Hubbard Brook Waterviz Project
2017 Educator's Roundtable
REPORT

EXECUTIVE SUMMARY

On January 9, 2017, the Hubbard Brook Research Foundation convened a group of 12 educators and scientists for a focus group to evaluate the Waterviz water cycle visualization and sonification tools for use in formal and informal education settings. Kaari Casey, an informal science educator from the City Parks Foundation, presented teaching materials for Waterviz that she developed during her 2016 Research Experience for Teachers program at Hubbard Brook. Participants worked in pairs to explore both the website and Kaari's materials, and participants offered feedback to the Waterviz project team during facilitated group discussions.

Overall, participants were excited about the Waterviz products and many were eager to try them out in their classrooms in the near term. The group shared feedback for improving the current tools, especially developing the components available for the "pre-set" events, and improving the navigation of the website. The group also discussed ideas for future "pie-in-the-sky" improvements, such as interactive features where students could manipulate conditions and options for adding human disturbances. Educators suggested that the Waterviz team focus on a 7-8th grade level for the project, which will allow the most flexibility for teachers to ramp up or down depending on their students.

PERSPECTIVES

"I love the art and the music. I'm interested in relationships between the components. I can use this in teaching freshwater ecology unit."

"I'd use this as a "grabber" – have it playing when students walk in the room and grab their attention."

"We found it isn't a great tool for introducing the water cycle – it is better for students who already have been introduced to these concepts to highlight relationships between components."

"I'd like to have students develop a sonification or a visualization as a lab report."

"My school is emphasizing cross-curricular lessons. I'm excited to talk to our music teacher about this."

CURRENT STRENGTHS OF WATERVIZ:

- Integration of music, art, and science allows for cross-curricular lessons.
- Project is a compelling example of modeling for students (using Next Gen Science Standards definition of models as representations of data).
- For NH students, this uses local data.

- The data are real and from a close-by location.

NEED TO DO (NEAR-TERM):

1. Develop the "pre-set" events:
    a. Need visual keys to these events with photos and video.
    b. It would be really helpful to have a teachers' guide for the pre-sets so we know we're interpreting the events correctly. Need interpretations of the events – what are these events showing us? Why are these events important? Walk the teachers through this so they are confident in what they are sharing with their students.
    c. Short narrations could help: "Look at the tree. Now look at stream flow…" Not a video click-through – just audio of what we are seeing when we look at the pre-set events visualizations.
    d. Can we have a barrel visualization for each pre-set as well?
    e. Need graphs for each pre-set – need to be specific – and use consistent units. Could do toggle of different units – metric is better but consistency is most important.
    f. Access to the raw data is important. Teachers want to be able to show students the data: what is powering these tools?
    g. Need to explain the pre-sets more. Are these looping data? How long does it play? What is the timeframe? Explain everything.
    h. There is a lag-time in the visualization when you change between pre-sets and between real-time and pre-sets. You need to add a loading symbol or some sort of explanatory text – this is really confusing.
    i. Be able to compare between pre-sets to get a sense of scale. What does evapotranspiration look like during one event vs another?

2. Improve the website:
    a. More intuitive – no "click here" text – improve navigation consistency – getting back to the main visualization isn't always intuitive.
    b. Can't find the visualization key. This needs to be much more obvious.
    c. Think about teachers projecting this in a semi-lit room. Consider color contrast of symbols and text.
    d. Highlight our current new teacher video.
    e. Need a virtual tour, webcams, photos to connect people to the place where the data are streaming from.
    f. Students are using ipads. Will this work on mobile devices?
    g. Need a clear sonification key on the website.
    h. Storm gallery has old data.
    i. Highlight for users how to change dates in the visualization and where the visualization key is – these are really important for students to understand the tool.

3. Visualization suggestions:

a. Key for evaporation needs to point to the actual symbols: evaporation, transpiration.
b. Snowpack should be still, not moving.
c. Delineate a background where the snow area is.
d. Is the soil next to the stream or beneath? Having a few terrestrial plants on the soil could show the soil is next to the stream, not beneath – and/or tree trunk with roots going down into soil.
e. Can you make it so students can look at the rain barrel's current conditions data for all dates?
f. Add in solar gain. Helps for talking about process.
g. In our area a big issue is groundwater. I'd like the relationship between stream water and groundwater in the model to be more clear.

CAN WE DO?

1. Short narrated video about the project -- Short videos with scientists embedded in site are valuable.
2. Also camera and microphone to live conditions for streaming data. Give people a picture of where the data are coming from.
3. Build basic curriculum extensions: e.g., what is a cubic foot?

PIE IN THE SKY

- Can we add human impact effects? Land cover impacts? Could do pre-sets if you can't do an interactive model: just a few scenarios modeled to launch discussion – human drivers of water cycle vs natural drivers. Most students have a settled landscape experience.
- Could we scale up? Landscape scale? Or add an urban area: Baltimore Waterviz. Love the natural cycle as the default, but want to see what happens with human impact.
- Lots of interest in a modeling version that you can manipulate.
- I'd want my students to predict: what would happen if there was no precipitation?
- Ability to manipulate the data. For middle school – to assign different instruments to the datasets and create their own compositions. For music students to play their own music, record it as an instrument input, and create their own compositions

FOR WATERVIZ TEAM TO CHECK OUT:

Gizmos
Phet

WHERE TO SHARE/DISSEMINATE:

New England League of Middle Schools
NHSTA conference
New England Environmental Educators (listerv)
Art and music teacher networks?

Next Step Suggestions:

1. Website improvements with navigation.
2. Build out the pre-sets:
    a. Video and photo gallery
    b. Interpretations
    c. Raw data
    d. Graphed data