Persuasive systems design for health

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Outline

• The PSD Model
• What’s up, Doc?
• Lessons learned
• Wrap up
THE PSD MODEL
Persuasive Systems Design Model


Forms of influence

- Persuasion
  - Exchanges of money, goods, or services for actions by the person being influenced
- Inducements
- Coercion
  - Force and possibly economic sanctions
- Deception
  - A pop-up window or a hyperlink may be purposefully deceitful (example)
The PSD Model

- Persuasion Postulates
- Persuasion Context
  - To discern opportune and/or inopportune moments for delivering the message(s)
- Persuasive Features
  - To implement actual SW features

PERSUASION POSTULATES

Step 1: Applies to all PS
1. Information technology is never neutral
2. People like their views about the world to be organized as consistent
3. Persuasion is often incremental
4. Direct and indirect routes are key persuasion strategies
5. Persuasive systems should be both useful and easy to use
6. Persuasion through persuasive systems must always be unobtrusive to a user’s primary tasks
7. Persuasion through persuasive systems should always be transparent
After understanding the postulates

PERSUASION CONTEXT

Persuasion context: The intent

- The intended Outcome/Change
  - O/C Design Matrix

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<thead>
<tr>
<th>O/C DESIGN MATRIX</th>
<th>C-Change</th>
<th>B-Change</th>
<th>A-Change</th>
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<td>F-Outcome</td>
<td>Forming an act of complying (F/C)</td>
<td>Forming a behavior (F/B)</td>
<td>Forming an attitude (F/A)</td>
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<td>A-Outcome</td>
<td>Altering an act of complying (A/C)</td>
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Persuasion context:
The event

• Use context
  – Problem domain dependent features
  – User(s) in situ

• User context
  – User dependent features
  – User’s life situation

• Technology context
  – Technology dependent features

Persuasion context:
The strategy

• Persuader
  – Endogenous, exogenous, autogenous

• Message
  – One or multiple arguments and what kinds of arguments

• Route
  – Direct vs. indirect route (or perhaps both)

• Designer bias
  – Often the empirical and/or experimental research does not reveal much about the motives behind the system under study
PERSUASIVE FEATURES


Persuasive SW features

Categories

- Primary task support
- Dialogue support
- Perceived credibility
- Social influence

Features

- The goal is not to implement all features
- Choosing the right features

Most of the features adopted from Fogg (2003)
The applicability of the PSD model

- Design, development and evaluation of apps
  - Note: Even SW specifications
- Comparative evaluations of applications
  - From research prototypes to full-fledged commercial apps
- Research model
  - Field studies, experiments, surveys
  - Case studies
- Systematic (and other types of) literature reviews

WHAT’S UP, DOC?
Health BC
What’s up, Doc?

Tech support for BC

• Behavior Change Support Systems
Need for persuasive design

- Design issues deserve more attention, as they have real implications.
- If the systems are not designed properly, the persuasive potential is not fulfilled.
- Previous research
  - persuasive system design has a significant impact on adherence
  - in boosting effective user engagement, and
  - keeping the users motivated in their endeavors.

CONDUCTED RESEARCH
My, my team’s, with my research collabs
Adopting a healthier lifestyle

- Physical activity
- Eating behavior
- Sleep patterns
- Mental health
- Stress level
- Link with clinical applications
- Sensors and SW architectures
- Ethical and societal aspects

Physical activity

Eating behavior (incl. drinking, smoking)


Sleep patterns

Mental health


Stress level

Link with clinical systems


Sensors and SW architectures

Ethical and societal aspects


LESSONS LEARNED
Reviews, experiments, studies, surveys
Mobile apps for wellbeing: SOCI

- Mostly to share information through Facebook, Twitter, blogs, discussion forums
- Note: Social support found minimal (sic)

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Mobile apps for wellbeing: CRED

- Credibility support low (even if some features found)
- Note: Weak implementations

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Mobile apps for wellbeing: DIAL

- Reminders the most common feature
- Note: Dialogue support surprisingly little utilized


Mobile apps for wellbeing: PRIM

- Self-monitoring, reduction, personalization most commonly utilized
- Note: Tailoring wasn’t used in any of the evaluated applications

Adoption and use continuance of health coaching


- Objective
  - Consumer perceptions of Virtual Health Check and Coaching
  - Non-clinical web-based system for personal lifestyle and health management
- Limitation
  - No measurement whether actual behavior change took place though the virtual health coaching
- Data
  - N=130 virtual check; N=91 adopted coaching
Adoption and use continuance of health coaching


• PRIM: Negative feedback for the general and non-tailored health-related advice
  – Multiple non-interoperable applications in use
  – Inputting the same data into several locations diminishes primary task support
• System has to fit into the regular daily lives of the users
  – Cf. Unobtrusiveness Postulate
• Unpredictable events
  – Illness of the user
  – Also adapting to more mundane events such as a holiday season or a long work trip

Adoption and use continuance of health coaching


• DIAL: request for reminders to keep motivated
  – May be strengthened, e.g. virtual rewards
• CRED: Credibility assessments rather positive
  – Institution-based trust

[SOCI: No social support in this app.]
Adoption and use continuance of health coaching


• Perceived usefulness (value-for-user) important
  – Some respondents did not see the point of continuing using the virtual coaching system

• Tech is not the solution for everything
  – Technostress, fatigue, and social overload
  – Enjoyment, fun
  – Technology-related addictions

Adoption and use continuance of health coaching

Use continuance intention and perceived effectiveness

- Theory-driven effort to empirically explain and predict users’ continuance intention towards a BCSS for weight loss
- N = 314
- Structural Equation Modelling


Feature categories…

Note. All paths p<0.01; DIAL=Dialogue support; SOID=Social identification; SOCS=Social support; PRIM=Primary task support; CRED=Perceived credibility; EFFO=Perceived effort; EFFE=Perceived effectiveness; CONT=Continuance intention

... and perceived effectiveness


... and use continuance intention

Treating Depression Through a BCSS Without Face-to-Face Therapy

- People suffering from depressive symptoms
- Web-based acceptance and commitment therapy (ACT)
- No face-to-face contact
- Participants (N = 39)
- Randomly assigned to an HBCSS or a waiting list control condition
- The program comprised home assignments, online feedback given by master's-level students of psychology over a 7-week intervention period, and automated email-based reminders


Study setting

- Standardized self-reporting measures
  - Beck Depression Inventory [BDI-II],
  - Symptom Checklist–90 [SCL-90],
  - Acceptance and Action Questionnaire [AAQ-2],
  - Five Facet Mindfulness Questionnaire [FFMQ],
  - Automatic Thoughts Questionnaire [ATQ], and
  - White Bear Suppression Inventory [WBSI]
- Pre- and post-measurement
- Long-term effects examined via 12-month follow-up


Results

• Significant effects in favor of the HBCSS group on depression symptomatology
• The treatment effects in the HBCSS group were maintained over the 12-month follow-up period
• The HBCSS participants stated that they would be happy to recommend the same intervention to others with depressive symptoms


Reminders and rehearsal

• Two groups; Both rehearsed target behavior virtually; However, only one group received e-mail reminders
• Mixed-method approach was used for analysis
• Data collection was performed with semi-structured self-reported questionnaires and post-study interviews
• Results
  – The severity of depression was noticeably decreased and participants’ self-confidence to manage depressive thoughts was generally increased through R&R
  – The effect of reminders for task completion was less than anticipated (when the participants felt that virtual rehearsal was an effective technique for learning new behaviors)

WRAP UP
Future of persuasive systems design

Humanized tech

Being part of our everyday lives opens up tremendous opportunities for influencing people’s behaviors

*The role of persuasive systems design will only keep growing*