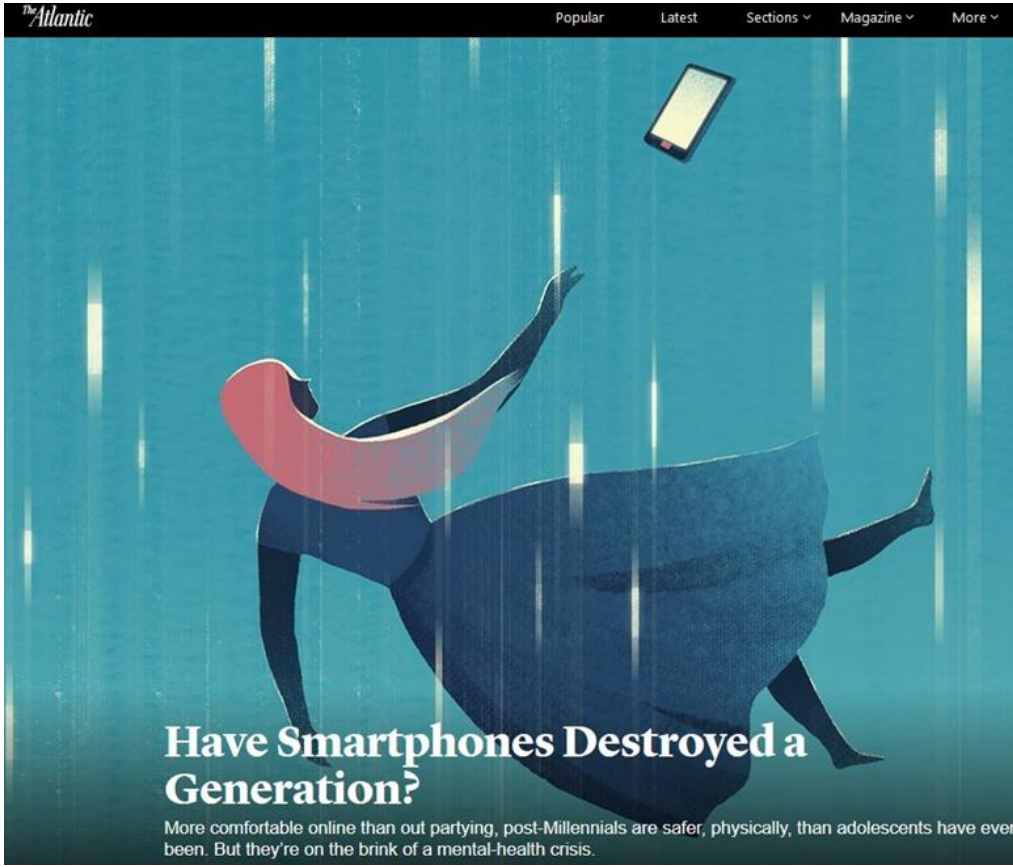
The Ethical Conundrum of Personalized Persuasive Technology

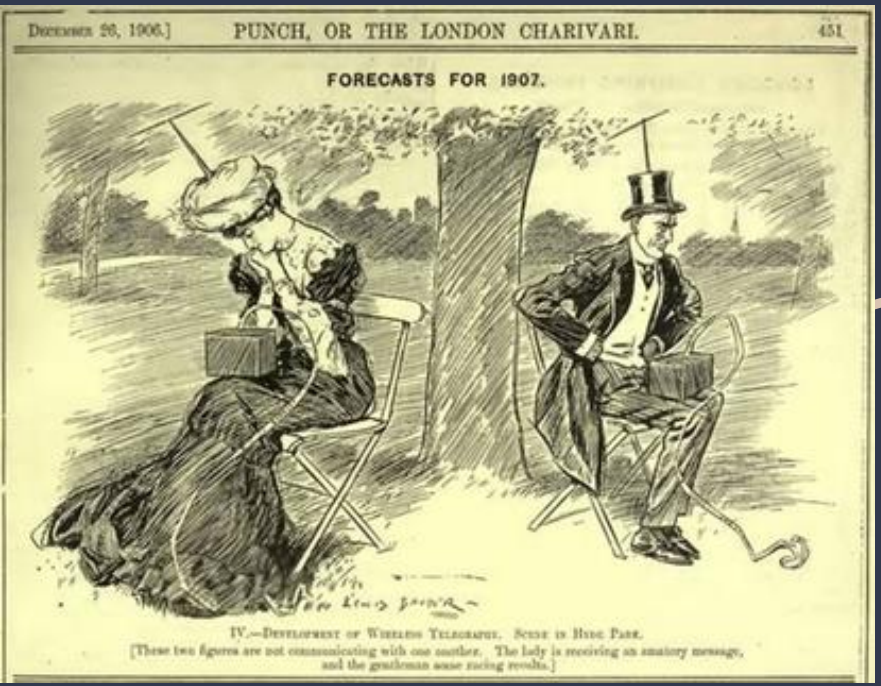
Julita Vassileva
University of Saskatchewan

Media Panic Lately

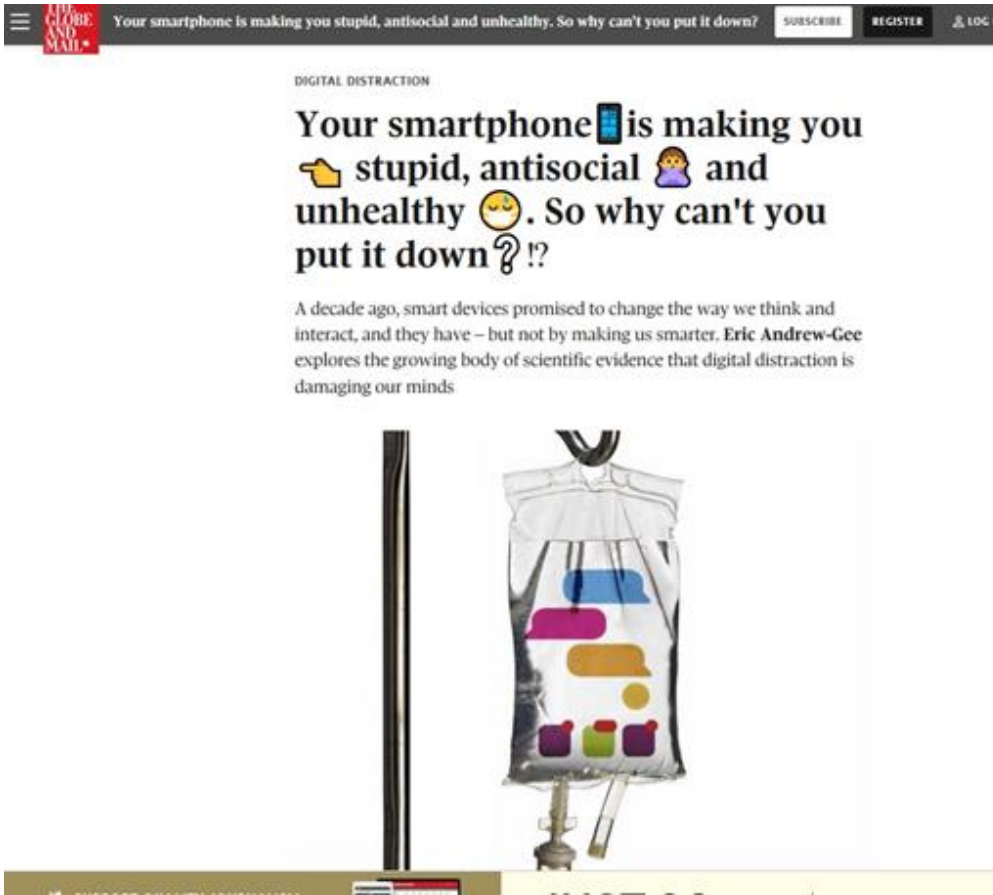
The Atlantic, September 2017



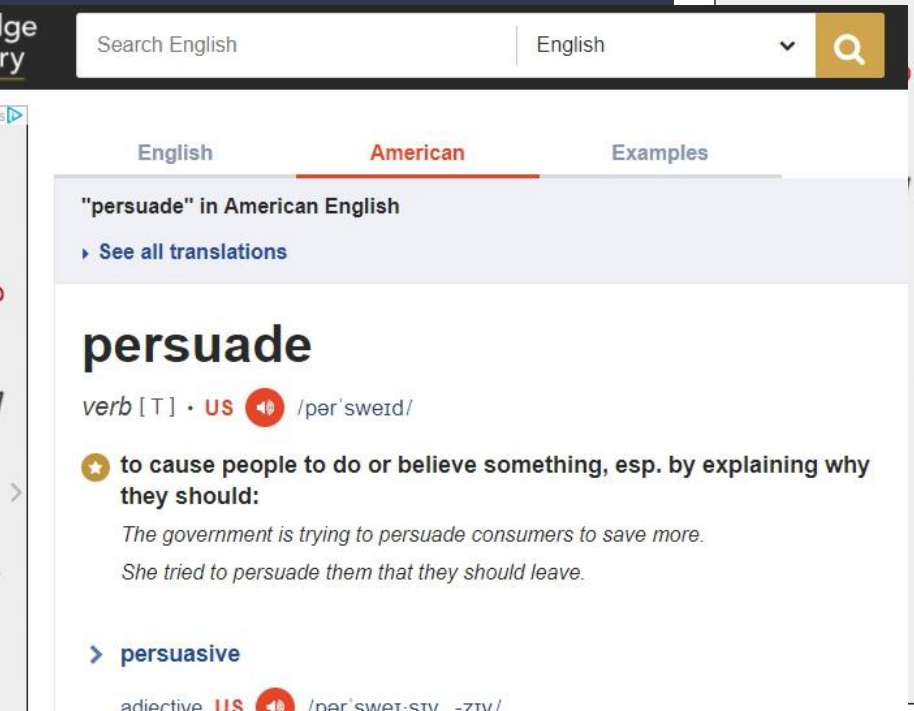
Media Panic



The Globe and Mail, January 2018



Persuasion



persuade

verb [T] · UK /pəˈsweɪd/ US /pəˈsweɪd/

B1 **to make someone do or believe something by giving them a good reason to do it or by talking to that person and making them believe it:**

If she doesn't want to go, nothing you can say will persuade her.

[+ (that)] *It's no use trying to persuade him **(that)** you're innocent.*

[+ to infinitive] *He is trying to persuade local and foreign businesses **to** invest in the project.*

Using a bunch of bananas, the zoo-keeper persuaded the monkey back into its cage.

FORMAL *The first priority is to persuade the management **of** the urgency of this matter.*

*Her legal advisers persuaded her **into/out of** mentioning (= to mention/not to mention) the names of the people involved in the robbery.*

− More examples

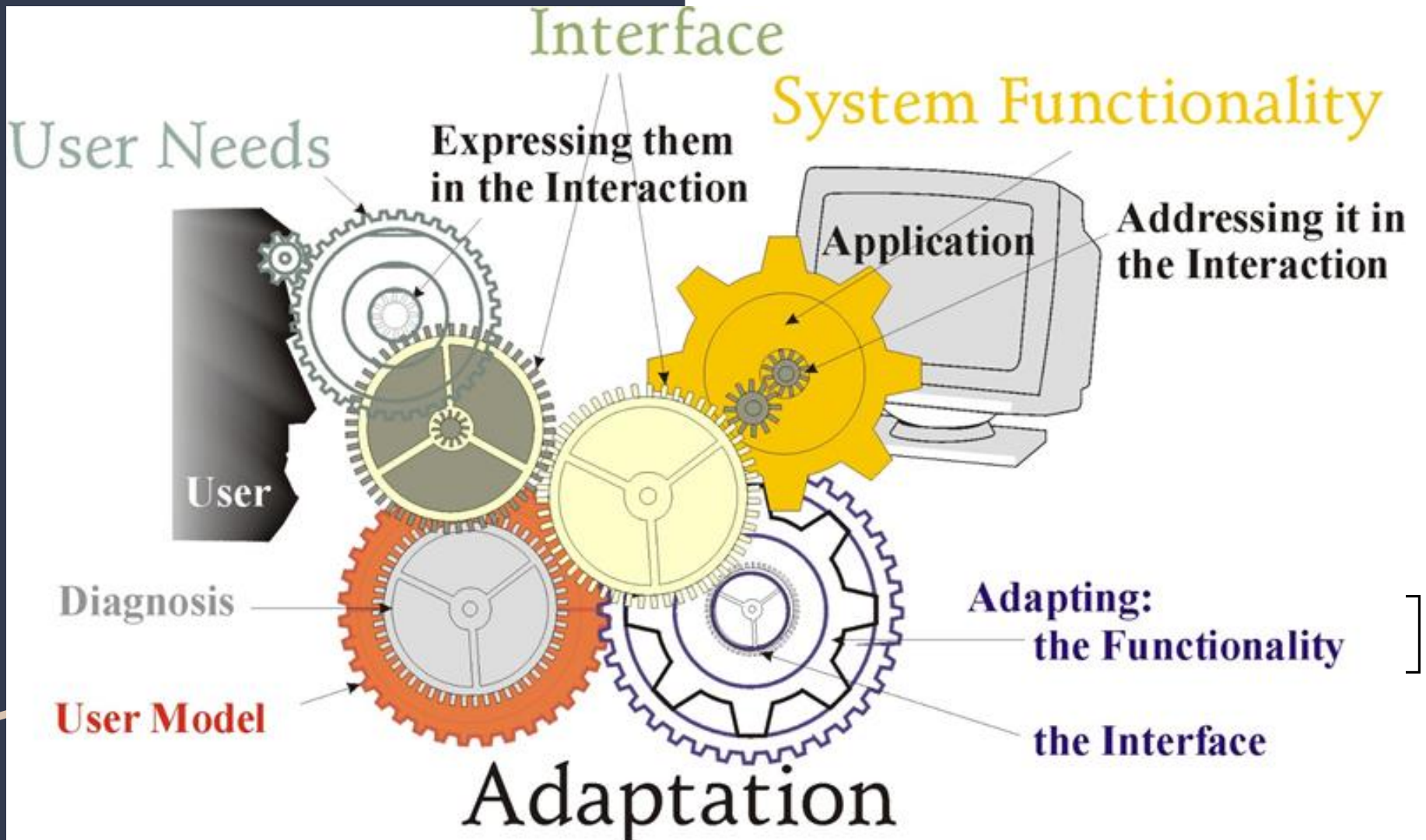
Clever salesmanship can persuade you to buy things you don't really want.

We only need one more player for this game - can you persuade your sister to join in?

I have a suspicion that he only asked me out because my brother persuaded him to.

Johnson was influential in persuading the producers to put money into the film.

She used her womanly charms to persuade him to change his mind.


Interface
System Functionality
User Needs
Expressing them
in the Interaction
Application
Addressing it in
the Interaction
User
Diagnosis
Adapting:
the Functionality
User Model
the Interface
Adaptation

Reflection: my research journey 1988-2018

@ Aurora Road by Christopher Waddell

Reflection dimensions:

Goals?

- User's own
- Somebody else's

Transparency?

- User know she is being persuaded
- User is unaware

Symmetry?

- Both parties have equal information about each other

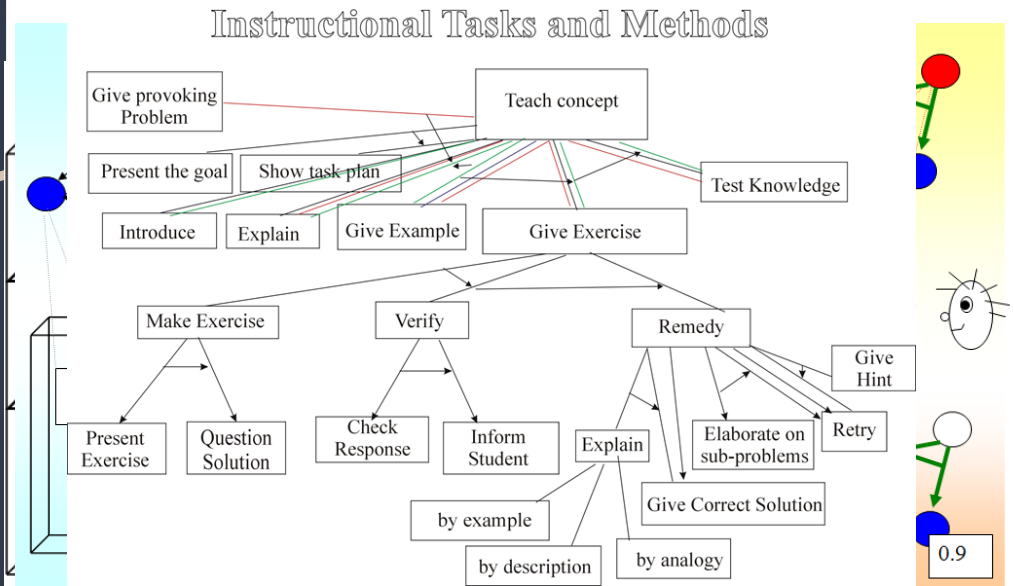
Stop 1: AI in Education, Intelligent Tutoring Systems

1 system: 1 user

AI planning approach for ITS

Instructional planning (TOBIE, 1990)

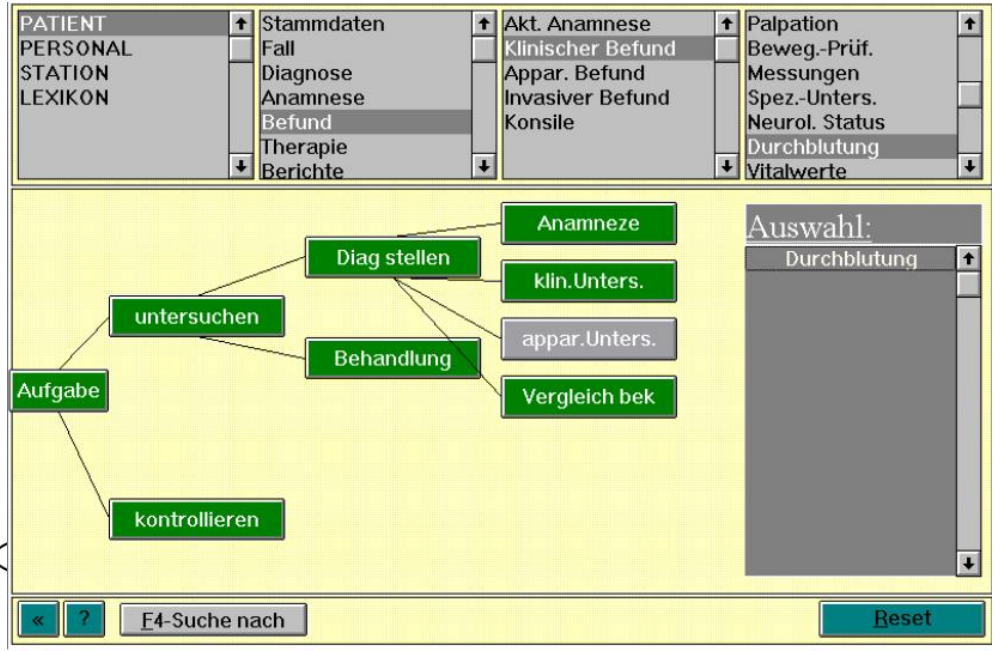
Dynamic Courseware Generation (DCG, 1992-98)



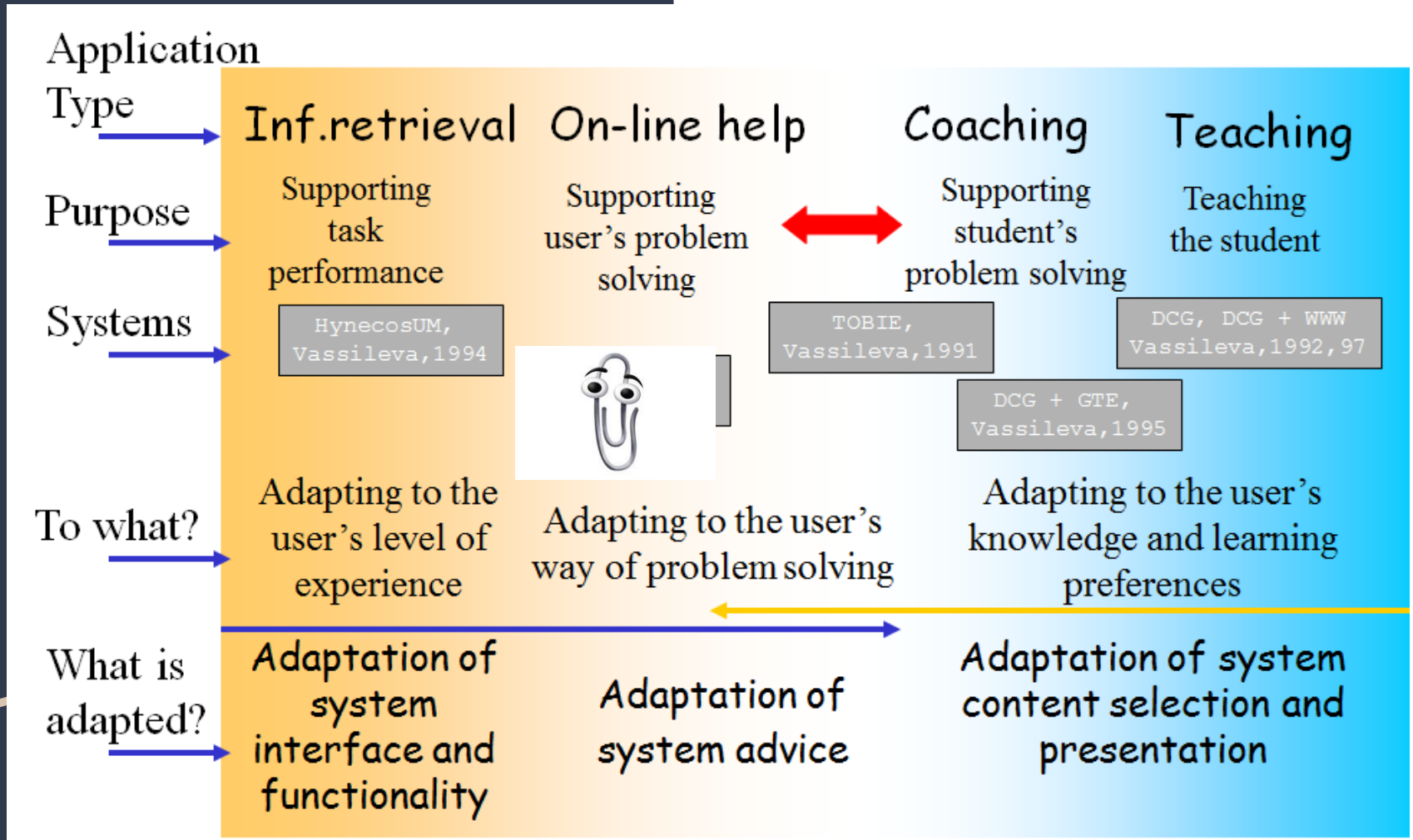
Vassileva (1998) DCG+GTE, Instructional Science
Vassileva & Deters (1998) DCG, BJET

Stop 1.5: Adaptive Information Retrieval

Adapting Information Retrieval (Menus) to User Experience



Vassileva J (1996) Task-Based Adaptation … UMUAI


Application Type
Inf.retrieval
On-line help
Coaching
Teaching
Purpose
Supporting task performance
Supporting user's problem solving
Supporting student's problem solving
Teaching the student
Systems
HynecosUM, Vassileva,1994
TOBIE, Vassileva,1991
DCG, DCG + WWW Vassileva,1992,97
DCG + GTE, Vassileva,1995
To what?
Adapting to the user's level of experience
Adapting to the user's way of problem solving
Adapting to the user's knowledge and learning preferences
What is adapted?
Adaptation of system interface and functionality
Adaptation of system advice
Adaptation of system content selection and presentation

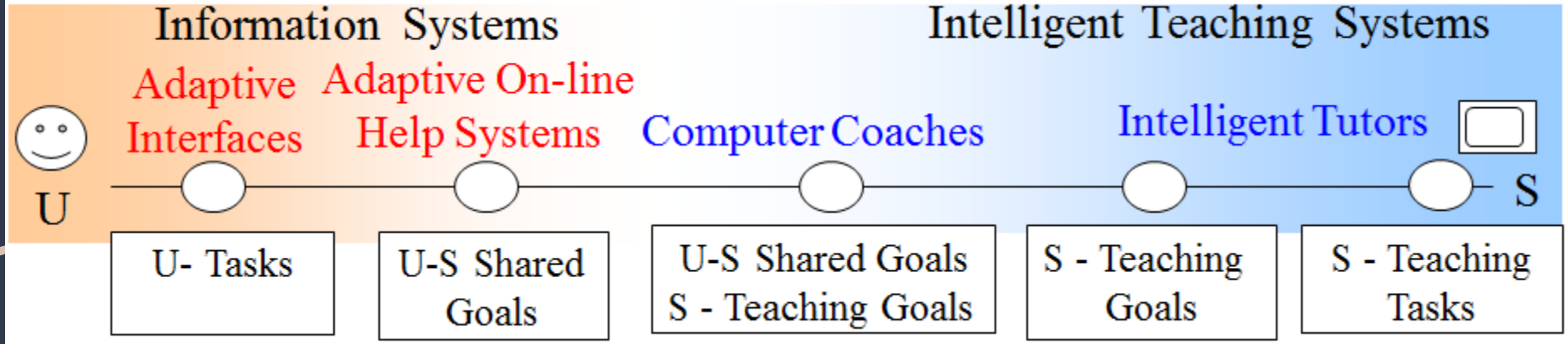
Stop 1: Ethical considerations

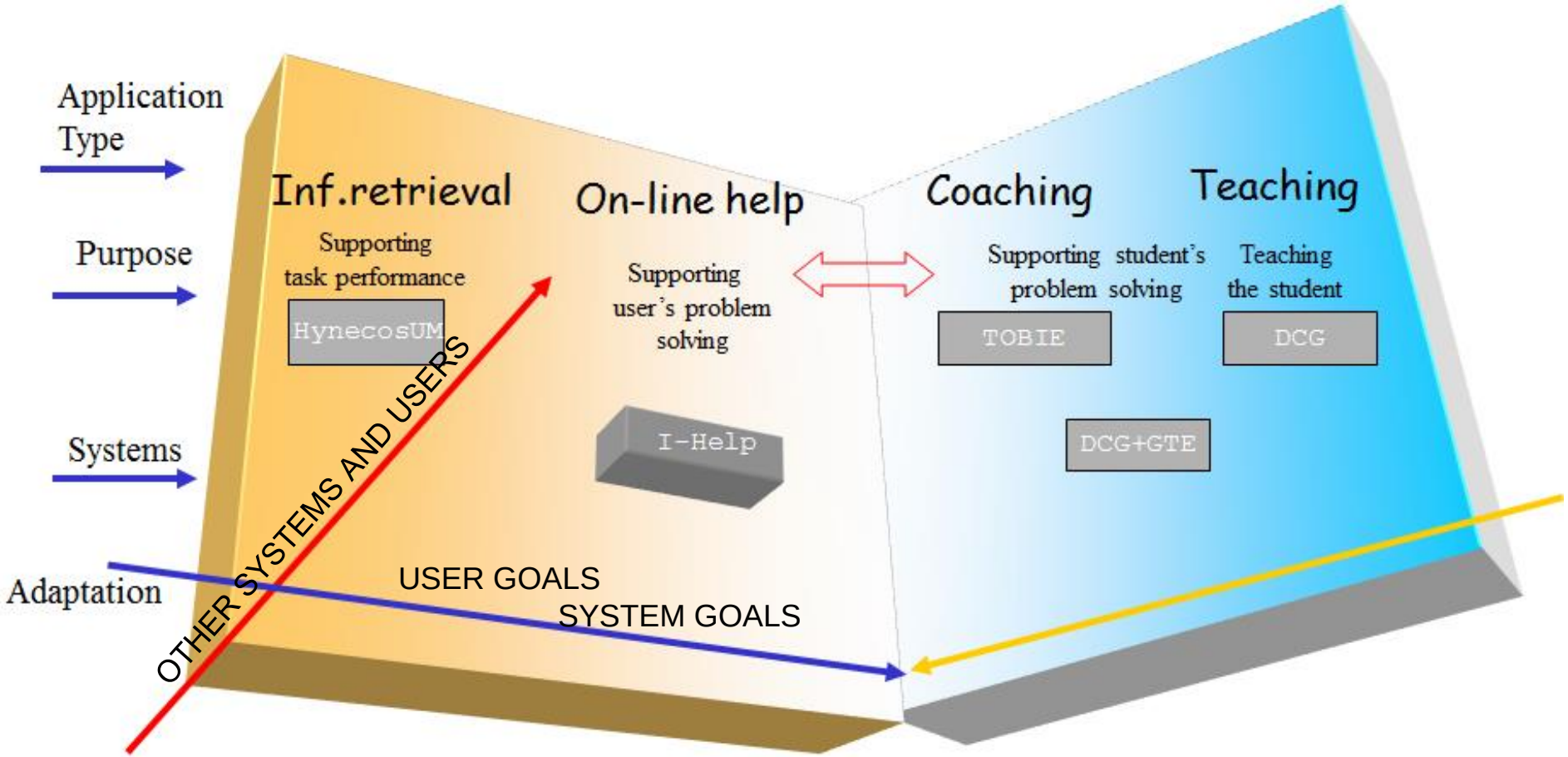
1 system – 1 user

Whose goals? Of system of user

Transparency? Yes

Symmetry? YES (context based)




Application Type
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Supporting task performance
Supporting user's problem solving
Supporting student's problem solving
Teaching the student
HynecosUM
I-Help
TOBIE
DCG
DCG+GTE
OTHER SYSTEMS AND USERS
USER GOALS
SYSTEM GOALS

Stop 2: Distributed Environments (Web)
m users – n apps

Autonomous Heterogeneous Interacting

Wang Y & Vassileva J, (2003 - 2008) Trust in P2P

Winoto P, McCalla G & Vassileva J (2004) Non-monotinic Bilateral Negotiation, AAMAS.

Multi-agent systems

Toolbox for investigating socio-economical phenomena on a macro-scale

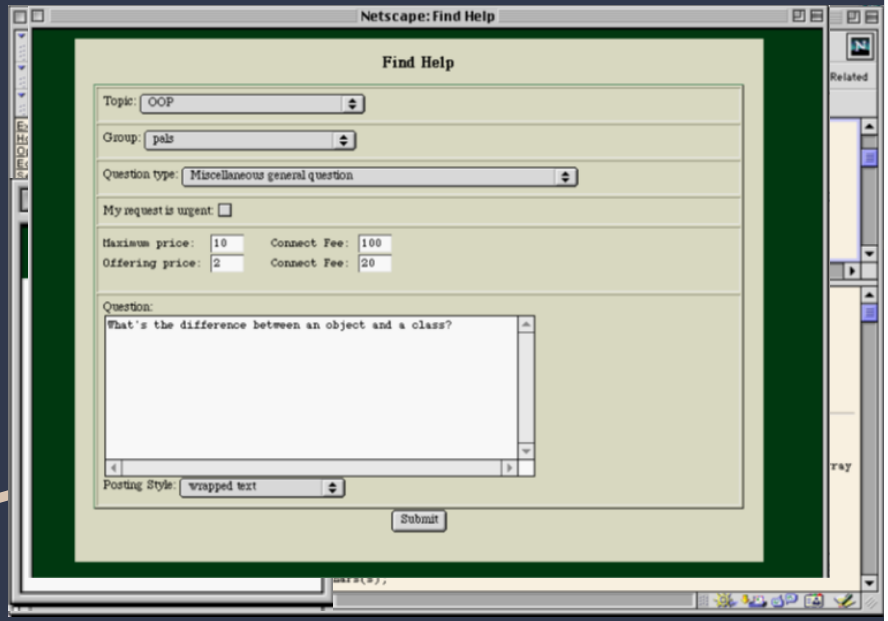
Autonomous behaviours driven by Intrinsic mechanisms: knowledge, inner-wiring/algorithm/ personality emotions (semi randomness)

Externally regulated by incentives, protocols of interactions, rules and regulations, other agent's behaviours

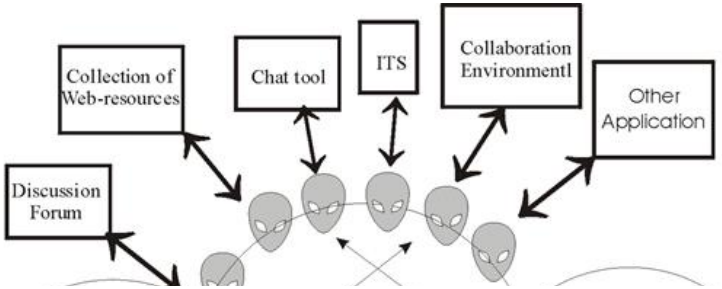
Mechanisms for cooperation? Negotiations, Prisoner's Dilemma, Repeated Interactions, … Rumours, Trust, and Reputation.

All this work - evaluated in simulations

Stop 2.5: Multi-agent Peer-Help System



I-Help (Greer, et al. 1998-2001)



Human-Agent Interaction

Anthropomorphic Agents:

- How much autonomy?
- What type of relationship?
- Agent "Persona" ?

2.5 Appealing to the greedy: a personal agent economy

Human Help costs effort and time

Market regulates the supply and demand:

- Help in exchange for currency
- Rate of pay is negotiable (by agents)
- Users set negotiation parameters for agents
- Users pay penalty if agent's deals are ignored

Persuasion = negotiation

Agent decides offers and counter-offers calculating an utility function with parameters set by users:

- This model allows for trust relationships to evolve between users (mediated by their agents)
- Users can build coalitions (trusted, interest-based communities)
- Simulations can be build to study sustainability, benefit…

Mudgal & Vassileva (2000) Multi-agent negotiation o support and economy for online help. Proc ITS.
Breban & Vassileva (2002) Agent Coalition formation Based on Trust… Proc. Canadian AI conference.

Stop 2: Ethical considerations

N systems - M users

Whose goals? Of system and of user

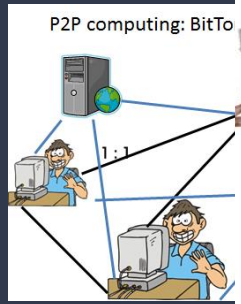
Transparency? Yes, assuming that the personal agent is transparent to the user

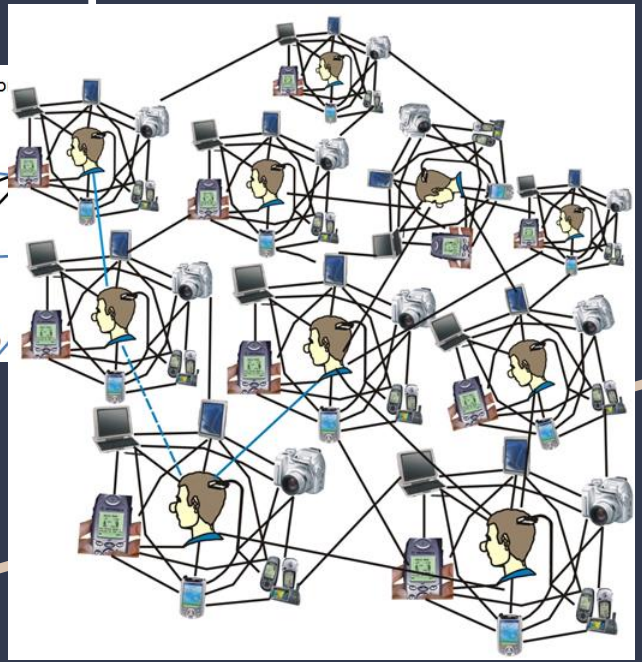
Symmetry? Yes and No

Yes - because of decentralization, UMs are scattered around each agent, contextualized fragments

No - because of the central Matchmaker agent keeping all student profiles: knowledge, cognitive style, eagerness, helpfulness, popularity, star-sign

Stop 3: Motivating Participation





Vassileva J (2001) Distributed and United, Keynote of ICCE'2001, Seoul.

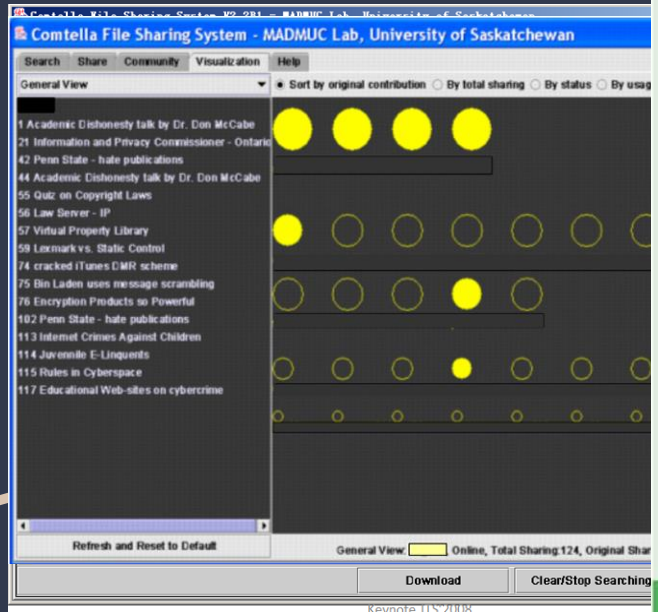
Lessons learned from I-Help deployment (2 years, 3 countries, over 2000 students): Huge variance in participation

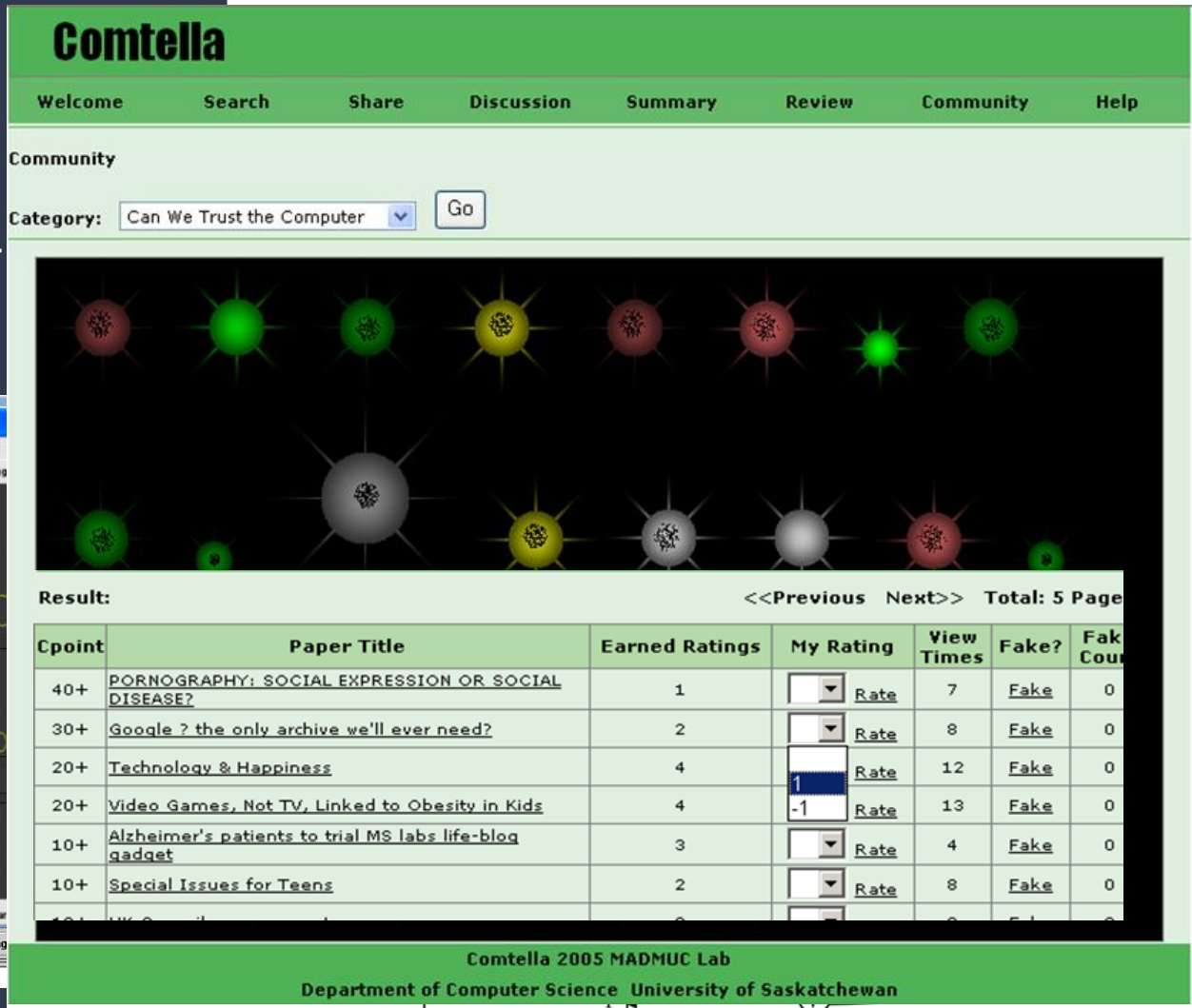
Why do people offer their time and resources?

- Some are altruists
- Some would help their friends and hope to make new friends
- Some seek glory
- Some seek teacher's attention
- Some seek high marks
- And even money

Need for Personalized Persuasion!

Motivating Participation on the Social Web





Stop 3.1 and 3.2 Ethical Considerations

Goals: System and User - improve user's test scores;

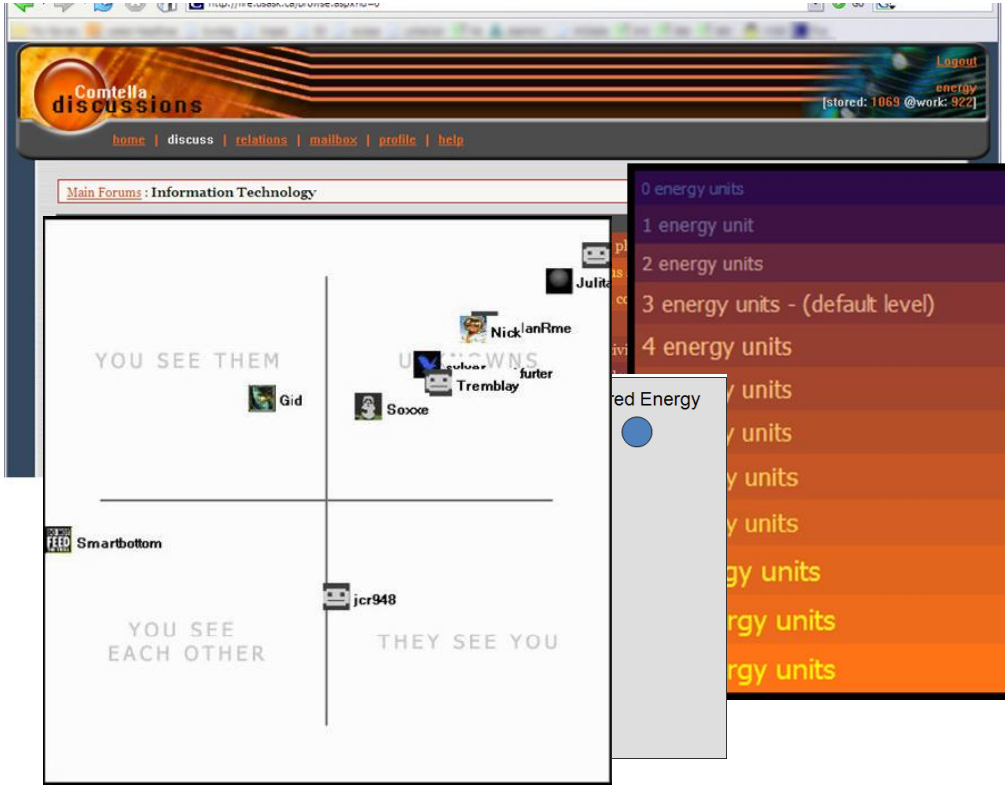
Transparency: Yes - user understands they are being persuaded, or that that they play a game

Symmetry: No - user does not understand how the system works, the system has all the user's data, the user has no ways to influence the system

Stop 4: Recommender Systems
4.1. Encourage user ratings and reciprocity

Explanation /visualization of the effect of rating → resulting in a visual recommender system

Encouraging reciprocity in views /ratings



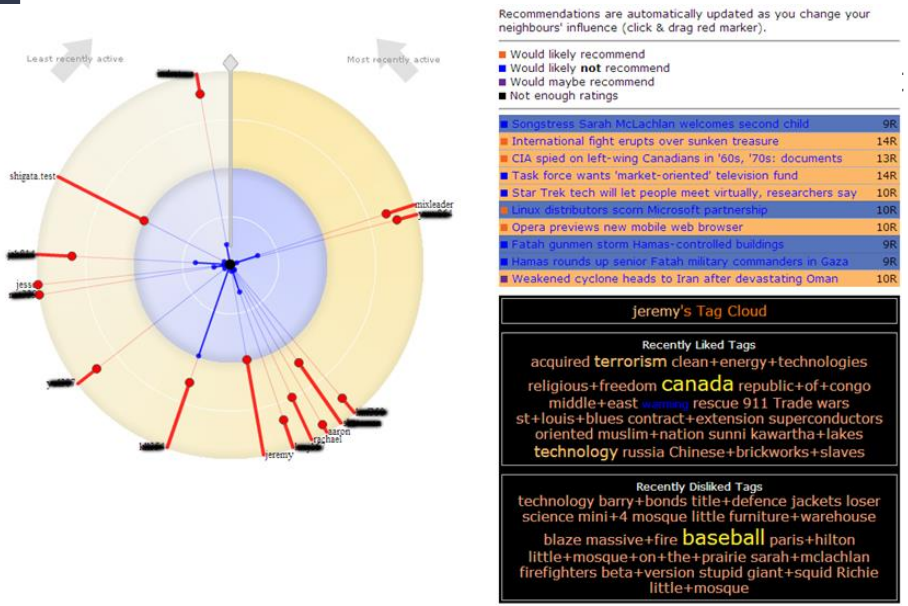
Webster & Vassileva, 2006, Proc. Adaptive Hypertext.

4.2 Transparency And User Control of RS

Problems addressed:

- Lack of Transparency of Recommendation
- Lack of user control

KeepUP: a hybrid recommender system for RSS feeds



Webster A, Vassileva J (2007) The KeepUP recommender system, Proc. ACM Recsys'2007.

4.3 Social Networks and Recommendation

Zhang J, Wang Y, Vassileva J (2013) SocConnect: A personalized social network aggregator and recommender, Information Processing and Management 49.

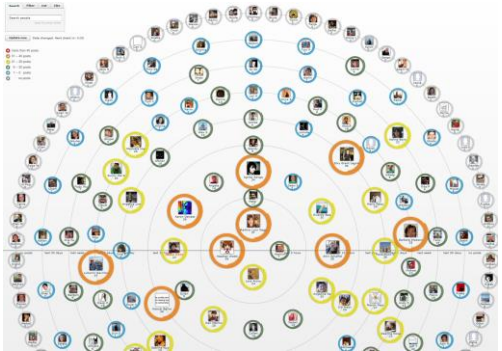
Shi S., Largillier, T. and Vassileva J.(2012) Keeping Up with Friends' Updates on Facebook, Proc. CRIWG'2012

Problem:

- Aggregating SN streams
- Information overload → Recommending posts
- User control → by content and by friends

Problem:

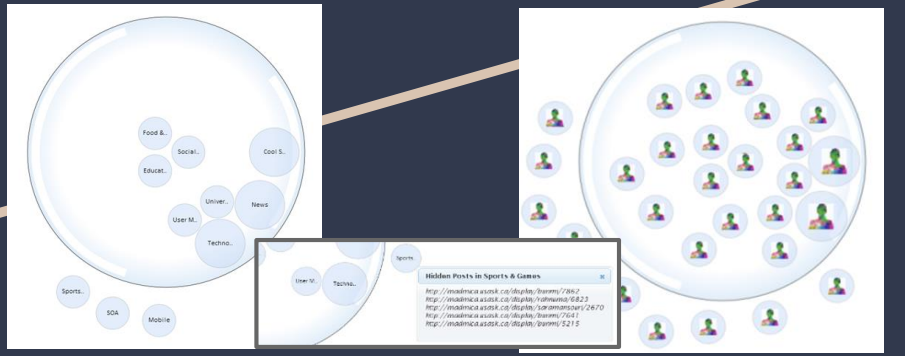
- Facebook stream data : how to Keep Up?
- Transparency → Visualization
- User filtering options (by time, friend)



4.4 P2P Social Networks: User Privacy and Control

Tandukar U., Vassileva J. (2012) Ensuring Relevant and Serendipitous Information Flow in Decentralized Online Social Network. Proc. AIMSA'2012

Nagulendra S, Vassileva J (2015) Providing awareness, explanation and control of personalized filtering in a social networking site. *Information Systems Frontiers*.



Problems addressed:

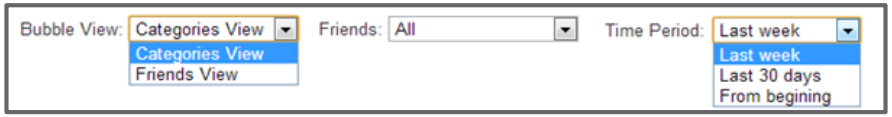
- Privacy
- Information Overload
- Filter bubble

Recommending Content with Serendipity on P2P Social Network (simulation with data from StudiViz)

More problems addressed:

- Transparency (of the filter bubble)
- User control

Interactive Visualization in a Real Social Network (Friendica → Madmica Social network)



Step 4: Ethical Considerations

Goals - both system and user (system makes recommendations to satisfy better the user's goals)

Transparency - yes (visualization giving the user an idea of the recommender's workings)

Symmetry - yes

- the user has means of control / manipulation of the algorithm (3.3, 3.4, 3.5, 3.6)
- the user has control over her data (3.6)

Step 5: Persuasive Technology for Behaviour Change

Ends and Means (Kaptein & Eckles, Persuasive 2010)

- Steps 1-4 were mostly about the Ends (What)
- Now focus on the Means (How)

5.1 Non-Personalized Approaches

- Persuasive “Emotional” agents in educational systems (2001)
- Gamification in Education (2014-
- Family support of isolated elderly (2014-2017)

5.1.1 Persuasive "Emotional" Agents Appealing to User Compassion

Agent Persona displaying emotions, attempting to evoke an act of compassion in the user

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tc.)

- Females felt a pressure to perform better to please the persona!
- Both genders preferred the emotional persona
- No significant difference in test performance

Facial expression for six major emotional states (Ortony,1988)

Okonkwo C, Vassileva J (2001) Affective Pedagogical Agents and Persuasion, Proc. UACHI, HCII, 397-401

5.1.2 Gamification in Educational Systems

and in the Workplace (data entry)

Collaboration with Brazil

University of Sao Paulo (USP) - Sao Carlos

Federal University of Alagoas - Maceio

Points, Levels, Badges, Leader-boards

5.1.3. Family communication support for elderly people

Social Connector Project, University of Chile

Francisco Gutierrez,
Prof. Sergio Ochoa

Persuasive Strategies

- Ease of use
- Awareness of others' activities
- Workload-based recommendations for check-ins
- Prompts

(a)

(b)

Gutierrez F.J., Ochoa S.F., Vassileva J. (2017) Mediating Intergenerational Family Communication with Computer-Supported Domestic Technology. Proc. CRIWG.

Step 5. 1 Ethical considerations

Goals: System's, in assistance of the user's goals

Transparency: Yes, user realizes that the game is to persuade her

Symmetry: No, user can't influence the system, has no control over the data collected about her

5.2 Personalized Persuasive Technology

Not Personalized, but Tailored!

- Persuasive Strategy Tailored to a User Stereotype or Selected as start. Static.
- User Profile = Stereotype (classification problem)

Stereotypes based on:

- Direct Mapping to Strategies (e.g. Cialdini)
- Psychological Types / Gamer Types -- mapping to strategies
- Demographic features mappings

5.2.1 Mapping Gamer Types to Strategies

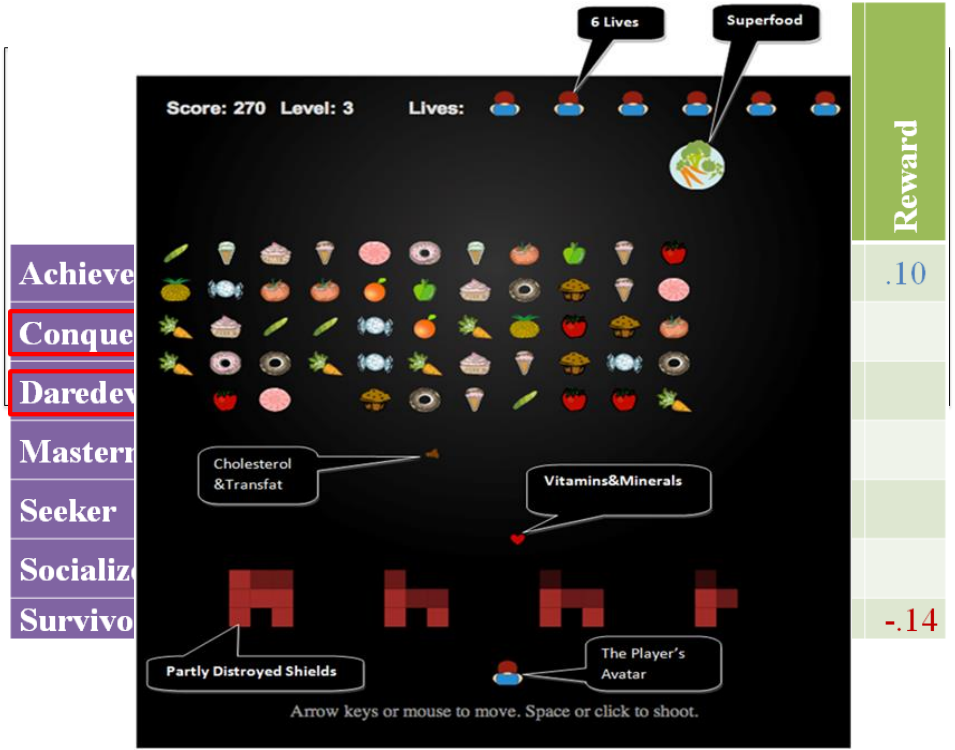
R Orji, J Vassileva, RL Mandryk (2014) Modeling the efficacy of persuasive strategies for different gamer types in serious games for health, UMUAI

Persuasive Games for Healthy Eating

R.Orji, J Vassileva, RL Mandryk (2017) Improving the efficacy of games for change using personalization models,TOCHI

Rita Orji, PhD Thesis Work

MT large study with storyboards illustrating strategies, participants take also the BrainHex gamer type test



5.2.2 Mapping demographics to persuasive strategies

Kiemute Oyibo, PhD work

Mapping user culture, gender, age on percept design aesthetics, usefulness, usability, trustworthiness

Mapping Culture on Socio- Cogntintive Theory Determinants of Behaviour Change.

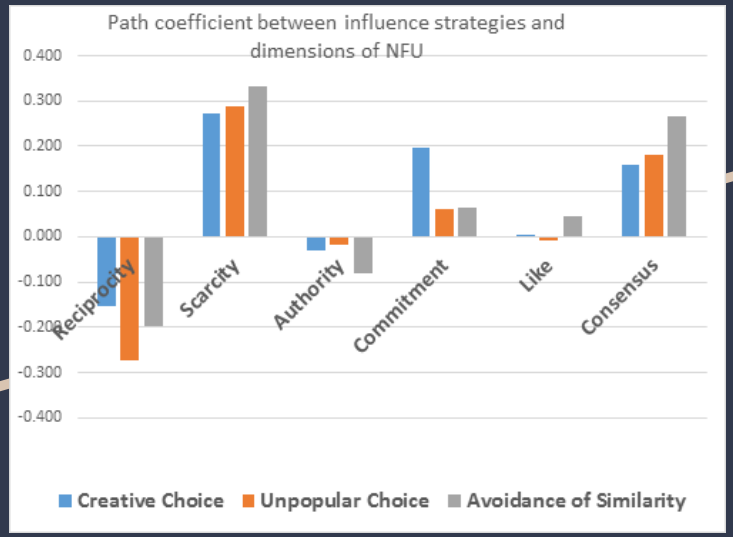
- Canadian → Self-Efficacy and Self-Regulation
- Nigerian, Chinese → Social Support and Outcome expectation

Goal: Design of a persuasive coach for home exercise using the TTM

Mapping common PSD strategies to the stages of the TTM in the context of home-based exercise.

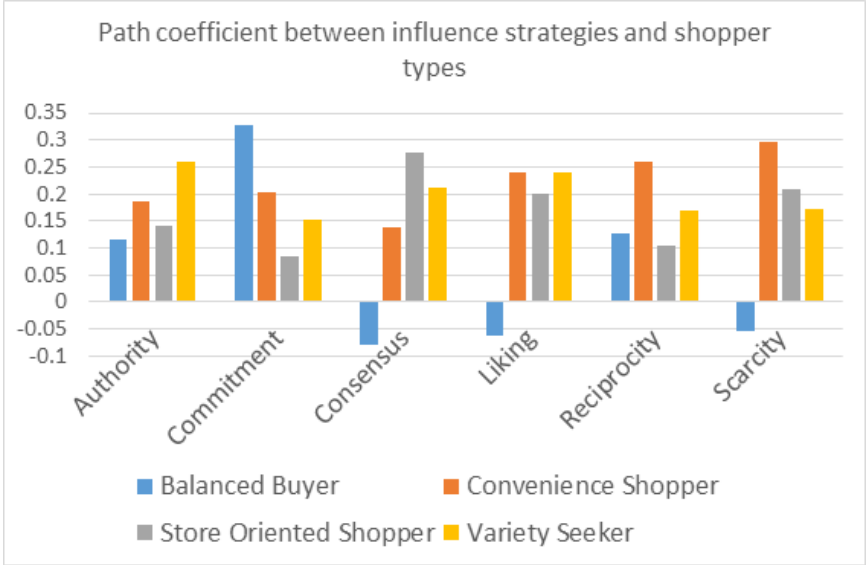
- Preparation Stage → Cooperation strategy

5.2.3 Persuasive technology for E-Commerce



Ifeoma Adaji, PhD research

- identifying the factors that improve e-commerce personalisation
- identifying how these factors influence the continuance intention of e-shoppers
- exploring the susceptibility of these factors to persuasive strategies



Step 5.2.2 Ethical Considerations

Goals: System's, in assistance of the user's goals

Transparency: No. Kaptein & Eckles argue persuasive strategy should not be transparent, or it won't have effect.

Symmetry: No, the user can't influence the system, has no control over the data collected about her

Finally: The Ethical Conundrum

To be effective PPT needs to model users → User Data is the core of PPT. The more data, the better. Successful services hoard user data → Asymmetry

To be effective PPT needs to [illegible]veal its strategies → Lack of Transparency

The Goals? Are they the same as those of users?
Can we trust companies providing PPT services?
-- that they pursue the same goals?
-- that they safe-guard the user data?

How to solve it?

Remove the asymmetry!

Big Data is harmful!

Decentralize the data!

PPT powered by small data - like the agents in I-Help.

User data securely stored, under user control.

Peer to peer persuasion, on a equal basis, with transparent ends and means.

User acceptable persuasive ends and means, expressed in contracts.

Technology exists already: Distributed ledgers

Adoption? Only through regulation.

Epilogue

No reason for Panic.

History shows such panics happening every time when new transformative technologies appeared.

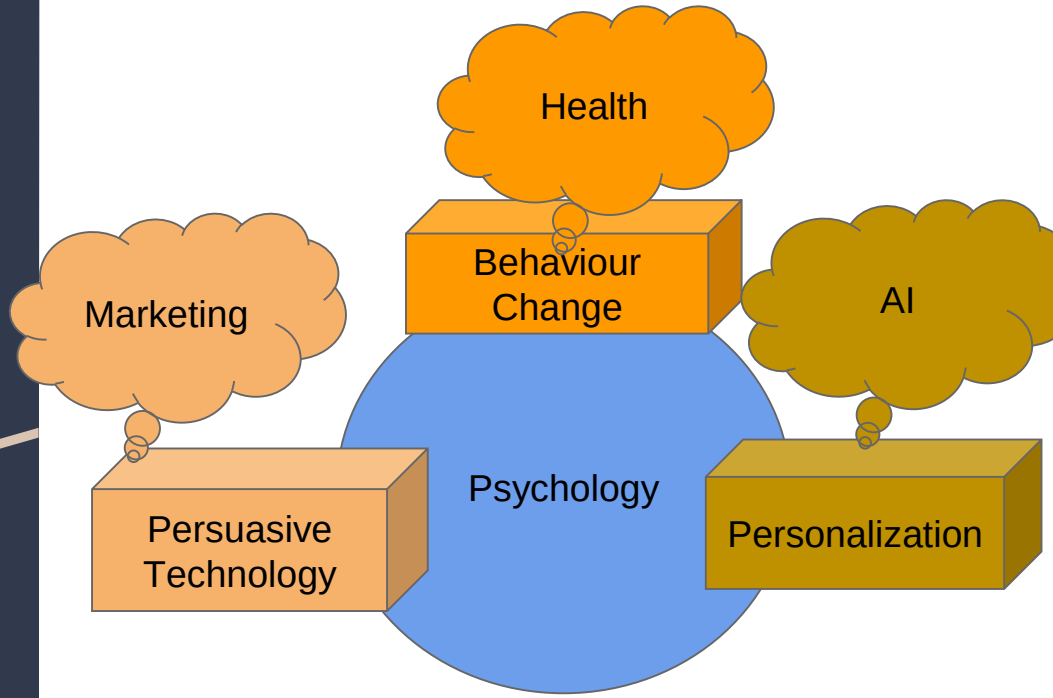
Writing

Printing

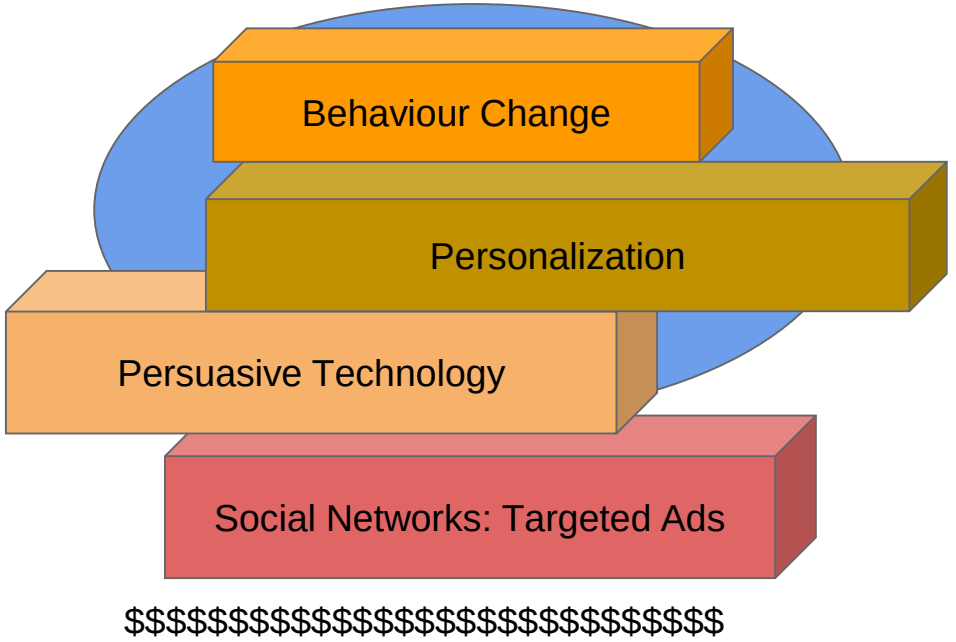
Cars

Society evolves, people adapt.

Map of the PPT area



Evolution


Behaviour Change
Personalization
Persuasive Technology
Social Networks: Targeted Ads
$$$$$$$$$$$$$$$$$$$$$$$$$$$$

Future: Dark Picture