How Personalized, Adaptive and Dangerous is Persuasive Technology

Julita Vassileva

University of Saskatchewan, Canada

Keynote talk at the Personalized Persuasive Technologies Workshop, with Persuasive'2018, Waterloo, Canada, April 17

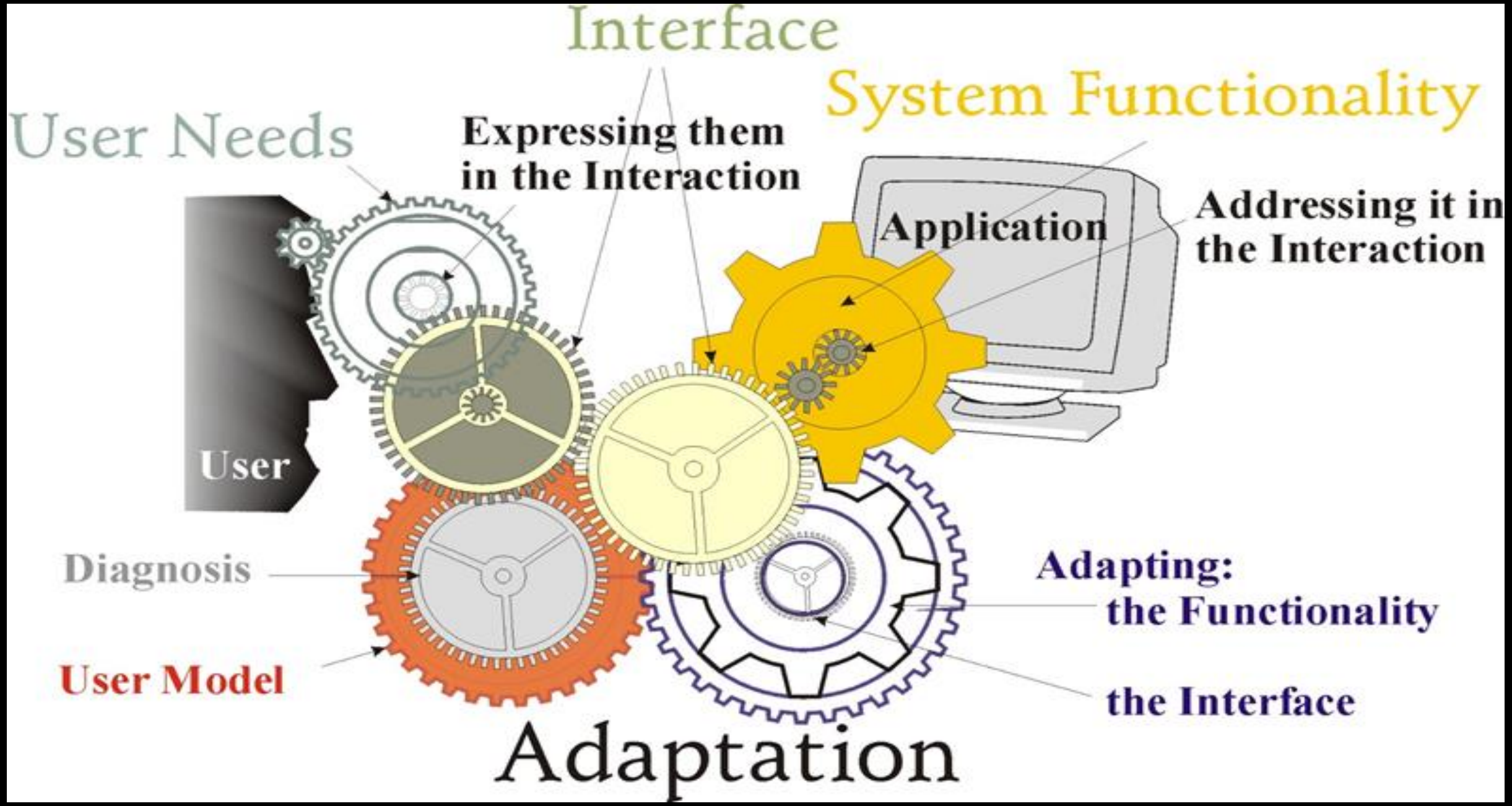
Dimensions for discussing PPT

- Dynamics of Personalization:
  - **Tailoring (design time) or**
  - Adaptation (run time)
- Target level of PT that is personalized:
  - Ends (goals),
  - **Means (approaches, strategies)**
- User Model dimensions: Designed versus Data-Driven:
  - **Profile** (set of variables)
  - **Overlay** on goals or strategies
  - **Stereotype** (named profile with some psychological validity, combination of variables, or monolithic)
- User's perspective of PT and of PPT
  - Awareness or PT
  - Awareness of PPT and user model
  - Control over user model, personalization and persuasion

Personalization defined

- Static (at design time): tailored
  - Take measures once (user fills questionnaire, supplies information)
  - Classify the user into a pre-defined set of user type
  - Select the version / persuasive strategy that matches the user's type
  - Assume that the user won't change drastically for a long period of time

- Dynamic (at run time): adaptive
  - Requires repeated interaction
  - Constantly collect measures at run time
  - Constantly select strategies that fit the user's measures / type at the moment

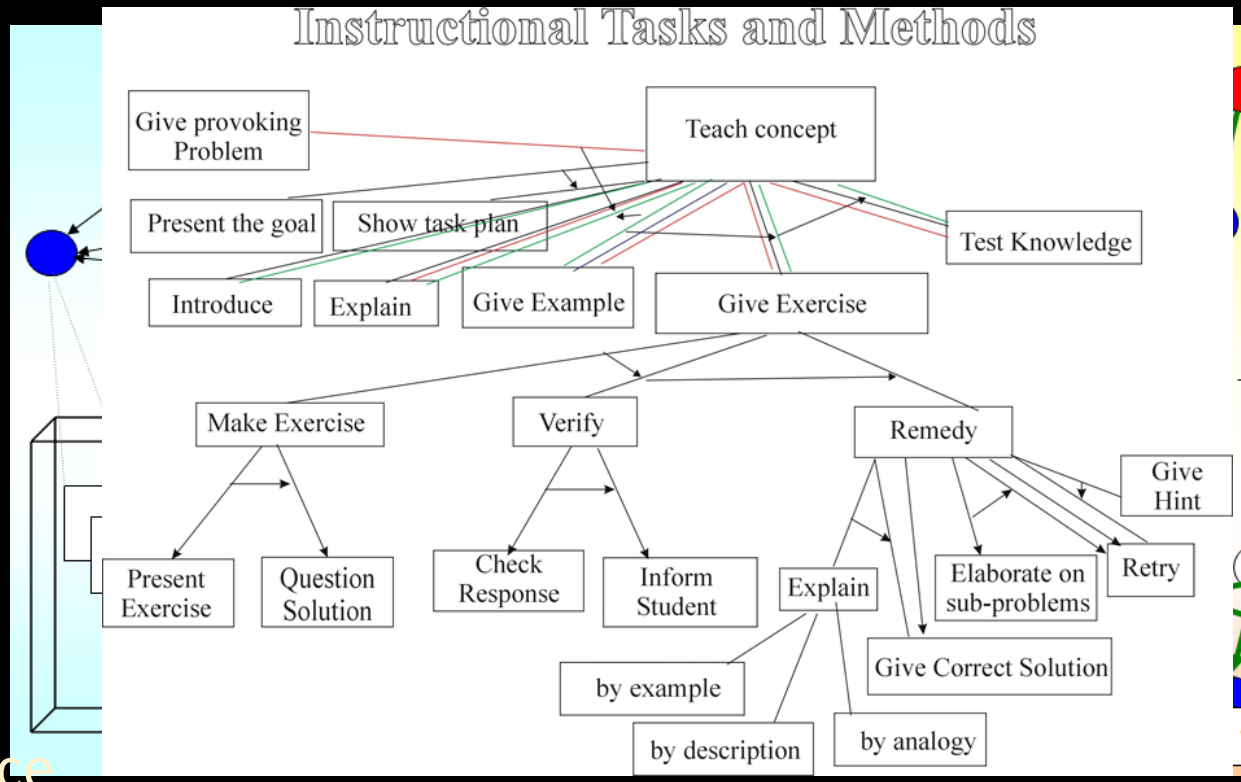

Interface
User Needs
System Functionality
Expressing them
in the Interaction
Application
Addressing it in
the Interaction
User
Diagnosis
Adapting:
the Functionality
User Model
the Interface
Adaptation

My Background: AI in Education, Intelligent Tutoring Systems

AI planning approach for ITS

Instructional planning (TOBIE, 1990)

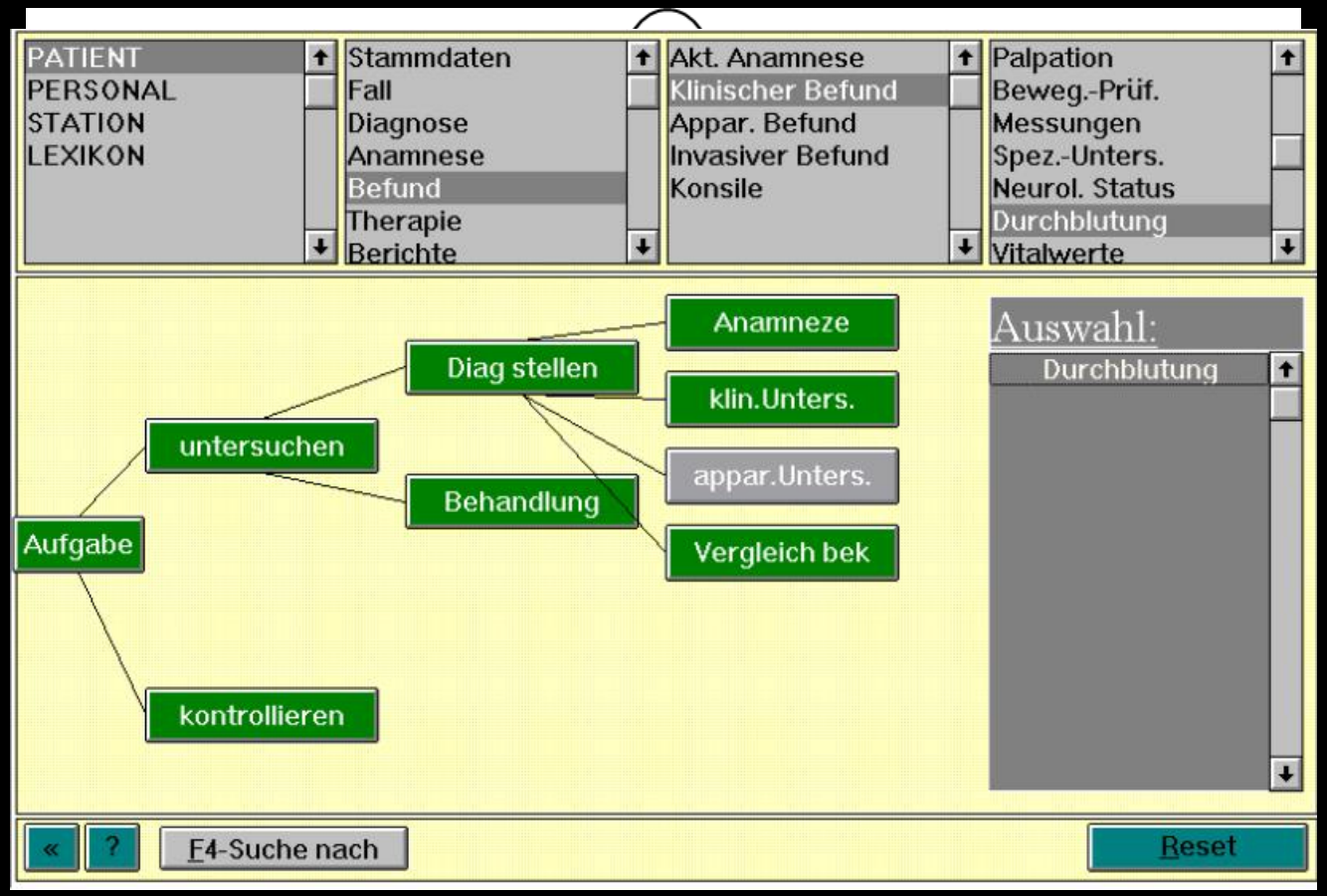
Dynamic Courseware Generation (DCG, 1992-98)



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

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 + GTE, Vassileva,1995	DCG, DCG + WWW Vassileva,1992,97
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	

Target Level of PPT

- *Selecting Effective Means to Any End: Futures and Ethics of Persuasion Profiling* by Kaptein and Eckles, Proc. PT'2010 defines two levels in adaptive persuasive technologies:
  1) ends – (what?) goals, recommendations;
  2) means – (how?) persuasive strategies

- PPT focus is on the means, since user persuasion strategies as well as user persuasion profiles are possibly universal

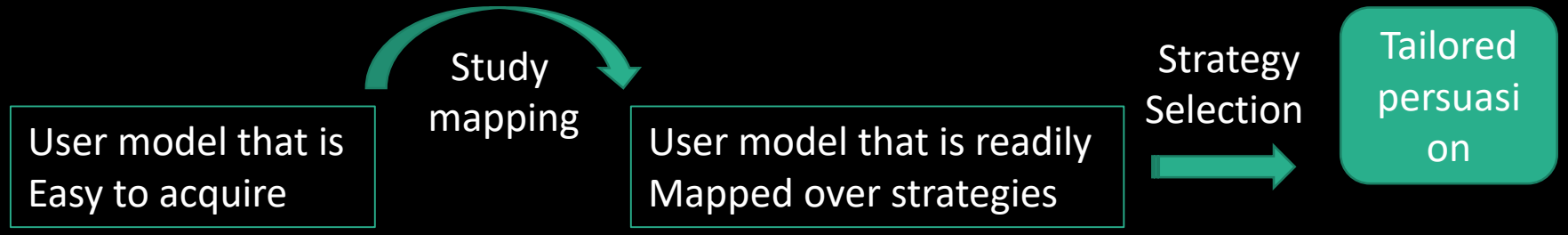
- Research in Recommender systems and Behaviour Change (e.g. approaches based on TTM) focus on ends.

User Profiles, Stereotypes, Models

- Profiles: lists of variables and their values (1960-70, CAI systems)
- Stereotypes: a set of variables with values in specific ranges (Elaine Rich, 1983)
- Overlays models: the set interconnected variables mapping entities in a model
  - Domain model, knowledge model, psychological model (based on some theory)
  - Changes in one entity value leads to propagation of changes in another one
- Implicit models learned from data (correlated clusters of similar users, but no clear stereotypes)
  - Make sense only in a group, for particular type of choices (domain specific)
  - Need HUGE data.

User profiles and stereotypes

- Overlay models: mapping individual users to means
  - Kaptein's persuasive profiles are mapped onto Cialdini's principles – user types mapped on the spectrum of available means…
  - Can we apply this approach to PSD Framework (38 strategies) ?
- Stereotypes: mapping user types to means (higher-abstraction overlay model)



Mapping user types and traits to strategies

- Mapping Brainhex gamer types on 10 common strategies (Rita Orji, 2014)
- Mapping Big-5 personality traits on 8 strategies (Halko & Kientz, 2010; Hirsch, Kang, et. al, 2012)
- Mapping Culture, Gender on Perception of Aesthetics, Usability, Trust, Socio-Cognitive Theory determinants (Oyibo, 2015-…)
  - How context and domain specific are these mappings?
  - Mapping over cognitive biases – but there are 87 of them! https://rationalwiki.org/wiki/List_of_cognitive_biases

How to define user types and mappings?

- A1: Start with an existing user typology
  - E.g. gamer types, personality types, buyer types, demographic features
  - map to persuasive strategies from some frameworks through empirical analysis
- A2: Analysing existing successful applications
  - Example: StackOverflow (Adaji)
  - what features make them persuasive?
  - can these be mapped to existing framework of PT strategies (PSD, Cialdini)
  - is there a pattern of usage data of these features among groups of users of some type
  - Validation: can we verify the persuasiveness of the strategies in the context of this application on users with known user types? (hard to do!)
- A3: Data-driven: learn user features from trying different persuasive strategies
  - Map features directly to persuasive strategies (Kaptein, on Cialdini)
  - Correlating some of these user features may lead to typology

Parallel with Content-based Recommender systems

Parallel with Collaborative Recommender systems

Caution with User Types

- **The Myth of 'Learning Styles‘:** A popular theory that some people learn better visually or aurally keeps getting debunked. Atlantic, April 11, 2018.
- **Myers-Briggs Personality** types: poor validity, reliability, independence.
- **Big Five Personality** types: based on the association between words but not on neuropsychological experiments, limited predictive power
- **Brainhex player types**: limited to digital games.

Common feature in these approaches: Tailored

- Persuasion tailored to a user type, not to the individual user.
- The underlying assumption is that the user stays in this type.

- But users change – depending on their goals, current situation, context, domain

Tailored vs Adaptive

- Adaptive persuasive technology would detect at run time in context changes in the user's goals, interests, and susceptibility to persuasive strategies and change its ends and means to adapt to the user.
- Would require to collect huge amount of data about users, constantly
- Not clear if Google, Facebook are doing it yet
- Alexander Kogan said that he strongly doubts that Cambridge Analytica's algorithms based on the user personality data he shared were of any use in influencing people in the US 2016 elections.

However, neuro-physiological features and processes seem to be valid across contexts

- E.g. Persuasive approaches based on variable rewards (conditioning) seem to be successful across domains
- The Economist, 1843 The Magazine, Nov 2016

Brain Hacking … startup Dopamine Labs boasts about its use of persuasive techniques to increase profits:
"Connect your app to our Persuasive AI and lift your engagement and revenue up to 30% by giving your users our perfect bursts of dopamine"

Ethical concerns (Kaptein & Eckles, 2010)

- “Even if a system that implements persuasion profiling does so ethically, once constructed the profiles can be used for ends not anticipated by its designers.”
- “Do individuals have access to their complete persuasion profiles or other indicators of the contents of the profiles? Are individuals compensated for this valuable information” [*Prabhaker, P.R.: Who owns the online consumer? Journal of Consumer Marketing 17, 158–171(14) (2000)]*
- Disclosure of means-personalization may diminish the persuasive effect. (unlike ends-personalization where explanations may make the recommendation more convincing).

Move towards ethical persuasion?

- When is persuasion ethical?
  - When it is for the benefit of the target user / of public interest
  - When it is based on truth, not deception
  - When it is happening in a balance of power situation (symmetrical)

- Features of ethical PT:
  - Integrity
  - Honesty
  - Competence
  - Confidentiality
  - Transparency
  - No conflict of interest
  - Need for establish good business practices and ethics

User Attitude to the PT

- Addressed so far only at the ends-level, in the context of Intelligent tutoring systems and recommender systems

- User modeling of affect and adaptive tutoring / learning environments
  - Conati, D'Mello, Azevedo

- Trust modeling and risk-attitudes
  - Wu (E-commerce), Pearl Pu (UI)

- Explanations to help user understand recommendations
  - Tintarev, Masthoff

- Transparency and User Control of recommender systems (FTC recommendation)
  - Walnder and Sayooran

Medium

Sign

★ Member preview

Richard Freed Follow

Child and adolescent psychologist, and the author of "Wired Child: Reclaiming Childhood in a Digital Age"

Mar 12 · 24 min read

The Tech Industry's War on Kids

How psychology is being used as a weapon against children

Donald Iain Smith/Blend Images/Getty Images

"We called the police because she wrecked her room and hit her mom… all because we took her phone," Kelly's father explained. He said that when the police arrived that evening, Kelly was distraught and told an officer that

"Video games, better than anything else in our culture, deliver rewards to people, especially teenage boys," says Fogg.

"Teenage boys are wired to seek competency. To master our world and get better at stuff. Video games, in dishing out rewards, can convey to people that their competency is growing, you can get better at something second by second." And it's persuasive design that's helped convince this generation of boys they are gaining "competency" by spending countless hours on game sites, when the sad reality is they are locked away in their rooms gaming, ignoring school, and not developing the real-world competencies that colleges and employers demand."

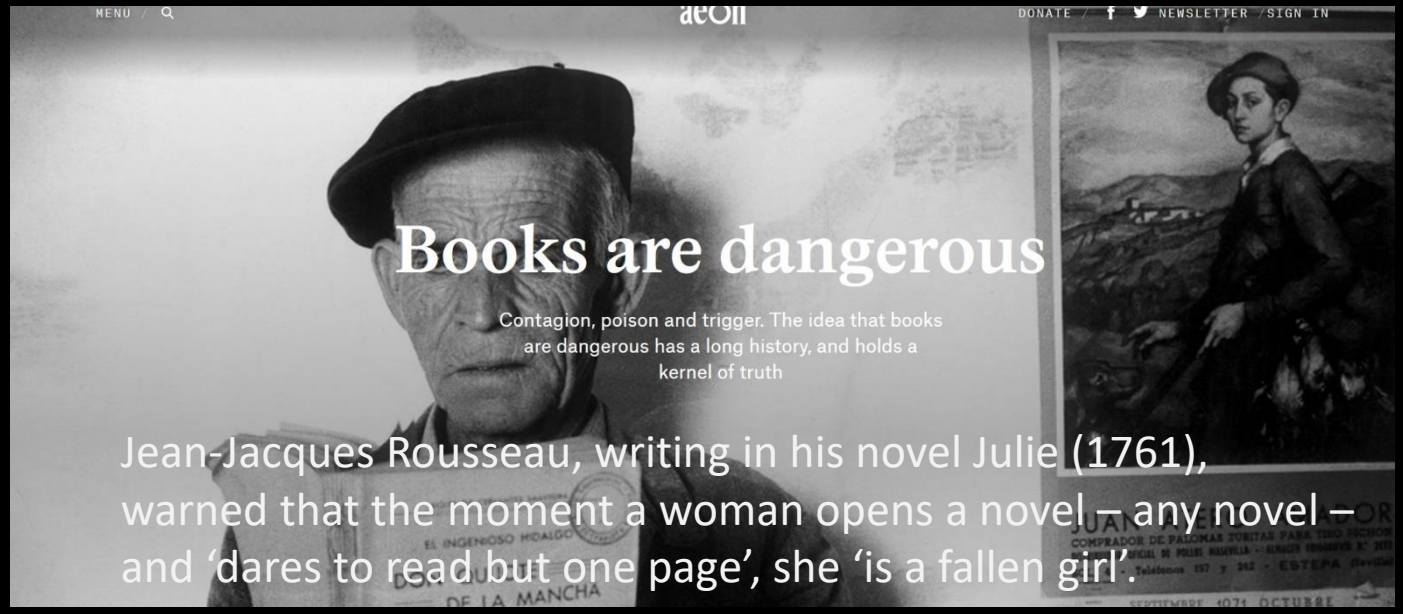
Weathering a Moral Panic

- Ancient Greek and Roman philosophers warned about the dangers of reading for the human mind. Echoed by J.J.Rousseau in 1769.
- Goethe's "The Sorrows of Young Werther" 1774 triggered a wave of suicides
- Victorian outrage with women reading novels
- New technologies often raise fears, moral panic and public outcry
- Technological progress marches on, people adapt
- The benefit of the current moral panic would be regulation, introduction of best business practices and ethics in the industry.
- To balance the commercial interests with those of people, individually (reasonable privacy of their data) and collectively (the integrity of the democratic process)

In Plato's dialogue, the *Phaedrus,* written in 360 BCE, Socrates warned that reliance on the written word would weaken individuals' memory, and remove from them the responsibility of remembering. Socrates used the Greek word *pharmakon* – 'drug' – as a metaphor for writing, conveying the paradox that reading could be a cure but most likely a poison.

AEON: Has this happened before?

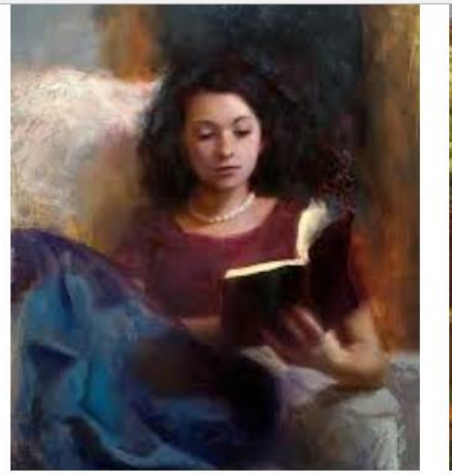
With the emergence of the novel in the early modern era, the risks posed by reading to the state of mind of the reader became a regular source of apprehension. Critics of the novel claimed that its readers risked losing touch with reality and consequently became vulnerable to serious mental illness.



Jean-Jacques Rousseau, writing in his novel Julie (1761), warned that the moment a woman opens a novel – any novel – and 'dares to read but one page', she 'is a fallen girl'.

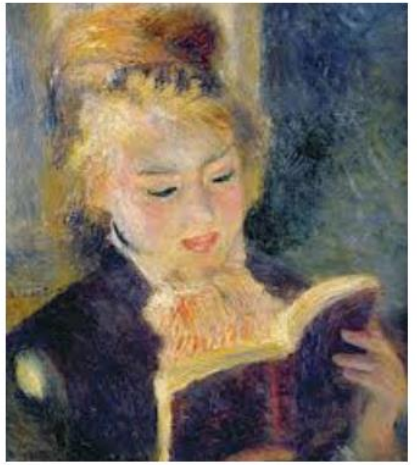
Many Greek and Roman thinkers shared Socrates' concerns. Trigger warnings were issued in the third century BCE by the Greek dramatist Menander, who exclaimed that th very act of reading would have a damaging effect on women. Menander believed that women suffered from strong emotions and weak minds. Therefore he insisted that 'teaching a woman to read and write' was a bad as 'feeding a vile snake on more poison' In 65 CE, the Roman stoic philosopher Seneca advised that the 'reading of many books is a distraction' that leaves the reader 'disoriented and weak'. For Seneca the problem was not the content of a specific text but the unpredictable psychological effects of unrestrained reading. 'Be careful,' he warned, 'lest this reading of many author and books of every sort may tend to make you discursive and unsteady.'


3182 × 4000 - en.wikipedia.org










Conclusion

- Media panics are not a new phenomenon.
- Technology can empower, but it can have negative effects too.
- Biggest concern – the asymmetry in having access to data to personalize persuasion. Google and Facebook have all the data about users, users have no data about Google and Facebook to counter-persuade…
- There are platforms allowing to reduce the information asymmetry: distributed ledgers! But will giant tech companies voluntarily adopt them?
- Regulation is needed! Public Education is needed !
- Time to start designing counter persuasion techniques ☺

Medium suggests regulation and APA taking action (quote) – for researchers:

- *“The APA should begin by demanding that the tech industry’s behavioral manipulation techniques be brought out of the shadows and exposed to the light of public awareness. The APA should follow its Ethical Standards by making strong efforts to correct the misuse of psychological persuasion by the tech industry and by user experience designers outside the field of psychology.*
- *There is more the psychology profession can and should do to protect children and rectify the harm being done to kids. It should join with tech executives who are demanding that persuasive design in kids’ tech products be regulated.*
- *APA must make stronger and bolder efforts to educate parents, schools, and fellow child advocates about the harms of kids’ overuse of digital devices.”*