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NSTA WebNews Digest

NSTA Reports

Wikis for Science Ed Collaboration

2/5/2010 - NSTA Reports—Debra Shapiro



***Editor's Note:** This online version of the cover story from the February 2010 issue of NSTA Reports contains additional material.*

Teachers and students are communicating and sharing ideas on collaborative websites called wikis that allow them to post work, comment on others' postings, and make revisions as a group. NSTA member Margie Gifford of Lebanon, Tennessee, is sold on their value. "The idea that teachers all over the world can work together and share the load is exciting to me," she says.

Gifford is one of more than 70 teachers contributing to the Science Cafés Wiki (<http://sciencecafe.wikispaces.com>). She learned about science cafés while attending a workshop on differentiated instruction using self-paced units—presented by Kristy Love of Houston, Texas—at the 2007 NSTA National Conference in St. Louis. Gifford describes her own version of science cafés as year-long self-paced units in which students are given a "five-course menu" with choices of different projects they can do, with each "course" addressing a different science standard.

When she offered to share her resources on science cafés on the NSTA Earth Science e-mail list in December 2009, Gifford says she received "an incredible response" for them. One came from Debbie Johnson of Tunkhannock, Pennsylvania. "The NSTA listserv is a great place to share ideas," observes Johnson. "Teachers, such as Margie, willing to share their ideas and hard work so that others can become better teachers, is an amazing thing." The café wiki, which Johnson set up on Wikispaces.com, "takes this cooperation a step further by allowing teachers to share specific ideas and work together to create the final products," she explains. The wiki is free and open to all teachers.

Teachers immediately began to contribute to a number of different cafes on the wiki, including an Energy Café, a Newton's Laws Café, and an Earth's Resources Café. "I checked in once a day as the site was evolving and organized the pages as they were being created so that the overall site would be user friendly," says Johnson. A wiki, she points out, is "a living document, easily accessible, ever changing, and yet always available. Teachers no longer have to be isolated in their classrooms, with only a few people in the district as a resource."

Types of Wikis

Wikis can be used in many ways, including for student engagement, collaboration on projects, and developing curriculum. "When teachers put their materials and class work online, they open their classroom for parents to connect with their children's learning," notes Johnson.

She advises teachers creating student wikis to determine how they "want the site to be used...informational, showcase of student work, homework helper, collaboration, reflection, or class record" and to consider "how they want their audience to interact within the site." For those new to wikis, "viewing how other teachers are using wikis is a great way to get started," she adds.

In her wiki for her middle school students, she says she "can provide support for my students, informally assess their understanding to help guide my instruction. Students are excited to use the computers and post, and excitement is contagious." As students "manipulate the content and create projects, they are not only deepening their conceptual understanding, but [also] applying their knowledge and using higher-order thinking skills to make connections within the material. Although they just think it is fun, they work harder when they have an audience."

But for safety's sake, students need to realize who might be in that audience. "It is essential that students understand that they are not anonymous," says Karolee Smiley, a middle school teacher from Sacramento, California. "By appearing faceless, many seem to feel they can post indiscriminately. But when students are aware that all readers will know the source of all posts and changes, students are more likely to take responsibility and post wisely."

Smiley's science class is using a wiki "to create a 'root word' library. Students are adding examples of different Greek and Latin roots and how they are used in science terminology." This is an example of "a very simple, low-maintenance wiki," she notes. She appreciates that "students can access the wiki whenever and wherever they want...on weekends, mornings, and even late night. Having open access also allows those that need more time the ability to access it as necessary."

Johnson says she has also "created a wiki for our teachers to use as a way of tracking parent contacts, conferences, conversations, and concerns for students [who] are not performing well in our classes." She believes "this has been extremely helpful" for identifying these students and providing "necessary interventions quickly."

At the high school level, biology teacher Louise Maine of Punxsutawney, Pennsylvania, uses several wikis with her classes. On <http://mrsmaineswiki.wikispaces.com/Cells>, for example, she created "Cell-vivor," a game based on the television reality series *Survivor*. During Cell-vivor, students advocate for one part of a cell's structure, stating reasons why the cell needs their part so much it shouldn't be "voted off."



Biology teacher Louise Maine created “Cell-vivor,” an activity based on the reality series *Survivor* in which her students choose a cell part and explain why it shouldn’t be “voted out” of the cell. Her students are using stop motion video to animate cell parts they made of clay and foam. Maine will post the videos on her Cell-vivor wiki. Photo courtesy of Louise Maine.

Maine thinks it’s important for teachers to design their wikis around students’ strengths and interests. For example, her students working on this year’s Cell-vivor wiki have expressed no interest in using a voice thread to state their cases, so she won’t use it. Instead, her students want to use “stop-motion photography,” an animation technique, to support their cell part and portray its “specific actions,” she explains.

She also changes each wiki’s focus every year and encourages students to develop new ideas for them. She podcasts her lectures and posts them on the wiki, and her students use the wiki to show what they have learned using “animations, videos, and writing.”

She advises teachers new to wikis to “consider yourself a learner” and don’t feel like you must “have all the answers.” The teacher’s role, she says, “is not to teach [students] everything: It’s to get them started” on the path to learning. This philosophy makes her and her students partners who “learn together” in groups and try new things. “I’ve learned an incredible amount of patience,” she adds.

Wikis allow for “easy fixes” when needed, and “very rarely do you lose data,” she points out. They save time by allowing teachers to create pages in advance and record all their thoughts “in one place.” She says her students check the wiki when they’ve been absent to see what assignments they need to complete. And as an environmentalist, she appreciates how wikis reduce the need for paper.

Maine believes because wikis can teach students how to use all types of Web 2.0 media, they contribute to students’ feelings of confidence and competence. She suggests giving students guidelines for using technology, “but let them know you trust them.” And when her students “were inspired to create a wiki following their passions, I did encourage them,” she says.

A Wiki for Undergraduates

Undergraduate students can learn how to write high-quality scientific articles and contribute them to a wiki—*The Encyclopedia of Earth* (EOE; www.eoearth.org)—by participating in the Student Science

Communication Project (SSCP), a faculty-supervised science writing initiative. SSCP teaches students the basics of wiki writing, as well as communication, writing, and literature searching and referencing skills. While students aren't required to write for *EOE*, they are "strongly encouraged" to do so, says SSCP Director Emily Monosson. "Our intention [for *EOE*] has always been to be a collaborative site where a scientist can update or add to [his or her] own or someone else's article. If students get this experience under supervision, they may be more likely to think about collaborative writing in the future."

In the past, wiki users had to know HTML, which discouraged some faculty, scientists, and students from contributing because they were hesitant to take on something new and challenging, says Monosson. But since *EOE* and most wikis no longer require HTML expertise, they have become "more user-friendly," she notes. She likes wikis because "you can do so much with them," including posting images and art, which is required for *EOE* articles. Some students do find that a challenge, she admits, but when students choose to write about something in their professor's field, their professor can help them with the writing and graphics.

SSCP offers numerous benefits for student authors, according to Monosson. "Having a published and citable article that has been reviewed and accepted" is one advantage, she points out. "This is something they can show to others: their published work on a legitimate science site." She believes it's important for scientists of all ages to realize "it's not so intimidating to write for the public."

Monosson extols the merits of experiencing the article review process. "The feedback from students about going through that process, which can be a little scary, was really positive and...[it was] really valuable for students, to know they can write to these scientists and get feedback on their work. This is the real thing for them, not 'a report that I'll delete once the class is over,' and they are very much aware of this."

Another benefit for students is "having their articles turn up *before* any embarrassing Facebook photos," she quips.

SSCP is open to students nationwide; to learn more, visit www.eoearth.org/article/Student_Science_Communication_Project.

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