GAMIFYING GREEN

JON FROEHLICH
ASSISTANT PROFESSOR CS
30TH ANNUAL HCIL SYMPOSIUM
MAY 22 2013
GAMIFYING GREEN

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Gamifying Green
Super Mario Bros
Green Edition
WHAT IS
GAMIFICATION
**gamification** [gay-muh-fi-kay-shuhn]
integrating game dynamics into your site, service, community, content, or campaign, in order to drive participation.
(from bunchball.com)

**gamification** [/ˈgæmɪfəˈkæʃn/]
the application of typical elements of game playing (e.g., point scoring, competition, rules of play) to other areas of activity, typically as an online marketing technique to encourage engagement with a product or service
(from Oxford Dictionary)
gamification [gəˈmɪfəˈkæʃən]  
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**gamification** [ˈgæmɪfɪˈkeɪʃən]

the **application of typical elements of game playing** (e.g., point scoring, competition, rules of play) to other areas of activity, typically as an online marketing technique to **encourage engagement with a product or service**.

(from Oxford Dictionary)
Gamification is:
The use of game design elements in non-game contexts

Sebastian Deterding
Academic / Leading Gamification Thinker

Deterding et al., From game design elements to gamefulness: defining “gamification”, MindTrek 2011
Gamification is:
The use of game design elements in non-game contexts

Sebastian Deterding
Academic / Leading Gamification Thinker

Supplies “the how” but not “the why”
Despite detractors, interest in **gamification** is growing

We’ll get into this later
Monday Run
MAY 20, 2013 - 6:08 PM

Duration: 31:35
Average Pace: 7:46
Calories Burned: 563

Map of the run route through Cleveland Park and other landmarks.
Fitness
Nike+ Fuelband

LATEST NIKE ACTIVITY
See what's happening in Nike+ around the world.
Ready? Set? Goals!

Whether you want to buy a home, save for retirement, get out of debt or pay down student loans, Mint helps you reach your goals. Just enter how much money you need, set a date and link your goal to specific accounts so it’s easy to stick to your plan.

See how you’re doing
You can check how close you are to your goal amount anytime. Keep up-to-date with monthly emails that track your progress, and learn how to reach your goals faster with free advice and customized next steps.
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Gamification is:
The use of game design elements in non-game contexts
to promote proenvironmental behavior

Sebastian Deterding
Academic / Leading Gamification Thinker
TravelSmart Tracker

Log your trips, measure your impact, see your results. Discover the TravelSmart benefits and the impacts of your daily travels. See how your choices affect you and the community around you, and make a change for good!

It's completely free and easy to use.

How are you going to get there?

Log a new trip

Already on board? Login or Register.

Copyright © 2013 TransLink | Privacy Policy
Send your suggestions to tracker@travelsmart.ca

Public Transit
https://tracker.travelsmart.ca
Welcome home
Meet the Nest Learning Thermostat

Living with Nest
Now at The Home Depot
What's new

Home HVAC
nest.com
Your regional rank for Dec/2010 (as of December 16, 2010)

**Your Score**
- Ranked 3
- Average Energy Economy: 4 miles/kWh

**Champion's Score**
- Average Energy Economy: 4.8 miles/kWh

---

**Eco-Driving**

**Nissan Carwings**
GreenBiz Group listed gamification as one of the top sustainable business trends of 2012, noting that **game mechanics are increasingly used** by companies to provide “rewards for making good, green choices”
This talk is based on my forthcoming book chapter in *The Gameful World*.

**Gamifying Green:**
Surveying and Situating Green Gamification for Environmental Sustainability

This is a draft chapter for the forthcoming book *The Gameful World*. Some content and pagination are subject to change. Note: the pagination, single/double spacing, figure and table placement are for draft purposes and will be handled by the publisher for final print version.

Please cite as:

GAMIFICATION INGREDIENTS
ACHIEVEMENT UNLOCKED
Successful cooking metaphor in talk
MARIO 003412

points

collections

WORLD 2-1

levels

TIME 131

scarcity / challenge

mini-goal

narrative

medium-goal

long-term goal (save princess)
Has informational and motivational properties: it provides a basis for assessment and action, and enables progress towards a goal.

eco-feedback
sensing and visualizing behavior to reduce environmental impact

you

sensing feedback
Sensing and Feedback of Everyday Activities to Promote Environmental Behaviors

Jon E. Froehlich

A dissertation submitted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

University of Washington

2011

Program Authorized to Offer Degree:
Department of Computer Science and Engineering
It's not so easy
Right ingredients but boring...
By 2014, 80% of current gamified applications will fail to meet business objectives primarily due to poor design.

Gartner Group
Technology Analyst Company
The difference is in the **design** and **execution**

**success**  vs.  **failure**
The difference is in the **design** and **execution**.

**ACHIEVEMENT UNLOCKED**

2nd successful cooking metaphor in talks. **Double bonus**.

success  failure
GREEN GAMIFICATION EXAMPLES
Opower’s mission is to give everyone, everywhere, the information, control, and motivation they need to save energy.

This is where behavioral psychology and gamification come in.
Traditional Bill:

Please request changes on the back. The amount enclosed includes the following donation: FPL Care To Share: $____

Account number: Total amount due: New charges due by: Amount to be paid:

$295.43 Jul 16 2008 $0

Last Month Neighbor Comparison:

- You used 46% more than your efficient neighbor.
- Understanding your usage better will help you save money.

Last 12 Months Neighbor Comparison:

- You used 45% more electricity than your neighbors. This costs you about $1,029 extra per year.

Opower Bill:

Florida Power & Light Company
P.O. Box 227697
Miami, FL 33105

Please request changes on the back. Notes on the front will not be detected.

Account number: Total amount due: New charges due by: Amount to be paid:

$329.10 Jul 16 2008 $0

ComEd
An Exelon Company

Home electricity report
Account number: 1336928890
Report period: 04/01/09 - 05/31/09

We are pleased to provide this personalized report to you as part of a pilot program. The purpose of the report is:

- To help you understand the amount of electricity used in the context of other homes.
- To track progress on the report, we provide feedback on your home’s electricity usage over time and show you how you can reduce it.

Your electric statement
For: May 27 2009 to Jun 25 2009 (20 days)

Amount of your last bill: $329.10
Payment received: $329.10

Balance before new charges: $295.43
New charges: $0

Total amount you owe: $295.43

Meter reading - beige: IC118147
Current reading: 3266
Previous reading: 3246

Amount of your last bill: $329.10
Payment received: $329.10

Balance before new charges: $295.43
New charges: $0

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A Gamification Lens

Home electricity report
Account number: 1234567890
Report period: 04/10/09 - 05/08/09

We are pleased to provide this personalized report to you as part of a pilot program. The purpose of the report is to:
- Provide information: This report is an educational tool to help you understand your home’s electricity use in the context of other homes.
- Track progress: We will help you learn about how your home’s usage changes over time and where you likely have opportunities to save.
- Share energy efficiency tips: On the back of the report, we provide ideas for saving energy and money. You can find more tips at www.ComEd.com/energyreport

JOHN DOE

Last Month Neighbor Comparison
You used 48% more than your efficient neighbors.

Efficient Neighbors: 707 kWh
You: 1,049 kWh
Neighbors: 1,333 kWh

Who are your “neighbors”?
- All neighbors: Approximately 60 occupied, nearby homes that are similar in size to yours
- Efficient neighbors: The most efficient 20 percent from the “All neighbors” group

Last 12 Months Neighbor Comparison
You used 45% more electricity than your neighbors. This costs you about $1,029 extra per year.

Key:
- You
- All neighbors
- Efficient neighbors

leaderboard

iconic rewards

feedback

3 levels

goals (implicit)
A Behavioral Science Lens

Home electricity report
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JOHN DOE

Last Month Neighbor Comparison

**Efficient Neighbors:** 707 kWh

**You:** 1,049

**Neighbors:** 1,333

HOW YOU'RE DOING:

- GREAT 😊
- GOOD 😊😊
- MORE THAN AVERAGE

WHO ARE YOUR "NEIGHBORS"?

- **ALL NEighbors**: Approximately 60 occupied, nearby homes that are similar in size to yours (avg 5,379 sq ft)
- **EFFICIENT NEighbors**: The most efficient 20 percent from the "All Neighbors" group

Last 12 Months Neighbor Comparison

You used **45% more** electricity than your neighbors. This costs you about **$1,029 extra per year.**
Descriptive Norms

A descriptive social norm describes what is typical or normal behavior in a particular context:

“If everyone is doing it, it must be a sensible thing to do”

Goldstein et al., Using Social Norms to Motivate Environmental Conservation in Hotels, J. of Consumer Research 2008
We invite you to join with us to conserve water by using your towels more than once. In addition to decreasing water and energy consumption, you help us reduce the amount of detergent waste water that must be recycled within our community. Please hang the towels up if you wish to participate in the program — if not, simply leave them on the floor.

©1996

Join your fellow guests in helping to save the environment. Almost 75% of guests who are asked to participate in our new resource savings program do help by using their towels more than once. You can join your fellow guests in this program to help save the environment by reusing your towels during your stay.

We appreciate your help!

Printed on recycled paper. Laminated to reduce waste.

Goldstein et al., Using Social Norms to Motivate Environmental Conservation in Hotels, J. of Consumer Research 2008

standard environmental message descriptive norm message

26% increase
But there’s a problem with social norms...
The Boomerang Effect

Schultz et al., The Constructive, Destructive, and Reconstructive Power of Social Norms, Psychological Science 2007
The Boomerang Effect

Schultz et al., The Constructive, Destructive, and Reconstructive Power of Social Norms, Psychological Science 2007
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John Doe

Last Month Neighbor Comparison
You used 48% more than your efficient neighbors.

Efficient Neighbors: 707 kWh
You: 1,049
Neighbors: 1,333

* kWh: A 100-Watt bulb burning for 10 hours use 1 kilowatt hour

Who are your “neighbors”?

All Neighbors: Approximately 60 occupied, nearby homes that are similar in size to yours
Efficient Neighbors: The most efficient 20 percent from the “All Neighbors” group

Last 12 Months Neighbor Comparison
You used 45% more electricity than your neighbors.
This costs you about $1,029 extra per year.

Loss aversion

Feedback

Descriptive social norm

Injunctive messaging
Is Opower successful?
Social norms and energy conservation

Hunt Allott

MPhil, United Kingdom, New York University, United States

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Keywords:
Social norms
Energy demand
Randomized field experiments

ABSTRACT

This paper evaluates a series of programs run by a company called OPOWER to send Home Energy Report cards to randomly selected households comparing their electricity use to that of their neighbors. Using data from monitored natural field experiments at 600,000 treatment and control households across the United States, I estimate that the average program reduced energy consumption by 2.9%. The program provides additional evidence that non-price interventions can substantially and cost-effectively change consumer behavior: the effect is equivalent to that of a short-run electricity price increase of 11 to 20%, and the cost-effectiveness compares favorably to that of traditional energy conservation programs. Perhaps because the treatment includes perceptive social norms, effects are heterogeneous: households in the higher decile of pre-treatment consumption decrease usage by 6.2%, while consumption by the lowest decile decreases by only 0.6%. A stronger discontinuity design proves that different categories of “social norms” play in different roles in encouraging relatively low users not to increase usage.

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1. Introduction

Climate change has emerged as one of the most important economic policy issues of the 21st century, and many view energy efficiency as an appealing approach to reducing greenhouse gas emissions. Traditionally, economists and policymakers have focused on relative prices as the primary driver of energy decisions. As a result, carbon cap-and-trade programs at the core-piece of proposed climate change policies, and subsidies for energy-efficient durable goods show the vast majority of public energy efficiency funding in the U.S. (Gillingham et al., 2006).
~2.5% energy savings
20 million tons of coal
yearly output of 4 nuclear power plants

[Armel, BECC 2008]
Together with our 80 utility clients, we’ve now saved 2 Terawatt hours
That’s enough energy to take the city of Sacramento off the grid!

Find out more ▶️
GREEN
GAMIFICATION
ECO-DRIVING
There is a well known link between DRIVER BEHAVIOR and FUEL ECONOMY.

Greene, 1986; Ford, 2008a; Gonder, Earleywine, & Sparks, 2012;
Fuel economy can vary by up to 25% due to driver behavior

Greene, 1986; Ford, 2008a; Gonder, Earleywine, & Sparks, 2012;
Economical Driving

Eco-Driver Behaviors

- Accelerating moderately
- Anticipating traffic flow & signals
- Driving at the speed limit
- Eliminating excessive idling
- Good car maintenance
If $\frac{1}{3}$rd US drivers adopted eco-driving behaviors, SAVE 33 million metric tons of CO$_2$.

Feedback in the automobile
Early steam-powered cars had no speedometers!
Austin Torpedo, 1932; http://goo.gl/43A67
gas gauge
speedometer
tachometer
Then... a breakthrough
Real-time feedback about fuel economy!
Then... another breakthrough
Constantly watching the mileage measurements on the Prius's little video screen is really a **mobilized video game**. It's NOT simply driving a car.

**Harry Fuller**  
Former executive editor at CNET
Drivers interpret the feedback as a game. 

Kurani et al., 2010; Stillwater and Kurani, 2011
Prius Designed in **Pre-Gamification** Era
When we observed hybrid drivers, we found they were going for high scores, a gaming behavior that has never existed in cars before. We designed to accommodate it.

Steve Bishop
Designer at IDEO
Ford SmartGauge
Debuted in 2010

feedback

feedback + narrative

visual reward + collections
ECO ASSIST

The Ecological Drive Assist System (Eco Assist) feature guides drivers to realise the full benefits of Honda Hybrid Technology.

**SCORING FUNCTION**
Cummulative/Long Term

**IGNITION ON**
Eco Guide when Ignition ON - Grow “leaf” while driving. A more fuel efficient driving style will provide you with faster growth.

![Diagram of leaf growth stages](image)

**IGNITION OFF**
Eco Guide when Ignition OFF - The grown leaves will accumulate and gradually form a trophy to indicate fuel-efficiency driving level: Beginner, Advanced, Congratulations.

![Diagram of trophy stages](image)

BLUE: UNECONOMICAL DRIVING  BLUE-GREEN: MODERATELY FUEL-EFFICIENT  GREEN: FUEL-EFFICIENT DRIVING
Nissan Carwings

Regional Rankings

Your regional rank for Dec/2010 (as of December 16, 2010)

Your Score
Ranked 3
Average Energy Economy 4 miles/kWh

Champion's Score
Average Energy Economy 4.8 miles/kWh

Your Rank for Dec/2010
Are these systems successful?
Analyzed 400,000 journeys by 5,697 drivers across 5 countries. Drivers reduced consumption by 6% with eco:Drive.
GAMIFICATION CRITICISMS
Overhyped and superficial

Play should be voluntary

Intrinsic vs. extrinsic motivation

Credibility and trust

Point inflation

Ethical issues

Undermines user agency

...
Gamification is an inadvertent con. It tricks people into believing that there's a simple way to imbue their thing (bank, gym, job, government, health) with the psychological, emotional and social power of a great game.

Margaret Robertson
Game Designer / Consultant
At SCVNGR we like to joke that with seven game dynamics you can pretty much **get anyone to do anything**.
Business Model:
Partner with utilities.
Pay virtual currency for verified energy efficiency.
You will become [energy] efficient in spite of yourself because you want that farm cash.

Eric Senunas
Co-Founder Zema Good, Inc
Slide based on Sebastian Deterding’s Meaningful Play talk, 2011: http://codingconduct.cc/Meaningful-Play
Intrinsic vs. Extrinsic motivation

When sensors go wrong, gamification breaks.
When sensors go wrong, **gamification breaks**.
When sensors go wrong, **gamification breaks.**

GPS sensor could not get a good fix and Runkeeper does not properly smooth the signal.
When sensors go wrong, **gamification breaks**.
When sensors go wrong, gamification breaks.
When sensors go wrong, **gamification breaks**.
TALK

CONCLUSION
Some useful books
Some **inspiring/useful talks**
Some **helpful design cards**
Thank you for purchasing this Mental Notes™ card deck. I hope you find this to be a fun, inspiring and — most of all — useful tool.

www.getmentalnotes.com
Design with Intent
101 patterns for influencing behaviour through design
Free download from danlockton.co.uk
Me in under 140 characters

Sebastian Deterding designs and researches playfulness and persuasion in digital media.

Short Bio

Sebastian Deterding is a designer and researcher working on persuasive and gameful design (gamification), user experience and video games. He is broadly interested in how code shapes conduct – and how to put that knowledge into practice.

He is a PhD researcher in communication research at the graduate school of the Research Center for Media and Communication, Hamburg University, supported by a grant of the Hamburg Federal Initiative of Research Excellence. His thesis looks into the use of game design elements to motivate behaviour in non-game contexts. He is also an affiliated researcher at the Hans Broder Institute for Media Research in Hamburg, and works as an independent user experience designer. Recent clients include the BBC, Greenpeace, Omnicom Group, Otto, Xing and Schibsted, as well as several startups.

He speaks internationally at venues like LIFT, Interaction, CHI, Web Directions and Playful, and his work on gameful design has been covered by The Guardian, The New Scientist, the Los Angeles Times and EDGE Magazine among others.

Previously, he worked as user experience designer at Europe’s largest magazine publisher, Gmunden, and as Program Manager Multimedia at the German Federal Agency for Civic Education.
The Gameful World

Approaches, Issues, Applications

A book questioning playful and gameful design and their ramifications for society, politics, ethics, design, and individuals.


Sign up to get a single e-mail when the book is ready.

e-mail address

GO

Gamifying Green:
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John Thornhill

Editor(s)

Stefan P. Wrede, Sebastian Deterding

Publisher

MIT Press

Publication Date

2013
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Sign up to get a single e-mail when the book is ready.

Goto gamefulworld.org & sign-up to receive an announcement when the book is ready.
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ACHIEVEMENT UNLOCKED
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