Facilitating Citizen Science through Gamification

RYAN MURPHY

MEMORIAL UNIVERSITY

THE IDEA

CITIZENS + SCIENCE + GAMES = DISCOVERY

CITIZEN SCIENCE is the phenomena of engaging the general public in the collection & analysis of scientific data.

The National Audubon Society's Christmas Bird Count

Zooniverse's Galaxy Zoo

GAMIFICATION is the use of game elements in non-game contexts, typically to change the experience of that context.
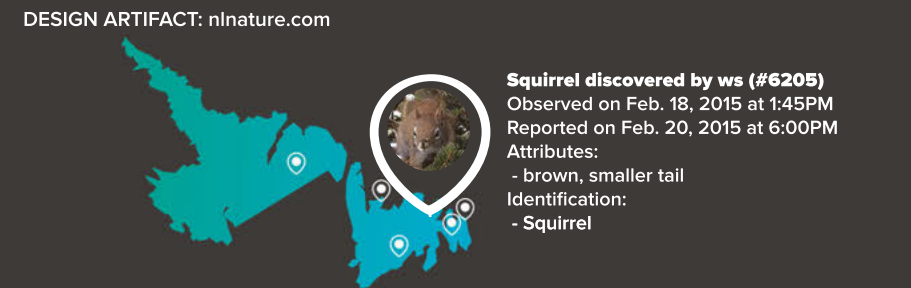
Foursquare

Foldit

Ingress

The **GAMIFICATION** of **CITIZEN SCIENCE** might unlock new capacity in scientific projects by engaging volunteer citizen scientists.

DESIGN SCIENCE provides solutions to complex challenges while developing an innovative tool—the *design artifact*—with broad application.

HYPOTHESIS

Basic **GAMIFICATION** (quests, events, and rewards) would result in more contributions provided by citizen scientists on NLNature than in the control group.

THE STUDY

DESIGN ARTIFACT: nlnature.com

Squirrel discovered by ws (#6205)
Observed on Feb. 18, 2015 at 1:45PM
Reported on Feb. 20, 2015 at 6:00PM
Attributes:
- brown, smaller tail
Identification:
- Squirrel

NLNature is a citizen natural history project that enables anyone in Newfoundland & Labrador to report natural history phenomena. The collected data is processed and analyzed by ecologists at Memorial University.

GAME MECHANICS
We defined a set of Quests and Events which participants could complete in order to obtain an NLNature Honorary Citizen Ecologist certificate.

QUEST EXAMPLE
Birdwatcher: Record at least 5 different bird species in any area other than at a bird feeder.
EVENT EXAMPLE
Bird blitz: We're looking at the birds this week.

PARTICIPANTS
17 participants from a population of approximately 500 students in first- and second-level Biology courses at Memorial University during the Winter 2015 semester.

PROCEDURE
- Upon registration, participants were randomly assigned to the treatment or control condition and emailed with instructions on using NLNature.
- These instructions included descriptions of the Quests, Events, and the reward for the treatment group and placeholder suggestions for the control group.
- Participants used NLNature freely throughout the study.
- Contributions were automatically collected by NLNature's database.

THE RESULTS

Summary of participants' contributions.

Condition	Number of Participants	Sightings Reported Mean	Standard Deviation
Control	8	0.25	0.71
Game	9	0	0

Only one participant across both groups submitted one sighting during the study period: a member of the control group!

DISCUSSION

RECRUITMENT CHALLENGES
Sample population stress:
- Participation may have appeared to require substantial commitment, discouraging typically distressed students[1] from registering for the study.

Volunteer motivations:
- We promoted the present study under the premise that students would contribute to natural history research.
- Promoting how participation is in the self-interest of students might have been more successful.[2]

The Winter season:
- It may have been paradoxical to encourage volunteer natural history research in the midst of Newfoundland's winter months.

INSTANTIATION VALIDITY
- Evaluation of the NLNature's validity as a gamified citizen

CONCLUSION
- Participants in the gamified condition did not contribute more than those in the control condition.
- Low registration prevents generalizing these results to gamification and citizen science.
- Better understanding the barriers to registration and participation we faced will improve the design of future artifacts.

1. American College Health Association. (2013). *American College Health Association-National College Health Assessment II: Memorial University of Newfoundland Executive Summary Spring 2013.* Hanover, MD.
2. Rotman, D., Preece, J., Hammock, J., Procita, K., Hansen, D., Parr, C., … Jacobs, D. (2012). Dynamic changes in motivation in collaborative citizen-science projects. In *Proceedings of the ACM 2012 conference on Computer Supported Cooperative Work* (pp. 217–226). ACM.