Designing and Digital Storytelling for Climate Change Education

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Digital technology has made rapid advancements in knowledge sharing and communication. As one of the most effective methods in enhancing social connections, digital storytelling offers an opportunity to take on perspectives different from our own and empathize with the challenges, dreams, disappointments, and accomplishments of others. Although storytelling is not a new concept, digital storytelling is still new in the context of climate change education. As one of the most popular tools in education, it offers enormous potential for achieving climate change education goals to realize this global fightback. The application of digital storytelling in climate change education is particularly critical for youth who are among those most at risk from the global climate crisis. In addition to providing a sense of personal agency and empowerment to young people, digital storytelling in climate change education can have a significant impact on both major and minor decision-making. Digital storytelling could help weave engaging, positive, and action-oriented narratives. Yet, it could easily create narratives of displacement, exclusion, and extremism. Designing an interactive digital storytelling curriculum that transitions from predominantly negative to a more balanced spectrum has been concerning for educators. In accordance with this premise, researchers aim to provide examples of digital storytelling as a medium for climate change education curriculum design.

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Digital technology has transformed the way we share stories. In recent years, interactive design techniques and tools have opened new avenues for creative expression. In particular, the storytelling medium can break free from traditional media by leveraging visually dynamic digital elements,[2] such as video, illustrations, 3D objects, and animations. Designers and educators working with the storytelling medium may come from varied backgrounds in media design, motion graphics, user experience design, or additionally have hybrid roles as designer/filmmaker or in design research. Digital stories are not required to be static, linear affairs consisting of fixed text and image blocks – they need not even follow a traditional content format. This allows audiences to engage with the stories. In the education field, storytelling is the original form of teaching. By crafting storylines, teachers help students make sense of the complex and chaotic world around them.[3] Using digital storytelling as a pedagogical design can engage students in more profound, more meaningful learning experiences.[4] Compelling, emotionally engaging formats that combine story-making and story distribution services to prioritize the power of individual perspectives make digital storytelling an effective tool in the classroom.[5]

In climate change education, storytelling can introduce hard concepts,[6] bringing a human element to a discipline often perceived as sterile.[7] Climate change education could use stories for different purposes: connecting to students, creating "interweaving" between problematic situations, and explaining or asking questions. The key is to bring out the student's perspective

2 Yogesh K. Dwivedi et al., "Setting the Future of Digital and Social Media Marketing Research: Perspectives and Research Propositions," *International Journal of Information Management* 59 (2021), https://doi.org/10.1016/j.ijinfomgt.2020.102168.

3 Bernard R. Robin, "Digital storytelling: A powerful technology tool for the 21st century classroom." *Theory into practice* 47, no. 3 (2008), 221.

4 Najat Smeda, Eva Dakich, and Nalin Sharda, "The Effectiveness of Digital Storytelling in the Classrooms: A Comprehensive Study," *Smart Learning Environments* 1, no. 1 (December 2014), https://doi.org/10.1186/s40561-014-0006-3.

5 Bernard R. Robin, "The Power of Digital Storytelling to Support Teaching and Learning," *Digital Education Review* 30 (December 1, 2016): 19, https://eric.ed.gov/?id=EJ1125504.

6 Miranda Jeanne Marie Iossifidis and Lisa Garforth, "Reimagining Climate Futures: Reading Annihilation," *Geoforum*, December 2021, https://doi.org/10.1016/j.geoforum.2021.12.001.

7 Bryan R. Warnick and Campbell F. Scribner, "Discipline, Punishment, and the Moral Community of Schools," *Theory and Research in Education* 18, no. 1 (February 10, 2020): 147787852090494, https://doi.org/10.1177/1477878520904943.

on the matter and how climate change affects their lives. For instance, students coming from under-resourced backgrounds may be struggling with accessing a balanced diet. Digital stories can help students understand how food insecurity is connected with climate change and the actions that could be taken to counter them. In the 2019 film, *The Boy who harnessed the Wind*, a fourteen-year-old in Malawi living in a drought-struck village decided to use his knowledge of physics to design and build a wind turbine to help his village deal with the crisis.[8] The story, inspired by the real achievements of William Kamkwamba, presents themes of drive, resilience, and most importantly, hope. The power of such stories lies in their ability to make a boy in New York relate to a boy in Malawi, facing the same set of issues albeit on a different scale.

Digital Storytelling Design Development and Elements

The "Digital Storytelling Movement" originated at the StoryCenter, and traces its roots to the artistic and cultural ferment of the 1970s and 1980s in the US. An experienced theater producer Joe Lambert founded the StoryCenter in Berkeley, California as a non-profit community arts organization. Lambert developed seven elements comprising digital storytelling theory, including: self-revelation, personal or the first-person voice, live experiences, the use of photos more than moving images, soundtracks, length and design, and intentions.[9]

Additionally, Lambert discussed the seven steps of digital storytelling in story circles, including having insight, "catching the moment," seeing, hearing, assembling, and sharing their stories.[10] According to Bernard R. Robin's theory, educators need 12 elements to complete the design of a digital storytelling project. It is important to note that the script development process consists of 12 steps, including selecting a topic, conducting research, writing the first draft, receiving feedback on the script, revising the script, finding, creating, and adding images, respecting copyright, creating a

8 Jan-Erik Leonhardt et al., "Glocal Perspectives in Film-Based Foreign Language Education: Teaching about Sustainability with 'the Boy Who Harnessed the Wind' (2019)," *Global Education Review* 8, no. 2–3 (September 13, 2021), 48, https://ger.mercy.edu/index.php/ger/article/view/602.

9 Joe Lambert, Digital Storytelling Cookbook (Digital Diner Press, 2010), 9.

10 Ibid.

storyboard, recording audio narration, adding background music (optional), and building the digital story.[11] Schuck and Kearney argue that additional digital storytelling steps, also involved in developing the idea, are: capturing the pedagogical frame, structuring the storyboard, arranging the storyboard, preparing the video, recording the video, arranging the video, presenting the video to a small group, presenting the video to a large audience/classroom, and disseminating the video.[12]

Compared to the traditional lectures, digital storytelling combines storytelling and digital components including texts, pictures, recorded audio narrations, music, and videos in the curriculum.[13] The use of digital storytelling in the classroom serves as an effective educational tool when designers and educators produce historical documentaries and instructional videos that provide students with an understanding of an important concept or practice.[14] The video or documentary they make combines the language of the words to evoke the audience's empathy directly. In other words, digital storytelling is a passport to connect the fundamentals of human communication and interaction, as oral tradition has contributed to the transfer of knowledge, skills, attitudes, and values since the birth of language.[15] Hence, the relationship between digital storytelling and education is inextricably linked. With climate change education, students already come across plenty of first-hand experiences with their environment making digital

11 Robin, "The Power of Digital Storytelling to Support Teaching and Learning," 22.

12 Sandra Schuck, "Classroom-Based Use of Two Educational Technologies: A Socio-Cultural Perspective," January 1, 2008, https://www.academia.edu/79048310/Classroom_based_use_of_two_educational_technologies_A_socio_cultural_perspective.

13 Rita Mojtahedzadeh et al., "How Digital Storytelling Applied in Health Profession Education: A Systematized Review," *Journal of Advances in Medical Education & Professionalism* 9, no. 2 (2021): 63–78, https://doi.org/10.30476/jamp.2021.87856.1326.

14 Bernard R. Robin, "Digital Storytelling: A Powerful Technology Tool for the 21st Century Classroom," *Theory into Practice* 47, no. 3 (July 11, 2008): 221, https://doi.org/10.1080/00405840802153916.

15 Jan-Erik Leonhardt et al., "Glocal Perspectives in Film-Based Foreign Language Education: Teaching about Sustainability with 'the Boy Who Harnessed the Wind' (2019)," *Global Education Review* 8, no. 2–3 (September 13, 2021), https://ger.mercy.edu/index.php/ger/article/view/602.

storytelling an effective tool to connect their experiences to the broader global challenges.[16]

Digital Storytelling Forms

Designing the storytelling process in the classroom is critical to achieving learning objectives. The goal is to achieve a shift in narratives, attitudes, and levels of knowledge after going through a storytelling exercise. Consider the following forms of storytelling techniques that educators could use in the classroom.

Personal Narratives are stories based on personal experiences – a powerful tool for building emotional connections.[17] For instance, a personal narrative could be about a farmer in Pakistan, describing his struggling to grow crops because of extreme weather patterns. The story could dive into the farmer's experience dealing with floods, droughts, and other events and how it has impacted their life, finances, and relationship with the community around them. Personal narratives like these help educators connect students with climate change issues by evoking empathy. While effective in reaching students who might otherwise not take climate change as seriously, this is also a limitation to personal narratives because they can risk narrowing the scope of complex issues leading to climate change. In this instance, issues like systemic barriers to stop carbon emissions, and government reluctance to policies that prioritize the environment over profits may not be apparent from the personal narrative of a farmer.

Visual Storytelling uses images, videos, graphics, and other visual elements to tell a story or convey a message. In the context of climate change education, visual storytelling could be used to communicate complex information about climate science, the impacts of climate change, and potential solutions in an engaging way. Visual storytelling can help to make information more memorable and easier to understand. Research has shown that people are

16 Ya-Ting C. Yang and Wan-Chi I. Wu, "Digital Storytelling for Enhancing Student Academic Achievement, Critical Thinking, and Learning Motivation: A Year-Long Experimental Study," in Cas.columbia.edu, 2012, 350, www-sciencedirect-com.ezproxy.cul.columbia.edu/science/article/pii/S0360131511003289.

17 Ana Roeschley and Jeonghyun Kim, "'Something That Feels like a Community': The Role of Personal Stories in Building Community-Based Participatory Archives," *Archival Science* 19, no. 1 (February 7, 2019), 29, https://doi.org/10.1007/s10502-019-09302-2.

more likely to remember information when it is presented in a visual format. That visuals can help to simplify complex information by breaking it down into smaller, more digestible pieces.[18] Movies, documentaries, and short videos are effective visual storytelling media. With the rise of short video platforms like TikTok among young people, the medium presents an enormous opportunity for educators to level with their students and meet them where they are comfortable. For instance, the Drawdown Stories Project focused on climate justice and reimagined climate storytelling using underrepresented climate heroes to amplify individual voices and reimagine climate storytelling.[19]

Interactive storytelling is a type of storytelling that allows the audience to participate in the story and shape its outcome. In the context of climate change education, interactive storytelling can be used to engage students and help them to understand complex issues related to climate science, impacts, and solutions. It also can take many forms, from choose-your-own-adventure style narratives to role-playing games, simulations, and virtual reality experiences.[20] Interactive storytelling aims to create an immersive and engaging experience that allows students to explore different perspectives and outcomes related to climate change.[21] Interactive storytelling can help to increase engagement and motivation among students. Allowing students to take an active role in the story makes them more likely to be emotionally invested in the outcome and retain the information presented. Therefore, interactive storytelling can help to develop critical thinking skills and encourage collaboration and communication. When students are presented with choices and consequences, they must analyze the information presented and make decisions based on their understanding of the topic. This can lead to discussions and debates, which can help students to refine their thinking and learn from one another. Examples include online simulations that allow students to explore different scenarios related to climate science and policy, role-playing games that simulate the impact of climate change

18 Eliza Bobek and Barbara Tversky, "Creating Visual Explanations Improves Learning," *Cognitive Research: Principles and Implications* 1, no. 27 (December 2016), https://doi.org/10.1186/s41235-016-0031-6.

19 "Drawdown Stories," Project Drawdown, January 20, 2022, https://drawdown.org/stories.

20 See note 18 above.

21 Mark Owen Riedl and Vadim Bulitko, "Interactive Narrative: An Intelligent Systems Approach," *AI Magazine* 34, no. 1 (December 6, 2012): 67, https://doi.org/10.1609/aimag.v34i1.2449.

on communities and ecosystems, and virtual reality experiences that allow students to experience the effects of climate change firsthand.

Green Game Jam, for instance, is a video game studio that incorporates green activation by including environmentally themed features and messages and educating its users on environmental issues. Besides increasing the entertainment, this game story engages students in an interactive discussion about climate change and human activities. Currently, there are more than a billion players who have participated in the 2021 game campaign, and over 60,000 pledges have been signed for the UN campaigns, as well as $800,000 donated to various charities working on environmental issues.[22]

Future scenarios are a type of storytelling that involve imagining possible futures based on different projections and assumptions related to climate change.[23] In the context of climate change education, future scenarios can help students understand the potential impacts of climate change, strategies for mitigating and adapting to its effects. Future scenarios typically involve creating narratives that describe possible worlds based on different scenarios related to climate science, policy, and technology.[24] These narratives can be presented in various formats, from written stories to visual media such as videos or infographics. The goal is to create a compelling and realistic future vision that students can engage with and explore.

Engaging students in a future scenario exercise can help develop their critical thinking skills and encourage them to think creatively about solutions to climate change. Students are encouraged to analyze and evaluate the presented information by presenting different scenarios and outcomes and considering the potential consequences of other choices and actions. In addition, by presenting a compelling and realistic vision of the future, students are more likely to be emotionally invested in the topic and to feel a sense of urgency about taking action to address climate change. Examples include narratives that describe possible future worlds based on different levels of greenhouse gas emissions, population growth, and technological advances.

22 UN News, "Video Games for Climate Action: Winning Solutions for the Planet," May 31, 2022, https://news.un.org/en/story/2022/05/1119292.

23 Emma Frances Bloomfield and Chris Manktelow, "Climate Communication and Storytelling," *Climatic Change 167*, no. 34 (August 2021), https://doi.org/10.1007/s10584-021-03199-6.

24 Antonia Liguori et al., "Towards 'creative participatory science': exploring future scenarios through specialist drought science and community storytelling," *Frontiers in Environmental Science* 8 (2021).

These narratives can be presented in various formats, from written stories to visual media such as videos or infographics.

Mythological narratives are a powerful tool for storytelling in climate change education. They draw on ancient myths and legends to create compelling stories that connect contemporary audiences with timeless themes and universal human experiences. In the context of climate change education, mythological narratives can be used to explore the complex relationships between humans and nature and to inspire people to take action to address the urgent environmental challenges we face. It also provides a rich and diverse source of stories and archetypes that can help engage a broad audience range. These stories are often deeply ingrained in cultural traditions and passed down through generations, making them a powerful and familiar reference point for many people. Mythological narratives can also help to connect people with the natural world and to inspire a sense of reverence and awe for it. Many myths and legends feature gods, goddesses, and other mythical beings intimately connected with the natural world and embody its power and beauty. By drawing on these stories, educators can help students appreciate nature's wonders and develop a deeper connection with the natural world.

Examples of mythological narratives in climate change education include stories that explore themes such as the balance between human needs and the needs of the natural world, the consequences of human actions on the environment, and the power of human ingenuity and cooperation to address environmental challenges. These stories can be presented in various formats, from written reports to visual media such as videos or art installations.

Effectiveness of Digital Storytelling in Climate Change

Integrating climate crisis problems within a real or imaginary story, such as environmental justice, is crucial to climate change education. This approach facilitates the process of problem-solving by engaging students in a meaningful and relatable manner. However, as with any form of information exchange in digital media, there are potential downsides. The inundation of overwhelming or inaccurate information can influence individuals to make uninformed decisions.[25] The improper or excessive use of digital media

25 Daniela Acquadro Maran and Tatiana Begotti, "Media Exposure to Climate Change, Anxiety, and Efficacy Beliefs in a Sample of Italian University Students," *International*

stories can also lead to mental health issues such as depression, anxiety, and addiction.[26] Therefore, it is imperative to ensure that digital storytelling projects are designed thoughtfully, portraying a sense of hope and connection in communities nationwide that are actively working towards implementing climate solutions. A well-designed digital storytelling project can inspire students to participate actively in the fight against climate change while promoting mental well-being through positive and uplifting narratives.

Zan Rosetta identified narrative fractures in the story-problem formulation, where breakpoints exist between the mathematical structure and the narrative dimension.[27] In the context of climate change education, it is crucial to establish a strong connection between the question structure and the narrative dimension to avoid such fractures. This connection allows students to build strong community relationships and relate to climate problems described in digital storytelling representations. Conversely, the story may obstruct the solution process when climate problems do not arise spontaneously from the context or the narrative information does not relate to the problematic situation.

If the narrative part dominates the climate problems, students may become too engrossed in the story and pay attention to the consistency of climate change education. For instance, when a tale prioritizes entertainment and engagement over education and action, the purpose of climate change education could be lost. For example, a digital story about a fantastical, post-apocalyptic world affected by climate change may be visually stunning and engaging. Still, it could leave the viewer with a sense of hopelessness or apathy and may have few lessons in climate change education. Similarly, storytelling that focuses solely on individual experiences and emotions without providing a broader context or scientific information may not effectively convey the urgency and severity of the climate crisis.

Storytelling also runs the risk of reinforcing existing biases and perpetuating harmful stereotypes. For example, a digital story about a

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Journal of Environmental Research and Public Health 18, no. 17 (September 4, 2021), https://doi.org/10.3390/ijerph18179358.

26 Elena Bozzola et al., "The Use of Social Media in Children and Adolescents: Scoping Review on the Potential Risks," *International Journal of Environmental Research and Public Health 19*, no. 16 (August 12, 2022), https://doi.org/10.3390/ijerph19169960.

27 Rosetta Zan, "The Crucial Role of Narrative Thought in Understanding Story Problems," no. 2 (2017), https://doi.org/10.33683/ddm.17.2.3.

climate activist portrayed as a radical or extremist could discourage viewers from taking action or lead them to dismiss the importance of climate activism. Similarly, digital stories that focus on individuals in wealthy or developed countries may need to address the disproportionate impact of climate change on vulnerable populations in less developed areas.

It is essential to approach storytelling with a clear purpose and message to avoid these pitfalls and ensure that digital storytelling effectively engages and educates audiences about climate change. Similarly, it is essential to incite empathy through digital storytelling to introduce the best way for individuals to express their story and evoke emotion from their audience, making the entire experience more authentic and three-dimensional. An excellent digital storytelling project presents a collection of stories that portray a sense of hope and connection in communities working to bring climate solutions to fruition while avoiding overwhelming or inaccurate information that can negatively impact mental health.

Two Case Studies in Digital Storytelling for Climate Change

The connections between digital storytelling design and climate change education are apparent in light of the overview above. The following section presents two case studies of applied projects designed to examine how climate change movements utilize digital storytelling to organize student activities, coordinate community members, and raise public awareness. The first case study is from Global Oneness Project, a free multimedia education platform providing stories and lessons for growing minds.[28] The climate change digital storytelling project from Global Oneness Project aims to transform students' experience through digital tools to make connections between themselves and the globalized world. The second case study comes from Love&Future, a non-profit organization in the US that supports youth to be change agents through inspirational digital storytelling. Love&Future's digital storytelling project proposed a hands-on journey in utilizing artificial intelligence technology applications in storytelling curricula. In both projects, digital tools are used for storytelling to foster compassion, interconnectedness, and awareness regarding the impact of human activities on the planet.

28 "Featured," Global Oneness Project (GlobalOnenessProject.org, 2020), https://www.globalonenessproject.org.

Using Digital Storytelling to Interpret Climate Impact

Founded in 2006 as an initiative of Kalliopeia Foundation, the Global Oneness Project aims to sow the seeds of empathy, resilience, and a sacred relationship with the planet. They achieve this by utilizing stories as a pedagogical tool for growing minds and bringing the world's cultures to life in classrooms. Committed to exploring cultural, environmental, and social issues, the project offers a vast library of multimedia stories, including award-winning films, photo essays, and written essays, along with companion curriculum and discussion guides.[29]

Their mission is to connect the local human experience to global issues such as climate change, water scarcity, food insecurity, poverty, endangered cultures, migration, and sustainability through stories. By featuring individuals and communities impacted by these issues, the stories and lessons offer opportunities to examine universal themes such as identity, diversity, hope, resilience, imagination, adversity, empathy, love, responsibility, and our common humanity. The project's interdisciplinary approach to learning promotes the development of critical thinking, inquiry, empathy, and listening skills. The resources are available in both English and Spanish and are aligned with National and Common Core Standards. The Global Oneness project was built on collaboration with young people to explore their hopes and fears for the future through digital technology. According to Bowman, as young people look toward an uncertain future, their imaginations flourish.[30] The project addressed the growing interest in climate activism among young people, especially as it is shaped by their perceptions of the future.

As a complement to narrative theory, the Global Oneness Project allowed students to develop universal human values and respect for the living environment through personal narratives, visual storytelling, digital films, and photo essays. Stories serve many purposes, including challenging people to

29 Global Oneness Project, "About Us," accessed April 8, 2023, https://www.globalonenessproject.org/about-project.

30 Benjamin Bowman, "Imagining future worlds alongside young climate activists: a new framework for research." *Fennia-International Journal of Geography* 197, no. 2 (2019), 297.

consider their contributions to the world in which they live.[31] As a result of stories, students' perspectives are expanded, and they are introduced to worlds they may not have imagined. For instance, one of the most touching films from the project named *Lost World* illustrates how climate change impacts individuals, communities, and ecosystems across the globe. From a woman's perspective from Cambodia, the film allowed the audience to learn how indigenous communities are losing their subsistence lifestyles and land due to changes in temperatures and rainfall, among other factors.[32] While most of the stock footage is *show-and-tell* type that directly relates to the script, producer Mam Kalyanee in *Lost World* also used many visual metaphors. For example, the film compared landscapes of natural beauty and industrial production pollution. Through the digital image impact, students reflected on the changes associated with the visual perception of the landscape due to human activities. Using this film story as a resource, students became aware of the world they live in without having to understand another language, thus creating a sense of empathy and allowing them to reflect on a world suffering from the same challenge everywhere i.e., climate change.

Digital storytelling for the Global Oneness Project, therefore, served as a new language, a democratic literacy, that everyone (including students and educators) can use to demonstrate their proficiency as climate change agents designing a sustainable future. Students, especially those with marginal status, can exhibit knowledge and skills typically suppressed in traditional teaching methods when they use digital storytelling.

To date, the Global Oneness Project has contributed to developing students' critical thinking, inquiry, empathy, listening skills, and an interdisciplinary approach to the learning process.[33] Several international media outlets have featured their films and lessons, including *National Geographic*, PBS, *The Atlantic*, *The New York Times*, *The New Yorker*, TED-Ed, and the Smithsonian.[34] Their educational resources are being used in a wide range of settings, from

31 Athriyana S. Pattiwael, "Literature for Developing Student's Humanity Awareness," *Journal International Seminar on Languages, Literature, Arts, and Education (ISLLAE)* 1, no. 1 (2019), 80.

32 Kalyanee Man, "Lost World," Global Oneness Project, accessed April 2nd, 2023, https://www.globalonenessproject.org/library/films/lost-world.

33 Kalyanee Man.

34 Grateful.org, "Grateful Changemakers: Global Oneness Project," July 25, 2019, https://grateful.org/grateful-changemakers/grateful-changemakers-global-oneness-project.

public schools to independent schools, both internationally and nationally.[35] In 2018, Common Sense Media selected the Global Oneness Project as one of its top picks for learning, stating that the project offered "captivating, cross-curricular stories to increase cultural awareness."[36]

Visualizing the Imagination of Climate Future through Artificial Intelligence

Love&Future, a US-based non-profit working on issues of climate change and sustainability, organized an online workshop in January 2023 to delve into the potential of artificial intelligence and digital art in climate change education. The workshop targeted high school students and aimed to harness their digital skills to inspire positive action and optimism towards sustainability. The central objective of this workshop was to help students envision potential climate futures and empower them to express themselves more effectively.

The emergence of artificial intelligence has revolutionized the means by which individuals communicate and produce material. Canva AI is an artificial intelligence-powered story generator that turns open-ended text into actionable knowledge.[37] Furthermore, MidJourney is a tool that uses artificial intelligence algorithms to create visual artwork, providing users with the ability to quickly generate visuals for digital storytelling. Despite the abstract and elusive nature of climate change's impact, the potential offered by artificial intelligence tools like Canva AI and MidJourney is limitless. The use of artificial intelligence in climate change education has not been widely researched. This section looks at the use of MidJourney as a promising tool in climate change education by Love&Future that demonstrates how artificial intelligence can convert text into digital images that can be utilized in climate change education. Incorporating artificial intelligence images into curriculum development allows students to gain a better understanding of the impacts of climate change and explore the possibilities of technology in addressing these

35 Global Oneness Project, March 29, 2017, https://hundred.org/en/innovations/global-oneness-project.

36 Global Oneness Project, March 23, 2021, https://en.wikipedia.org/wiki/Global_Oneness_Project.

37 "AI Story and Plot Generator," accessed March 23, 2023, https://www.canva.com/ai-image-generator.

challenges. Such an approach bridges the gap between human creativity and technology in designing an effective climate change curriculum.

Hicks and Holden argued that incorporating probable and preferable futures, scenarios, and envisioning in the classroom can be beneficial in developing a futures perspective in environmental and sustainability education.[38] They advocated for future literacy as an essential aspect of such education. Using MidJourney enhances the engagement among a younger generation and supports them to drive equality, create inclusiveness, and build relationships. Andrea Orellana, the Digital Storytelling Manager, has designed a captivating digital storytelling image for her workshop participants called Today and Tomorrow. This digital illustration shows global warming and environmental degradation in 2023 versus 2050.

"Today and Tomorrow" is a digital story that masterfully combines future scenarios and visually captivating elements to convey a powerful message about the consequences of global warming and pollution. The story aims to raise awareness and encourage consideration for the world around us by highlighting the fragility of the environment and the devastating impact of human activities on climate change. At its core, the piece represents a powerful intersection between storytelling and education, using a stunning digital image to bring to life the complex relationship between humans and the earth.

Over the course of two weeks, Love&Future hosted a digital storytelling workshop that engaged 35 high school students in immersive, hands-on learning experiences. According to student feedback, digital storytelling is a relatively new educational tool that is not commonly utilized in traditional classroom settings. However, students found that digital storytelling was an effective way to comprehend and share information about climate change. They also expressed that this workshop helped them to convey their vision for a sustainable future, particularly through the use of digital technology in education. Students believed that digital storytelling could effectively communicate, interact with, and shape the mindsets of others towards making sustainable choices. Through the process of designing digital content in climate change education, students could share and exchange perspectives on the three most critical aspects of sustainable living: survival, connection, and meaning.

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38 David Hicks and Cathie Holden, "Remembering the Future: What Do Children Think?," *Environmental Education Research* 13, no. 4 (September 2007): 501–512, https://doi.org/10.1080/13504620701581596.

Digital Storytelling for a Sustainable Future

Climate change is an urgent issue that requires immediate action, and one way to raise awareness and inspire action is through storytelling. Stories have the power to inspire, inform, and change behavior. They have the power to create empathy and foster a sense of shared responsibility, helping individuals to understand the impact of their actions on the environment and encouraging them to take action to reduce their carbon footprint. Digital storytelling is an effective way to make complex issues accessible and engaging. It has the potential to create engaging and impactful stories that can reach a wider audience and inspire meaningful action.

For example, the Global Oneness Project uses digital storytelling to promote ecological sustainability and social justice by sharing stories of people who are working to create positive change in their communities. By harnessing the power of storytelling, they aim to inspire more people to take action on climate change and create a better future for ourselves and future generations. Similarly, Love&Future emphasizes the importance of empowering young people to be active agents of change in the face of climate change, rather than passive observers. Another organization that uses digital storytelling is the Climate Museum, a New York-based museum that aims to inspire and empower visitors to take action on climate change. The museum's exhibits feature immersive experiences and interactive displays that use storytelling to communicate the impacts of climate change and the urgent need for action. By creating an emotional connection with visitors, the Climate Museum is helping to build a sense of shared responsibility and inspire action on climate change. From the Global Oneness Project to Love&Future to the Climate Museum, there are numerous examples of organizations that are using storytelling to raise awareness and inspire action on climate change.

To succeed in a world facing the great challenge of climate change, it is imperative to embrace the shift towards digital technology especially for educators who have to prepare young people for the world they live in. The mere mention of "climate change" on a screen is insufficient; to captivate and motivate students, educators must make digital storytelling compelling, stirring, and action-oriented. They must strive to cultivate vital skills like listening, sharing, healing, and persuasion – much as oral and written storytelling have for centuries.

To prepare for including digital storytelling in education, educators should familiarize themselves with the various digital tools and platforms available

for storytelling, such as social media, podcasts, videos, and interactive media. They should also explore different formats and styles of digital storytelling, from short-form social media stories to long-form documentaries. They must consider the audience they are trying to reach and tailor their storytelling accordingly. For example, if the target audience is younger students, educators may want to focus on more visual and interactive storytelling formats, while for older students or adults, more in-depth and data-driven storytelling may be more effective.

In addition, educators should collaborate with other stakeholders, such as designers, media specialists, and environmental experts, to ensure that the digital storytelling content is not only engaging but also accurate and effective in communicating the urgency of climate change. Lastly, educators should prioritize ethical considerations in digital storytelling, including data privacy, representation and inclusivity, and responsible use of digital tools. Through a little effort, educators can effectively integrate digital storytelling into their teaching practices, fostering critical thinking and inspiring action towards climate change mitigation and adaptation.