primary and secondary school curricula (CIAC, s.d.). In similar way in civics or social studies class, students use DST to raise awareness about social issues or advocate for change in their communities (CIAC, 2023). For example, students produce documentaries or digital stories that address topics such as environmental sustainability, social justice, or human rights, incorporating interviews, testimonials, and data visualisations to make a persuasive argument. This empowers students to use their voices and digital skills to effect positive change in society.


3.4 Digital tools and devices


1.	
Name	Go! Animate
Description (up to 500 characters)	Go! Animate is a tool that allows you to create animated videos in a very appealing way and in a very short time. You need to create a free user account and then choose the type of scenery, characters, special effects, music, sound effects, etc. The lines are available in several languages, you can turn the text into a voice, the character says what you've written or you can record your own voice using the microphone. The end result can be saved on your computer or shared on Facebook, YouTube, Twitter and by e-mail. The interface is in English.
Keywords	Accessible characters; realistic movements;
Language(s)	English
Best suited for (name comma-separated tasks that can be achieved with the use of this tool)	Customized scenario-based training
Ease of use (provide a rating of 1 = very easy to use, 5 = extremely hard to use)	1
Price (put 0 for a free tool)	23 euros
Logo of the tool	

Link	https://www.vyond.com/solutions/training-andelearning-videos/
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2.	
Name	MakeBeliefsComix
Description (up to 500 characters)	Make Beliefs Comix offers a library of fantastic, free ebooks for SEL. The library hosted by Make Beliefs Comix contains fillable PDFs that you can download for free.
Keywords	Younger students; creative writing
Language(s)	English
Best suited for (name comma-separated tasks that can be achieved with the use of this tool)	Young people
Ease of use (provide a rating of 1 = very easy to use, 5 = extremely hard to use)	1
Price (put 0 for a free tool)	0
Logo of the tool	
Link	https://makebeliefscomix.com/

3.	
Name	Animoto
Description (up to 500 characters)	Animoto is a tool that lets you create videos in a very simple way, adding videos, photos, music and short phrases or expressions. In the end, it analyses all the content that the user has inserted and generates a slideshow with the animation of a true video editing professional. To do this, you need to create a free user account.
Keywords	Short videos;
Language(s)	English
Best suited for (name comma-separated tasks that can be achieved with the use of this tool)	Make eye-catching school promotional videos with ease; help your whole school communicate better with video
Ease of use (provide a rating of 1 = very easy to use, 5 = extremely hard to use)	1
Price (put 0 for a free tool)	0
Logo of the tool	
Link	https://animoto.com/

4.	
Name	Storybird
Description (up to 500 characters)	Storybird is a tool that allows you to create short stories in digital book format. You need to create a user account, then you'll be presented with various illustrations divided into themes. The illustrations are impressive and stimulate anyone's imagination and creativity. The story you create can be shared by email, on social networks or as a paper publication (on request). The interface is in English but is simple and easy to navigate.
Keywords	Unique stories; illustrations; young students
Language(s)	English
Best suited for (name comma-separated tasks that can be achieved with the use of this tool)	Boost Writing Skills; Empowering young writers to create unique stories with amazing illustrations.
Ease of use (provide a rating of 1 = very easy to use, 5 = extremely hard to use)	1
Price (put 0 for a free tool)	0
Logo of the tool	
Link	http://storybird.com/

5.	
Name	Vev
Description (up to 500 characters)	The best stories on the web are experiences. Discover how to bring narratives to life through immersive visual media, data visualization, and animations. Vev makes it easy to work storytelling visualization into any piece of digital content—without writing a line of code. Customize Vev's pre-coded design elements and animations to craft your own visual story.
Keywords	Immersive visual media
Language(s)	English
Best suited for (name comma-separated tasks that can be achieved with the use of this tool)	Interactive landing pages and product pages, to reports, articles and modular content.
Ease of use (provide a rating of 1 = very easy to use, 5 = extremely hard to use)	1
Price (put 0 for a free tool)	0
Logo of the tool	
Link	https://www.vev.design/

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

4.1 Introduction to the selection of the best practices

In the pursuit of sustainability and environmental stewardship, the concept of the circular economy has emerged as a pivotal framework. At its core, the circular economy aims to minimize waste and resource depletion by emphasizing reuse, repair, and recycling. In this context, digital storytelling serves as a powerful tool for disseminating knowledge, inspiring action, and fostering engagement in circular economy practices (Pozzetto, Colurcio, & Vianelli, 2023).

Portugal, with its rich cultural heritage and burgeoning innovation ecosystem, stands as a prime example of leveraging digital storytelling to promote the principles of the circular economy. Through a careful selection process, exemplary initiatives and campaigns that encapsulate the essence of effective digital storytelling in this domain are highlighted.

From innovative startups to established organizations, Portugal boasts a diverse array of actors actively engaged in promoting circular economy principles through digital storytelling. These initiatives harness the power of multimedia content, including videos, interactive websites, social media campaigns, and immersive experiences, to communicate complex concepts in accessible and compelling ways. The selected best practices showcase a variety of approaches, ranging from educational campaigns targeting consumers to industry-led initiatives promoting sustainable production and consumption patterns.

In addition, scalability, effect assessment, and inclusivity are considered during the selection process to make sure that the selected best practices not only inspire but also provide noticeable results that lead to a more sustainable and circular future. Portugal serves as an example of how innovation and sustainability may come together to build a more promising and resilient future for future generations.

4.2 Best practices

1	
Case study name	Circular Schools Program by Quercus - National Association for Nature Conservation
Description of the context in which the best practices have been developed	Quercus, in collaboration with educational institutions across Portugal, launched the Circular Schools Program to integrate circular economy concepts into the curriculum. Through digital storytelling tools such as interactive e-books, educational videos, and online workshops, the program engages students, teachers, and school administrators in exploring topics such as waste reduction, resource efficiency, and sustainable consumption. By incorporating real-life examples, case studies, and gamified learning experiences, the Circular Schools Program inspires environmental awareness, critical thinking, and problem-solving skills among students, empowering them to become active agents of change in their schools and communities.
Location	Portugal in general
How the methodology of DST have been used to develop contents related to the Circular Economy	Within this case study, interactive E-books and Educational Videos were produced. Also, through storytelling techniques such as case studies, role-playing exercises, and virtual simulations, students are immersed in real-world scenarios where they can explore the challenges and opportunities of transitioning to a circular economy model. The programme also used gamified learning experiences, using DST to develop educational games, quizzes, and challenges that reinforce circular economy principles in a fun and interactive way. The case study also compiled student-generated content, by producing videos, and digital artworks that convey their understanding of the Circular Economy.
Target group involved	Students, teachers, and educational institutions
Three most important issues the case study addresses	Environmental Education; Promotion of Circular Economy Principles; Empowerment of Youth
Outcomes of the case study (link)	https://www.greencork.org/o-projecto/
Key words (or hashtags) related to the case study	Communities; Schools; ONGs

2	
Case study name	Educational Action: Educating for Climate Change by LPN
Description of the context in which the best practices have been developed	Following the Educating for Climate Change online action for teachers, LPN has also organised the Educating for the Circular Economy online actions and programme, given the integration between the

	two themes for the Educational Sector. This is a targeted learning programme aimed at greater sustainability at the national level.
Location	Portugal and online sessions also.
How the methodology of DST have been used to develop contents related to the Circular Economy	<p>There were a series of training sessions that provided continuous learning. The materials collected from LPN (the entity responsible for organising the training programme associated with Digital Storytelling for the Circular Economy), showed DST techniques to create an excellent framework on the meaning and importance of the Circular Economy theme. Demonstrated the different concepts and methodologies of the linear economy versus the circular economy and highlighting various resources and examples of educational practices.</p> <p>LPN invited the Secretary of State for the Environment - Inês Costa, Cristina Sousa from the LPN Board and founder of ZeroWasteLab, Teresa Oliveira, a teacher seconded to the SPEA and Márcio Oliveira, a teacher and coordinator of the Environment Club at the EBI/S Cardeal Costa Nunes School - Madalena do Pico School Group. The inclusion of guest speakers, such as the Secretary of State for the Environment and other experts, improves the moments of storytelling to communicate their experiences, insights, and visions for advancing the circular economy agenda.</p>
Target group involved	Educational Experts, Educational Entities, Students, Trainers and School Advisors
Three most important issues the case study addresses	Recycling, Sustainability and Critical Thinking
Outcomes of the case study (link)	https://www.lpn.pt/pt/noticias/jornadas-de-ambiente-da-escola-secundaria-jose-saramago
Key words (or hashtags) related to the case study	#enviromental #plastic #new_horizonts #criativiy

3	
Case study name	Let's Reinvent the Future
Description of the context in which the best practices have been developed	Is an environmental awareness and education programme developed by the Portuguese Pact for Plastics (PAC) with the aim of promoting the circular economy and raising awareness about the correct use of packaging and disposables, and the management of the waste associated with them. This programme used digital storytelling contents to reach the target group.
Location	Portugal

How the methodology of DST have been used to develop contents related to the Circular Economy	It was created a story around PAC, a boy trying to save the planet from plastics and producing videos calling to action on better manager plastics and their reuse
Target group involved	Aimed at children, teachers and guardians
Three most important issues the case study addresses	Circular economy for plastics; Incorporating recycled plastic into new plastic packaging; Ensure recycling of plastic packaging
Outcomes of the case study (link)	www.reinventarofuturo.pactoplasticos.pt https://youtu.be/DHt_DRoz_VM
Key words (or hashtags) related to the case study	#PAC #PetPlastics

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

5.1 Introduction

Circular Economy Education in secondary schools in Portugal is a forward-thinking approach designed to increase sustainable habits in young learners. This educational approach is centred on the principles of reducing waste, reusing materials, and recycling resources, creating a sustainable loop that minimizes environmental impact. By embedding these principles into secondary education, the country aims to cultivate a generation equipped to drive sustainable development and address the pressing environmental issues.

The Ministries responsible for Education and the Environment signed a Cooperation Protocol which, among other initiatives, gave rise to the creation of a network of teachers with technical-pedagogical skills to coordinate and promote projects developed in conjunction with environmental non-governmental organisations, or anchored in equipment to support environmental education. Other initiatives pass from programmes that bring students to companies and business that already apply circular economies principles or invite them provide insights of their experience in their school environments (Secretaria-Geral do Ministério do Ambiente e Ação Climática).

Over the last few years, it has become possible to disseminate innovative practices in carrying out environmental education projects, based on partnerships between schools, local authorities, NGOs and other local and regional organisations, under the coordination of education professionals and environmental specialists. It is also worthy highlighting the contribution of these protocols to the training of teachers at various levels of education and teaching in topics linked to Environmental Education for Sustainability, as well as to the extension of environmental education to citizens in general, through local, regional and national intervention and dynamization work (Circular Economy Portugal., 2022).

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

Portugal's Ministry of Education has issued comprehensive guidelines to facilitate the transition from a linear to a circular economy. The challenge of this transition requires the interconnection between the Ministry of the Environment and the Ministry of Education, which envisages 16 measures framed by three strategic objectives: More Transversal Environmental Education; More Open Environmental Education; and Environmental Education Participative. These objectives serve the three central pillars of this government's environmental policy: decarbonising society, making the economy circular and enhancing the value of the territory. Raising awareness and educating the public, particularly the younger generation, is crucial. The guidelines advocate for the integration of circular economy concepts into educational curricula at all levels, ensuring that future generations are equipped with the knowledge and skills needed for sustainable living. Also, emphasis is placed on science, technology, engineering, and mathematics (STEM) subjects to equip students with the technical skills needed for innovative solutions in the circular economy (Secretaria-Geral do Ministério do Ambiente e Ação Climática).

Moreover, the Ministry supports practical projects and partnerships with schools, universities, and business to develop innovative solutions and hands-on learning experiences. These projects encourage students to engage in activities that illustrate the benefits and applications of circular economy concepts in real-world settings. Schools are also encouraged to participate in national campaigns to raise awareness about the circular economy, engaging not just students but also their families and the wider community.

Another important aspect of Portuguese Ministry of Educations is the promotion of training programs for teachers that are developed to ensure they are well-equipped to teach circular economy concepts effectively. This includes workshops, seminars, and access to up-to-date educational resources (Direção-Geral da Educação , 2022).

This approach ensures that education serves as a pivotal tool in driving sustainable development and innovation in Portugal.

5.3 Conceptual Background of Circular Economy in Portugal

The conceptual framework of the circular economy in Portugal is built on the principles of sustainability, resource efficiency, and innovation. It aims to transition from the traditional linear economy, characterized by a 'take-make-dispose' model, to a regenerative system where resources are reused, refurbished, and recycled, minimizing waste and environmental impact. The initiatives to be developed pursue the thematic 'Making the Economy Circular' and encourage collaboration between environmental education agents, fostering synergies and optimising available resources. These initiatives are set out in Notice no. 4656-B/2019 published in Diário da República, 2nd series - No. 55 - 19 March 2019. This transition aligns with the European Union's broader circular economy strategy and involves several key principles and strategic goals such as Sustainable Resource Management, Product Lifecycle Extension, Waste Minimization and Economic and Environmental Integration (Diário da República, 2019).

Through this comprehensive approach, Portugal aims to build a sustainable, resilient economy that benefits the environment, society, and the economy.

5.4 Circular Economy and Sustainable Development

In Portugal, the development of the circular economy and sustainable development is a multifaceted effort involving government policies, private sector initiatives, and community engagement. The Portuguese government has spearheaded several strategies to promote sustainability. Portugal has implemented strict waste management regulations (e.g. starting from January 1, 2024, Portuguese municipalities are required by law to collect and manage organic waste separately). These legislation aims to address the issue of organic waste management, promote recycling, and reduce the burden on landfills (Ministério do Ambiente e Ação Climática, 2023).

Tax incentives and subsidies are provided for sustainable practices and technologies. This includes reduced taxes for businesses that adopt circular economy practices and investments in renewable energy. Besides this, many Portuguese companies are adopting circular economy principles, focusing on sustainable product design, resource efficiency, and waste reduction. Collaborations between the government, businesses, and research institutions are promoted and driving innovation in sustainability practices. These partnerships help scale up sustainable solutions and promote best practices across industries (Fonseca, Domingues, Pereira, Martins, & Zimon, 2018). Also are financed and boosted initiatives to educate the public about sustainability and the benefits of a circular economy are widespread. This includes school programs, public campaigns, and community projects that encourage sustainable living practices (Secretaria-Geral do Ministério do Ambiente e Ação Climática).

Overall, Portugal's approach to fostering a circular economy and sustainable development is holistic, involving coordinated efforts across government policies, corporate initiatives, and community participation.

5.5 Portuguese perspectives On Circular Economies

Portugal sees the circular economy as a strategic method to attaining sustainable development, increasing resource efficiency, and boosting economic resilience. Through a variety of laws and programs, the country has pledged to alter its economic model in order to reduce waste and promote continuous resource usage. It has bolstered the development of environmental education projects and programmes that encourage a shift in the economic paradigm - from a linear system of consumption based on the erosion of natural capital to a restorative and regenerative system that seeks to preserve the usefulness and value of resources (material, energy) for as long as possible - which should lead to the protection of ecosystems as well as the financial capital of businesses and civil society (Ministério do Ambiente e Ação Climática, 2017).

As overall, there's a government commitment to circular economies trough guides such as Action Plan for the Circular Economy (PAEC). Introduced in 2017, the PAEC aims to shift from a linear "take-make-dispose" model to a circular one, emphasizing waste reduction, recycling, and resource efficiency. The plan targets key sectors such as construction, agriculture, and manufacturing to implement circular practices. As EU Member State, Portugal's circular economy initiatives are closely aligned with the European Union's Circular Economy Action Plan. This alignment ensures that national efforts are reinforced by broader EU policies, funding, and regulatory frameworks.

Portugal economic and environmental goals are mainly focus on resource efficiency. By keeping resources in use for longer, Portugal aims to create a more sustainable and self-sufficient economy. Embracing circular economy principles, is perceived as a triggering guidance for innovation and competitiveness, leading to new business models and technologies. This shift is expected to boost Portugal's competitiveness in the global market, fostering economic growth and job creation in green industries (Ministério do Ambiente e Ação Climática, 2017).

In conclusion, Portugal views the circular economy as crucial to attaining sustainability, resilience in the face of economic adversity, and environmental preservation, coordinating domestic initiatives with more comprehensive EU plans to promote systemic change.

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

6.1 Introduction of the expert

The expert chosen was Fábio Borges, a speaker, trainer and coach focussed on Positive Communication. He arrived in Portugal from Brazil in 2021 to provide training in coaching, public speaking and digital storytelling. Nowadays works as consultant for individuals and teams in these areas. This expert was chosen due to his flexibility in adapting and implementing the tool of digital storytelling to various subjects, including circular economy, and various educational settings, including secondary schools. His previous experience was also taken in consideration, since he has worked on a project to create a children's digital book to promote circular economy. A character was created who lived in a vulnerable community near a rubbish dump. On this journey they discover how to use rubbish to promote the growth and sustainable development of the community.

6.2 Interview highlights on the Circular Economy

It was considered by the expert that the main challenges are on two fronts regarding the teaching of circular economy to youth. In one side, the changing of the culture, which is starting to be worked on among younger students, but still needs to be reinforced among older people, who come from another period and different ways of waste treatment. On the other side, is the relation to the infrastructures and technologies for implementing these policies. There's a need to connect students' reality to the topics and applications of policies. Accordantly to the expert, this can be achieved by adapting teaching material, having a character, that students follow throughout a period, while doing activities creating a sense of self-reflection throughout. When the pedagogical curriculum manages to make these various points of integration with different disciplines, different contexts, enriches students' experiences and increase the understanding of information. The expert highlighted that there's a lot of progress to make, but the context in Portugal is positive, due to the constant policies, measures and educational strategies that haven been pursued by national government and local organizations.

6.2 Interview highlights on the use of Digital Storytelling

It was highlighted by the expert the importance of the inclusion of this topic in the academic training of educators and education professionals. The most important step is for professors to integrate this topic into the curriculum and in an interdisciplinary way in the training and preparation of lessons for their students. A way to support these professors is to present materials, show paths of creating activities and materials appropriated to the class and how to introduce these in the educational settings. It was also reenforce the choice of subjects and themes that really provoke students' interest, to use the proximity to the reality of students' lives to introduce permanent pedagogical themes. The subjects and themes to be taught must be connected to the students' real-life situations, where they can feel a sense of belonging and connection to the topic and activity. The participation of students in the choice, stimulating this co-creation of the content is fundamental. Encouraging co-operation and creativity in groups and facilitating the choice of easily accessible resources for implementation is the action that ends up having more success in the engagement of students and the understanding of information taught.

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

Key subjects should emphasize both fundamental ideas and practical applications while teaching the circular economy using digital storytelling to increase student involvement. This is a recommended list:

- Overview of the Circular Economy: Explanation of the circular economy and compare it with the take-make-waste linear economy (concepts such as waste minimization, sustainability, and resource efficiency)
- The Life Cycle of Products: Follow the path of common products through design, production, use, and disposal using digital storytelling.
- Case Studies of Circular Businesses: Provide actual instances of businesses implementing circular economy concepts, like product-as-a-service, repair, and reuse.
- Examine how digital technologies (AI, blockchain, and IoT) are used to track materials, optimize resource consumption, and support circular systems in Circular Economy.
- Impact on the Environment and Society: Describe how the circular economy would help society and the environment by reducing pollution, requiring less resource extraction, and creating jobs. Examine how circular economy practices differ on a local and global scale, considering cultural and economic variables.
- Student-Developed Circular Economy Projects: Motivate students to create their own circular economy projects, showcasing their concepts through interactive apps, films, and animations.

7. Conclusion and recommendations

Throughout the report has been shown the potential of digital storytelling as an educational tool, specifically to incorporate circular economy in schools. It is considered that integrating digital storytelling projects into existing subjects like Environmental Science or Technology is key. Students can create stories that illustrate circular economy concepts, such as sustainable production, recycling, or resource management, using digital tools like videos, podcasts, or interactive media. Secondly, training teachers on both circular economy principles and digital storytelling methods is also imperative. Workshops or online training can equip educators with the skills to guide students in crafting compelling, informative narratives about sustainability. Collaborative projects are another effective strategy. Students can work in teams to develop stories that explore local, reality based, challenges or solutions, connecting with businesses or communities to highlight real-world examples. This collaboration fosters practical learning and community engagement. To further engage students, schools can offer digital platforms where stories can be shared, evaluated, and discussed. Hosting virtual storytelling competitions or showcasing student work on social media can raise awareness and motivate students. Lastly, promoting creativity and critical thinking through storytelling encourages students to reflect deeply on circular economy issues, helping them connect the theory to real-world impacts in a memorable and engaging way. Overall, there's a commitment in Portugal to promote educational approaches that increase awareness and application of the subject of circular economy in classes.

8. Bibliography

Andrade, C. M. (2012). *Recursos multimédia como estratégia para reduzir a indisciplina na escola - Produção de digital storytelling*. Lisboa .

CIAC. (2023). *PROPS – Narrativas Interativas Propõem Discurso Pluralista*. Obtido de Centro de Investigação em Artes e Comunicação (CIAC): <https://props.ciac.pt/projeto>

CIAC. (s.d.). *PROPS – Narrativas Interativas Propõem Discurso Pluralista*. Obtido de Centro de Investigação em Artes e Comunicação (CIAC): <https://props.ciac.pt/projeto>

Circular Economy Portugal. (2022). *Projects*. Obtido de Circular Economy Portugal.: <https://circulareconomy.pt/en/projects/>

Conceição, J. M. (2014). Contar histórias no palco digital : as potencialidades da tecnologia podcast nas histórias digitais : um estudo de caso : "conta-nos uma história!". Obtido de DGE – Direção-Geral da Educação: <https://erte.dge.mec.pt/concurso-counta-nos-uma-historia>

Diário da República. (2019). *Aviso n.º 4656-B/2019, de 19 de março*. Obtido de Diário da República: <https://diariodarepublica.pt/dr/detalhe/aviso/4656-b-2019-121277190>

- Direção-Geral da Educação* . (2022). Obtido de *Direção-Geral da Educação*:
<https://www.dge.mec.pt/noticias/webinar-economia-circular-modelo-de-gestao-sustentavel-e-socialmente-responsavel>
- Escola Secundária Afonso Lopes Vieira. (5 de May de 2021). Viajar - Fernando Pessoa/LGP. Leiria.
- Fonseca, L. M., Domingues, J. P., Pereira, M. T., Martins, F. F., & Zimon, D. (2018). Assessment of Circular Economy within Portuguese Organizations. *Sustainability*.
- Marie, P., Réquio, P., & Laranjeiro, D. (2022). Humanidades Digitais e ensino da História: O projeto 25 AprilPTLab. *Revista Portuguesa de Educação* .
- Matos, M. G. (1997). Programa de promoção de competências sociais: manual de utilização.
- Matos, M. G., Gaspar, T., & Ferreira, M. (2013). *Aventura Social no CED: Intervenção numa Comunidade Educativa*. Lisboa: Aventura Social .
- Ministério do Ambiente e Ação Climática. (2017). *Plano de Ação para a Economia Circular em Portugal*. Obtido de <https://www.portugal.gov.pt/download-ficheiros/ficheiro.aspx?v=6728940a-1482-4b22-92e7-209bf8e317bb>
- Ministério do Ambiente e Ação Climática. (2023). *Separação e Gestão de Resíduos Orgânicos*. Obtido de Governo da República Portuguesa:
<https://www.portugal.gov.pt/pt/gc23/comunicacao/comunicados-de-impressao/min-ambiente.aspx>
- Pozzetto, E., Colurcio, M., & Vianelli, D. (November de 2023). Storytelling for the Faceless: A Tool for Communicating Sustainability and Circular Economy in the Public Sector. *IGI Global*.
- Secretaria-Geral do Ministério do Ambiente e Ação Climática. (s.d.). *Estratégia Nacional de Educação Ambiental 2022*. Obtido de Secretaria-Geral do Ministério do Ambiente e Ação Climática: <https://missao360.com/en/educational-resources-2/>