Student Voice and Project-Based Learning

ISTE 2016 Student Objective: Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.

by Nathan Smith

Teachers can help their students meet this standard on many levels. Let's start by sharing an extreme example that a high school is trying out. Watch the video, "If students designed their own schools..."

Video Description: The best small town in America experiments with self-directed learning at its public high school. A group of students gets to create their own school-within-a-school and they learn only what they want to learn. Does it work? Charles Tsai finds out by spending a week with the Independent Project.

Charles begins the video by saying, "It's crazy that in a system that is meant to teach and help the youth, there is no voice from the youth at all."

Our current educational system is so focused on content, on standards and objectives, and associated high stakes tests, that we educators have been literally tied to them. Will Richardson spoke of visiting a high school in Texas. In his TEDx talk to TEDxNYED, he said, "...English teachers told me that they are reading from the same PowerPoints on the same day in order that their kids get the same content, so that they can take the same test and pass it. And by the way, they are doing a great job. They are an exemplary school in Texas for doing that right now. And three years ago I stood in a 3rd grade classroom in Florida where teachers took index cards out and read scripts, literally read scripts, to their 3rd graders so that those 3rd graders would pass the FTASK. Because if they didn't pass the FTASK there are huge ramifications for them. You can even look at the news. [Here he displays a news article.] This week in Memphis -- How wonderful is this? You've heard about this, right? -- teachers in a pilot group are going to be wearing wireless earbuds, and they're going to be coached by other observers from the back of the room, almost NFL style. So basically, if they're doing something wrong, then they'll get a message in their ear to do something different. And by the way, let's not miss the point, in this article, it's all about raising the needle on the test scores."
It's a powerful talk! If you can find time, it's worth watching. It's 14 minutes long. Further in the talk, he says, "Now I've got to tell you, as a parent of two kids, and for someone who has been learning in these spaces for almost a decade now, if this is your definition of better [learning or teaching], you can have it. I don't want this for my kids. I don't want this for any kids, to be honest with you."

In those kinds of “learning” that Will Richardson talked about - Charles Tsai is right to say, "There is no voice from the youth at all."

Let's take a deeper dive into student voice and choice. Dr. Russell J. Quaglia is a globally recognized pioneer in the field of education, known for his unwavering dedication to student voice and aspirations. Dr. Quaglia has been described by news media as America's foremost authority on the development and achievement of student voice and aspirations. His innovative work is evidenced by an extensive library of research-based publications, prominent international speaking appearances, and a successfully growing list of aspirations ventures. Watch his video about student voice.

So, how can we educators create a learning environment that allows students to articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes? How can we allow our students to have voice and choice in their learning? These are questions I'd like you to think about and share your ideas with the rest of the class in our Experience 3 Canvas discussion.

One idea is through project-based (or challenge-based) learning (PBL). Please watch the following short videos about PBL...

Video 1: Five Keys to Rigorous Project-Based Learning (6:30)

Video 2: Establishing Real-World Connections in Projects (Keys to PBL Series Part 1) (2:28)

Video 3: Building Rigorous Projects That Are Core to Learning (Keys to PBL Series Part 2) (1:54)

Video 4: Structuring Collaboration for Student Success (Keys to PBL Series Part 3) (2:24)
There are other ways to give students voice and choice. There are other means to have students articulate, set, and meet personal learning goals. One would be to allow students to negotiate with their teacher on how they are going to demonstrate mastery of a learning objective - whether it be written, a multimedia presentation, or project they finish, etc. Can you come up with other ways?

Project-Based Learning: What Experts Say (source)

Sylvia Chard, The Project Approach
Vicki Davis, Flat Classroom Project
Chris Lehmann, Science Leadership Academy
John Mergendoller, Buck Institute for Education
Seymour Papert, MIT’s Media Lab
Bob Pearlman, Education Consultant
Eeva Reeder, Education Consultant

Organizations and Resources that Support and Promote PBL
The NASA STEM Educator Professional Development Collaborative (EPDC) at Texas State University is presenting a series of free webinars open to all educators. Join NASA education specialists to learn about activities, lesson plans, educator guides and resources that bring NASA into your classroom. **Registration is required to participate. To register, simply click on the link provided beneath the webinar description.**

**May 18, 2017, at 6:00 p.m. ET:** *International Space Station -- Off the Earth, For the Earth: Mass vs. Weight (Grades 6-8)* -- "Mass" and "weight" have very different meanings and often are used incorrectly. Participants will explore mass and weight using NASA curriculum that incorporates education video filmed by astronauts on board the International Space Station. Newton’s Laws of Motion, NASA online resources and STEM inquiry activities will be integrated into this "heavy-duty" online program. Register online to participate. [https://www.etouches.com/248389](https://www.etouches.com/248389)

**May 23, 2017, at 4 p.m. ET:** *Train Like an Astronaut: Out of This World Activities for a Healthier Generation (Grades K-10)* -- Developed in cooperation with NASA scientists and fitness professionals working directly with astronauts, the Train Like an Astronaut activities are a physical and inquiry-based approach to human health and fitness on Earth and in space. Students can participate in physical activities modeled after the real-life physical requirements of humans traveling in space. Register online to participate. [https://www.etouches.com/246973](https://www.etouches.com/246973)

**May 23, 2017, at 6:30 p.m. ET:** *International Space Station -- Off the Earth, For the Earth: Sally Ride EarthKAM (Grades 4-9)* -- Sally Ride EarthKAM (Earth Knowledge Acquired by Middle school students) is a NASA educational outreach program that enables students, teachers and the public to learn about Earth from the unique perspective of space. During Sally Ride EarthKAM missions (periods when the Sally Ride EarthKAM camera is operational), middle school students around the world request images of specific locations on Earth. The entire collection of Sally Ride EarthKAM images is available in a searchable archive. This opportunity and accompanying activities are extraordinary resources to engage students in Earth and space science, geography, social studies, mathematics, communications and art. Register online to participate. [https://www.etouches.com/244255](https://www.etouches.com/244255)

**May 25, 2017, at 6:00 p.m. ET:** *International Space Station -- Off the Earth, For the Earth: Space Food and Nutrition (Grades 5-8)* -- Eat your way through math and science. This webinar will cover NASA STEM lessons that investigate space food and nutrition for astronauts. Participants will find out about NASA resources to research the caloric content and nutritional value of space foods, learn about nutritional needs of astronauts, and construct sample space food menus. Explore a menu of inquiry activities and other resources to satisfy your STEM appetite. Register online to participate. [https://www.etouches.com/235775](https://www.etouches.com/235775)

For the NASA STEM Educator Professional Development webinar schedule, go to: [http://www.txstate-epdc.net/events/](http://www.txstate-epdc.net/events/)
EARTH SCIENCE WEEK UPDATE: American Geosciences Institute

Plan Activities Now for Earth Science Week 2017

Don't wait until fall to prepare for Earth Science Week 2017 (October 8-14)! Now is the time to plan your activities. Take this opportunity to make a wish list: How would you like your students to celebrate Earth Science Week?

You can promote this year’s theme - “Earth and Human Activity” - by preparing activities that help your students explore the geoscience heritage of their neighborhood, city, state, nation, and world. Start with the exciting classroom activities featured on the Earth Science Week website.

Leading up to the October celebration, you'll see more and more Earth Science Week events, both local and nationwide, listed online. For more ideas, read about successful past events or see recommendations on how to get involved.

New Event Registry Heightens Your Visibility: Are you hosting an Earth Science Week 2017 event, such as an exhibit, tour, lecture, or open house? The new Earth Science Week Event Registry enables you to promote your event more effectively than ever.

To register your event, simply provide a few key details. Fill out the easy-to-use online form, and let the Earth Science Week team and the world know about your event.

Any registered event will be listed on Earth Science Week’s Events In Your Area and acknowledged in the Earth Science Week Highlights Report following the event.

Focusing on ‘Human Activity,’ Consider Geoheritage: While exploring this year's Earth Science Week theme of “Earth and Human Activity,” consider the ways that people worldwide relatively recently have begun to recognize, designate, and conserve special places and natural resources that represent our rich geologic heritage, or “geoheritage.”

In October 2015, AGI and the National Park Service jointly published “America's Geologic Heritage: An Invitation to Leadership,” which provides a detailed overview and stunning pictures of the nation's geoheritage.

Also, EARTH Magazine, a top resource for the latest geoscience news, published “Geoheritage: Preserving Earth's Legacy” in June 2015. The article provides a geoscientist's perspective on the global phenomenon of geoheritage studies, education, and conservation.

Look to CLEAN for Climate, Energy Science: The Climate Literacy and Energy Awareness Network (CLEAN) Portal is designed to steward a major collection of climate and energy science educational resources and to support a community of professionals committed to improving climate and energy literacy. The three key components are:

The CLEAN Collection of Climate and Energy Science Resources - high-quality, digital resources (learning activities, visualizations, videos, short demonstrations/experiments) geared toward educators of students in secondary through undergraduate levels. Guidance in Teaching Climate and Energy Science - pages designed to help educators understand and be equipped to teach the big ideas in climate and energy science. The CLEAN Network - a community of professionals committed to improving climate and energy literacy.

Funded by the National Oceanic and Atmospheric Administration (NOAA), the National Science Foundation, and the Department of Energy, CLEAN was launched in 2010 as a National Science Digital Library (NSDL) Pathways project. It is led by the science education expertise of TERC, the Cooperative Institute for Research in Environmental Science (CIRES) at the University of Colorado Boulder, and the Science Education Resource Center (SERC) at Carleton College. As of 2012, CLEAN has been syndicated to NOAA’s Climate.gov portal.

You’re an Earth Educator? Rendezvous With Peers: Taking part in the third annual Earth Educators’ Rendezvous on July 17-21, 2017, at the University of New Mexico, Albuquerque? On the program website, you can learn how the event’s combination of workshops, posters, talks, round-table discussions, and plenary presentations is designed to help guide participants through a suite of interrelated challenges that are characteristic of Earth education in schools, colleges, and universities today.

The program is designed to appeal to everyone from instructors and graduate students attending their first Earth education-themed meeting to experienced STEM education researchers and administrators who want to better support students in their programs.

Among many options, participants can learn about new teaching approaches, discover opportunities to get involved in research programs, prepare for an academic career, or discuss how to approach teaching and learning challenges in their classroom. See the conference program for more.
NSTA Provides Links to Free Science Resources: Looking for teaching resources? Check out a page called “Freebies for Science Teachers” on the National Science Teachers Association website.

Updated periodically, this searchable “array of free resources for you and your classroom” frequently features online links to publications, CD-ROMs, DVDs, videos, kits, and other materials for Earth science education. For more, go online.

Power Up Education With Energy Resources: What is energy? Where does energy come from? How much energy do humans use? Free, interdisciplinary education materials and videos are available to answer important questions like these - and to foster a more energy literate nation.

AGI’s Center for Geoscience & Society has produced corresponding education materials, including videos in English and Spanish, student and teacher guides, a “quick start” guide to energy literacy, lesson connections, and guidance on aligning energy literacy lessons with the Next Generation Science Standards. Also, AGI provides links to many resources available through AGI member societies and partners.

Essential Principles and Fundamental Concepts for Energy Education resources, available on the U.S. Department of Energy website, are available online. Please visit for information on and resources of the Center for Geoscience & Society.

Discover Geoheritage on National Fossil Day 2017: Exploring the past is in your future! The National Park Service and AGI are collaborating to kick off the eighth annual National Fossil Day during Earth Science Week 2017. On Wednesday, October 11, you and your students can participate in events and activities taking place across the country at parks, in classrooms, and online.

Ever look at a fossil and see into the past? Understand why paleontologists protect the locations where fossils are found? Know what fossils can tell you about climate change? National Fossil Day resources and activities help you answer these questions, celebrating the scientific and educational value of fossils, paleontology, and the importance of preserving fossils for future generations.

Look for fossil-themed activities and materials in the Earth Science Week 2017 Toolkit. And stay up to date on emerging resources and events through the National Fossil Day website. For instance, the program’s 2017 logo depicts a primitive group of fish known as heterostracans (“different shields”), which represent an order of early jawless fish that existed between the Early Silurian and the Late Devonian when they became extinct (about 358 million years ago). Check out National Fossil Day.

BLM Helps Schools Explore Solar Energy: Does the need for carbon-free renewable energy outweigh the potential risks to wildlife habitats, cultural and historical resources, and recreation areas? Middle school teachers can explore this question with their students through “Solar-Generated Electricity,” the latest teaching guide in the Classroom Investigation Series of the U.S. Bureau of Land Management (BLM).

The unit describes how solar facilities on public lands work, examines the tradeoffs in detail, and illuminates the factors that affect decisions about where to build solar electricity plants. Each activity includes learning objectives and teacher preparation steps, background information, lesson procedures, adaptations to consider, assessment, and student handouts. Find the PDF online.

Visit Your Nearby National Wildlife Refuge: Want a direct encounter with geoheritage? Overlapping with most of Earth Science Week this year, National Wildlife Refuge Week is being held October 9-15, 2017. The event celebrates the richness of the 550 units that make up America’s National Wildlife Refuge System.

Whether you prefer to study Earth science firsthand, admire the fall colors, thrill to a sky full of migratory birds, explore a mountain trail, or learn about the cultural resources that are part of the U.S. Fish and Wildlife Service’s conservation mission, you can find what you like at a National Wildlife Refuge. Sponsored by the U.S. Fish and Wildlife Service, a longtime Earth Science Week partner, this week focuses on lands and waters where wildlife and habitats are under federal protection. For information and educational resources, see online. Got to the National Wildlife Refuge Locator’s map to find refuges near you.
New From WGBH Education -- The Solar Eclipse of 2017: Teacher Toolkit

Are you a K-12 teacher looking for ideas and information on what to do with your students, your school, or your community about the upcoming solar eclipse on Aug. 21, 2017? Boston-based PBS station WGBH, supported by a NASA cooperative agreement, has gathered information from trusted content partners into a “Solar Eclipse of 2017: Teacher Toolkit.”

Check out the toolkit to find maps, activities and more. Learn how to align your eclipse activities to national education standards. Watch an archived recording of a professional development webinar about the eclipse. And you can even find resources available in Spanish!

Get ideas and share your plans for bringing the eclipse to your classroom through the #TeachEclipse2017 tweetchat on Wednesday, May 24, 2017, at 6 p.m. EDT.

For all of this and more, visit http://bit.ly/EclipseToolkit.

Please direct questions about this toolkit to Rachel Connolly at rachel_connolly@wgbh.org.

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New Lesson Plans Available on NASA/4-H Expeditionary Skills Website

Find out what astronaut Anne McClain says about leadership and followership. NASA Education’s STEM on Station and the 4-H program announce the fourth and final learning module release for Expeditionary Skills for Life, a curriculum modeled after the soft skills that astronauts train for as they prepare to work together on the International Station. Expeditionary skills include self-care/team-care, cultural competency, leadership/followership, teamwork and communication. Each skill-focused learning module includes STEM-based activities along with a video message from an astronaut or astronaut trainer explaining how the skill is used at NASA and why it is important to a successful STEM career. The leadership/followership video features Anne McClain as she shares a story to illustrate the often misunderstood roles of leadership and followership.

The release of Expeditionary Skills for Life aligns with the spaceflight of astronaut Peggy Whitson, a former 4-H member. Whitson helped develop the expeditionary skills courses used during astronaut candidate training.

The lesson plans and videos will be used in 4-H clubs and camps throughout the U.S. and are available publicly at www.nasa.gov/education/4H.

The 4-H Youth Development Program is the youth outreach program from the land-grant universities’ Cooperative Extension Services and the United States Department of Agriculture.

Please direct questions about these resources to Kelly McCormick at Kelly.McCormick-1@nasa.gov.
New ‘Teachable Moment’ Educational Resources Available From JPL Education

Are you looking for ways to bring the latest NASA science and mission news into your classroom? Education specialists at NASA's Jet Propulsion Laboratory in California have the resources to help you do just that! The “Teachable Moments” blog brings together news, activities and education tips on the latest happenings at NASA.

Check out the latest offering from JPL Education.

Teachable Moment -- A Moment You Won't Want to Miss: Cassini’s Daring Mission Finale Between the Rings and Saturn -- Grades K-12

After almost 20 years in space, NASA’s Cassini spacecraft has begun the final chapter of its remarkable story of exploration: its Grand Finale. This last phase of the mission will deliver unprecedented views of Saturn and its rings. On April 26, the spacecraft flew between the planet and its rings -- a feat that had never been attempted. Cassini will complete 22 of these ring-gap orbits before making a grand finale dive into Saturn's atmosphere. For more information and ways to bring Cassini's exciting final phase into the classroom, visit https://www.jpl.nasa.gov/edu/news/2017/4/25/a-moment-you-wont-want-to-miss-cassinis-daring-mission-finale-between-the-rings-and-saturn/.


Group Work and Teacher Guidance

Professional Development Video from the Teacher Improvement Network:

Imagine that your class is working on group projects. Everyone is on task, you're helping each group precisely when they need it, and students stay on pace to finish by the due date. Sound too good to be true?
Screencast: Tour of LoyalBooks.com by Nathan Smith
**Contraption Maker**

Target Audience: All Ages

Link: [http://contraptionmaker.com/](http://contraptionmaker.com/)

Use Contraption Maker to solve problems, puzzles, brain teasers while creating wacky machines. Hands-on problem-solving leads to great fun and independent learning with the right curricular wrap-around to make connections between what kids are doing and what they need to know.

"On its own, Contraption Maker is a wonderfully entertaining game. At this point, the game lacks any structured curriculum or lesson tools (although they're promised in the near future). So, for now, teachers will find that any subject that requires problem-solving, understanding of cause-and-effect, and systems thinking can use this game to bring those points home. Whether bringing up examples in class and having students talk through possible solutions, or having kids play as a means to opening conversations about more serious types of systems and problems, Contraption Maker is a great way to get kids talking and thinking, and to cement learning through experience." *(Source)*

**FactMonster**

Target Audience: Ages 9 and up

Link: [www.factmonster.com/](http://www.factmonster.com/)

FactMonster is free-to-use and sponsored by the [Family Education Network, also known as FEN Learning](http://www.fenlearning.com/). FactMonster provides information on a variety of topics. Kids can take quizzes, play games, watch educational videos, and use reference tools such as a dictionary, an atlas, timelines, the periodic table, and so much more as they work on their homework or just want to learn and have fun while doing it.

"Education is a top priority for parents and teachers. We know that learning happens outside as well as inside the classroom, and we understand that parents need resources that deliver the facts to children in a safe learning environment. Factmonster.com's content is written and edited by experts, not outside users, assuring you that we provide trusted, reliable information. Our broad range of content includes an encyclopedia, dictionary, thesaurus, atlas, a homework center, and educational games. Factmonster.com combines essential reference materials, fun facts and features, and homework help for kids. From the solar system to the world economy to educational games, Factmonster.com has the information kids are seeking. Educate, entertain, and engage. That's what Factmonster does—and we've been doing it well since 1998." *(source)*