

UNIVERSITY OF TWENTE.



The Fifth International Conference on eHealth,  
Telemedicine, and Social Medicine

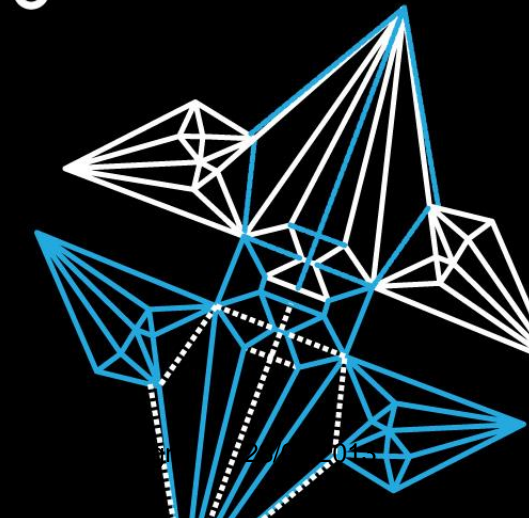
eTELEMED 2013

February 24 - March 1, 2013 - Nice, France

# Unlocking the black box: how technology can make eHealth interventions more persuasive and productive

Lisette Van Gemert-Pijnen

25-02-2013





Center for eHealth  
Research and  
Disease management

to intensify cooperation with (inter)national  
research centres and healthcare institutes

to contribute to the solution of global health  
problems, like ageing and chronic care, via  
persuasive designs and business modelling

multidisciplinary development & implementation  
approach (social sciences & technology)

<http://ehealthresearchcenter.org>

# Outline Presentation

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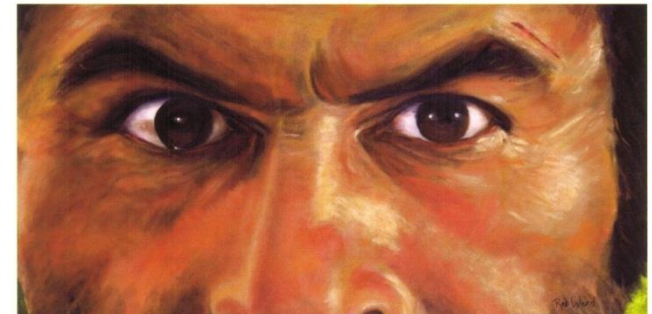
- eHealth: the Good, the Bad and the Ugly
- The Black Box phenomenon
- Unlocking the Black Box
- Holistic Approach
- Persuasive Technology
- Productive Technology
- Comprehensive evaluations Uptake&Impact



The Good



The Bad



The Ugly

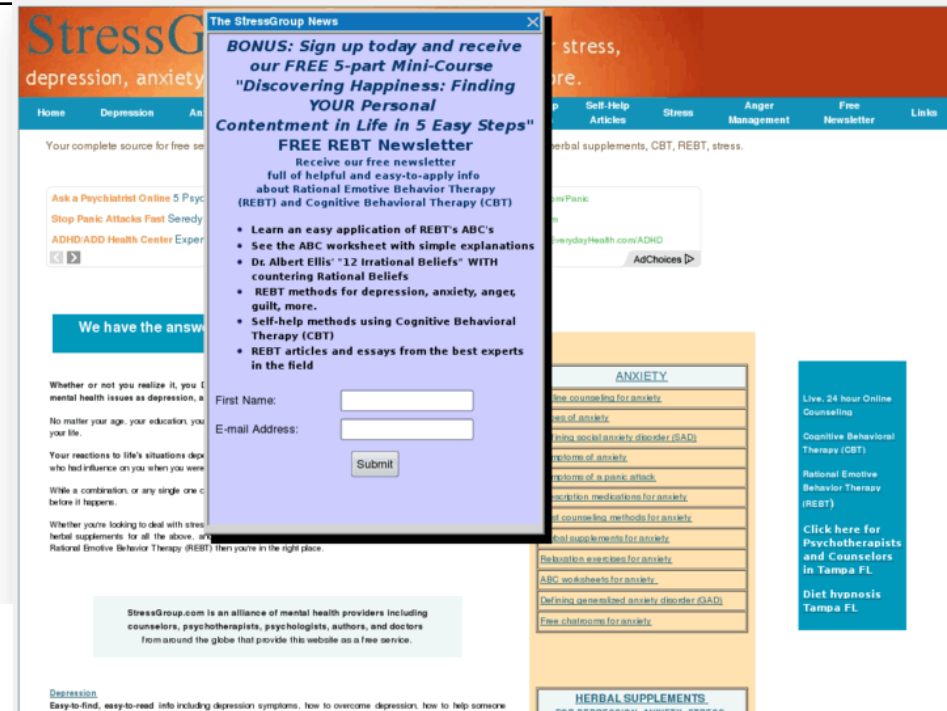
# Bad Technology; low uptake, low impact Weight LossTech

Look and feel of a self-help book  
Women-driven  
Not-interactive  
Low uptake  
High drop-out





# Tsunami of Happy Feeling & Well-being Tech high drop out, low impact



Preacher-Technology

Text Driven

Fixed program

Diaries and Lessons

Cognitive Focus



# Lower impact than expected

## Overestimation of self-tracking

The screenshot shows the FoodSmart Daily Calorie & Fat Calculator interface. On the left is a navigation menu with options like 'Introduction', 'What You Eat', and 'Daily Calorie & Fat Calculator'. The main area features a large digital scale graphic where users input their activity level, gender, age, height, and weight. The calculator displays the following results: BMI 19, Fat (g) 64, SatFat (g) 21, and Calories 1926. A 'Calculate' button is visible. Below the scale, a BMI scale from 15 to 34+ is shown, with 'Underweight' (15-19), 'Healthy Range' (20-24), 'Overweight' (25-29), and 'Obese' (30-34+). A message at the bottom states: 'Your data indicate that your BMI may be in the underweight range for your height and weight.' The interface also includes a 'LOG OUT' button and a 'CONTACT US' button.

The screenshot shows the header of The Economist website. The logo 'The Economist' is in a red box on the left. To the right are links for 'Log in', 'Register', and 'Subscribe'. Further right, it says 'Digital & mobile'. Below the header is a navigation bar with categories: 'World politics', 'Business & finance', 'Economics', 'Science & technology', 'Culture', and 'Blogs'.

Technology Quarterly: Q1 2012 ▾

### The quantified self

## Counting every moment

Technology and health: Measuring your everyday activities can help improve your quality of life, according to aficionados of "self-tracking"

Mar 3rd 2012 | from the print edition

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THE idea of measuring things to chart progress towards a goal is commonplace in large organisations. Governments tot up trade figures, hospital waiting times and exam results; companies measure their turnover, profits and inventory. But the use of metrics by individuals is rather less widespread, with the notable exceptions of people who are trying to lose weight or improve their fitness. Most people do not routinely record their moods, sleeping patterns or activity levels, track how much alcohol or caffeine they drink or chart how often they walk the dog.

But some people are doing just these things. They are an eclectic mix of early





# No diversity



# High educated , **conscientious** women



# Low added value Tech eConsult Medisch A-Z



Blaasonsteking?  
Misschien helpt dit



Fit uit het  
vliegtuig  
Doe aan flight-  
fitness



Slaap beter...  
en onthoud meer



[Informatiefolders](#)

[Medicijnen](#)

[Medische begrippen](#)

[Reisadvies](#)

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U bevindt zich hier: Medisch A-Z / Digitaal Consult

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Meld je hier aan en ontvang gratis iedere week



**ill-driven**

**no profit for client**

**Inadequate business model**

**log-in ID password**

**Identify your complaint on the virtual body**





# Tsunami of ePortals & ePlatforms

**Lower Uptake than expected;  
Low Adherence**

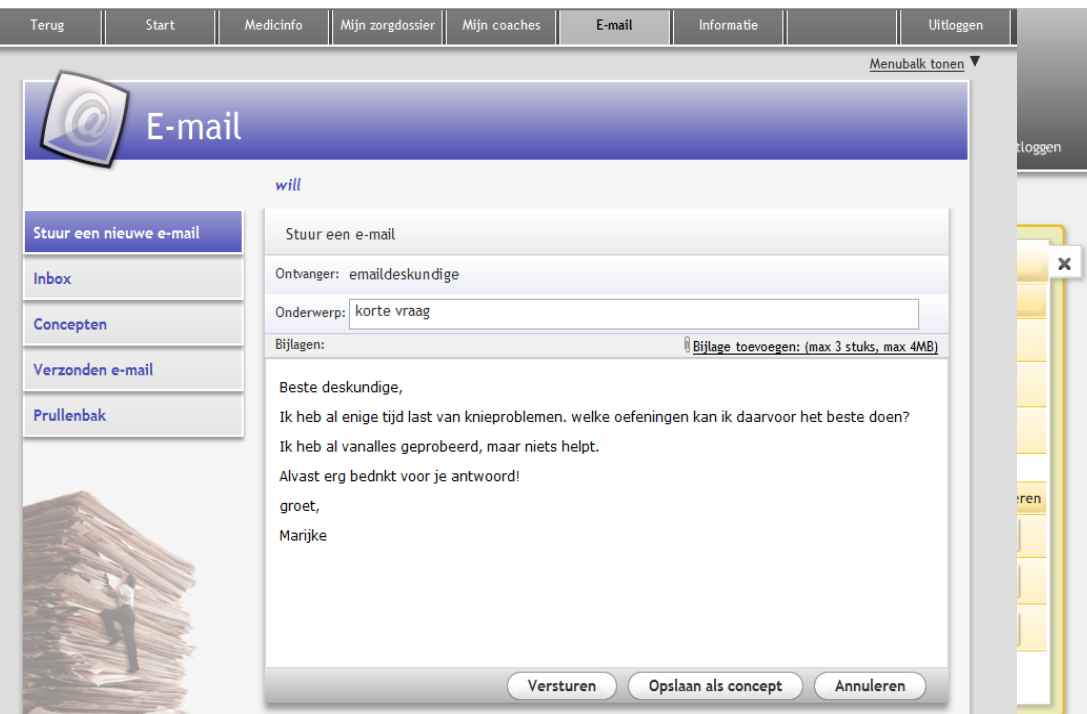
**Information-overload**

**No incentives for usage**

**Not sexy**

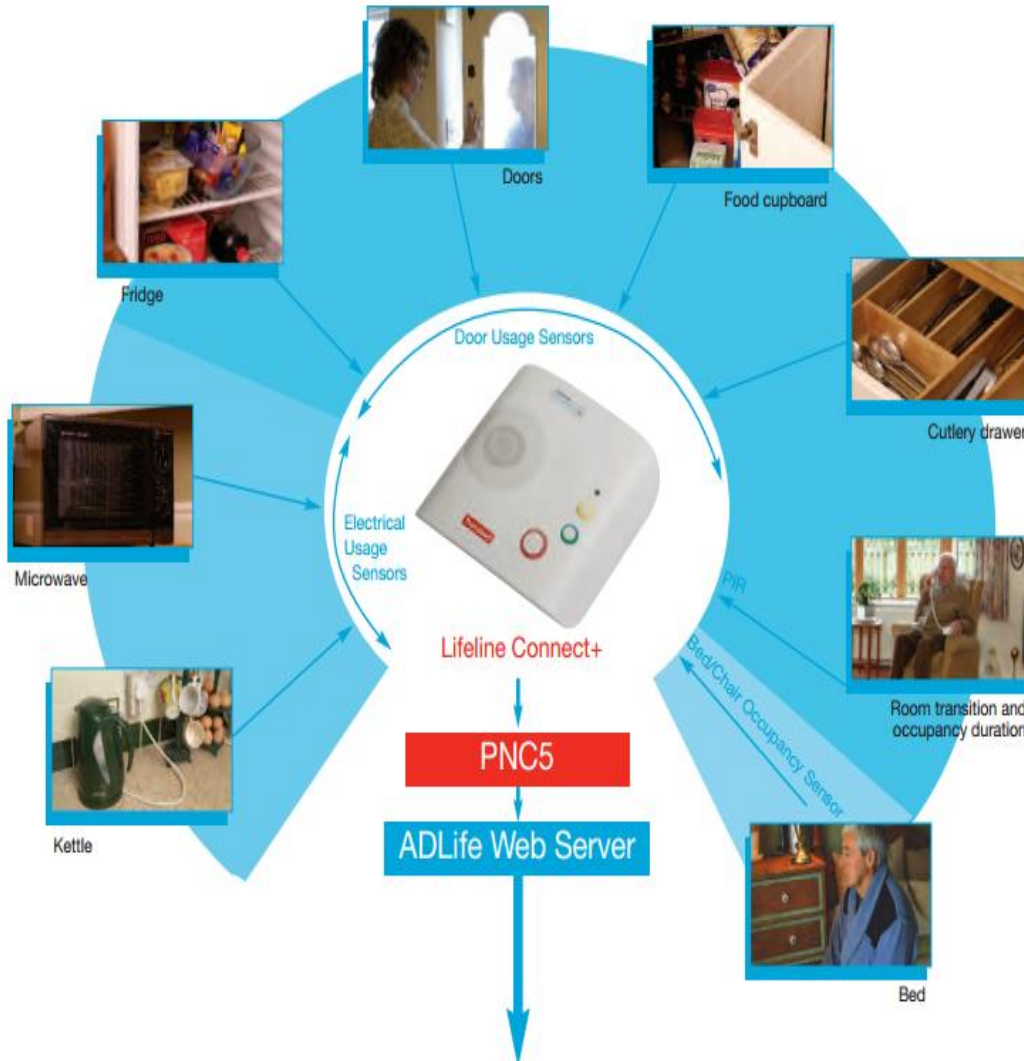
**Data management challenge**

**Interoperability and inter-  
usability problems**



# Ugly Tech Tech for Frail People

Engineering Driven  
Not Human centered



**ADL support**  
**Sleep/Wake support**

# Data make no sense for HCWs

Activity	19-03-2012	last 7 days	last 28 days
<i>i</i> PIR Slaapkamer	30.0	19.0	21.8
<i>i</i> Bedmat	21.0	12.7	16.4
<i>i</i> Senseo Koffiezetapparaat	27.0	14.3	14.6
<i>i</i> PIR Badkamer	30.0	17.0	22.3
<i>i</i> Voordeur	10.0	4.4	5.6
<i>i</i> Achterdeur	0.0	0.0	0.0
<i>i</i> Toiletdeur	39.0	18.0	26.1
<i>i</i> Stoelmat	16.0	12.9	17.0
<i>i</i> PIR Kamer	30.0	17.9	24.5

Traffic light system:

**Red** (danger)

**Yellow** (slightly danger)

**Green** (no danger)

- for every specific sensor -





Authorised User/Care Provider can login to view the ADL data using the ADLife website



7 day summary for kettle usage

Activity summary for 11, Beverley Road (Unit: 002002)

Note: Resident has been away since 09:02, 12/02/2008  
Note: Data range contains periods when the resident was away.

Activity	13-02-2008	last 7 days	last 28 days
Master Bedroom visits	3.0	4.1	4.7
Kettle usage	8.0	7.7	5.5
TV usage	5.0	4.6	4.3
Main Bathroom visits	8.0	12.6	13.2
Toaster usage	1.0	1.5	1.4
Kitchen visits	8.0	11.9	12.7
Back door usage	8.0	8.9	2.4
Front door usage	14.0	14.3	14.2
Living Room bed chair usage	20.0	22.9	13.0
Living Room visits	1.0	3.7	9.6
Other door(s) usage	8.0	2.7	3.9
Hall visits	7.0	14.7	26.6

Click on any number for more information • usage data for full time range  
Compare to average from:

Activity summary screen clearly shows the traffic light system



28 day summary screen for kitchen visits

Amend Snapshot email alert settings for 11, Beverley Road (Unit: 002002)

Alert frequency:

Alert destination 1:

Alert destination 2:

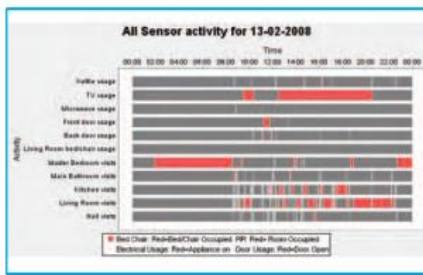
Alert destination 3:

Alert destination 4:

Alert destination 5:

Prevent email delivery if away:

Email Alert setup screen



Screen showing all sensor activity for one specific day

# Uptake problems

- Technical interruptions
  - ✓ No data received (server)
  - ✓ Overload phone line
  - ✓ Sensor too sensitive
- Data hard to understand due to unclear interface
  - ✓ The presentation of data (graphs) was hard to read
- Data hard to interpret due to technical calibration (safety industry)
  - ✓ The value of data was disputable, activity patterns (deviations) are not traceable to medical evidence, standards, treatment programs

**Ugly Tech**  
**No Impact**

**Industrial Driven**  
**Top down Initiative**  
**Not well thought concept**

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**Electronic Patient Record (EPD), 1994- ?**

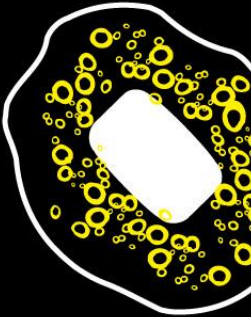
# eHealth, a struggle ..

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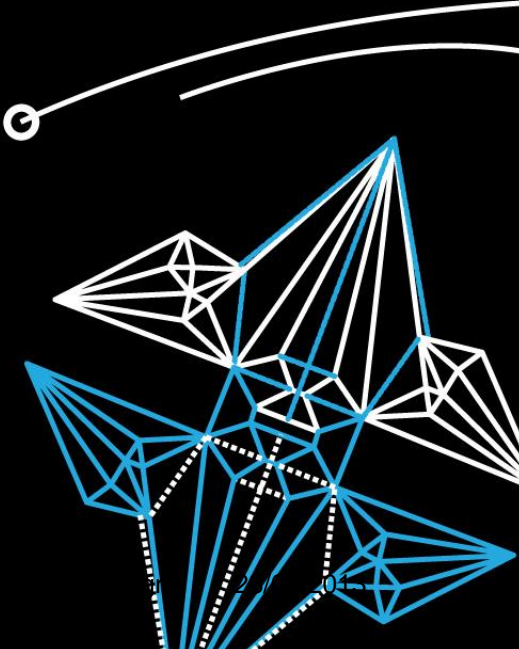
- A tsunami of failed products
- Lack of long-term effects
- Rock Solid Healthcare
- Inadequate business models
- How to survive?





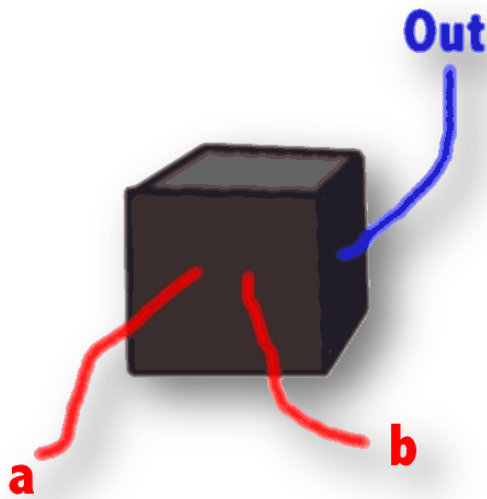


# Black Box Phenomenon



# Does IT work? Can IT help? Is IT productive? For whom?

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## Black Box phenomenon

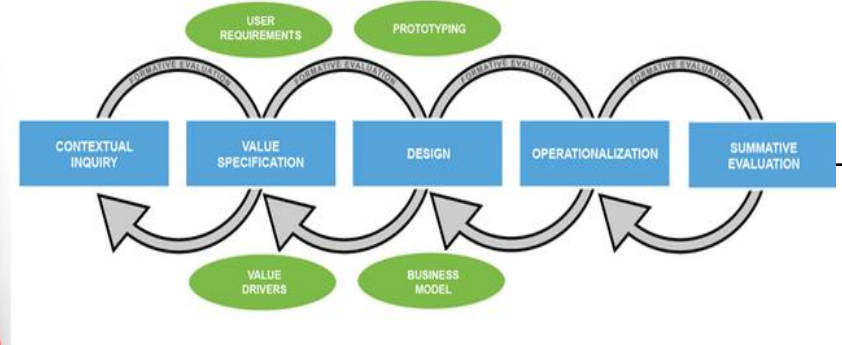
# Black box phenomenon

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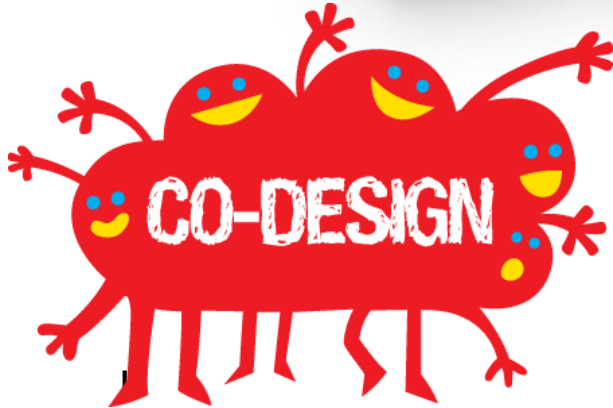
- Technology developed in an ad-hoc manner
- Technology considered as a by-product
- Technology not articulated in research-designs
- No smart data collection
- No comprehensive evaluations







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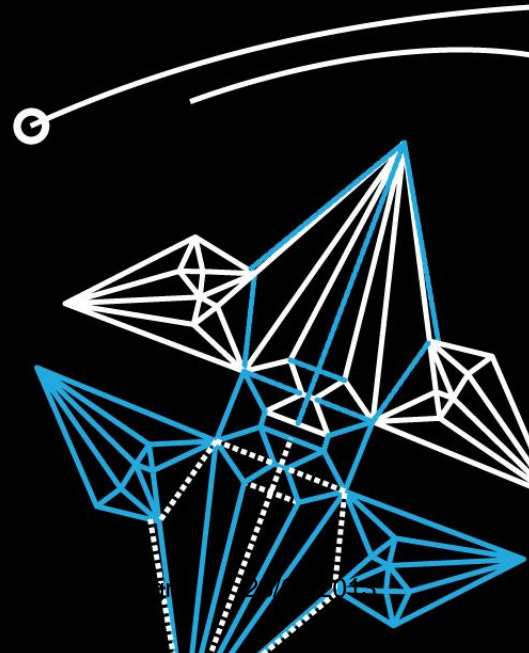
Helping your patients stick to their therapy!



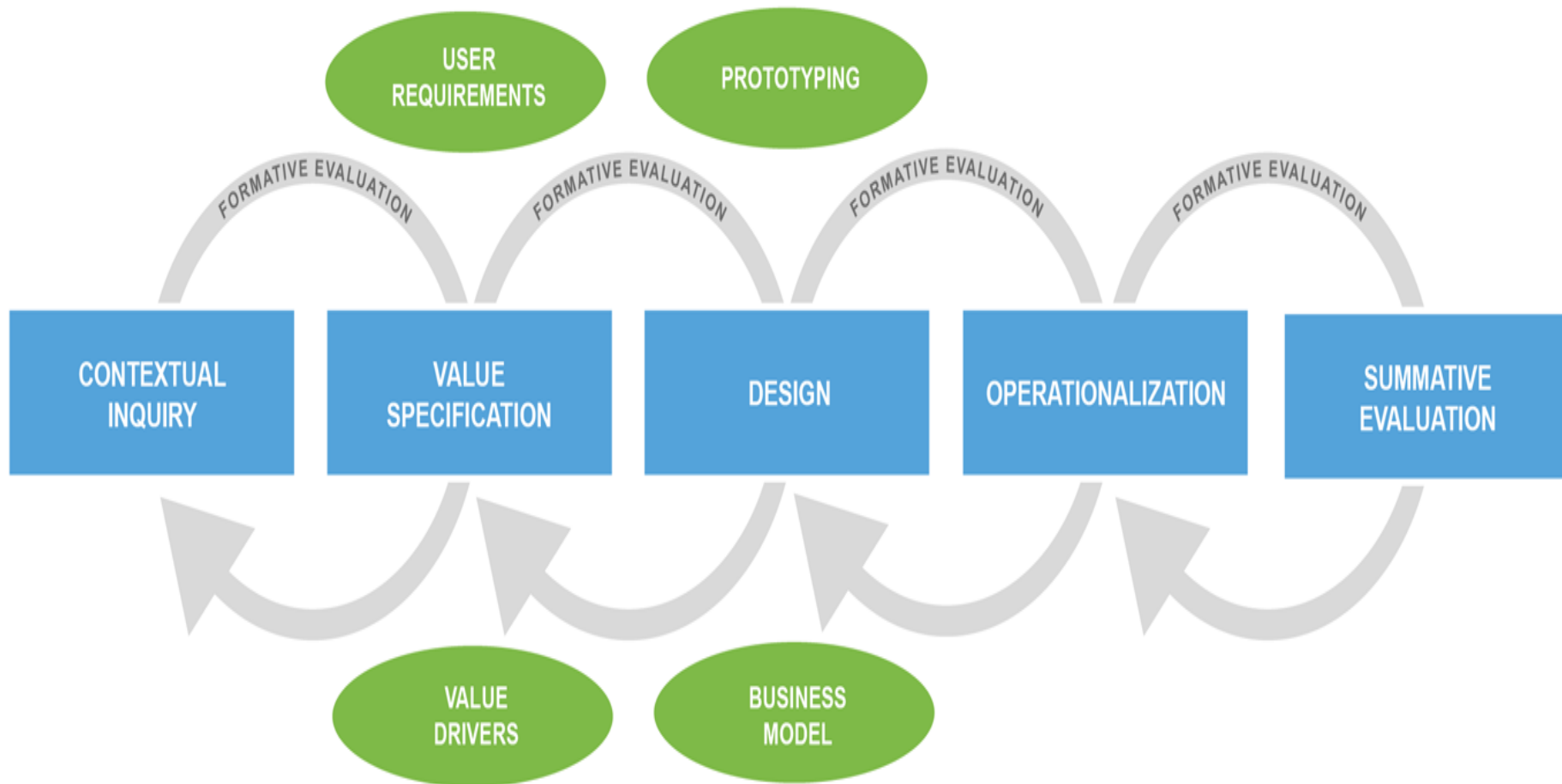
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# Unlocking the Black Box



# Holistic approach eHealth Roadmap



## Good Tech, High Uptake, High Impact

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- Cooperation Designers and Healthcare professionals
- Stakeholder dialogues in early stage of development
- Design for adherence; Persuasive technology
- Co-creation users and designers
- Implementation interwoven with development
- Comprehensive evaluation; smart data collection; robust methods



# Stakeholder dialogues

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- An early-stage-development debate among stakeholders is a prerequisite to determine the added values for implementation.
- It's the “preservatives” — the incumbent healthcare players. That is, the preservatives are trying to protect the status quo, rather than focusing on how to sincerely address the *Triple Aim (improve outcomes, reduce cost, improve patient experience)*. In every healthcare organization I've talked with, whether they are a provider, pharma, or health plan, there are transformers internally who know what to do but are stymied by preservatives. Forbes, Healthcare's Trillion-Dollar Disruption 1/17/20

# Values medical models & Tech

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“

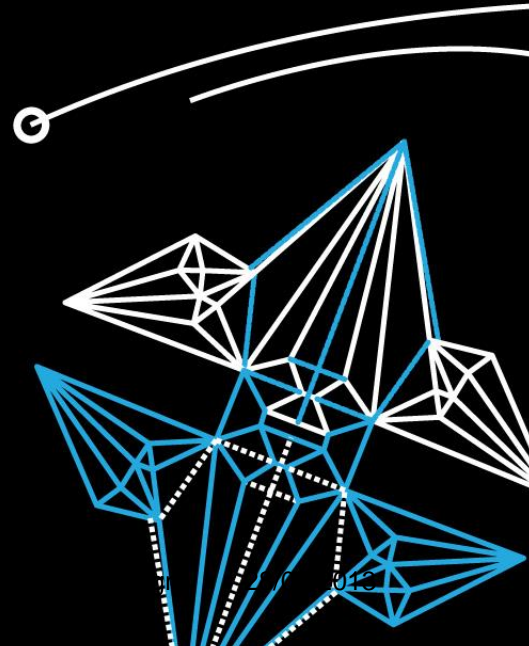
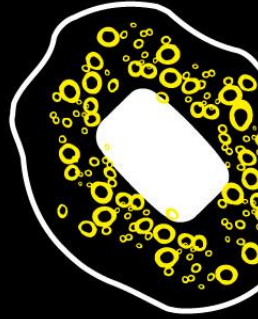
The current system is stuck on fee-for-service, and it's a barrier to a better healthcare model. But I think we're at a historic time, with a growing consensus that it's time to move away from fee-for-service. Once freed from that tyranny, creativity is unlocked. ”

George Halvorson  
chairman and CEO  
of Kaiser Permanente

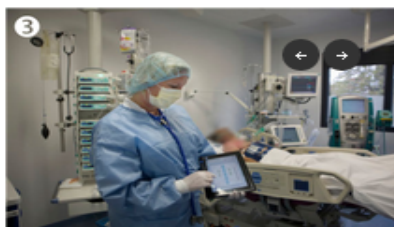
- Patient centred care
- Consumer engagement
- Prevention models
- Population-Health-management models
- Smart Homes
- Just in time and Personalized care
- *Nudging healthier lifestyle via persuasive technology*
- .....

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# Nudging lifestyles via Persuasive Technology Designs



Click on an image below to see enlargements and captions



### Background

Persuasive eHealth Technology is initially created to influence or change the health and well-being of people via persuasive e-designs. Persuasive Designs include techniques that aim to facilitate attitudinal and behavioural change on a voluntary base. They result from a holistic development approach of eHealth technologies (CeHRes Roadmap). In this approach, a social science perspective on the role of technology in health and health care is empirically developed. Persuasive eHealth technology development transcends an instrumental approach to designing a technical product, a service or a stand-alone device. We recognise the social dynamics and significance of eHealth technologies and their potential for improving health care. Therefore, the central position of the people involved and the values they pursue are consequently accounted for.

### Goals

- *Persuasive designs.* The focus is on the development of persuasive design techniques to increase adherence and reduce costs for people with complex health care or social care needs. Leading questions are the following. How can persuasive design techniques improve the capacities of technology so that they are better attuned to user profiles and usage situations? Which persuasive designs have more benefits than others, and for whom? What are the benefits over time?
- *Business modelling* via continuous participation of stakeholders to create eHealth technologies that have added values and that make sense for different stakeholders. Leading questions are: How to realise the optimal balance between usual care and eCare? What are the critical factors for implementing eHealth and which business models are feasible for sustainable implementation?

### Perspectives

Improving self-management (online persuasive therapies, lifestyle programs, domotica) and supporting patient safety (eDecision aids infection control, prudent use of antibiotics).



#### RESEARCHER(S)

Dr. Lisette van Gemert-Pijnen

#### SUPERVISOR(S)

Prof. dr. Ernst Bohlmeier

#### RESOURCES

Direct funding, third-party funding

#### STATUS

Ongoing

#### PARTNERS

EurSafety Health-net (UMCG, University of Munster), RIVM, Medicinfo, Focus Cura, University of Toronto, Toronto Rehab, University of Waterloo (NIHI, Canada), VU University Amsterdam (Mental Health), University of Utrecht (department of Innovation and Environmental Studies), various hospitals in Germany and the Netherlands, and nursing homes

#### KEYWORDS

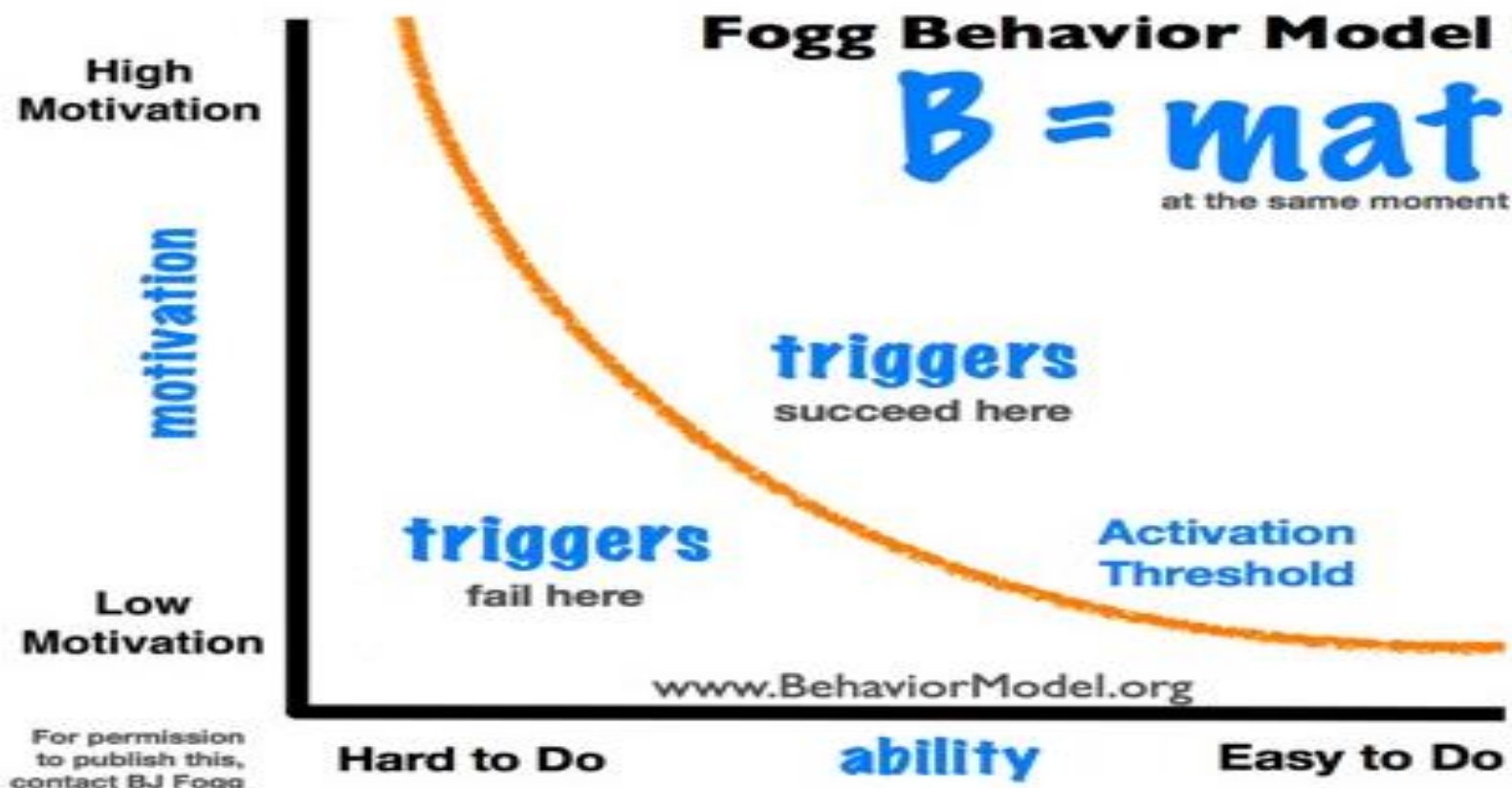
business modelling, eHealth, human-centred design, persuasive design

# BJ Fogg's Behavior Model

Stanford University

## What Causes Behavior Change?

My Behavior Model shows that three elements must converge at the same moment for a behavior to occur: Motivation, Ability, and Trigger. When a behavior does not occur, at least one of those three elements is missing.





## Persuasive system design-model

Primary  
Task  
Support

Reduction, Tunneling,  
Tailoring,  
Personalization, Self-  
monitoring,  
Simulation, Rehearsal

Dialogue  
Support

Praise, Rewards,  
Reminders,  
Suggestion, Similarity,  
Liking, Social role

Credibility  
Support

Trustworthiness,  
Expertise, Surface  
credibility, Real-world  
feel, Authority, Third-  
party, Verifiability

Social  
Support

Social learning, Social  
comparison,  
Normative influence,  
Social facilitation,  
Cooperation,  
Competition,  
Recognition

# Medical Protocols translated into decision aids

## EursafetyHealth-net Platform

### 1 Risicocategorieën

Het risico op de aanwezigheid van MRSA is niet in alle gevallen gelijk. Daarom wordt ten aanzien hiervan een viertal categorieën onderscheiden:

1. bevezen MRSA-dragerschap
2. hoog risico op dragerschap
3. matig verhoogd risico op dragerschap
4. geen verhoogd risico op dragerschap

Bij twijfel worden deskundigen in het ziekenhuis (arts-microbioloog, infectioloog of ziekenhuishygiënist) betrokken bij de indeling in een risicocategorie. Met name het verschil tussen categorie 3 en categorie 4 vereist veelal afweging door deskundigen. Welke groepen van patiënten of medewerkers onder welke risicocategorie vallen, wordt in de onderstaande overzichten 1 en 2 weergegeven.

#### 1.1 Overzicht 1, Patiënten per risicocategorie

##### Categorie 1

- Patiënten bij wie het MRSA-dragerschap is aangetoond.

##### Categorie 2

- Patiënten die minder dan 2 maanden geleden langer dan 24 uur in een buitenlands ziekenhuis werden verpleegd. Patiënten die korter dan 24 uur in een buitenlands ziekenhuis werden verpleegd maar die waren geopereerd, of een drain of katheter kregen of werden geïntubeerd of huidlaesies hebben of mogelijke infectiebronnen zoals abscessen, furunkels en waarbij deze risicofactoren bij opname in een Nederlands ziekenhuis nog aanwezig zijn.
- Buitenlandse patiënten op de dialyse-afdeling (zgn gastdialysanten).
- Patiënten afkomstig uit een ander Nederlands ziekenhuis of verpleeghuis, van een afdeling of unit waar een MRSA-epidemie heerst, die nog niet onder controle is.
- Patiënten die met een onverwachte MRSA-drager op één kamer hebben gelegen.
- Patiënten uit categorie 1 na behandeling voor dragerschap, waarvan de controlekweken nog niet bekend zijn.
- Kinderen die geadopteerd worden, hebben een verhoogde kans op dragerschap, maar screening wordt alleen aanbevolen als deze kinderen een ziekte hebben die maakt dat zij moeten worden opgenomen in het ziekenhuis of dat zij regelmatig de polikliniek moeten bezoeken. Het is van belang om zich in dit kader te realiseren dat MRSA-dragerschap een ziekte op zich is.

Task support; Simple and Smart  
Decision support; reduction of needless info; tailored to tasks HCWS  
Bed side tech; right moment, right format  
Reduces errors, saves time



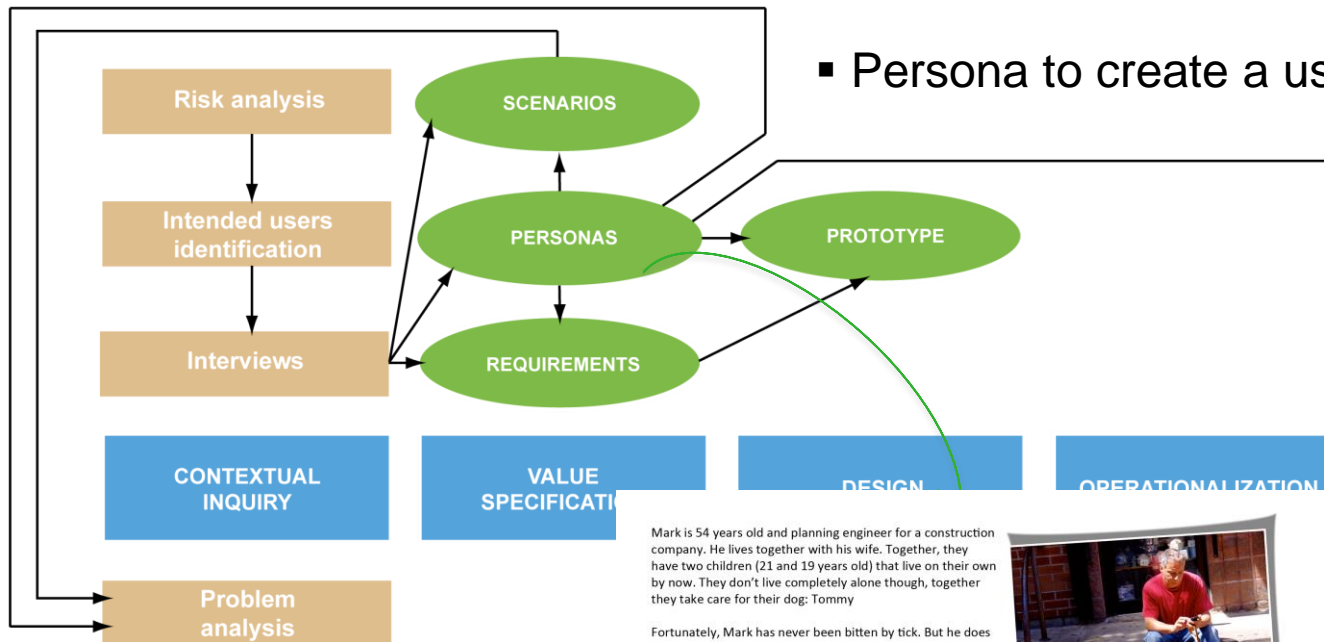
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# Persona for Personalization

## ePublic Health Risk Prevention

- no one-size-fits-all
- Persona to create a userprofile



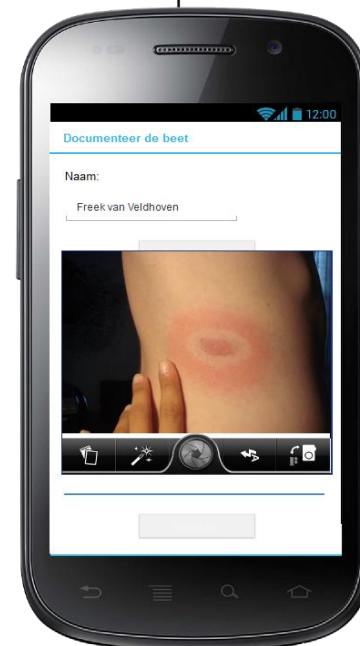
Mark is 54 years old and planning engineer for a construction company. He lives together with his wife. Together, they have two children (21 and 19 years old) that live on their own by now. They don't live completely alone though, together they take care for their dog: Tommy

Fortunately, Mark has never been bitten by tick. But he does know some things about the bug. He knows that it's an insect that bites and sucks your blood. He also knows it can give you Lyme disease. Finally, he thinks that ticks fall down on you from trees, and that if you're bitten you should visit your GP to get the tick removed. Mark has seen ticks before, Tommy takes them home now and again. Then, Mark or his wife remove them with tick pliers.

Mark does not visit nature very often. In the summer he likes to sit in his backyard, and when they go on vacation he and his wife like to make long walks through the forests or the mountains. He does not take preventive measures to prevent a tick bite then. He also doesn't check for tick bites afterwards. It simply does not cross his mind.

His digital skills are perfectly fine, Mark thinks. After all, he thinks it's fun to try out new technology and he has numerous apps on his iPhone 4g. He takes his phone everywhere and never turns it off. Mark will only start to search for information about ticks on the internet or on his iPhone when he notices he's been bitten by a tick. In that case, he will Google first, but will also check out the website of his Local Health Authority.

Photo: ChrisGobINV, used under creative commons license



# Dialogue Support

## PROJECT QUIT: High-Tailored Smoker's Story

Rhonda, as we come to the end of your **Project Quit** guide, we'd like to leave you with some words-of-advice from Deb. Like you, she was ready to quit smoking but faced many challenges. Here's her story.

### Why did you decide to quit?

I had several good reasons for quitting. First, we needed to save money to put towards a car that would actually work. Second, my husband wanted me to. Third, I didn't like leaving the fun when I'd have to stop outside to smoke at places that didn't allow smoking inside. It made me feel like an outcast. Plus, it wasn't really fair to the kids for me to tell them not to smoke while I did. "Do as I say, not as I do" isn't such a great example to set.

### How did you prepare for the change?

I had heard that you have to change what you do and how you think to stop smoking, so I wanted to try something I actually thought I could do to help me quit. So about two weeks before I was going to quit, I began to walk first thing in the morning. I don't normally smoke right before or after exercising, so that helped me delay my first smoke of the day.

### Did you try anything else as your quit day approached?

Yes. I usually smoked about a pack and a half a day, but started cutting a few out each day just to see how I'd do. I'd make a game out of it by trying to drive to work without a cigarette. Then, if I really needed it, I'd have one on the way from the parking lot to the office. I also cut back on going to the bar and parties where I knew there would be a lot of smoking. And I began to skip my "dessert" cigarette before bed.

### Did these things help?

Definitely. By the time I quit, I was walking four mornings a week and beginning to feel better already.

### Did you ask for help?

I told my cousin Jason that I was going to need some help. If I say I'm going to do something, he doesn't cut me much slack until I do it, which is exactly what I needed. We spent a lot of time at the movies, sitting in non-smoking sections of restaurants, and hanging out in other places that wouldn't tempt me. Of course, all really needed to do was taking one good look at my kids to make me feel good about my decision.



### Tailoring Variables Used:

- + Stage of Change
- + Name
- + Age
- + Gender
- + Ethnicity
- + Marital status
- + Smoking status of spouse
- + Child in home
- + Physically active
- + # of cigs smoked
- + Job status
- + Barrier
- + Social Support



Praise  
Rewards  
Reminders  
Suggestion  
Similarity  
Liking  
Social role

# Social Support

Social learning

Social comparison

Normative influence

Social facilitation

Cooperation






Competition

Recognition



Comments

## Team Members

-  **Megan S.**  
★ 3466 pts
-  **Elaine P.**  
★ 3346 pts
-  **Tobias Y.**  
★ 3103 pts
-  **Tina B.**  
★ 2997 pts
-  **Paula D.**

## Healthy Hearts

★ 17477 pts 🏆 1st place 👤 Members of Keas

"Healthy Hearts Rule!"

Share:  Status  Photo

What's new with you?



**Elaine P.**

It's official. We won! Woo-hoo! Great job, team. Check out the challenge page, there's a link to the winner's page. Just a mere 44 points between us and 2nd place. Where should we go eat to celebrate??

27 days ago • Like • Comment

 **Richard O., Megan S., and 2 others** like this



**Megan S.**

Many congratulations to everybody .... yay !!!

27 days ago

Write a comment...



**Tina B.**



# Persuasion, no manipulations or coercion



Master persuaders

# Impact: Persuasive system design does matter

Systematic review of **adherence** to web-based interventions

(Kelders, Kok, Ossebaard, Van Gemert-Pijnen, JMIR, 2012)

---

- We included 101 articles on 83 interventions.
- 19 chronic condition; 16 lifestyle behavior; 48 mental health

**55% variance explained:**

***Significant predictors:***

**more frequent intended usage,**

**more frequent updates content**

**more frequent interaction with a counselor**

**more extensive employment of *dialogue support***

**interventions studied with a RCT-design (instead of an observational study),**

Block wise enter: 1 context, study design, 2 interaction mode, **3 system&content&interaction mode, RCT, 4 PSD**

# Conclusion Review

---

- Persuasive design does matter!!
  - DS sign predictor
  - SS trend towards sign
  - PTS not at all sign => more related to effectiveness?
- System&Content&Interaction matter
  - update, dose, duration, intended usage, interaction mode
- Methodology
  - Practical way to assess adherence objectively and comparably
  - Predictive model to compare web-based interventions

# Omgaan met emoties

eMental Health

Een ontdekkingsreis naar de balans tussen leed en geluk

## Impact Persuasive Features

Cockpit  
Les

Welkom Test1, je hebt de lesstof van de hele cursus afgerond!

[uitloggen](#)

▼ Mijn motto [Meer...](#)

▼ Feedback (9)

Automated vs  
Human Support

Coach

Personalization

▲ Mijn waarden

Sms berichten (27)

Reminders

- Zelfstandigheid (dingen zelf en alleen kunnen)
- Plezier
- Logica (rationeel doordenken)

▼ Dagboek

Self-monitoring

▼ Ervaringen van anderen [meer...](#)

Social learning

▼ Mijn top 5

Social facilitation

▼ Lessen

Tunneling

▼ Gemaakte oefeningen [Meer...](#)

Fractional factorial design;  
effects individual factors,  
what matters most...

# Dialogue Support

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- **It can be concluded that *support* is important in computer-based treatments for depression. This supports the wisdom that a *blended approach* is preferable, the more successful programs usually incorporate *some therapist/human support, whether that is online, or by phone, or in person.*”**

**Richards & Richardson (2012)  
Computer-based psychological  
treatments for depression: A systematic  
review and meta-analysis**



# Experiment: Interaction support (living to the full)

Interaction support

automated support vs  
human support

Outcomes  
CES-D  
HADS-A

Baseline/post/follow up

Feedback

Beste Saskia,

Je hebt het einde van de cursus bereikt dat je ook de laatste oefeningen hebt gedaan.

Voluit leven vraagt blijvende aandacht, zult vroeger of later terugvallen op de agenda van controle en vermijding. Tijd te nemen en na te gaan waartegen wijze je de strijd met psychisch leed het opmaakt en met mildheid overgaat op de acceptatie, lig je weer op koers.

Je eigen levensfilosofie kan het je makkelijke waard te maken. Het is belangrijk keuzes consequenties met zich meebrengend geleerd waar Voluit leven voor staat: te leven is ervoor gaan. We zijn somber, ge we doen intussen toch wat we belangrijk. De komende periode zul je zelfstandig Leven. Gebruik de inzichten die je hebt en blijf opmerkzaamheid ontwikkelen de oefeningen te doen. Je kan belangrijke bewaren door deze te selecteren en er te maken, dat je vervolgens kunt uitprinten.

Hartelijk dank voor je deelname en je in blijvend waardevol leven!

Groet,  
Jeroen Schnitzler

Welkom Saskia, je hebt de lesstof van de hele cursus afgerond!

Mijn motto Meer...

Mijn waarden

- Eerlijkheid (waarheidsgetrouw, oprecht)
- Zelfwaardering (zelfrespect)
- X

Mijn top 5

Lessen

Week 1 - Wat wil ik met het leven? bekijk  
Week 2 - Ik ben er (even) niet bekijk  
Week 3 - Gebruik niet je verstand bekijk  
Week 4 - Halo onzekerheid: welkom bekijk  
Week 5 - De proefballonnetjes van het verstand bekijk

Feedback (1) Meer...

Feedback week 9

Sms Coach

De sms Coach stuurt u drie keer per week een sms.

De smsjes helpen je om nog beter Voluit te Leven.

Op dit moment staat jouw Sms Coach aan op telefoonnummer: 0612345678

NB. Aan deze service zijn geen kosten verbonden.

aanmelden | afmelden

gevens

In de afgelopen week heb je geoefend met de bodyscan. Schrijf hieronder een paar ervaringen op.

x

Voor deze oefening is het nodig dat je de luidsprekers van de computer aanzet. Let ook op dat het volume ervan goed staat.

Observeren van de ademhaling

volume voortgang

Wil je de mindfulness op je mp3-speler beluisteren, dan kan dat ook door hier met rechter muisknop te klikken en het mp3-bestand te downloaden door op 'Doel opslaan als' te klikken.

NB. In sommige browsers staat in plaats van 'Doel opslaan als' iets anders zoals: 'koppeling opslaan', 'link opslaan' of 'download gekoppeld bestand'.

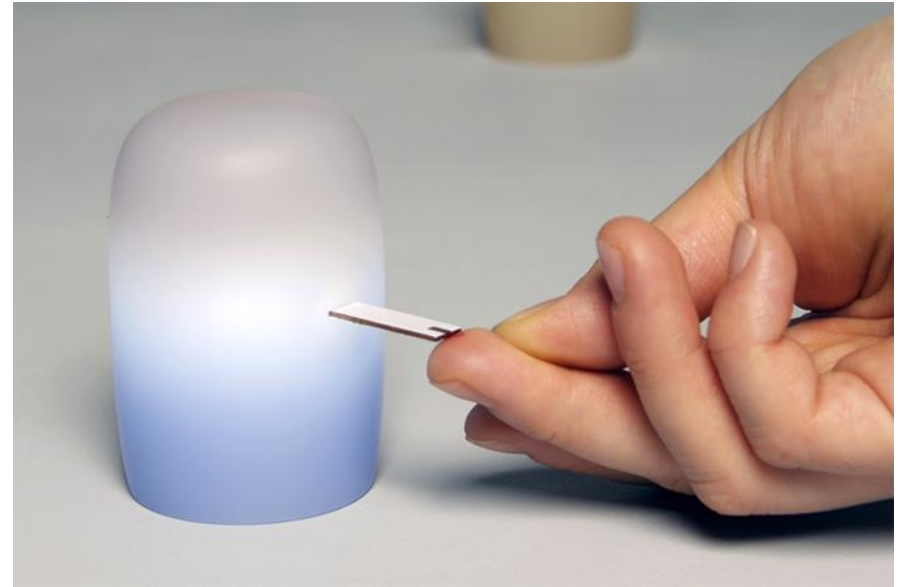
# Automated vs Human support

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- Reduction in depression and anxiety CES-D;HADS-A (post/follow up)
  - Resp. with *human support* improved more *during* intervention; improvement stagnated between post-followup-time
  - Resp. with *automated support* showed less improvement during intervention, *improvement carried on* between post-followup time
- Automated vs Human support no difference in adherence, effect (follow up)

# Design for experience; different cues; what matters?

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**Mickael Boulay**

# Slow Tech: An Idea Whose Time Has Come

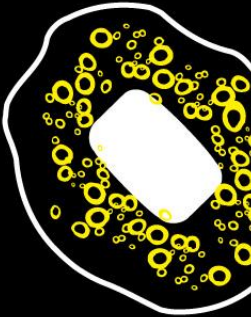
## Design for experience

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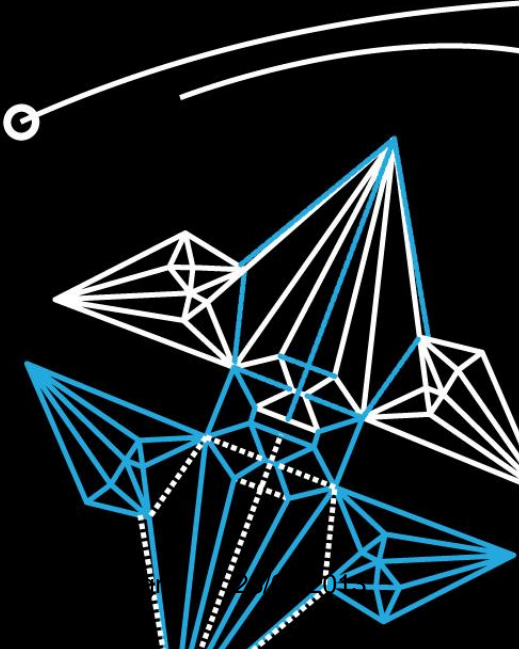
- More and more people report feeling overwhelmed by the omnipresence of online activities and the expectation to be constantly accessible. It's wreaking havoc on schedules, ruining a full night's sleep and disrupting relationships.
- "slow tech" movement is gaining momentum, pushing people to rethink how we approach technology from the ground-up. Instead of being obsessed with an overarching drive towards efficiency in our technology, slow tech thinkers advocate a more livable, mindful relationship between consumers and devices.

- MOBILEEDIA, JULY 19, 2012





# Productive Technology





# Activity pattern web-based Mental health- depression 12 weeks treatment (intended usage 3 times a week)

L	840	8	2	3	2	2	4	5	1	2	1	0	0	0	7	22
L	1027	8	1	3	1	2	1	0	1	1	3	0	1	0	7	14
I	794	2	2	1	1	1	1	0	1	1	0	0	0	4	8	
I	819	2	1	0	1	1	1	2	0	0	2	0	1	9	9	
I	835	2	1	1	1	0	1	0	0	0	0	0	2	5	8	
I	913	2	1	1	0	1	1	1	0	1	0	1	0	6	7	
I	918	2	1	0	1	1	3	1	0	0	0	0	0	4	7	
I	1014	2	3	2	3	3	1	1	0	0	0	0	0	5	13	
I	1030	2	1	1	0	1	2	1	1	0	0	0	1	5	9	
I	1075	2	2	0	2	1	3	1	0	0	0	0	0	5	9	
I	1122	2	1	1	1	0	1	0	0	0	0	0	0	3	4	
I	1126	2	2	3	3	3	3	3	0	0	0	0	0	4	11	
I	813	3	1	1	0	0	0	1	1	2	2	1	1	5	10	
I	853	3	1	2	3	2	0	3	1	1	0	0	1	6	14	
I	1159	7	1	1	1	1	1	1	1	1	1	1	1	7	10	
I	1178	8	1	1	1	1	1	1	1	1	1	1	1	9	8	
I	799	2	1	0	0	0	0	0	1	0	0	0	0	5	4	
I	841	4	1	1	2	0	2	0	1	0	0	1	0	9	9	
I	949	4	2	2	2	2	4	1	1	0	0	0	1	6	15	
I	1068	4	2	3	0	1	0	0	1	1	0	0	0	4	8	
I	879	5	3	0	1	2	2	0	0	0	0	0	0	4	8	
I	893	5	1	0	3	1	1	1	0	0	0	0	0	3	7	

Imbalance  
content and system

*Drop outs: week 4/5 critical points for persuasion*

# Diabetes eCoach

## logfiles to identify drop outs and usage patterns

Appendix X. Overview of activity patterns in months

Mean number of hits

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
H	1	19	34	11	27	13	10	34	16	9	47	32	29	51	9	10	3	8	4	35	16	12	14	0	0
H	2	8	39	7	1	8	2	8	2	0	45	5	2	2	1	0	20	2	0	2	2	8	0	0	0
H	3	11	50	5	1	20	2	5	15	0	2	2	2	16	0	1	2	7	2	5	3	0	0	0	0
H	4	10	50	9	1	20	5	6	49	3	2	11	44	9	11	0	1	2	12	2	8	0	0	0	0
H	5	81	69	33	1	11	14	0	0	4	7	20	43	1	0	1	2	34	88	5	14	9	0	0	2
H	6	44	43	17	30	10	24	0	5	2	4	2	0	1	1	1	3	0	6	2	0	2	0	0	2
H	11	27	41	3	0	55	8	0	0	4	75	86	52	10	36	29	58	15	26	3	2	13	21	29	0
H	12	13	147	58	34	110	6	0	6	13	4	10	2	0	15	5	12	9	0	19	2	0	21	0	0
H	21	8	36	24	12	35	19	14	20	14	10	24	17	8	20	15	17	13	6	24	15	19	16	21	4
H	24	4	159	257	198	55	47	43	96	37	28	35	23	9	8	32	16	20	24	13	68	0	14	16	6
H	27	61	60	49	9	34	73	70	58	55	34	37	28	42	52	6	17	15	22	13	21	4	0	6	0
H	31	48	27	20	16	31	3	62	61	16	5	3	13	22	3	3	2	0	0	5	0	2	0	0	0
H	44	51	142	104	109	32	43	18	6	56	9	3	15	8	0	6	0	3	3	0	0	8	6	0	0
H	47	34	161	45	9	18	39	27	59	4	15	9	8	7	16	11	7	9	14	0	12	20	0	3	0
H	48	24	22	18	30	32	37	30	10	24	3	0	8	3	7	28	17	6	0	0	3	0	0	0	3
H	49	44	40	12	27	26	16	5	6	13	12	11	9	3	10	3	3	0	13	0	0	11	0	9	3
L	7	33	57	16	6	8	7	0	0	38	0	0	0	1	0	1	2	0	2	2	0	0	0	0	4
L	8	10	27	10	7	7	1	0	0	87	27	0	0	1	6	6	20	2	2	2	0	0	0	0	2
L	9	11	44	6	3	18	5	0	0	3	2	2	0	1	0	1	2	0	2	2	0	0	0	0	2
L	10	12	11	2	0	0	0	0	0	22	3	0	0	0	0	1	0	2	1	0	0	0	0	0	2
L	13	10	14	0	0	0	0	0	0	3	1	1	0	0	0	0	0	0	0	0	2	0	0	0	0
L	14	2	12	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
L	15	27	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	16	6	4	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	17	38	41	8	17	68	2	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
L	18	7	0	0	1	2	4	0	2	3	2	2	0	71	5	0	0	0	0	17	0	0	0	0	0
L	19	53	3	21	90	5	1	2	3	26	12	42	0	0	0	9	0	0	0	4	1	20	0	0	
L	20	6	7	0	20	5	0	56	12	0	4	22	9	43	9	2	0	0	0	0	8	8	9	14	0
L	25	1	84	4	1	0	45	15	11	0	0	1	4	0	0	0	0	0	0	5	8	0	12	0	0
L	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	33	11	0	7	6	5	0	4	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	34	30	12	5	0	6	19	29	44	9	1	14	78	15	9	0	3	0	0	0	0	0	0	0	0
L	35	6	4	1	27	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	36	22	18	3	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	37	20	0	3	31	1	1	3	1	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	41	3	0	3	6	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0
L	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	43	24	6	0	19	29	27	74	35	13	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	46	22	3	0	0	4	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
L	50	38	0	33	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

# Start & Restart

# prompts for persuasion

Column 1: H=highly active, L=low active, I=inactive  
Column 2: patient number  
active  
nonactive

# Productive Mental Health ...

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## POSTS

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### **Occupy Mental Health! Countering the "Business Model" of psychology**

Posted on 08 Nov | [1 comment](#)

The medical model draws a significant amount of critique in clinical psychology these days, especially from existential and humanistic psychologists, and for good reason. The medical model is deeply flawed in its basic assumptions, including its construction of mental illness and conceptualization of what it means to be human. Although ongoing critique of the medical model is needed, it is increasingly evident that another disconcerting model is also in need of our attention and critique: the business model.

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Is this mental health?

# Productive therapies    Blended Approach

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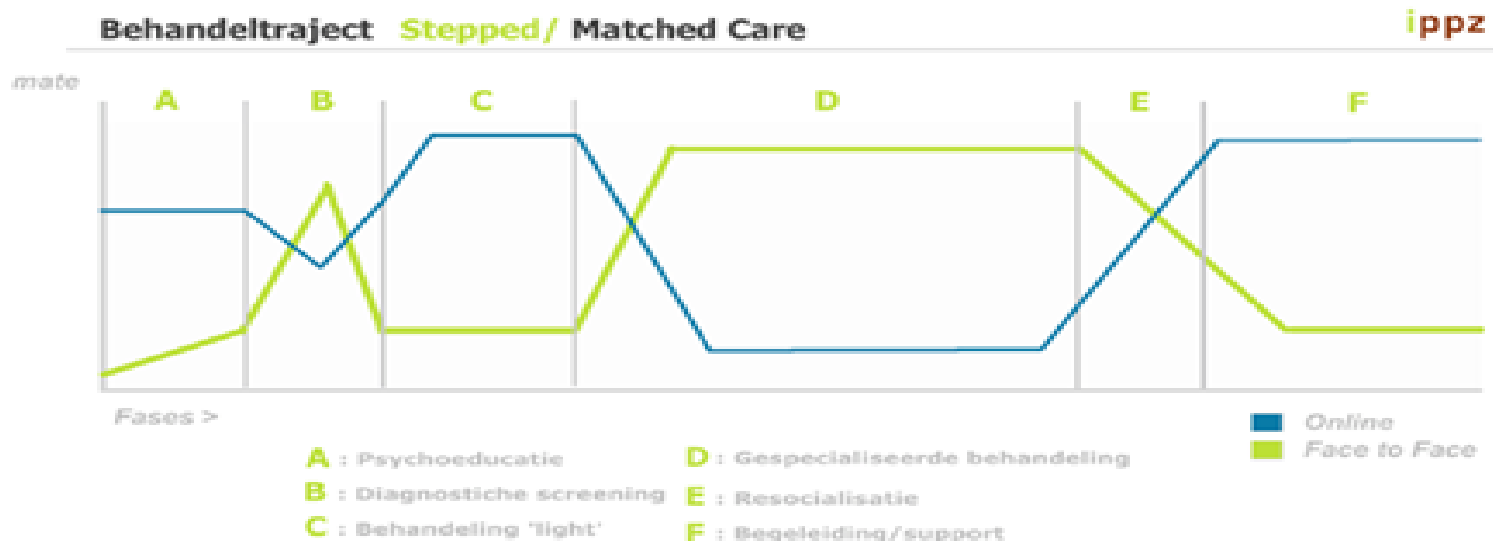
- Integration of online and face-to-face therapy
- Objective = increase efficient and effective treatment
- Not applied systematically in health care



# Productive Blended Approach

What dose, intensity, timing, mode of online and face to face support?

## STEPPED EN BLENDED CARE





# 50% FACE-TO-FACE & 50% ONLINE



# 25% FACE-TO-FACE & 75% ONLINE



## Blended treatment approach

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- Blended approach has the potential to improve therapy outcomes if:
  - Therapists and clients are involved in the development of technology
  - Technology and content of the therapy are integrated
- More systematic research is needed to show the effects of blended treatment
  - Adherence
  - Influence on depression
  - Influence on treatment process
  - Influence on costs
  - Etc.

STRATEGIC PARTNERS

KEY ACTIVITIES

VALUE PROPOSITION

CUSTOMER RELATIONSHIP

CUSTOMER SEGMENT



KEY RESOURCES

System  
Content  
Service

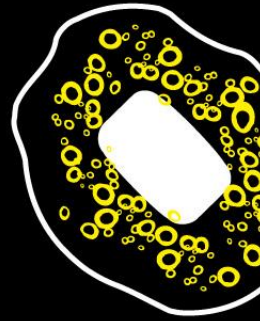
DISTRIBUTION CHANNELS



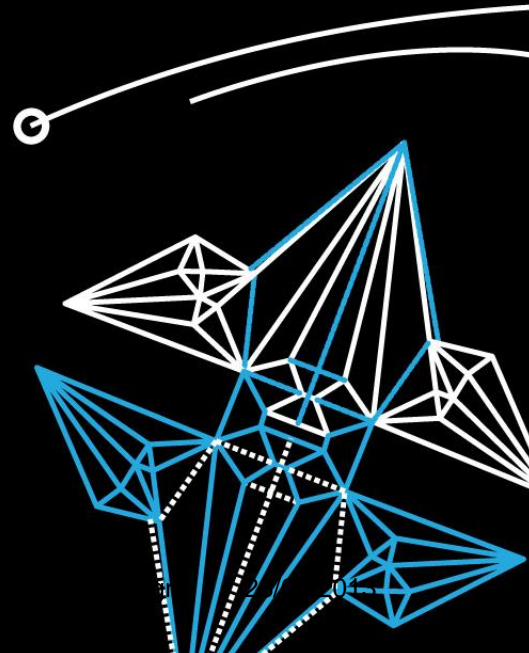
COST

REVENUES





# Comprehensive evaluations

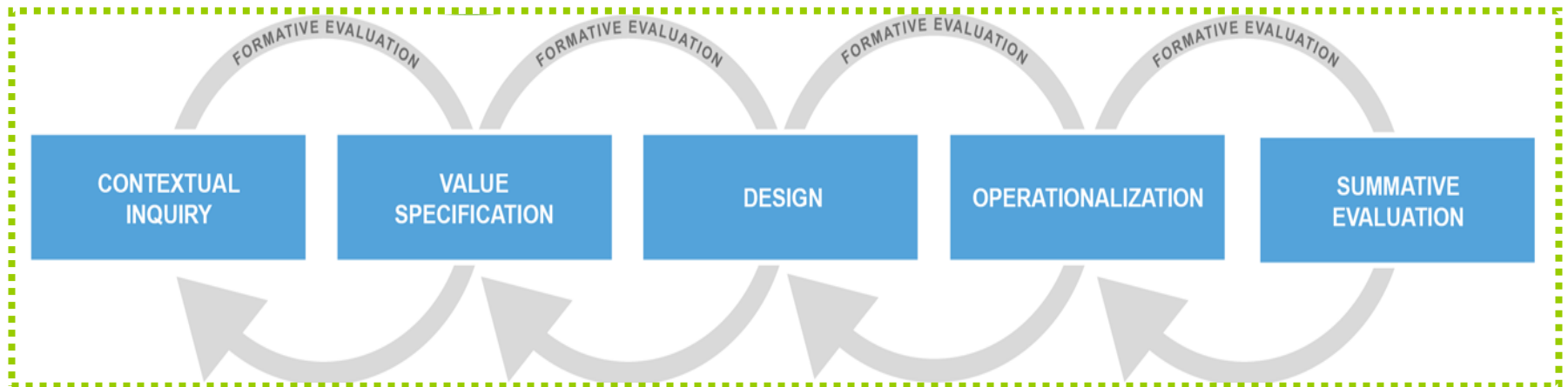




# Comprehensive evaluation

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- Performance & Productive (system, content, service)
- Stakeholders perspectives
- Continuous evaluation cycles
- Mixed methods



## Performance System&Content

What is the reach and adherence rate?  
What usage patterns emerge?  
What features are used?  
What aspects of use provide more benefits?

Who are the hard-core users? Who are the drop outs? Who are the re-starters?  
What user profiles can be identified?

Is the technology easy to use?  
Is the technology persuasive ? (triggers to support self-management)  
Is the technology inter-usable with other devices in use?  
Is the technology interoperable with other information systems in use by the users?

## Productive

What values are achieved?  
How service oriented is the eHealth intervention?

What are the net benefits according to the stakeholders?

Health and well being; QOL,  
Knowledge, Insight in healthier living

Productivity (utilization costs; just in time care; adequate use of care)

What kinds of business models can be developed to achieve the added values?

# Toolkit Research

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- Mixed methods
  - Dose and exposure rate via log-ins (engagement)
  - Usage, user patterns via logfiles (understanding of the black box)
  - Usability tests and interviews (does IT work)
  - Persuasiveness and Personality assessments (what works for whom)
  - Innovative analytic techniques (what IT-benefits most for whom)
  - Business modelling (what is productive)
- Continuous measurement and regular evaluations

# eHealth challenges

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- Patient centred and stakeholder driven interventions
- Persuasive design for engagement, adherence and experience
- Emphatic interaction with users
- Blended approach for productive tech
- Advanced analytics for understanding black box, to optimize interventions

Thanks..

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[www.ehealthresearchcenter.nl](http://www.ehealthresearchcenter.nl)



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