CYPRUS UNIVERSITY OF TECHNOLOGY
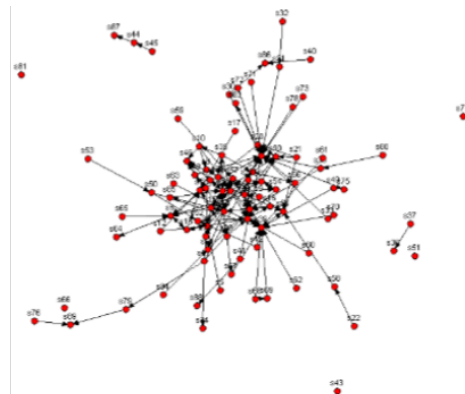Department of Multimedia and Graphic Arts

SMAP 2010
Describing and Modeling User Behaviour in Social Media

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Online Communities

Web 2.0 … Social Media

Entertainment (social) Systems

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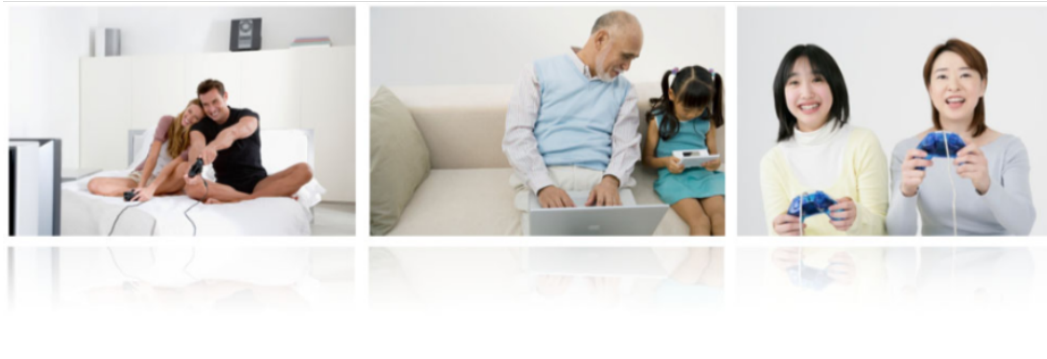
Virtual Worlds
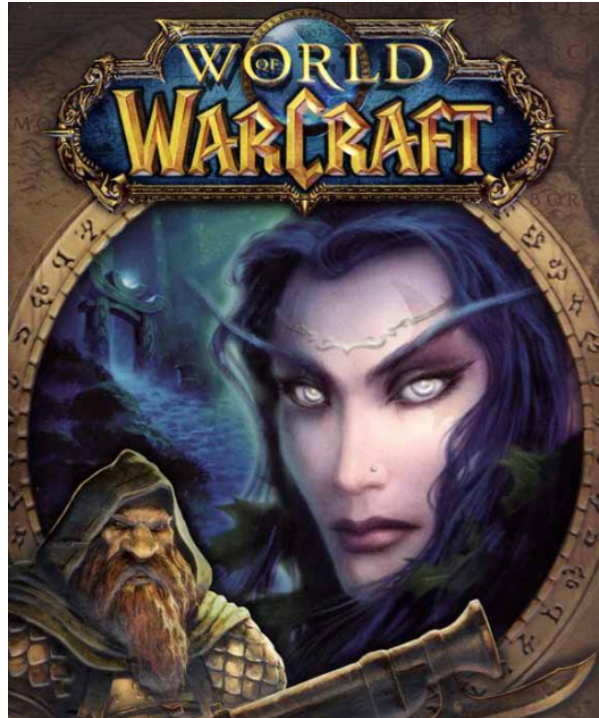
http://www.youtube.com/watch?v=pmTXGQ2BhUA

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Describing and Modeling User Behaviour in Social Media

In my view in 3 steps:

1. Analysing existing behaviour
2. Analysing social networks formed around social media
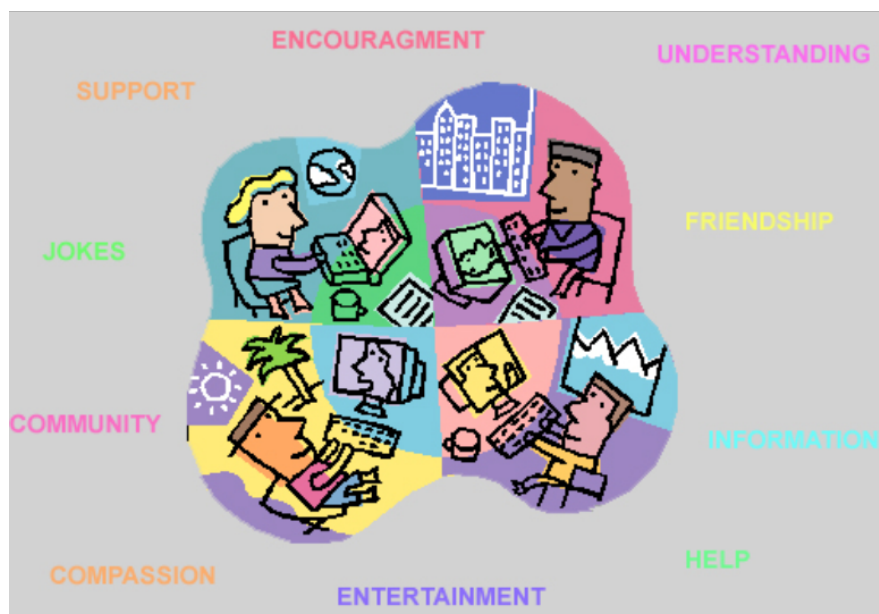3. Modeling/Simulating interactions

1. Analysing existing behaviour

- Query based Techniques (interviews, questionnaires, focus groups)
- Usability and Accessibility Evaluations
- **Content Analysis/Ethnography**

Case study: Patterns of empathy in online communication for older people

Data source

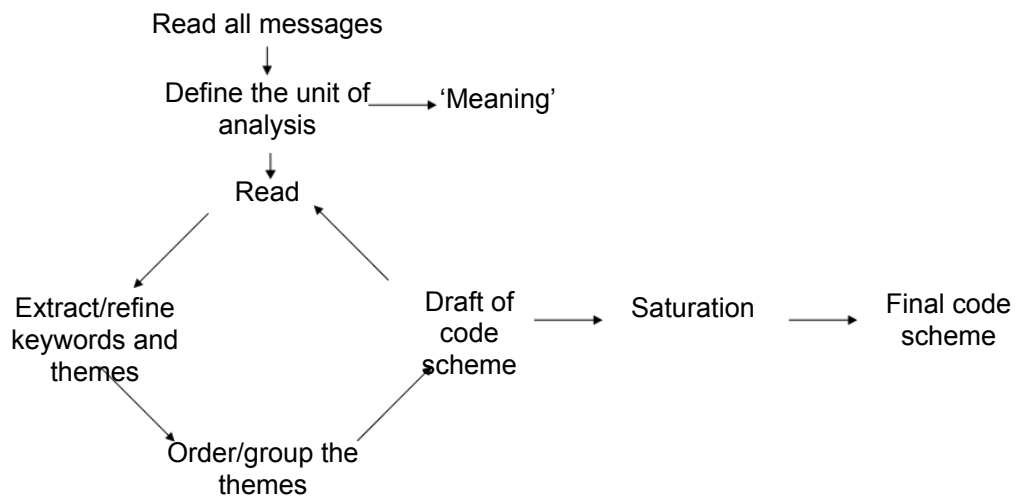SeniorNet (http://www.seniornet.org/)
- aims to educate older people about computer and internet usage
- hosts a large number of discussion groups on its website
- our study concentrates on the discussion board about depression

400 messages (6 Aug 2000 – 14 Feb 2002) from 47 members

Qualitative Content Analysis
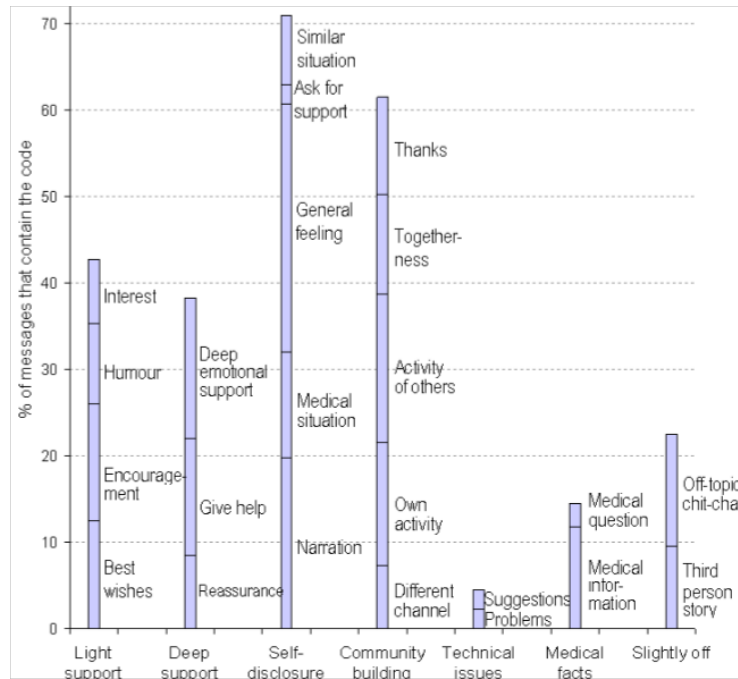
Read all messages
↓
Define the unit of analysis ⟶ 'Meaning'
↓
Read

Extract/refine keywords and themes

Order/group the themes

Draft of code scheme ⟶ Saturation ⟶ Final code scheme

Code Scheme

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2. Analysing social networks formed around social media

Case Study: Trends, Similarities and Differences in Newsgroup Usage by Younger and Older Internet Users

Older People and Technology

- There is a correlation between social interaction and quality of life for seniors (Czaja, Nair et al., 1993).

- Older people who used computers thought they had more social interaction, memory enhancement and mental stimulation (Eilers, 1989).

- Getting a better understanding about how senior citizens interact online through CMC could give the research community insights as to how this interaction could best be facilitated.

Key Objectives

- This study focuses on Computer Mediated Communication (CMC), and investigates the similarities and differences in CMC usage between teenagers and seniors.

- Concentrate on two newsgroups (alt.teens and soc.senior.issues) and analyse the online social communities that emerged within these groups.

- Qualitative and quantitative data analysis, ethnographic techniques and SNA

Social Network Analysis Questions

1. What are the properties of the networks and actors within the two newsgroups under investigation?

2. Who is central and powerful within the social structure of these two newsgroups?

3. Have any subgroups (cliques) formed within each of the newsgroups under investigation?

4. What are the network/group positions and social roles within each of the newsgroups?

5. What are the significant patterns, relations and structures within each of the newsgroups under investigation?

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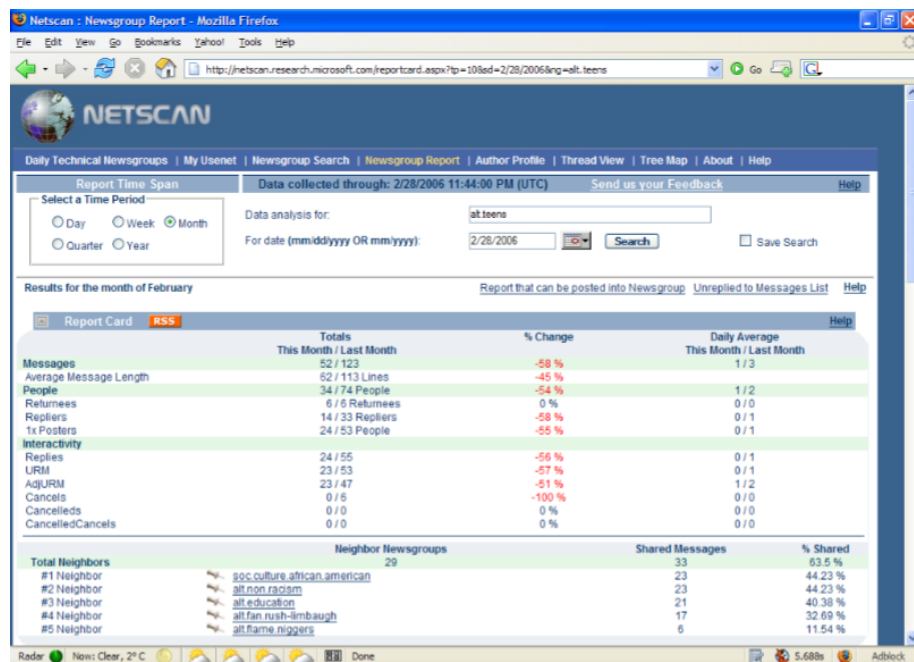
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(t=11.320, p<0.004)

(t=3.794, p<0.0003)

(t=-5.565, p<4.497E-07)

(t=7.031, p<1.095E-09)

Virtual Ethnography

- **Popular topics:** alt.teens (alt.abortion, alt.bible, politics, parents, drugs and music). soc.senior. issues (retirement, politics, military, culture, engineering housing, and health)
- **Abbreviations:** teens newsgroup members use more abbreviations (t=2.868, p<0.004).
- **Emoticons:** teens newsgroup members used more emoticons in their messages than the senior newsgroup members. However a t-test carried out on this data showed no significant difference (t=1. 380, p>0.168).
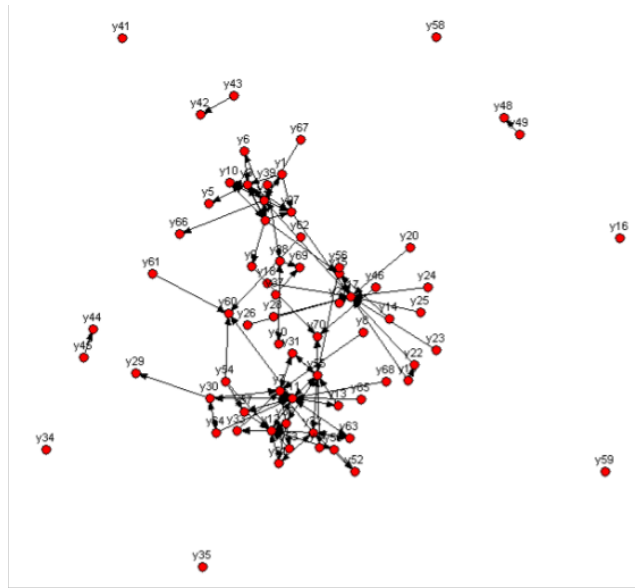
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Social Network Analysis (SNA)

- 200 messages were observed from each newsgroup and the message sender and receiver (s) recorded. The teens newsgroup had 70 unique authors and the seniors newsgroup 90.
- From this data, a 70*70 adjacency matrix was produced for the alt.teens newsgroup data set.
- Similarly, a 90*90 adjacency matrix was produced for the soc.seniors.issues data set.

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alt.teens
Sociogram
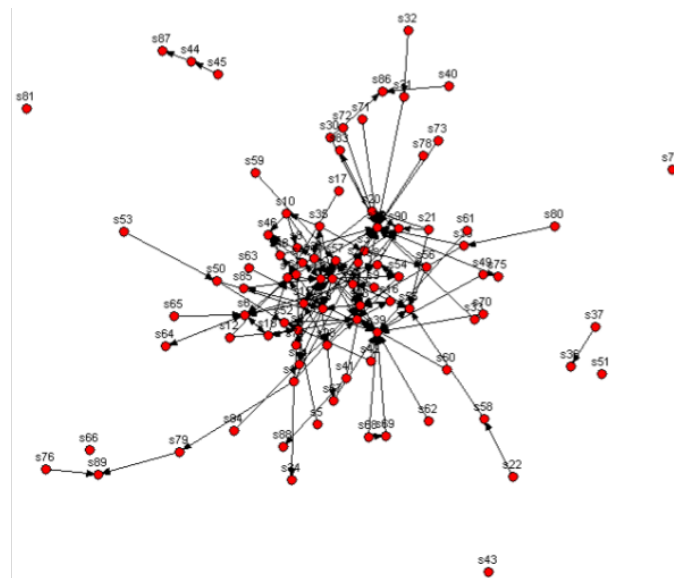
soc.senior.issues Sociogram

In Degree Centrality

alt.teens

soc.senior.issues

Out Degree Centrality

alt.teens

soc.senior.issues
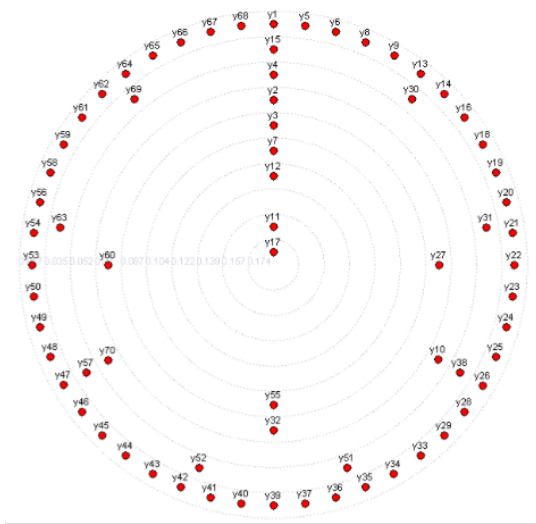
Clique Analysis
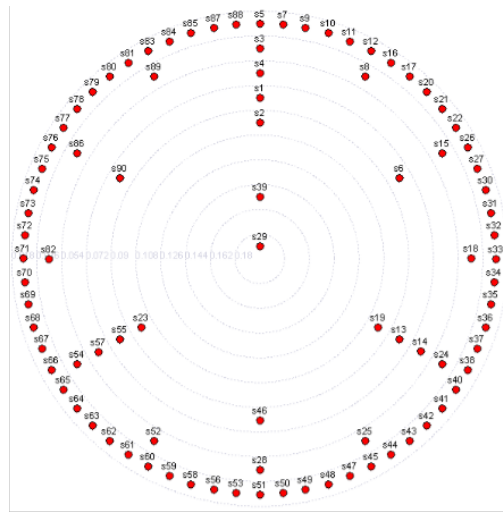
alt.teens
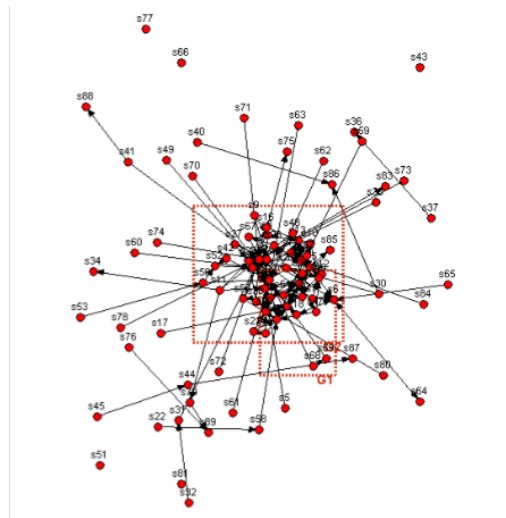
soc.senior.issues

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3. Modeling/Simulating interactions

Case Study: Modeling/Simulating interactions in Massively multiplayer online role-playing games (MMORPGs)

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MMORPGs

- games played over networked computers, where potentially thousands of players interact with each other in a real-time perpetual environment
- expected to grow from $31.63 billion in 2006 to $48.88 billion in 2011

MMORPG quiz

- Percentage of teenagers in MMORPG?
- mean age?
- Percentage of males players?
- Average hours playing a week?
- Percentage of players whose most positive experience over the past 7 days had been from the game?

Social Roles of WoW

- identify social roles that emerge from individuals' interaction in the community
- examine the interaction styles for the social roles
- identify the relationship between different social roles

SNA perspectives

- Most previous work in this area assumed the "conventional" social science analytical perspective. They studied "who the users are" (gender, age, etc) and "what the users do
- SNA: what the users do with whom?
- A role is *relational* to the group with whom one interacts.

Methods

- Dwelt in the game for weeks to familiarise ourselves with the general practice and culture around the game
- Then we joined a relatively large guild
- Using the in-game chat-log function, we managed to keep a record of guild members' chat activities

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Methods

- A total of 1944 guild messages were collected in 30 hours of observation spanning across 2 months.
- We categorised the messages

More than just killing

- Group Management
- Coordination
- Ask for Help
- Give Help
- Friendly Remarks
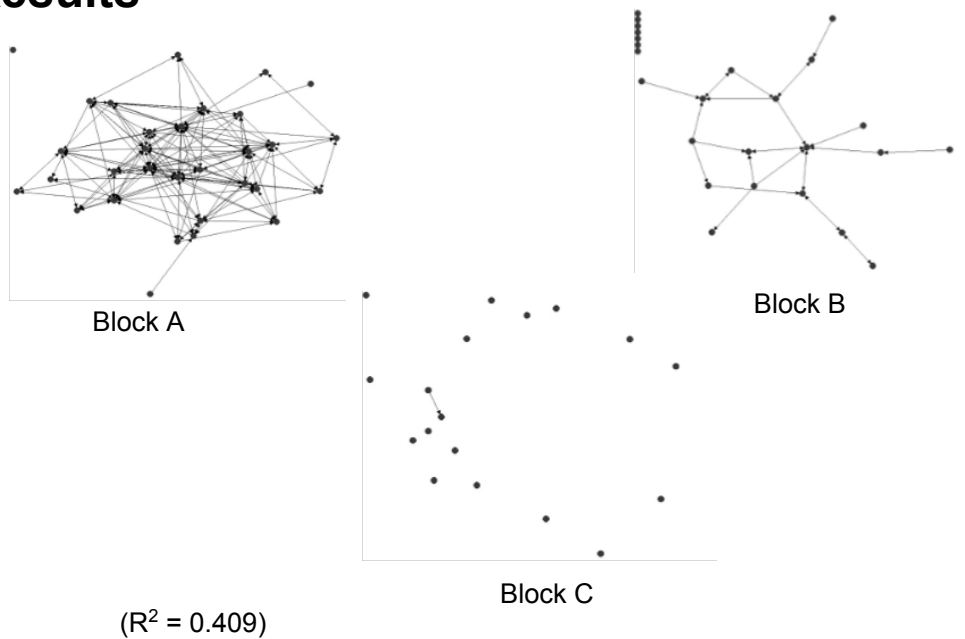- Game Chats
- Real Life Chats

Methods

- Tabulated the messages into socio-matrices for SNA by identifying "who talked to whom"
- UCiNET: CONCOR block model
- Blocking is based on similar patterns of interaction the players have with each other within the same block and with players from other blocks. (based on structural equivalence)

Results

Block A

Block B

Block C

$(R^2 = 0.409)$

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Interaction Types of each Block

Block	A	B	C
n	31	25	18
Friendly remark[a]	0.2383	0.3529	0.4907
Game chat[a]	0.2348	0.2025	0.000
Real life chat[a]	0.0157	0.0631	0.000
Ask for help[a]	0.0681	0.1813	0.4796
Give help[a]	0.2472	0.0844	0.000
Group manage-ment[a]	0.1457	0.0795	0.0111
Coordina-tion[b]	0.0362	0.0068	0.000

a Permutation ANOVA-test with 5000 iterations shows the three blocks were significantly different at $p<.001$

b Permutation ANOVA-test with 5000 iterations shows the three blocks were significantly different at $p<.05$

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EI-index for each block

Blocks	A	B	C	Overall
Overall interaction	-0.336	0.481	0.902	**-0.050[a]**
Ask for help [b]	-0.421	0.619	1	**-0.137[a]**
Give help	-0.307	0.592	1	0.018
Friendly remark [b]	-0.366	0.509	0.833	**-0.076[a]**
Group management	-0.611	0.529	1	**-0.378[a]**
Game chat	-0.683	0.467	1	**-0.477[a]**

a Permutation test with 5000 iterations shows that the E-I index was significant at $p < 0.05$

b "Ask help" and "friendly" messages were often posted to the whole guild community instead of to each individual. Since our analysis excluded this aspect, "ask help" and "friendly" might have had higher EI-index than that reported here
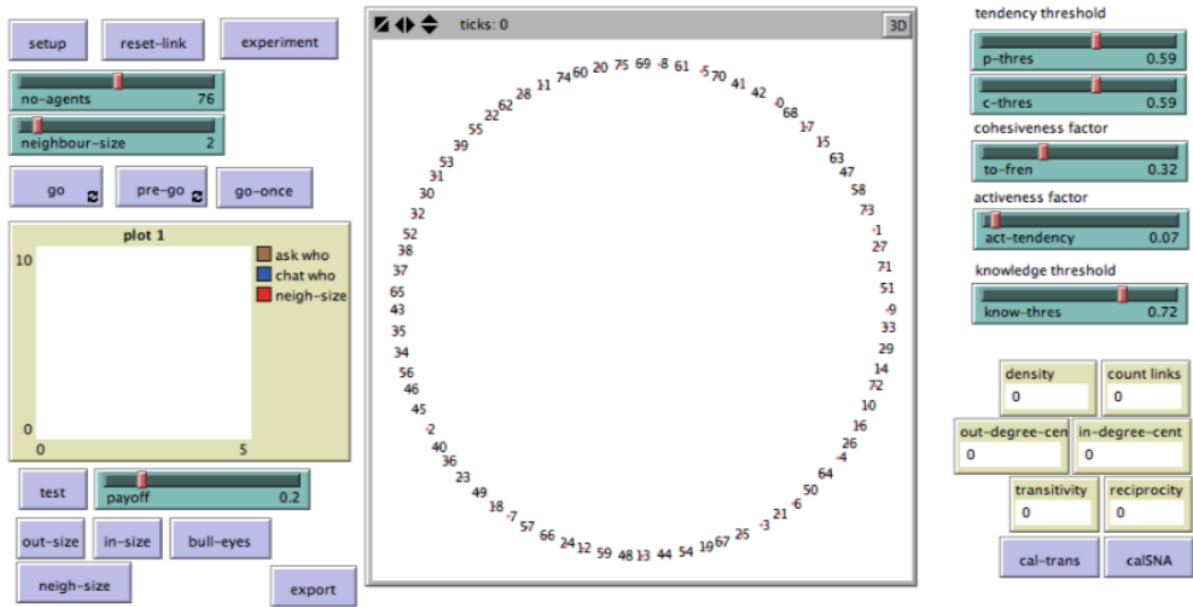
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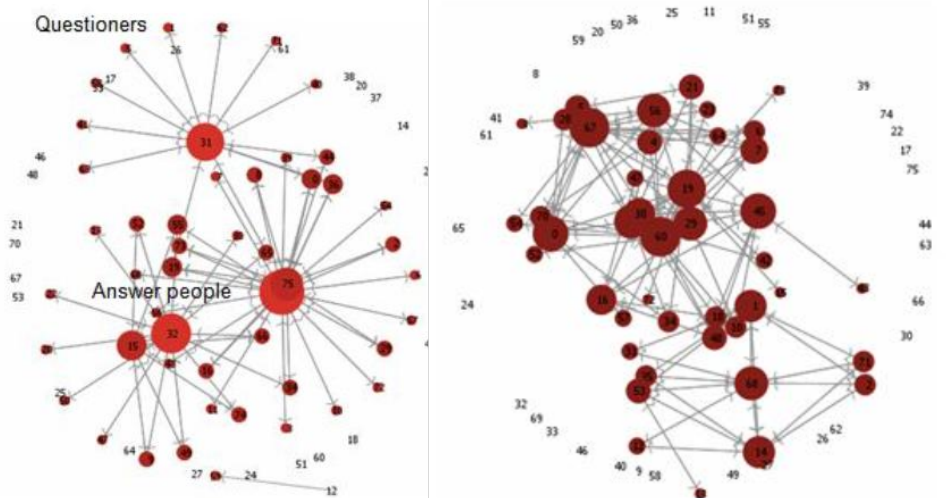

Interaction between blocks
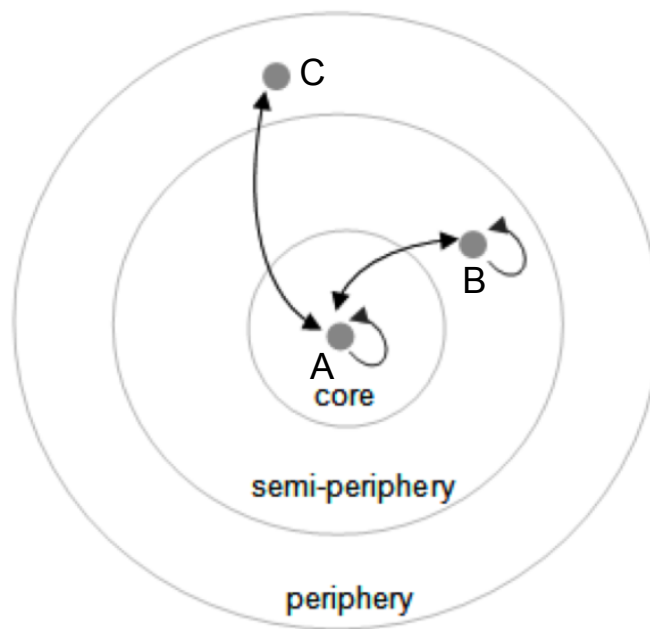
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Social Network Simulation

Validation

Answer/question network Social chat network

Validation

|	density	Out-degree	In-degree	Reciprocity
Observed Mean	0.0449	0.2247	0.1977	0.6230
Tolerance Error	0.0050	0.0500	0.0500	0.0500
Simulated mean	0.0448	0.2416	0.1836	0.6533
Standard Deviation	0.0006	0.0351	0.0372	0.0324
Worst case error	0.0004	0.0300	0.0280	0.0425

Virtual experiments

- we carried out virtual experiments with the simulation to identify the relationship between the parameters and the social network characteristics.
- The value of the five parameters was varied at 11 levels independently and 30 social networks were generated for each level.
- The average of the SNA measures was calculated for each set of the 30 social networks.
- A total of 30 x 11 x 5 (parameters) = 1650 social networks were produced for the main analysis.

Example of results
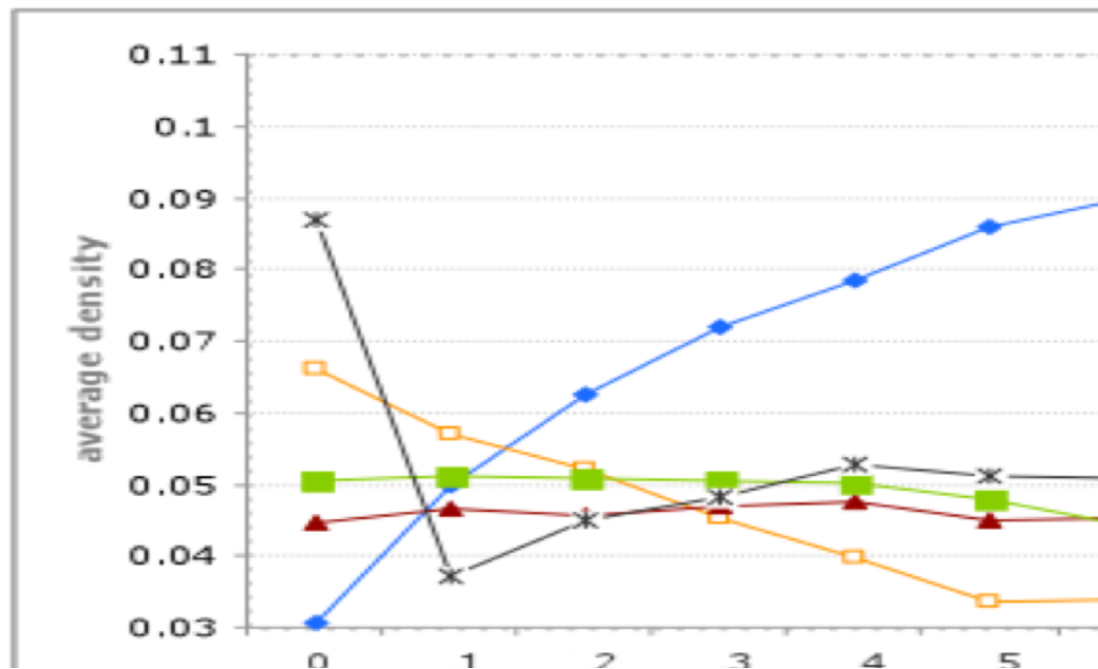
Semantic Media Adaptation and Personalization

- Understanding the mechanisms and the structure of social networks around social media.

- Answering research questions about the structure, evolution or collapse of online social networks.

- Describing and modeling/predicting user behaviour and providing user specific adaptations to the interface. E.g. provide user interface elements and mechanisms to encourage non active users to participate in the social network.

- Studying success or failure of user interface changes without risky deployment

Discussion/Conclusion

- Need for triangulation of methods

- Study of user behaviour in Social Media needs multidisciplinary approaches

- Social simulation can provide predictive answers to research and design questions

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