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Designing for Learning through Citizen Science

On behalf of Jess Wardlaw, Natural History Museum, London



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Jess Wardlaw: Natural History Museum, London, UK

Coordinates their citizen science program

Learning: an impact of citizen science



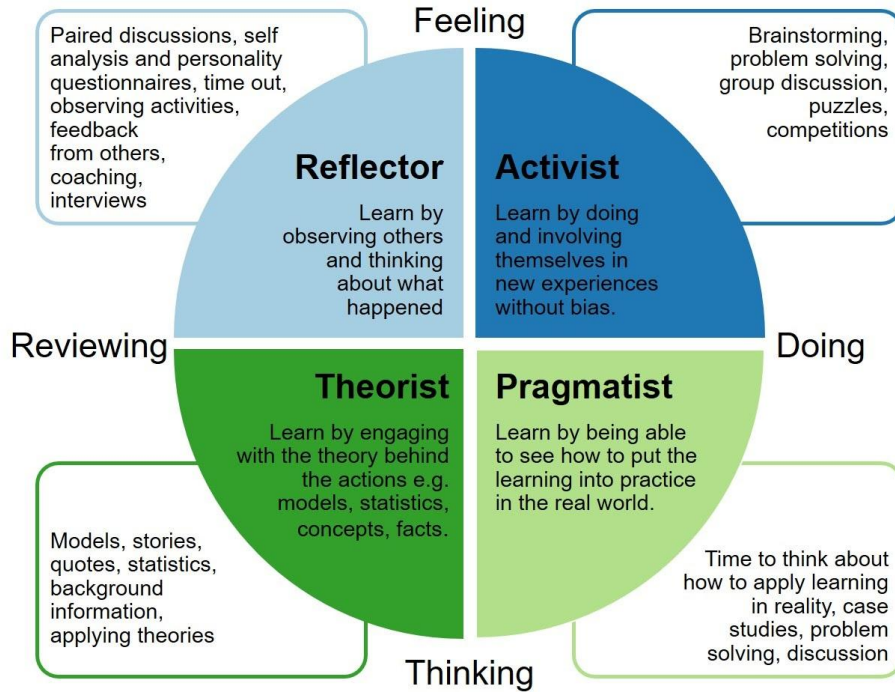
Jess introducing her course





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Course Highlights



Learning:

- not just taking in information
- acquiring knowledge & understanding
- acquiring “behaviours, skills, values, attitudes, and preferences”



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Course Highlights

- **Decisions project leader makes affect learning outcomes, even unintentionally**
- **How to meet participants' needs?**
- **Focus on learning affects broader citizen science goals**
- **Participants will all be different**
- **Design for diversity - this maximises learning opportunities for all**



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Course Highlights

- **Citizen science:**
practical, real-world,
data-driven
- **Learning opportunities**
a) technological, b)
social
- **Length and depth of
participation vary, e.g.
can start with easier
tasks**



Designing for learning through citizen science

Dashboard

Courses

Introductory courses

Designing for learning

Welcome and introduction (10 mins)

Unique possibilities for learning through citizen science

Now that you are familiarised with the concepts behind design for learning and the unique learning opportunities associated with citizen science, you are ready to explore strategies for designing and delivering for learning in citizen science:

1. Know the Audience
2. Design for Diversity
3. Support Multiple Kinds of Participant Engagement
4. Engage Stakeholders Throughout the Design Process
5. Develop Learning Supports

The next sections will describe these strategies in more detail and illustrate them with examples so that you can think about how to open up learning opportunities in your own citizen science activities.



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Course Highlights

Short quizzes throughout course

Activity: Aspects of unique learning through citizen science – the scientific and social context



Drag the words into the correct boxes

The scientific context of citizen science influences learning because it involves an [] which can be a new area of research but also the systematic monitoring of a specific area. Unlike scientific exercises that are common in traditional school settings where the outcome can be predicted, citizen science offers a []. Finally, it is frequently [] because in many projects participants are creating or processing data.

Citizen science is also different because the participants join either because they are [] the topic of the project, although a [] can also motivate participation. The aspects of doing something together mean that citizen science projects have a [] element. Also in some projects, such as those that require repeated surveying of the same area over time, citizen science offers [].

long term participation

interested in

real world setting

data driven

concern

communal

authentic scientific endeavour

✓ Check



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Course Highlights

- **Each course contains a Final Quiz**
 - **Score 50% to get the badge!**
- **Many also contain optional quizzes in fun formats**

Drag the words into the correct boxes

The scientific context of citizen science influences learning because it involves an **authentic scienti...** ✓ which can be a new area of research but also the systematic monitoring of a specific area. Unlike scientific exercises that are common in traditional school settings where the outcome can be predicted, citizen science offers a **real world setting** ✓. Finally, it is frequently **data driven** ✓ because in many projects participants are creating or processing data.

Citizen science is also different because the participants join either because they are **interested in** ✓ the topic of the project, although a **concern** ✓ can also motivate participation. The aspects of doing something together mean that citizen science projects have a **communal** ✓ element. Also in some projects, such as those that require repeated surveying of the same area over time, citizen science offers **long term partici...** ✓.

Excellent - you know the elements of citizen science learning!



7/7



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Course Highlights

Tools people can use, interpersonal interactions, and guidance from project leaders



Provide many examples and frequent feedback

Practitioners can enable participants to learn through practice by offering a chance to interact with examples of the kind of data that they will be collecting, classifying, or analyzing, and providing feedback about that interaction. For projects that tend to attract one-time engagement, building feedback into the experience may increase individuals' satisfaction, which can help lead to interest in additional engagement in citizen science.

Example: [Galaxy Zoo](#) provides regular and timely feedback regarding data contribution milestones and an extensive up-to-date list of scientific [publications](#) that use the data. This enables participants to expand their learning and role within the scientific process. Certain “super users” who were integral to particular discoveries or manuscript development have been named as co-authors or acknowledged in peer-reviewed Galaxy Zoo publications. Citizen scientists, for example, discovered a new class of rapidly-growing star forming galaxies known as “green pea” galaxies, so-called by volunteers due to their small and green appearance in Sloan Digital Sky Survey imaging (Cardamone et al, 2009).

Link the Project's Scientific Goals with Its Learning Goals

Frequent feedback from scientists can also connect the project's scientific goals to its learning goals. Updates about the use of collected data in scientific publications or to advocate for policies capitalize upon the authenticity of participants' activity. Other possible formats include written documentation shared with participants about how scientists have used the data in the past and might use the data in future; lists of publications; online databases for broader use; education about using results in ways that support civic decision making; and discussions about how project results can be used to inform policy.

Example: here is a video the Natural History Museum commissioned for its long-term monitoring project, Big Seaweed Search. This video was specifically designed to connect the task that volunteers carry out to its scientific purpose. It is about two minutes long and features both the seaweed scientist behind the project explaining its importance and aims, and a youth participant in the programme explaining how to get involved.

Plus ...

- Encourage Social Interaction
- Support Participants to Communicate and Apply What They Learn



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Course Highlights

Bioblitz Scenario

Now read through the following scenario as instructed. Don't worry, **this is 100% not a test!** There are no wrong answers. The aim is simply to think about how the content of this training can be applied within an authentic citizen science activity.

Instructions

STEP 1: Read **context**, description of who is involved.

STEP 2: Read the **scenario**, which describes part of a young person's BioBlitz experience.

STEP 3: Notice what the facilitator did to **open up** or **shut down** learning opportunities, and how this affected the young person's participation. Particularly pay attention to: 1) the **framing of the activity** participants received with respect to science and citizen science; 2) the **tools** available to participants and 3) the **interaction of the people** in the scenario. Then compare your thoughts with our observations!

STEP 1: Context



People involved:

Ben - young person, about 6 years old.

Ben's father

David - Activity leader/demonstrator.

Description of the event:

A BioBlitz event is taking place in the Wildlife Garden at the Natural History Museum (NHM), as part of a larger Family Festival event. This is a drop-in activity, so young people and adults come and go as they please. David, the demonstrator from the NHM, spends time speaking to individuals or families at different times. No group introduction is given at the start of the session. Young people can use small nets and trays to catch and collect pond organisms from a tank of water prepared by David beforehand. Ben arrives a few minutes after the activity has already started.

Image credit: Natural History Museum London. All Rights Reserved.



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Course Highlights

Further reading and learning to deepen your knowledge of this topic



Further reading:

<https://education.ucdavis.edu/yccs-home>

Kloetzer L, Lorke J., Roche J., Golumbic Y., Winter S., Jögeva A. (2021) Learning in Citizen Science. In: Vohland K. et al. (eds) The Science of Citizen Science. Springer, Cham. https://doi.org/10.1007/978-3-030-58278-4_15.

Educational resources developed for citizen science projects:

<https://edu.earthwatch.org.uk/>

<https://citynaturechallenge.org/education-toolkit/>

<https://www.earthwormwatch.org/youth-education>

<https://ed.ted.com/earth-school>

Videos:



The [UDL Guidelines](#): a tool that can be used to design learning experiences that meet the needs of all learners. These guidelines offer a set of concrete suggestions for applying the [UDL framework](#) to practice and help ensure that all learners can access and participate in meaningful, challenging learning opportunities.



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Thank you

Contact information

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