Enhance Nature Exploration With Technology

by Patricia Holloway and Carol Mahan

Kids and nature seem like a natural combination, but what was natural a generation ago is different today. Children are spending less time outdoors but continue to need nature for their physical, emotional, and mental development. This fact has led author Richard Louv to suggest that today's children are suffering from "nature-deficit disorder" (2008). Nature-deficit disorder is not a medical term, but rather a term coined by Louv to describe the current disconnect from nature.

While there may be many reasons today's children are not connected with nature, a major contributor is time spent on indoor activities. According to a national survey by the Kaiser Family Foundation, today's 8- to 18-year-olds spend an average of seven hours and 38 minutes per day on entertainment media such as TV, video games, computers, and cell phones, leaving little time for nature exploration or much else (2010).

According to Louv, children need nature for learning and creativity (2008). A hands-on experiential approach, such as nature exploration, can have other benefits for students, such as increased motivation and enjoyment of learning and improved skills, including communication skills (Haury and Rillero 1994).

Digital storytelling

Our idea was to use technology as a tool to provide or enhance students' connection with nature. Students are already engaged with technology; we wanted to use that interest to foster outdoor experiences that promote learning. The content of the learning can be any concept or skill in the current curriculum. For example, if they are studying habitats, students can select a habitat and photograph the animals and plants found in the habitat to tell a story.

A perfect fit for our objectives was the digital story, which combines digital photography in nature with telling a story (see Resources for examples of digital stories created by students). Storytelling has long been used by scientists and explorers to re-create the world as they find it. It is the path taken by generations to preserve stories of our place in the world. Everyone has a story to tell (Porter 2004).

This activity requires students to use technology to capture visual images and audio sounds and add their voices as they tell their stories. Students can experience the connection among art, science, and the natural world by developing stories of their own. True digital storytelling is a 21st-century creative-writing experience that is supported by images and sound. Careful observation and record keeping are necessary in order to tell a story. Technology is the tool that binds it all together.

Engaging with nature

Students need to have experiences in nature in order to develop their stories. To spark students' creativity, have them read or listen to stories about nature. Reading books like *Water Dance* (Locker 1997), *The Hunter and the Woodpecker* (Crowl 1990), or one of the *One Small Square* series by Donald M. Silver and Patricia J. Wynne (1997) can set the stage for outdoor nature study. To find a quality science trade book that encourages exploration, review the list of NSTA Outstanding Books on *www.nsta.org/recommends*. A second way to prepare students for a nature experience is to have them carefully observe natural objects you have brought into the classroom, such as seed pods, plants, insects in a viewing box, pieces of animal fur, tree bark, feathers, rocks, fossils, or other items from nature. Students can record their observations using words that appeal to the senses.

Then take students on a nature walk. Nature can be found in the cracks of a sidewalk, a small flower bed, a grassy area, or one tree. Prior to the nature walk, teachers should assess the school grounds, neighboring park, vacant lot, or grassy field for safety concerns. Get to know the area by exploring it on your own first. Limit the area for student exploration by setting boundaries ahead of time. Make notes of necessary precautions; for example, a patch of poison ivy, student allergies, and proper clothing. Once you are familiar with your

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FIGURE 1	A storyboard example

Page: 1	Date: January 24	Project name: Swamp Producers	Author: PJH
		Frame description (describe the screen): Pic of American lotus in the swamp	**Media list** (list all of the music, songs, sounds, voice recordings, pictures, videos, text, or title transitions required for this part of the project): Recorded sounds of croaking frogs and water dripping, picture of American lotus, recorded student narration
Narration: "Carefully look at the American lotus. What producers do you see?"			

surroundings, select observations that complement the features of the natural area. Ask students to observe the clouds, sounds, birds, trees. At the end of the outdoor experience, a quick formative assessment could include small-group or class discussion of what they learned or what they did not understand.

After reading a nature book, observing natural objects, or taking a nature walk, engage students briefly in storytelling. Pair up students and have each orally share his or her observations and feelings as practice telling a story.

Creating the digital story

The next step is to move from telling the story to writing it down. Create cooperative learning groups of three or four students by assigning students of differing abilities and learning styles to work together on the project; if possible, include one technologically literate student per group. The goal will be for each group to create a digital story that reflects the science content students are learning. An example is to have students identify the kind of producers found in a swamp. Have student groups focus on inquiry skills by creating questions that explain what they would like to explore further, such as the following: What kinds of plants grow in a grassy field or forest? Are more insects found in the school yard in September or October? What is the air temperature at the school in the morning, at noon, and in the afternoon? Where is the hottest or coolest place in the school yard? After 10 minutes, schedule a meeting with each group to ensure students select a suitable topic.

At this point, teachers should create a blank storyboard that students will use as a template to plan their stories. Many websites provide free suggestions for creating a storyboard in Word. For example, Jason Ohler has instructions for making a template in Word by inserting a 10 cm × 10 cm (4 in. × 4 in.) table (see Resources). You can merge some of the cells, while resizing others to fit your

| FIGURE 2 | Photography tips for students |

- Get to know the camera; use it often.
- Take lots of pictures.
- Zoom in close.
- Create interest by dividing the frame into thirds and shooting the subject in one of the thirds or off center.
- Take pictures at different times of the day.
- Avoid harsh sunlight during midday.
- Use a homemade screen to soften the harsh sunlight during midday.
- Save the pictures in a file with your name.
- Use a photo-editing site such as Picnik.
- Respect nature by leaving everything as it was found.

The goal will be for each group to create a digital story that reflects the science content students are learning.

needs. After you have created a blank storyboard, make a larger version on poster board to model for your students how to develop a storyboard. Select five statements that tell a simple story. The example tells the kind of producers found in a swamp. Choose 10 pictures to use in your sample story, and copy and enlarge them for ease of demonstration. Using double-sided tape, place the copies of pictures on the storyboard with the sentence each picture supports (see example in Figure 1). After the teacher demonstration of how to use a storyboard, have students meet with their groups to begin the process of developing their storyboard using the blank storyboard you created. The goal should be for student groups to create a two-minute presentation that will require approximately 200 words and 20 images. Completion of storyboard pages can serve as an assessment. Student groups can hand in each page as new components are added.

Have students write the story in the first person using blank storyboard pages. This will become the script that students will record in their own voices. Assign each
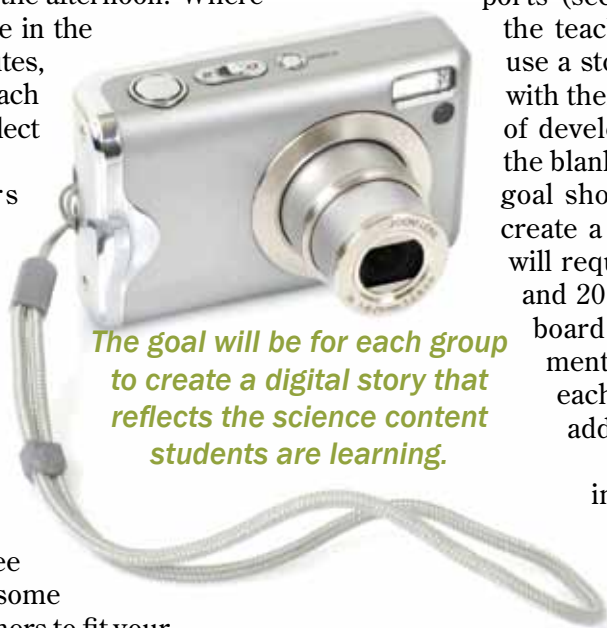
FIGURE 3	Digital-storytelling scoring guide

Student name:_____

Project name:_____

Digital story	Exceeds expectations	Meets expectations	Below expectations	Not present
	3	2	1	0
Content	Information is accurate, affects audience, cites sources, uses higher-level thinking.	Information is clear, appropriate, and correct.	Information is confusing.	Information is inaccurate or inappropriate.
Creativity	Idea is well developed, adds a new approach to the story.	Idea is developed, good approach to story line.	Idea is weak, ordinary approach to story line.	Idea is lacking or inappropriate, does not fit story line.
Storyboard	Well-planned story line was fully implemented.	Evident that story line was basis for the finished product.	Story line did not match the planning.	Planning was not evident.
Videography: Quality of images, sound, and editing	Images and sound provide relevant information; editing adds to the quality of the product.	Appropriate image quality and audio that enhances the content, minimal editing.	Inappropriate use of copyrighted images or audio, voice garbled, images unclear, editing confuses story.	Incorrect, inappropriate, or missing images, sound, or editing.

ADAPTED FROM AN IN-DEPTH SCORING GUIDE FOR EVALUATING DIGITAL STORIES CREATED BY STUDENTS, DEVELOPED FOR THE SHOW-ME A MOVIE DIGITAL STORYTELLING CONTEST FOR MISSOURI STUDENTS (SEE RESOURCES).

student in the groups a storyboard to complete. One person will be responsible for the beginning, others for the middle details, and one student will be responsible for writing the ending. Each group will need access to a computer and set of headphones with a USB adapter to record the script. Be sure to have students save the recording of each student in the group in an audio folder labeled with the name of the student and the group.

Use nature photography to gather visual images that support the story. Review the tips for taking a good photograph with students (Figure 2). If possible, plan class time to take students outside to take pictures that help tell their stories. One camera or cell phone with a photo feature per group would be adequate to complete the activity. Group members can share responsibility for taking the pictures. These pictures can be saved on the computer in an image folder and labeled with the student's name for later use in the project. If access to equipment is limited, student groups can rotate among the various tasks of collecting data, writing the script, taking or scanning pictures, and recording narration. Be sure to save all of the groups' photos in a separate folder labeled with the group's name. Ensure group participation by having each group member supply an equal number of photos. Have student groups use Windows Movie Maker, iMovie, or Photo Story to put their work together and begin the digital editing process. See Resources for helpful links.

FIGURE 4 | Digital editing process (teacher directions) for creating a system to save student work

To ensure smooth creation of the project, the information from each student group must be collected in one folder.

1. Set up a system of folders: Use names of student groups for each folder.

    a. Make three subfolders within each main folder for students to save images, narration, and the entire project. Use students' last names and the following titles to identify the subfolders:

        i. Images

        ii. Narration

        iii. Project

2. Have students use storyboards to write a script with a total of approximately 250 words per group.

    a. Later students will type their written contributions from the storyboard into the recording window of the digital story-editing program you have chosen to use for the projects (Photo Story, iMovie, or Windows Movie Maker).

3. Have student groups gather approximately 20 pictures. The images can be scanned or imported into each student's subfolder named "Student Name Images." Images should be "medium" in size, or approximately 640 dpi.

4. Students will use digital story-editing software to import pictures from the subfolder in the order that goes with the script. Students can save individual images in their folder. Once all the pictures have been imported save the project in the folder named "Group Name DS Project."

    a. Students will use the storyboard to type in the script. Save the project in the subfolder named "Student Name Project." As each student adds to the narration, be sure to save the latest version in the folder named "Group Name DS Project."

    b. Students will record narration by using the headset and reading part of the script. After each recording, make sure students save the project in the folder named "Group Name DS Project."

    c. Students can add transitions or a sound track, if desired.

5. After all editing is complete, have students finalize the project. Help students burn the finalized project to a DVD so it can be viewed by one and all.

To begin the digital editing process, students will need to have access to one computer per group. You may need to schedule a class visit to a computer lab or enlist additional help from the teacher responsible for technology. Student groups will import the narration and images from their saved files. As each piece is added, students need to save their work as a project in the same file. A soundtrack can also be added. Remember to guide students in using audio tracks or visual images that adhere to copyright permissions. In the editing process, student groups can add transitions, as in PowerPoint presentations, however, caution students against using too many fancy, fast-moving transitions. Similar to PowerPoint, a simple presentation is often the least confusing. Remind student groups to save their work as they make progress. When the project is ready to finalize, have student groups save projects in a movie file. The movie can be put on a CD, flash drive, or the hard drive of a computer.

The class instruction and activities involved with this project could take from 5 to 10 class periods. The amount of time required to complete this project varies, depending on the age and ability level of students. The equipment available and time required to observe and record the science concepts involved are other factors that influence the amount of time required for project completion. For example, living and nonliving factors in the ecosystem will be easy to document, while finding examples of asexual

and sexual reproduction might be more difficult to observe and photograph. Demonstrating changes over time, such as seasonal ones, would require more observation time outdoors.

Assessment and presentations

The productions can be evaluated in several areas. You may want to devise your own rubric, but a sample scoring guide is included in Figure 3. The scoring guide includes measures of content, creativity, storyboarding, and videography (or the quality of images and sound). Ratings range from a high score of 3 (exceeding expectations) to a low of 0 (required items not present). Individual participation in the project could be measured by adding an individual-performance category to the scoring guide. To assess individual achievement on the science content, pre- and posttests could be given.

It is important to schedule presentations of all students' productions. To include 21st-century communication skills, students can post their stories to sites such as VoiceThread or Animoto. Students can share the movies on a class blog, podcast, or wiki, or on other social media sites. Students can work collaboratively, another 21-century skill, with students in other schools to compare their school yard. Social media is a great way for you to locate another classroom willing to collaborate.

Finally, invite parents and friends for an evening viewing. Seeing the productions with family and friends invests students emotionally in the project. Combining that emotional investment with the physical and mental aspects in which they have already been engaged will reap the benefits of experiential learning. Looking back at Richard Louv's coined term *nature deficit disorder,* you will see throughout this process how students will connect to nature and learn the science concepts you are teaching along with the 21-century skills of creativity, communication, collaboration, and technology. ■

References

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Resources

A journey into process—*http://digitalstorytelling.coe.uh.edu/movie_art_02.html*

Animoto for educators—*http://animoto.com/education*

iMovie tutorial—*www.apple.com/support/imovie/?cmp*

National Science Teachers Association—*www.nsta.org*

Photo Story 3 guide—*http://windows.microsoft.com/en-US/windows-xp/help/digitalphotography/create-first-photo-story*

Show-Me a Movie Digital Storytelling Contest for Missouri students—*www.csd.org/TechnologyVLC/Show%20Me%20a%20Movie/showmehome.php*

Storyboard in pdf—*www.jasonohler.com/pdfs/digitalStorytellingStoryBoard-adv.pdf*

The educational uses of storytelling—*www.coe.uh.edu/digital-storytelling*

VoiceThread class subscription—*http://voicethread.com/products/k12/educator*

Windows Movie Maker guide—*www.windows-movie-maker.org/windows-movie-maker.html*

Student projects

Animal adaptations by Mrs. Cochefski's class—*www.schooltube.com/video/55edb063df25471f8447/Animal-Adaptations-Mrs-Cochefskis-Class*

Oreo the attack bunny—*http://digitales.us/content/oreo-attack-bunny*

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