SOCIAL LEARNING USING SERIOUS GAMES IN A TRANSBOUNDARY CONTEXT

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Outline

- Introduction
- Important definitions
- Research objective; research questions
- Methods
- Simulation Gaming events
- Results
- Conclusion and pathways for further research

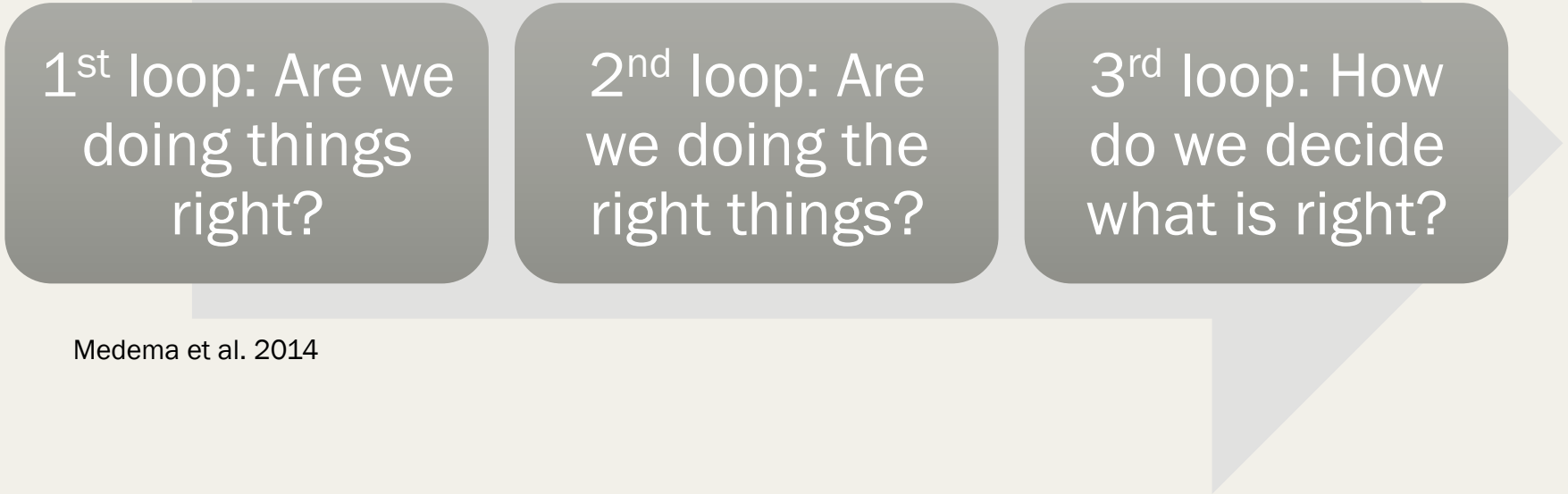
About Me

- Graduated Concordia in Environmental Science (B.Sc)
- Certificate in Urban Agriculture UQAM
- Pursued a graduate school degree at McGill in Integrated Water Resource Management (M.Sc)

Multi-Loop Social Learning

Social Learning: In terms of sustainable water governance is in principle all about ‘managing processes of social change, in which people learn from one another in ways that may benefit wider social-ecological systems (Medema et al. 2014)

Requirements for social learning include learning through social interaction situated within wider social units or communities of practice (Reed et al. 2010).



Medema et al. 2014

A little about Boundaries

- Socio-cultural boundaries
  - *A boundary can be seen as a socio-cultural difference leading to discontinuity in action or interaction (Akkerman and Bakker 2011)*
  - *Boundaries are becoming more explicit because of increasing specialization (Akkerman and Bakker 2011)*

- Working within the boundary
  - *Boundaries and social learning*
  - *Boundary objects*

http://www.success.com/sites/default/files/styles/article_main/public/main/articles/Defend%20Your%20Boundaries.jpg?itok=v6R85fla

What are Serious Games?

- General definition: the general use of games and game technologies for purposes beyond entertainment (Sawyer, 2007).
- Examples of serious games for water management:
  - *Blokkendoos*
  - *Marine Spatial Planning Game*
  - ***Aqua Republica***
- Uses of Serious Games
  - *Capacity Building*
  - *Boundary Objects*
  - *Creating a space where social learning can occur*
  - *Allows for exchange of ideas and knowledge between players*

https://www.braingymmer.com/img/blog/serious-gaming.jpg

Aqua Republica

- Aqua Republica puts the future of a small nation in the hands of the players.
- Goal: To sustainably manage one's resources while trying always to protect water quantity and quality of Aqua Republica's major water source; all while assuring that Aqua Republica's citizens are content.
- Many different levels and scenarios

http://mblogthumb1.phinf.naver.net/20160805_228/unepmaster_1470364487834F1eK2_JPEG/AQ1.JPG?type=w2

http://chinawaterrisk.org/wp-content/uploads/2013/05/aquarepublica-scnshot.png

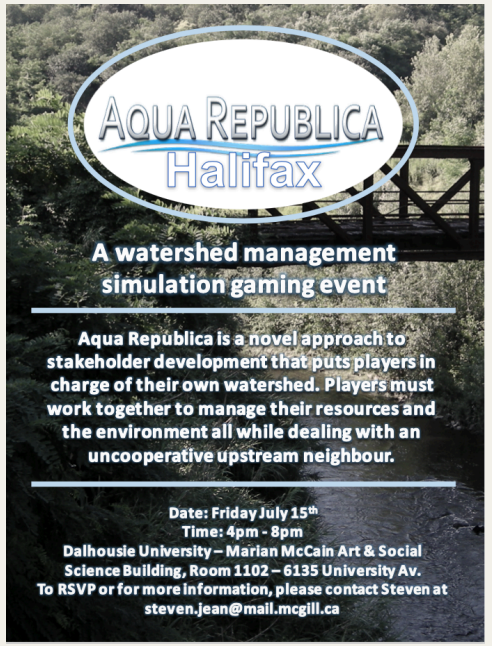
Research Objectives

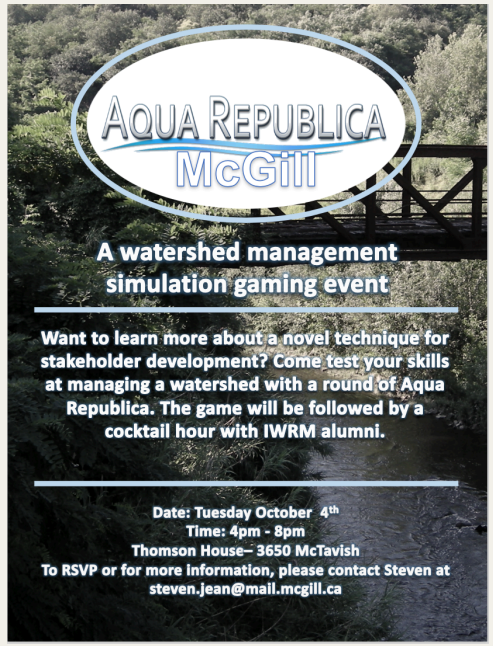
- **Goal: Determine whether serious games have the potential to create a space where (multi-loop) social learning can occur.**

- **Research Questions**
  - *1) Is technological expertise/familiarity a requirement for serious games to be successful?*
  - *2) Do serious games promote interactions between group members?*
  - *3) Is Social Network Analysis (SNA) a useful tool to identify gaps and boundaries between stakeholders?*

Simulation Gaming events

- Events where groups of stakeholders are brought together in order to play the Serious Game Aqua Republica. Players are recorded and surveyed
- Players are divided into small groups and must decide how to develop Aqua Republica
- Three events performed to date:
  - *Montreal, QC*
  - *Moncton, NB*
  - *Halifax, NS*





Results Montreal

- Participants: 7 McGill students from the Bio-resource Department and one junior engineer

- The first simulation gaming event of the project

- Acted as a learning experience
  - *Learned what NOT to do for future events*
  - *Helped anticipate questions that may be asked in future events*
  - *Helped determine which aspects of the game need to be explained in detail before beginning a simulation gaming event.*

Moncton and Halifax

- The Moncton event consisted of 7 members
  - *5 members of a local watershed association (PWA)*
  - *1 professor from the University of Moncton*
  - *1 Mayor of a local township*

- The Halifax also consisted of 7 participants
  - *2 retired environmental activists*
  - *1 employee of the Ecology Action Center in Halifax*
  - *1 Executive Director of local watershed organization (SRA)*
  - *1 employee of same watershed organization*
  - *1 Land planner*
  - *1 NGO employee*

Experimental Design and Methods

- Pre-game Survey (Research Question #1)
  - *Assessing Technological background (adapted from Zhou 2012)*
- Post-game survey (Research Question #2, #3)
  - *Post-game insights; views on the game (adapted from Zhou 2012)*
  - *Levels of familiarity and collaboration*
- Interaction Analysis (Research Question #2)
  - *Performed using recorded audio and video*
  - *Adapted from Jordan and Henderson (1995)*
- Social Network Analysis (Research Question #3)

Research Question #1: Is technological expertise/ familiarity a requirement for individuals to participate in a simulation gaming event.

- In order to determine this, questions from the pre-game survey exploring technological expertise were crossed referenced with amount of interactions throughout the length of the game.
- I based technological expertise on the following two statements ranked from 1 (strongly disagree) to 5 (strongly agree)
  - *In general, I enjoy trying out new uses and applications for computers.*
  - *In general, I quickly become comfortable in using new computer applications.*

Interactions VS. Technological Expertise

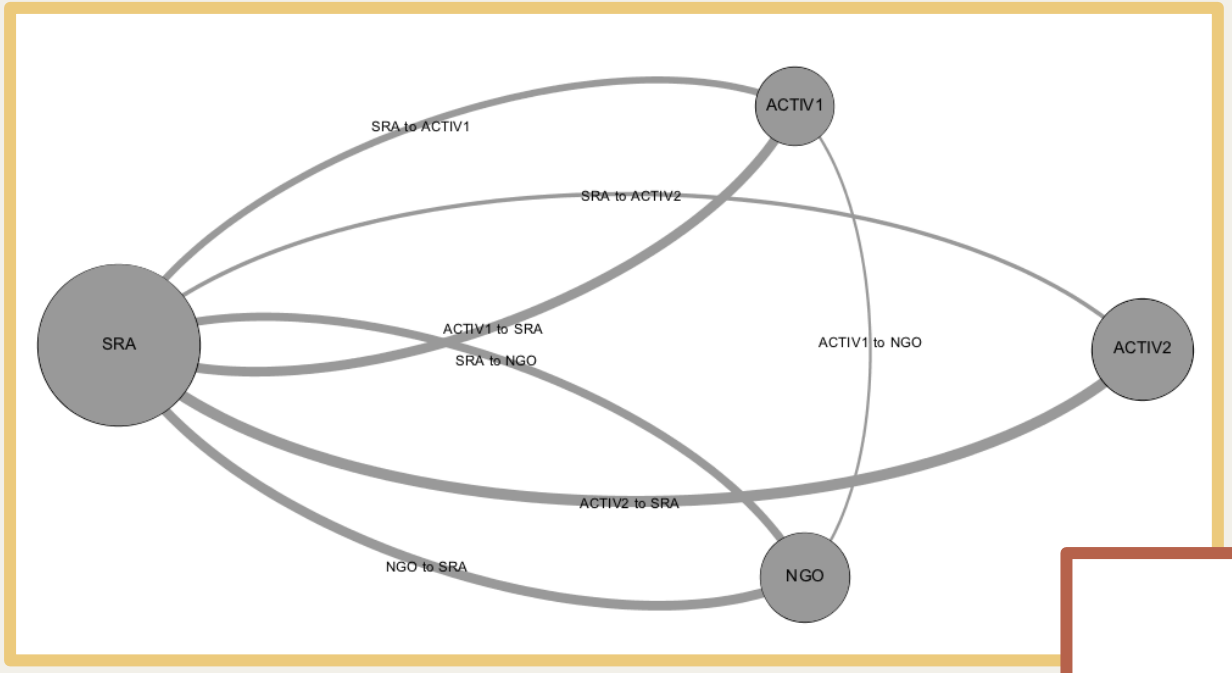
Average Technological Expertise (on 5)	Number of interactions during play
2.5	78
2.5	90
3	77
4	72
4.5	80
5	179*

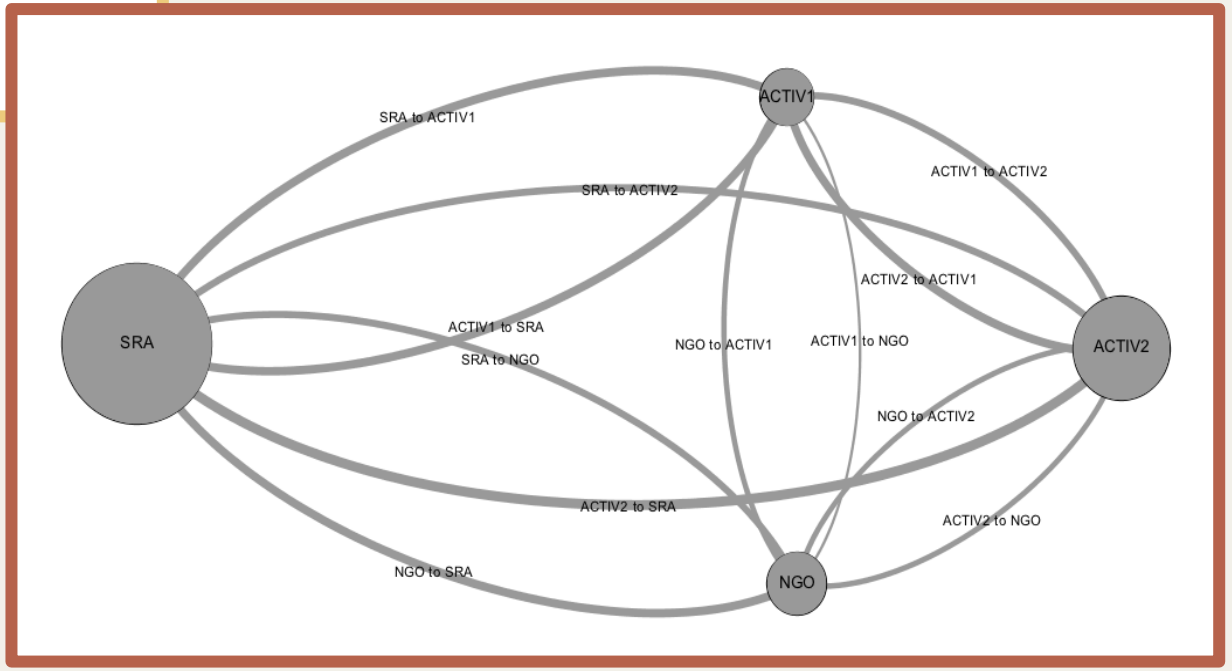
We do not see a correlation between technological expertise and number of interactions so we can conclude that these simulation gaming events will not alienate older participants who may have less technological expertise.

Research Question #2: Do serious games promote interactions between players?

- Based off the definition of social learning by Reed et al. we see that interactions are **necessary** for social learning to occur
- In order to determine this an interaction analysis based on Jordan and Henderson (1995) was performed using audio recordings from both events.
- We considered an interaction to be any time a participant spoke to another group member or to the group as a whole.
- Interaction maps were then made using data from the interaction analysis using GEPHI software.

Interaction Analysis Maps



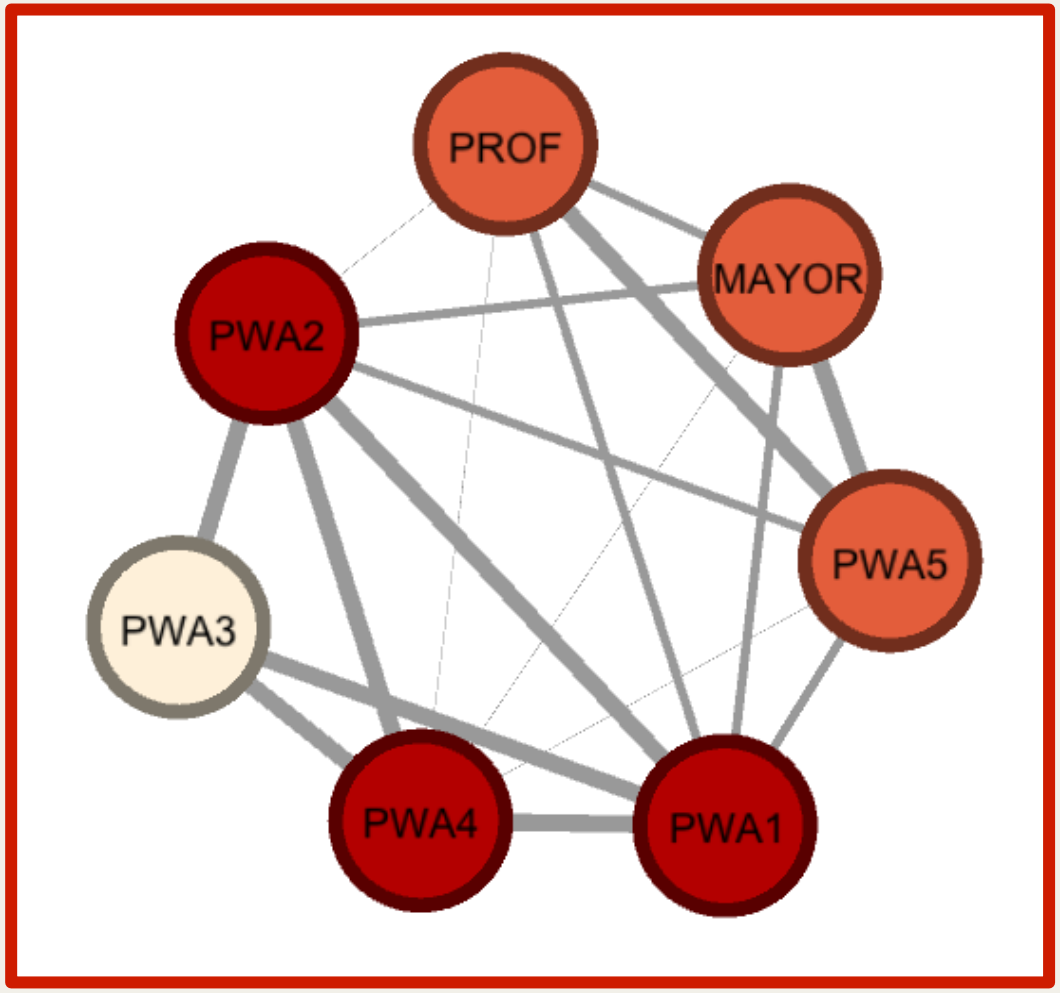


Research Question #3: Can Social Network Analysis be Used to Identify Gaps between Stakeholders?

- Used survey questions to determine how well participants knew each other before attending a simulation gaming event.

- Used survey responses to perform social network analysis
  - *In future and in a longer study, email and telephone correspondence should be used rather than relying on self-reported data from players.*
  - *Saw examples where players ranked each other differently, this would not occur if correspondences are used instead*

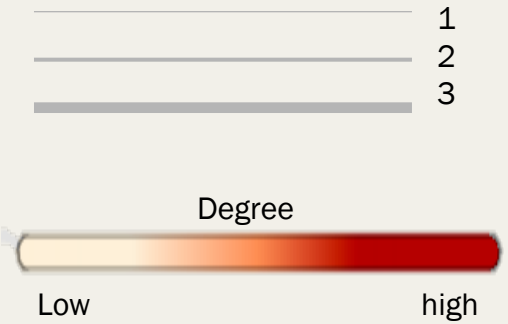
Social Network Analysis Moncton Group



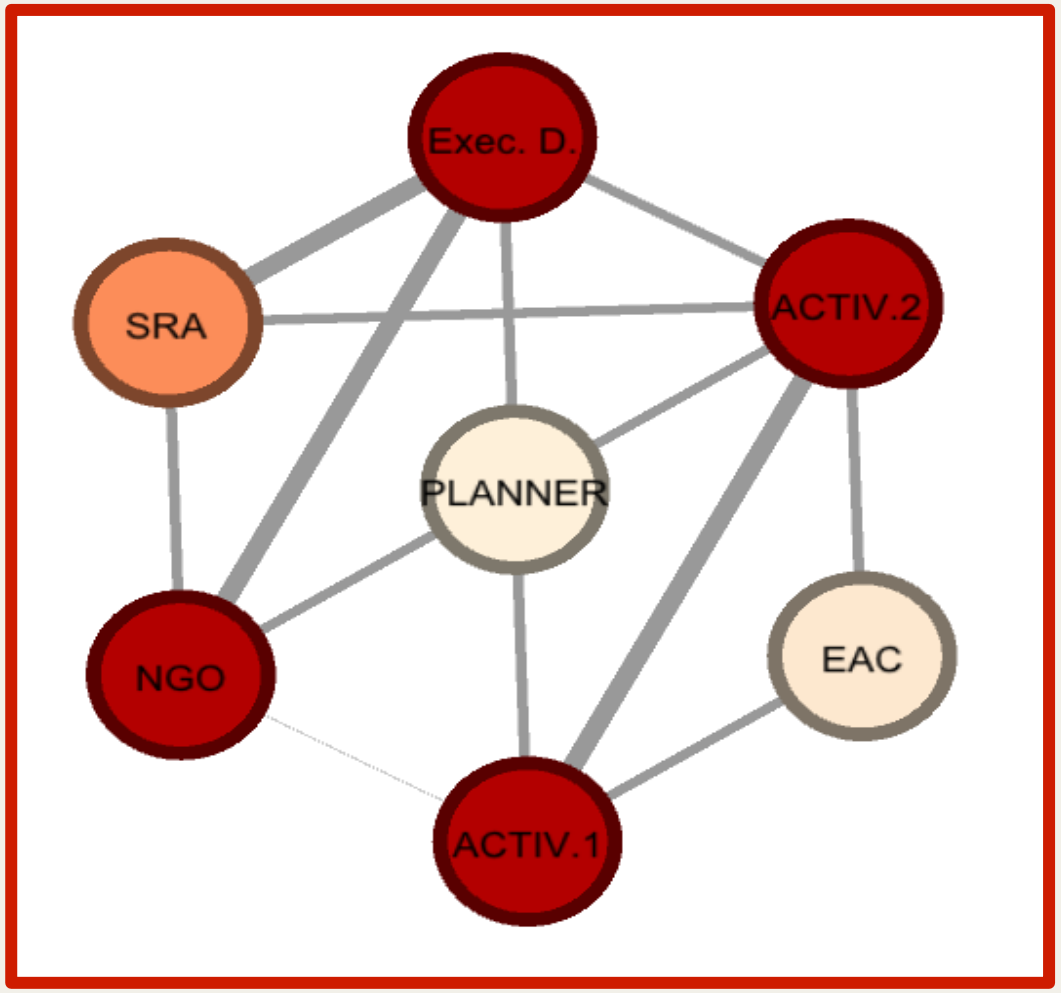
Statistics:

Mean Path: 1.14

Network Diameter (longest path): 2



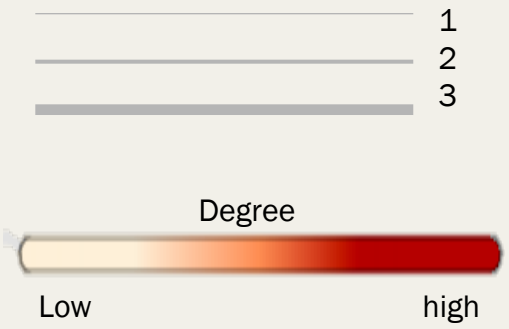
Social Network Analysis Halifax Group



Statistics:

Mean Path: 1.48

Network Diameter(longest path): 3



Goal: Determine whether serious games have the potential to create a space where (multi-loop) social learning can occur.

- Did we accomplish this?
  - *We found no significant evidence that serious games alienate those unfamiliar with technology.*
  - *We found that serious games result in a large number of interactions between participants*
  - *We found that SNA can be used to identify any gaps that may exist in stakeholder groups*
- All in all, we can at least determine that serious games **do** have the potential to create a space where social learning can occur in stakeholder groups.

Further Research

- A more longitudinal study must be done with participants
  - *Need more than one gaming session with the same group ; Cannot determine whether social learning occurs in isolated sessions like this*
  - *Social Network Analysis should be based on less biased data such as emails sent, phone calls made etc.*
- A control group is needed to determine whether these games result in more interaction than a traditional stakeholder meeting
  - *Mapping interactions is all well and good but with nothing to compare it to the values are somewhat meaningless*

Challenges

- Connecting with desired stakeholders
  - *Who should be included in these studies?*
  - *How to contact these stakeholders?*

- Scheduling
  - *A simulation gaming event takes time and it becomes difficult to get people to give up half a day of work or valuable free time on the weekends.*
  - *Different stakeholders have different schedules*

Interested in playing AquaRepublica?

- Come join in on the fun, myself along with my colleague Stephanie Shousha will be doing a brief presentation on Aqua Republica later today as part of the Youth Activities Workshop in room ADJ-2300 from 3:45-5:15

THANK YOU!

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