UNIVERSITY OF ABERDEEN

Gamification in teaching

Vasilis Louca

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game
learning
games
gamer
knowledge
Game-Based
learner
Learning
use
environment
strategies
outcomes
similar
purposes
instructional
example
part
scenario
instead
better
context
GBL
learn
something
must
important
words
playing
using
effective
needs
storyline
challenges
engage
right
transferable
sell
become
text
Explain
let
answer
popular
achieve
proven
process
get
contexts
Learn
just
carry
life
Gamification
character
working
used
abilities
types
order
response
audience
adventure
think
takes
client
stage
scenarios
different
new
etc
real

Why gamify?

"You create these communities around the game that do an incredible amount of intellectual work, and when they're done with the work, they will leave the game and go to another game that's more challenging. Can you imagine if we had that kind of environment in classrooms?"

– Constance Steinkuehler Squire

Associate Professor in digital media at the University of Wisconsin-Madison

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Engagement

Skills

Fun!

Deeper understanding

Gamification in teaching

“Gamification is defined as the application of typical elements of game playing to other areas of activity, specifically to engage users in problem solving”

Hall 2013

Gamification in teaching

*"Gamification is defined as the application of **typical elements of game playing** to other areas of activity, specifically to engage users in problem solving"*

Hall 2013

rules

points

leaderboard

competition

prices/rewards

Gamification in teaching

Understanding the target audience

Huang & Soman 2013

Gamification in teaching

Understanding the target audience → Defining learning objectives

Huang & Soman 2013

Gamification in teaching

Huang & Soman 2013

Gamification in teaching

Understanding the target audience → Defining learning objectives → Structuring the experience → Identifying resources

Applying gamification elements

Huang & Soman 2013

Other game elements:

Voting:

Other game elements:

Collect:

Other game elements:

Unlock: new *levels, skills etc*

Other game elements:

Lottery:

Characteristics of successful gamers:

Huang J et al . 2017 Master Maker: Understanding Gaming Skill Through Practice and Habit From Gameplay Behavior. Topics in Cognitive Science.

Characteristics of successful gamers:

1. Everybody can succeed

Gamers (students?) believe that everyone can succeed by working hard enough and long enough.

Huang J et al . 2017 Master Maker: Understanding Gaming Skill Through Practice and Habit From Gameplay Behavior. Topics in Cognitive Science.

Characteristics of successful gamers:

2. Play the odds

Gamers are more likely to believe, “with a little luck I can be successful without formal training.”

Huang J et al . 2017 Master Maker: Understanding Gaming Skill Through Practice and Habit From Gameplay Behavior. Topics in Cognitive Science.

Characteristics of successful gamers:

3. Learn from the Team, not the coach (lecturer!)

Gamers are good a teamwork, often gaming in groups. They learn from each other, not a coach or a teacher.

Recommendation: “Teach” by introducing a problem and then getting out of the way.

Huang J et al . 2017 Master Maker: Understanding Gaming Skill Through Practice and Habit From Gameplay Behavior. Topics in Cognitive Science.

Characteristics of successful gamers:

4. Gamers use maps

Gamers function best when they know exactly where they are, where they need to go, and who is ahead of them.

Recommendation: Incorporate learning plans into your courses

Huang J et al . 2017 Master Maker: Understanding Gaming Skill Through Practice and Habit From Gameplay Behavior. Topics in Cognitive Science.

Characteristics of successful gamers:

5. Demand the right team

Gamers seek out other gamers who are at the same skill level. Most gamers don’t like to play with experts or newbies.

Recommendation: Avoid mixing skilled and unskilled people into the same group. Unskilled people learn best when grouped with other unskilled people (*True?*).

Huang J et al . 2017 Master Maker: Understanding Gaming Skill Through Practice and Habit From Gameplay Behavior. Topics in Cognitive Science.

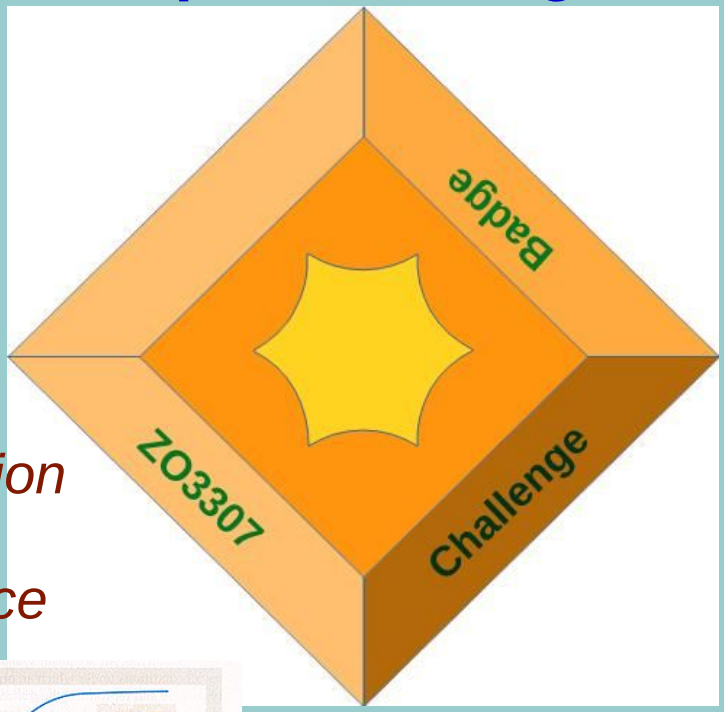
Gamification in teaching

Animal Population Ecology:
The course that everybody hates!

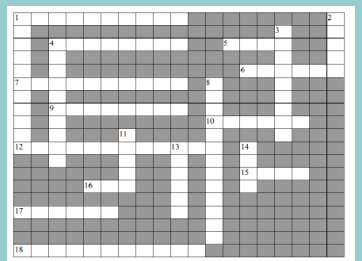
Five “Challenges”:

1) Online quiz
2) “Treasure hunt” in course reading material
3) Virtual modelling exercise
4) Crossword
5) Field-based taxi challenge (X2 points)

ZO3307 Game Completion Badge

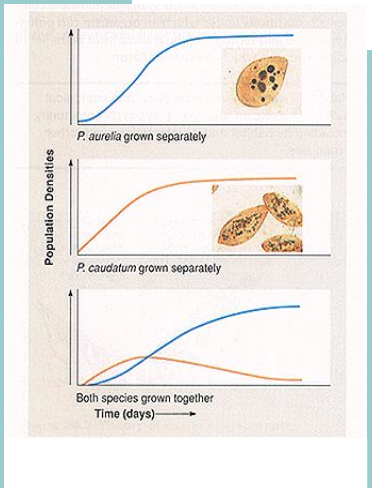


- *Each challenge was made available following completion of the previous one*
- *Students earned points for the attempt and performance*



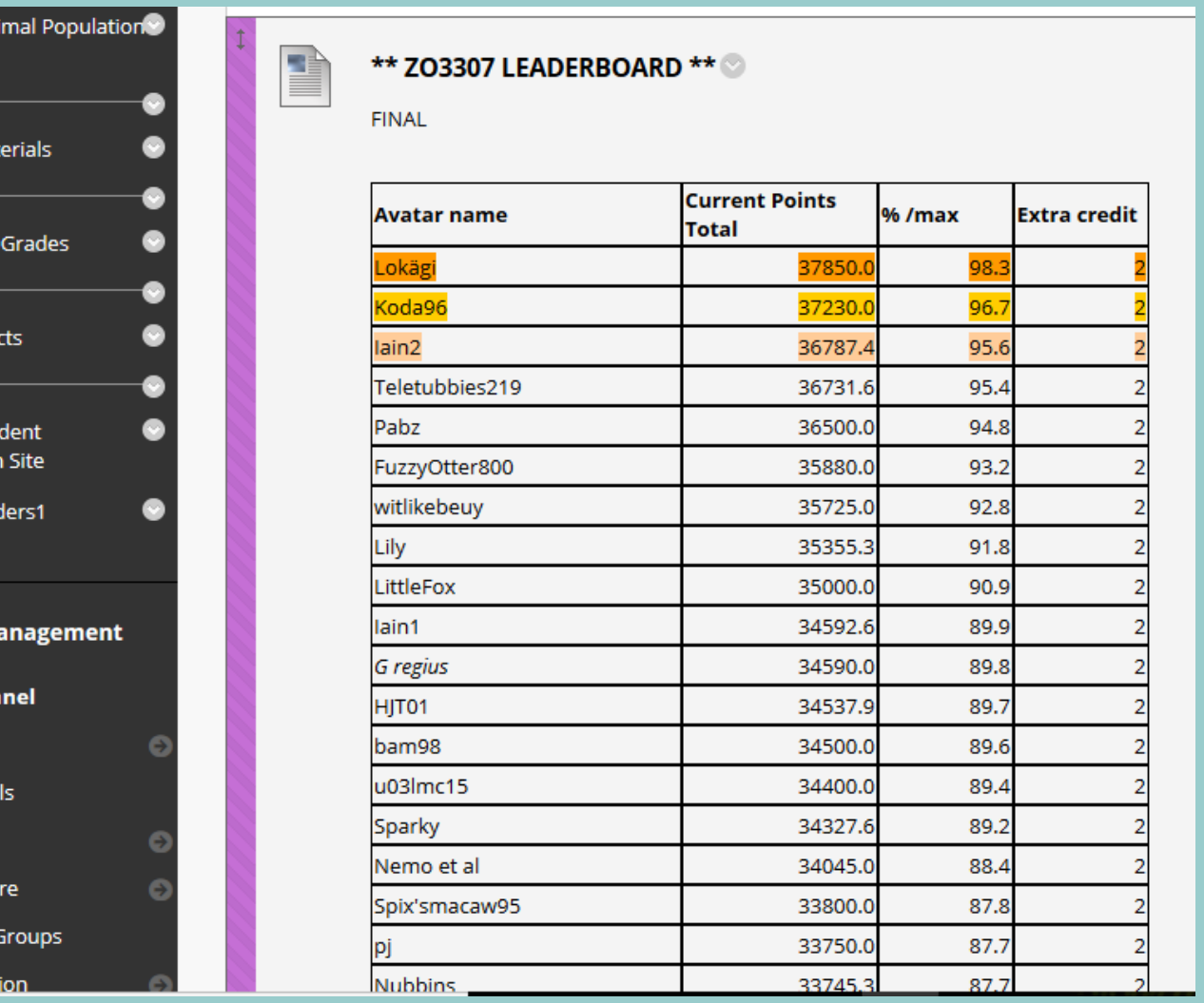
ACROSS
1. r=1/2(rmax)
4. K capacity
5. dN/dt=rN, population growth...
6. Ratio between 2 successive pop counts
7. interbreeding group in same area
9. S-shaped
10. positive density dependence
12. Exponential growth
15. Max intrinsic rate of change
16. population models
17. r>0, population...
18. Continuous population growth

DOWN
1. Humans
2. Mussel
3. Distinct reproductive season
4. ZO3307 Computer practicals
8. Random
11. Hirta and Boreray sheep
13. Ratio between 2 successive pop counts
14. At range boundaries, r= ?



Gamification in ZO3307

Leaderboard



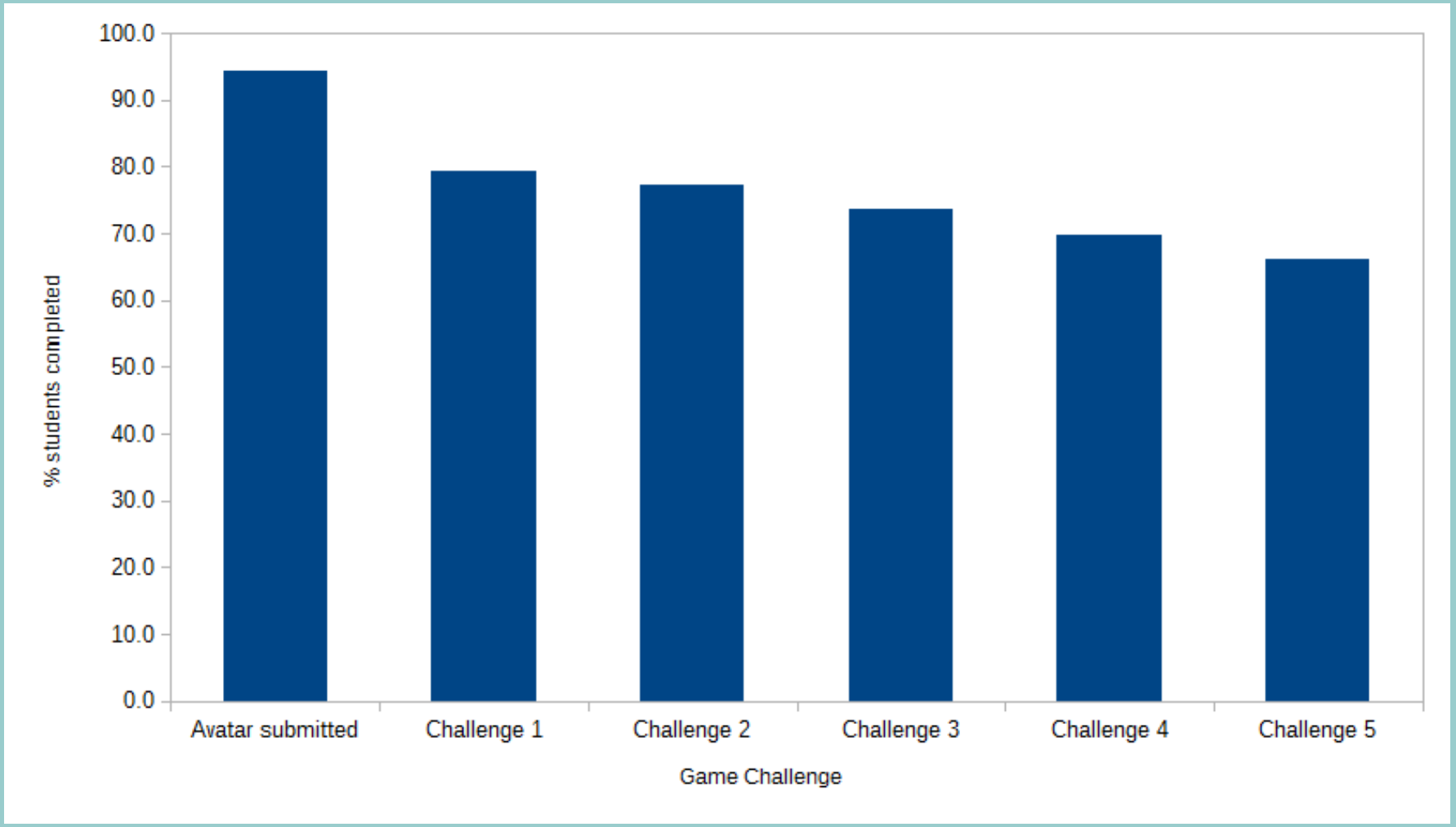
** ZO3307 LEADERBOARD **

FINAL

Avatar name	Current Points Total	% /max	Extra credit
Lokägi	37850.0	98.3	2
Koda96	37230.0	96.7	2
Iain2	36787.4	95.6	2
Teletubbies219	36731.6	95.4	2
Pabz	36500.0	94.8	2
FuzzyOtter800	35880.0	93.2	2
witlikebeuy	35725.0	92.8	2
Lily	35355.3	91.8	2
LittleFox	35000.0	90.9	2
Iain1	34592.6	89.9	2
G regius	34590.0	89.8	2
HJT01	34537.9	89.7	2
bam98	34500.0	89.6	2
u03lmc15	34400.0	89.4	2
Sparky	34327.6	89.2	2
Nemo et al	34045.0	88.4	2
Spix'smacaw95	33800.0	87.8	2
pj	33750.0	87.7	2
Nubbins	33745.3	87.7	2

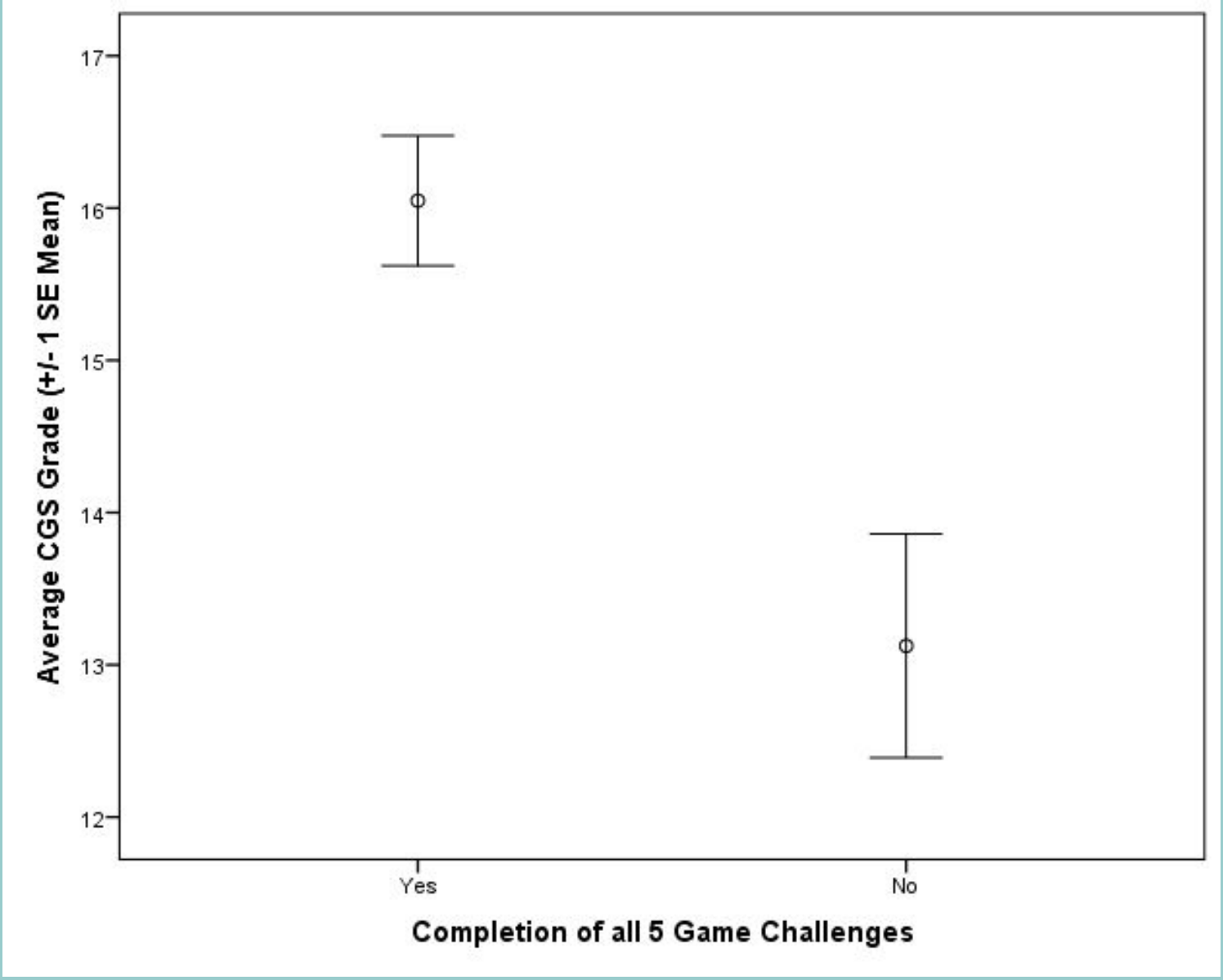
- Only Avatar names shown
- Updated weekly and accompanied by an email praising the top 3 students
- At the end of the course: +1 CGS grade to those that achieved >65% of the total possible marks; 2CGS for >85%.

Results: Student participation



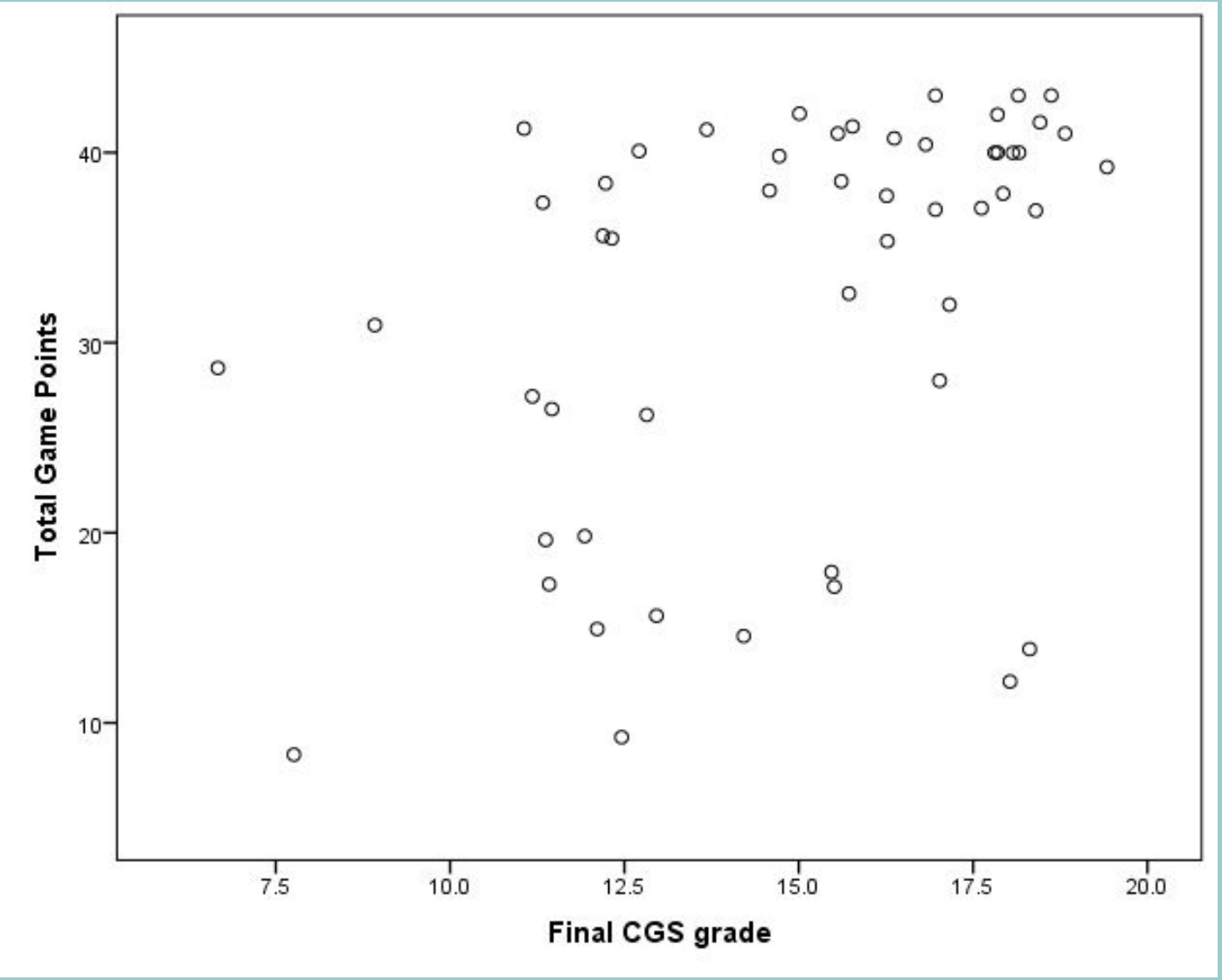
- 53 students registered on the course
- 94.4% submitted an avatar name
- 35 completed Challenge 5

Results: Challenge completion & final grade



T-test, N=32,20; t=3.69, ***P=0.001***

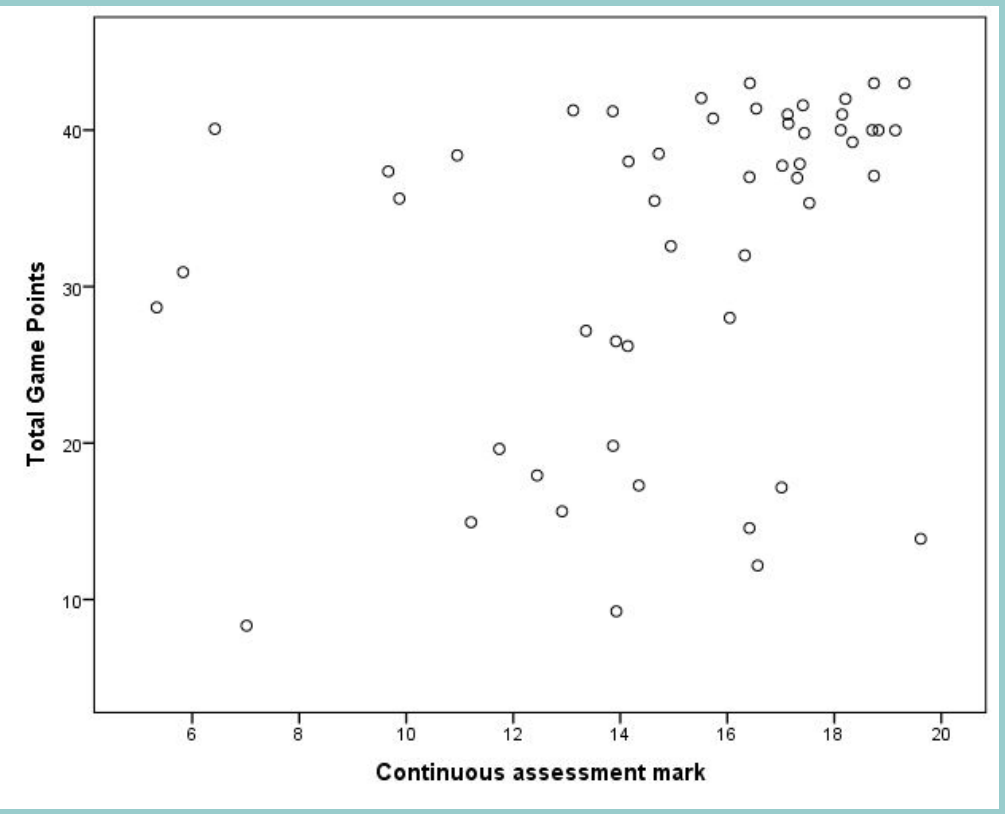
Results: Relationship between Game points and final course mark



Pearson's correlation, N=52, r=0.423, ***P=0.002***

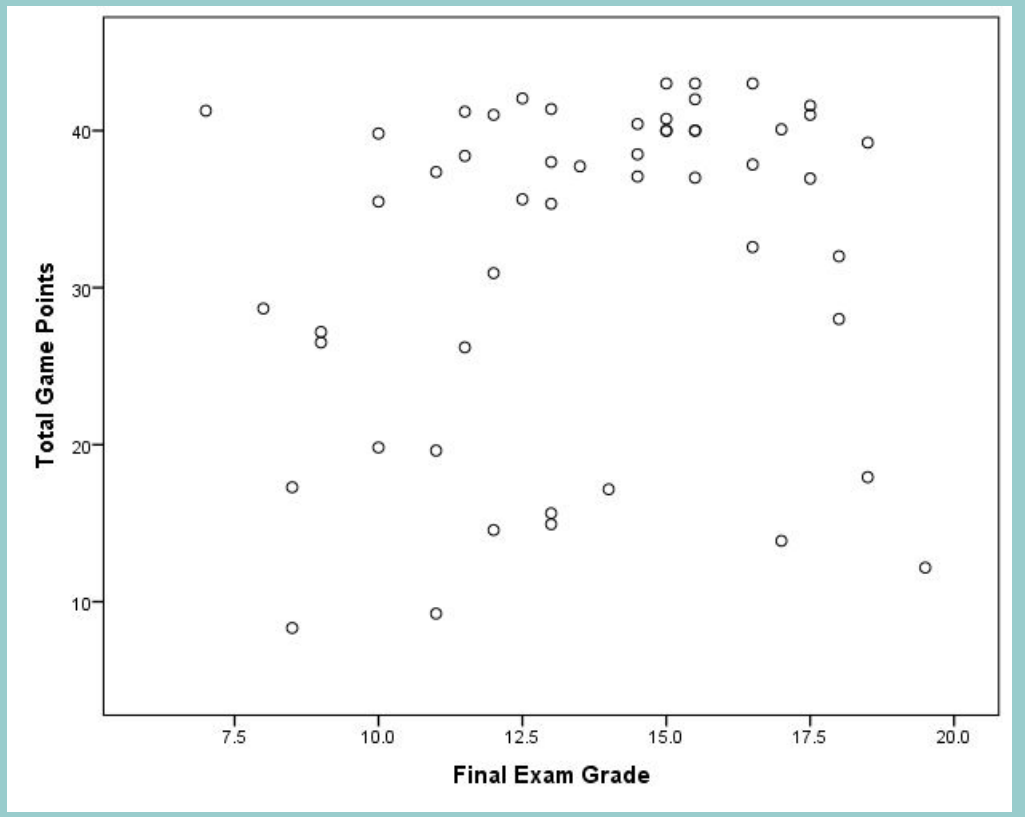
Results: Relationship between Game points and CA & final exam grade

Continuous assessment



Pearson's correlation, N=52, r=0.314, ***P=0.023***

Final Exam



Pearson's correlation, N=52, r=0.208 *P>0.05*

Results: SCEF responses

- Student course enjoyment: **78%**
  - ➔ *Pre-gamification*: **59%**

- In relation to the Game component of the course:
  - ➔ … better understanding of the course material? : **89%**
  - ➔ … better engagement with the course?: **92%**

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  - 2014-15: **59%**

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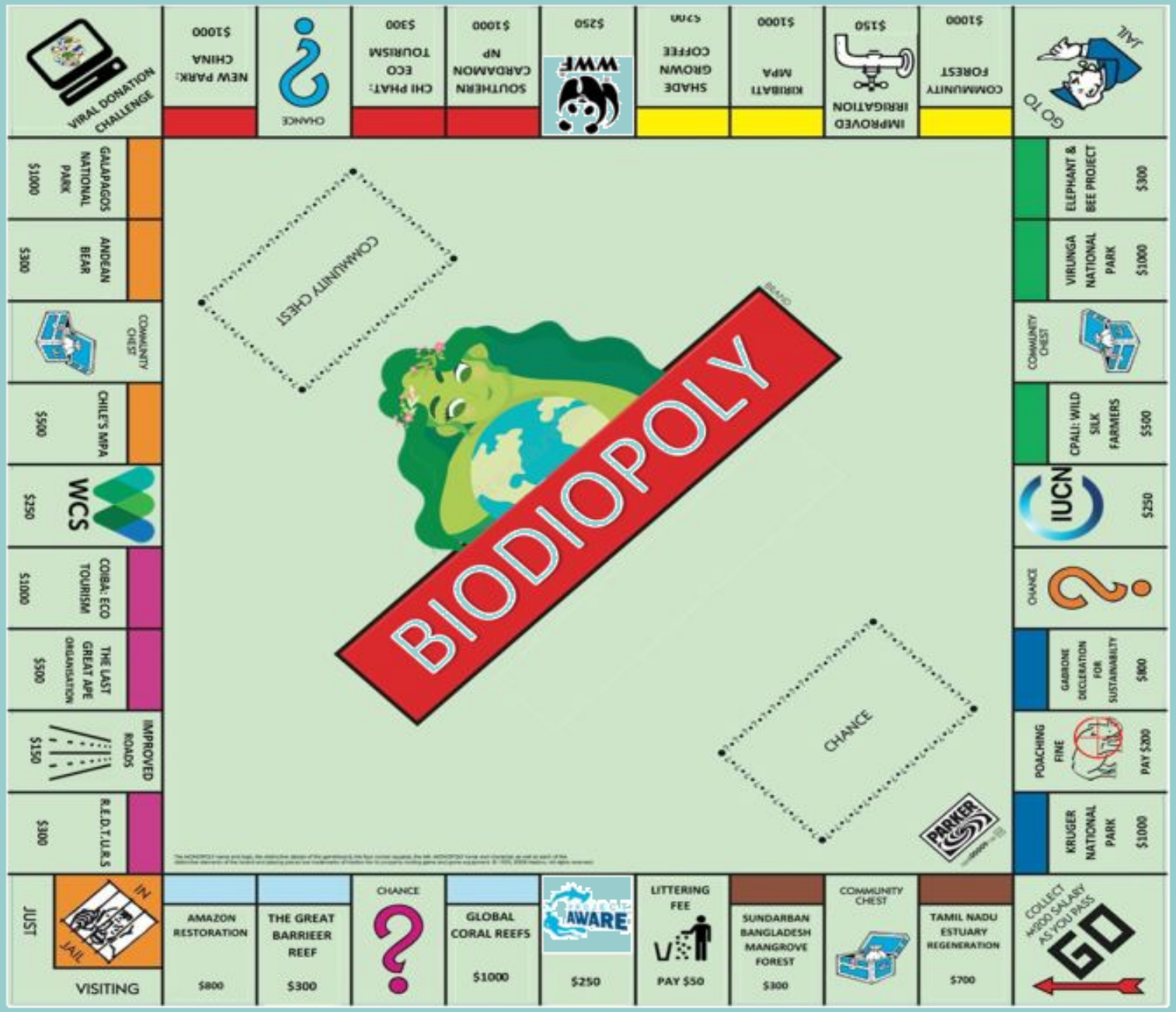
" …enjoyed the formative extra things"

"...enjoyed the optional activities entitling us to an extra marks."

"...Having to look through lectures to find answers made you more aware of the course material."

BIODIOPOLY



Topics in Conservation:

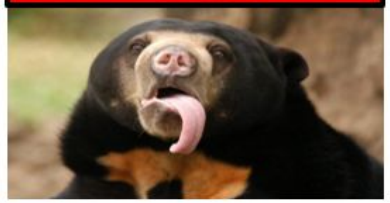
Eilidh Bennett
Eilidh Taylor
Jodie Stark

NEPAL: COMMUNITY FOREST

- Community based management
- 25% of the national forest (1.1 million ha) is now managed by more than 35% of the total population
- improvement in conservation of forests and enhanced soil and water management
- Some poorer groups suffer from less access to forest products
- Includes training of foresters to fit them for new roles as community advisors

COST: $1000
Donation: $100

CHI PHAT: ECO TOURISM



- Previously Chi Phat was poverty stricken and highly dependent upon illegal forest activities
- With ecotourism - Illegal forest activities have significantly diminished and community members are showing signs of emerging prosperity
- Creates a more sustainable village, protects the forest, and increases rewilding – in a sustainable manner

COST: $300
Donation: $30

NEW PARK: CHINA

- China has set aside vast territories home to small numbers of Siberian tigers & Amur leopards
- National park works with small numbers of locals to reduce threats to endangered animals
- Mining and logging practices have been banned – with the government promoting tourist industry instead
- Chinese government providing compensation to those affected

Cost: $1000
Donation: $100

R.E.D.T.U.R.S

- A network of indigenous and rural communities, and institutions devoted to supporting the sustainable development of tourism
- Community based management, allows communities to assume the leadership in planning, operation, monitoring and development of their businesses
- Only helps businesses/activities which are economically viable, socially oriented, culturally enriching and environmentally responsible

COST: $300
Donation: $30

Coiba: Eco-Tourism

- 1,053 sq. mile Coiba Island National Park, which remains largely unspoiled thanks to the fact that the island was home to a penal colony (from 1919 to 2004)
- Promotes eco-tourism and requires permission from the National Environment Authority (ANAM) to visit
- Those which inhabit the area rely on the income generated from the tourism, and are restricted to provide eco-tourism through laws and legislation

COST: $1000
Donation: $100

REGENERATION OF TAMIL NADU ESTUARY

- Project funded by SEEDS Trust
- Native mangrove population degraded due to explitative use, industrial and urban pollution, spread of invading weeds and intensive tourism
- Aim to regenerate 200ha of estuary ecosystem
- Locals' income and nutrition will benefit from healthier ecosystem as the fish stock will increase

COST: $800
Donation: $120

SUNDARBAN BANGLADESH MANGROVE FOREST

- World's largest natural mangrove forest
- Provides sustainable livelihoods for millions with people working as wood-cutters, fisherman and honey gatherers
- Offers protection against storms, cyclones and tidal surges
- Ecosystem at risk from illegal hunting, timber extraction and agricultural encroachment

COST: $800
Donation: $120

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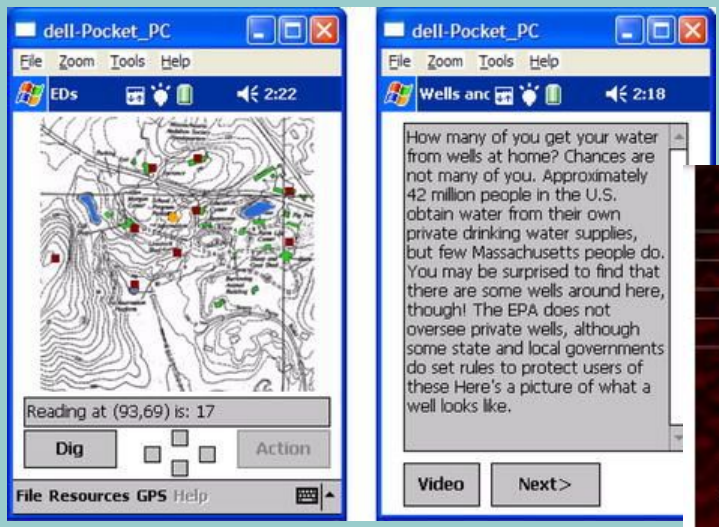
Computer – based games

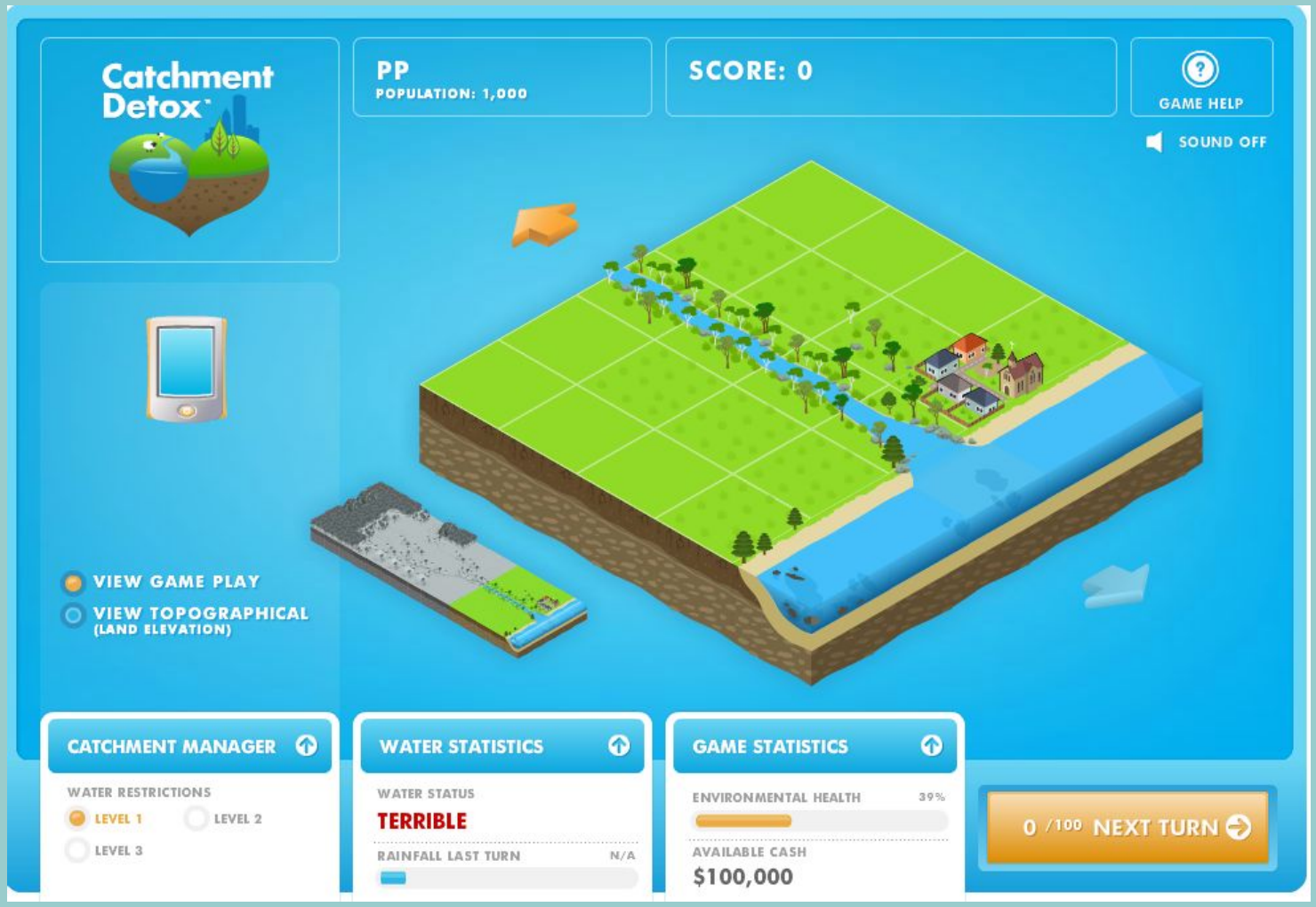


Environmental detectives - MIT

Supercharged - MIT

Catchment Management game

https://www.abc.net.au/science/catchmentdetox/files/home.htm



But: Gamification..

- Is not about making everything a game
- Is not about badges, points, and leaderboards
- It can’t fix a bad product

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- Is not about making everything a game
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- It can’t fix a bad product

- The game is not the goal.
- Engaging users and changing behaviour is the goal.


How would you apply gamification of learning to your courses?

- Why gamify that particular course? What is the motivation?
- Gamify the whole course or part of it?
- Single/multiple paths to "success"?
- Compulsory / optional?
- How would you structure it?
- Measure success?
- How would you assess effectiveness?