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

eTELEMED 2013

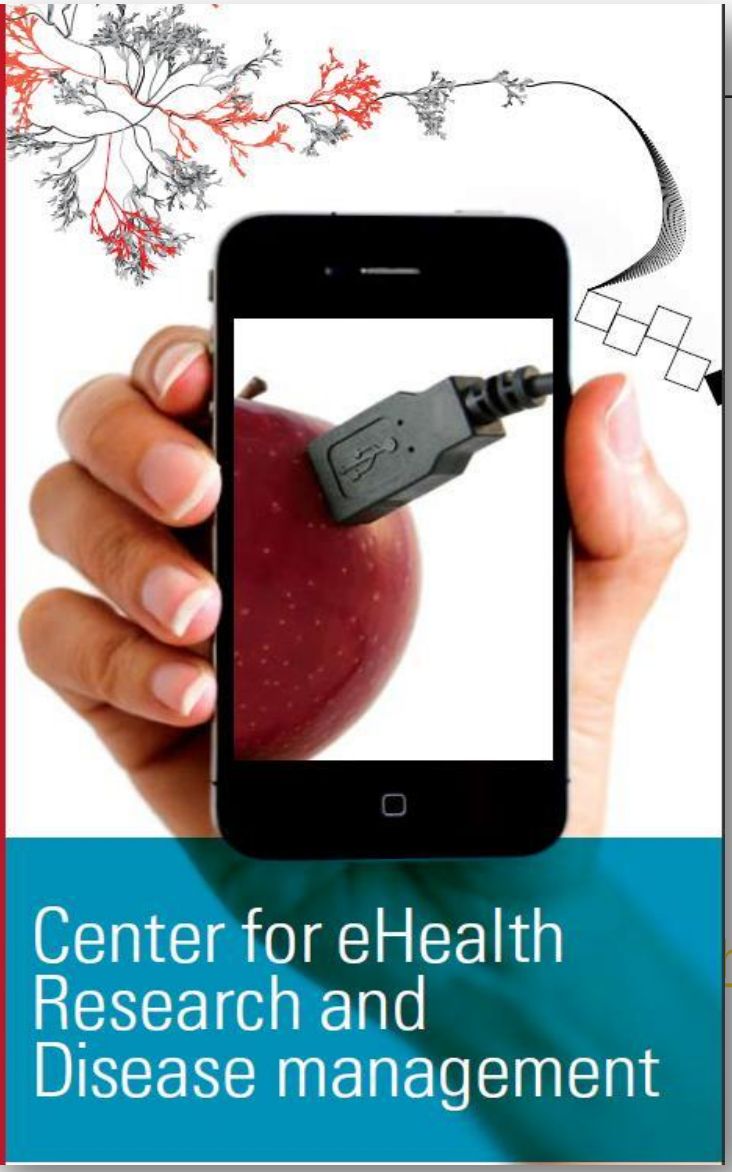
February 24 - March 1, 2013 - Nice, France

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 UNIVERSITY OF TWENTE.



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

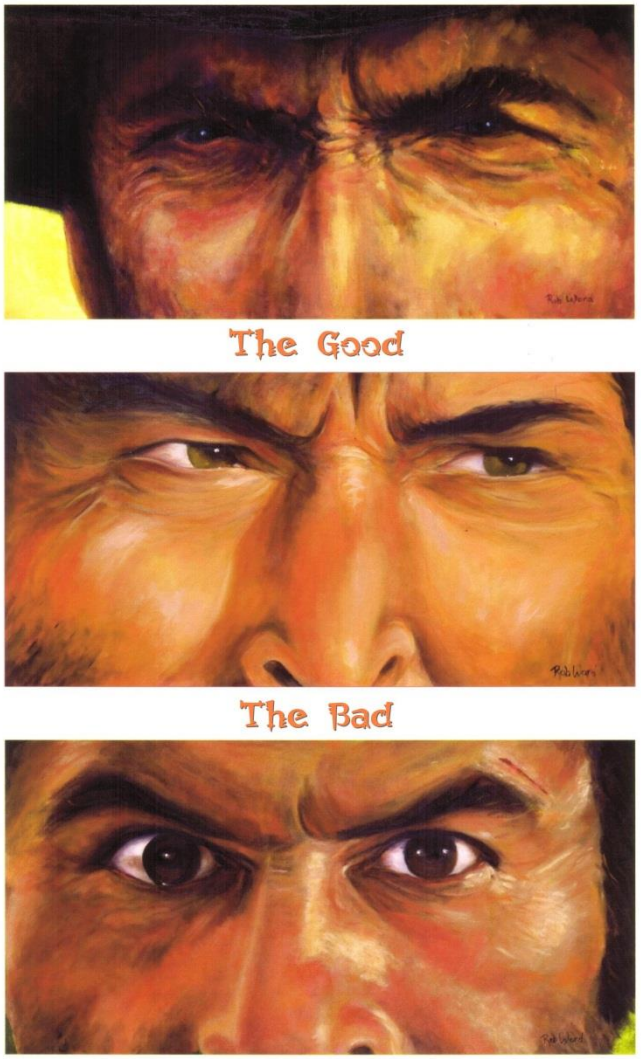
to contribute to the solution of global health problems, like ageing and chronic care, via persuasive designs and business modelling

multidisciplinary development & implementation approach (social sciences & technology)

http://ehealthresearchcenter.org

Outline Presentation

- 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



Bad Technology; low uptake, low impact
Weight LossTech

Look and feel of a self-help book

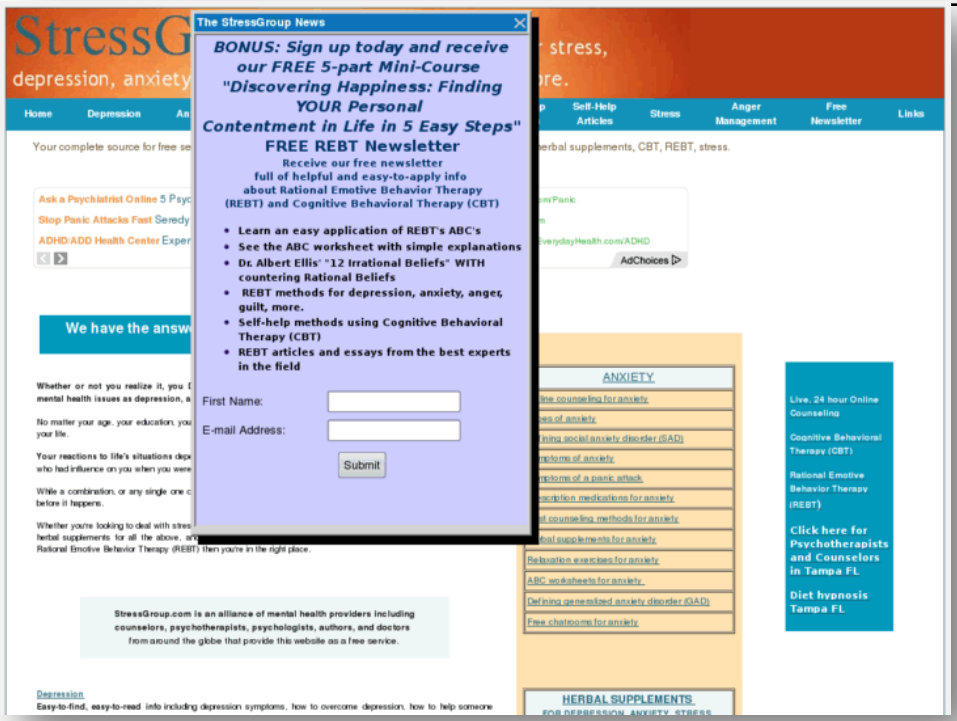
Women–driven

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

No diversity

High educated , conscientious women

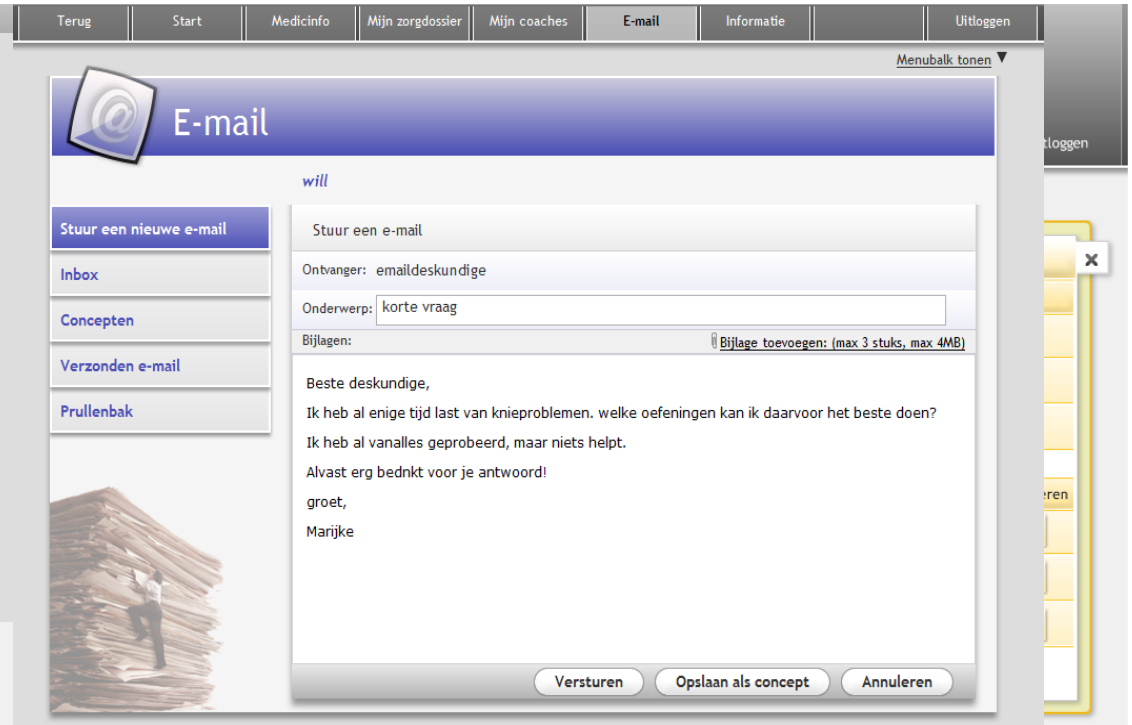
Low added value Tech eConsult

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

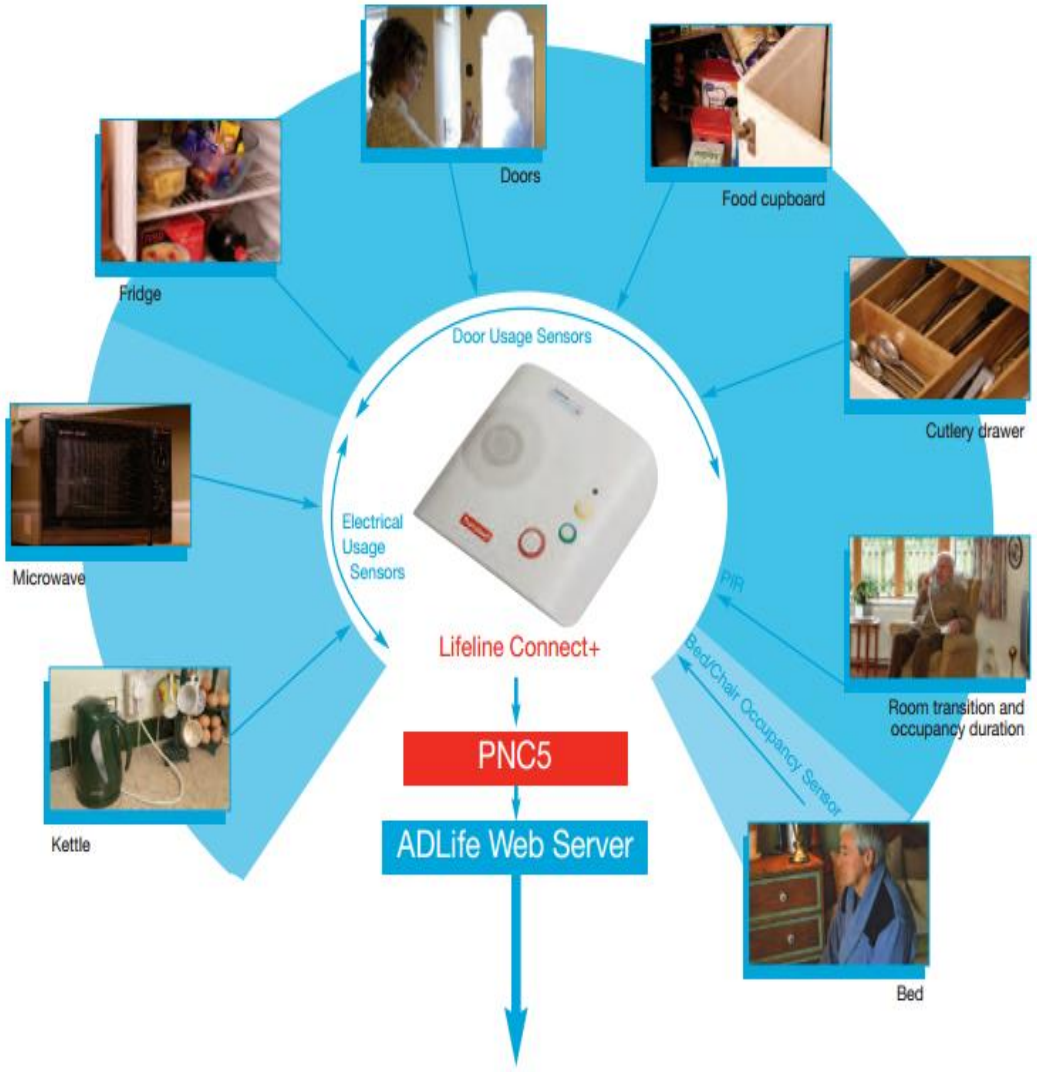
Data management challenge

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

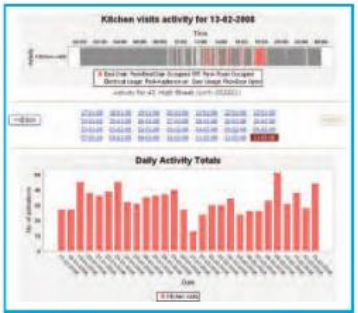
Activity	19-03-2012	last 7 days	last 28 days
PIR Slaapkamer	30.0	19.0	21.8
Bedmat	21.0	12.7	16.4
Senseo Koffiezetapparaat	27.0	14.3	14.6
PIR Badkamer	30.0	17.0	22.3
Voordeur	10.0	4.4	5.6
Achterdeur	0.0	0.0	0.0
Toiletdeur	39.0	18.0	26.1
Stoelmat	16.0	12.9	17.0
PIR Kamer	30.0	17.9	24.5

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

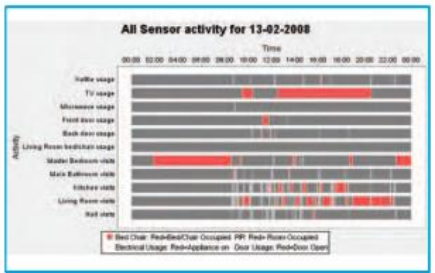
7 day summary for kettle usage

Activity summary screen clearly shows the traffic light system



28 day summary screen for kitchen visits

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**

Industrial Driven

Top down Initiative

Not well thought concept

Ugly Tech
No Impact

Electronic Patient Record (EPD), 1994- ?

eHealth, a struggle ..

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

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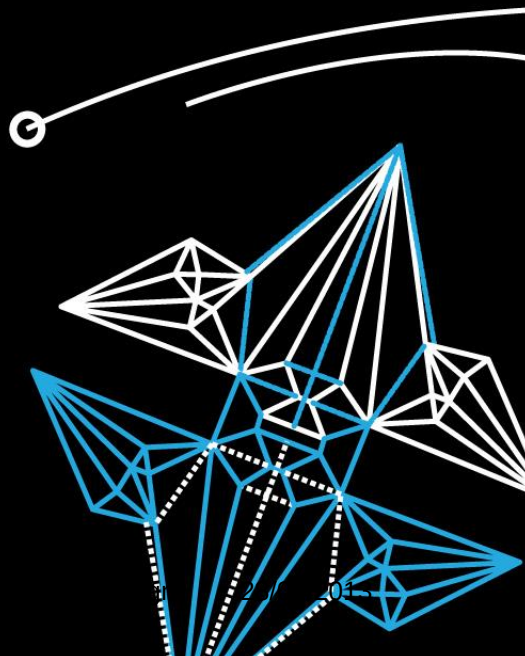
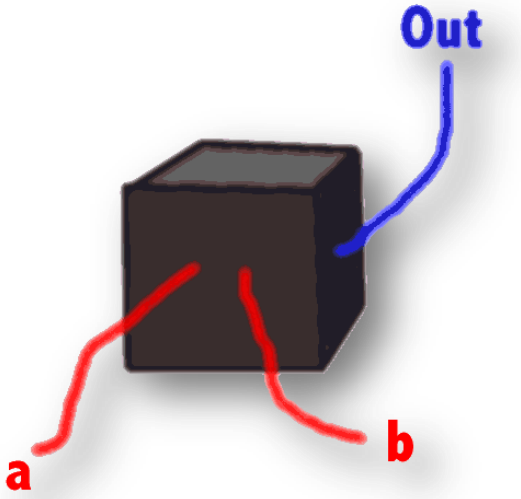
Black Box Phenomenon



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

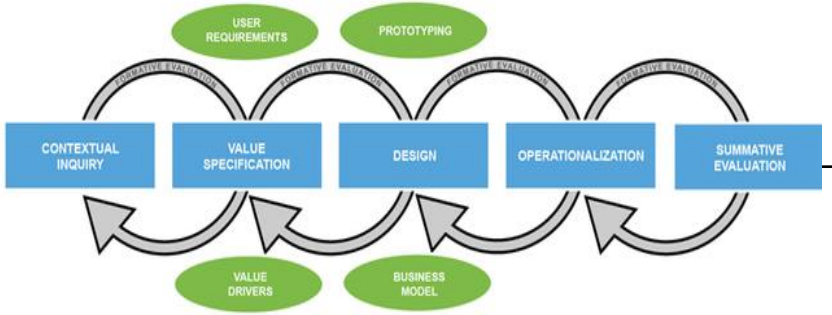


Black Box phenomenon

Black box phenomenon

- 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


VALUE
added


USER REQUIREMENTS
PROTOTYPING
CONTEXTUAL INQUIRY
VALUE SPECIFICATION
DESIGN
OPERATIONALIZATION
SUMMATIVE EVALUATION
VALUE DRIVERS
BUSINESS MODEL

PARADIGM
SHIFT


CO-DESIGN

Helping your patients stick to their therapy!

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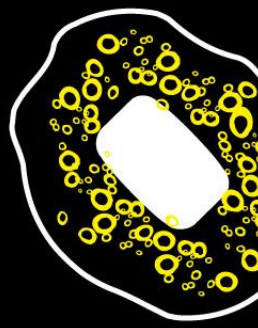
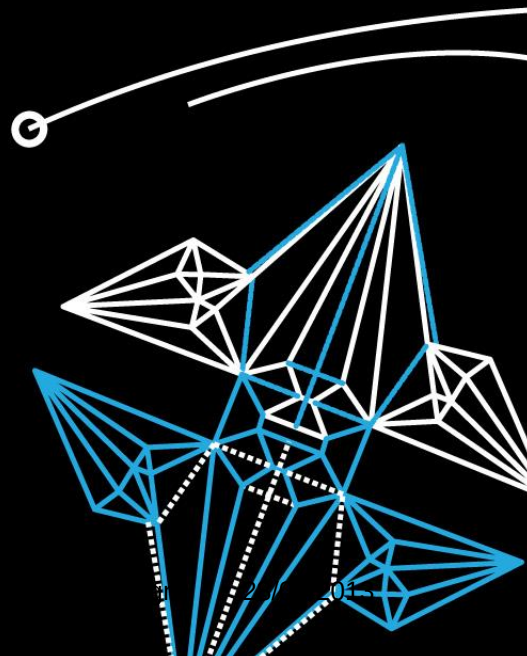
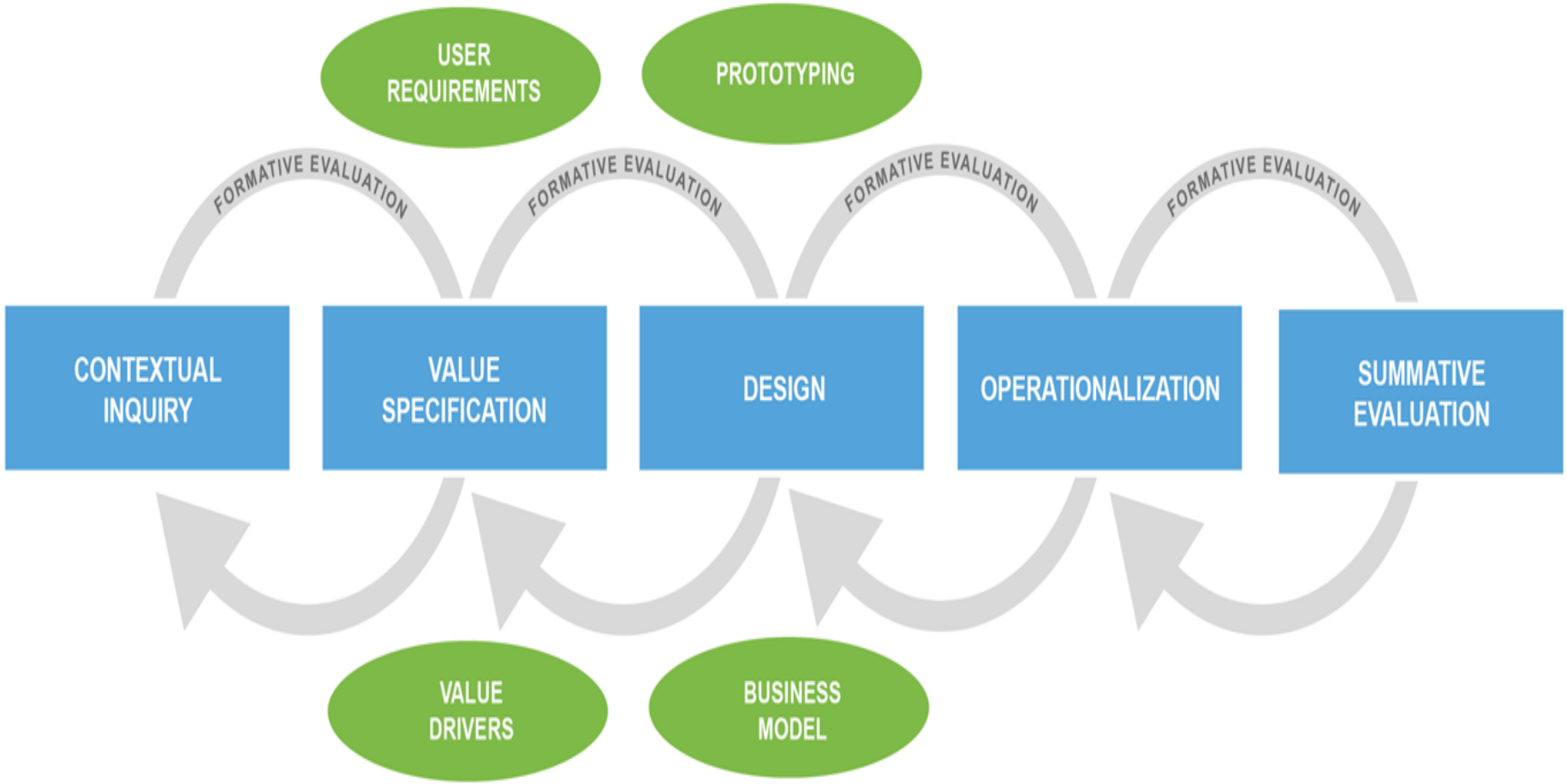


Unlocking the Black Box



Holistic approach eHealth Roadmap



CEHRES ROADMAP

Good Tech, High Uptake, High Impact

- 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

- 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

> 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

THEME HUMAN-TECHNOLOGY RELATIONS

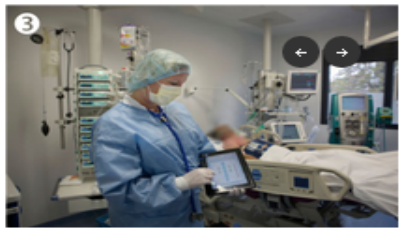
RESEARCH

PERSUASIVE eHEALTH TECHNOLOGY: DEVELOPMENT OF HUMAN-CENTRED AND VALUE-DRIVEN eHEALTH TECHNOLOGIES

DEPARTMENT GW - BEHAVIOURAL SCIENCES

CHAIR/GROUP CENTRE eHEALTH RESEARCH & DISEASE MANAGEMENT
PERSUASIVE eHEALTH TECHNOLOGY

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)

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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

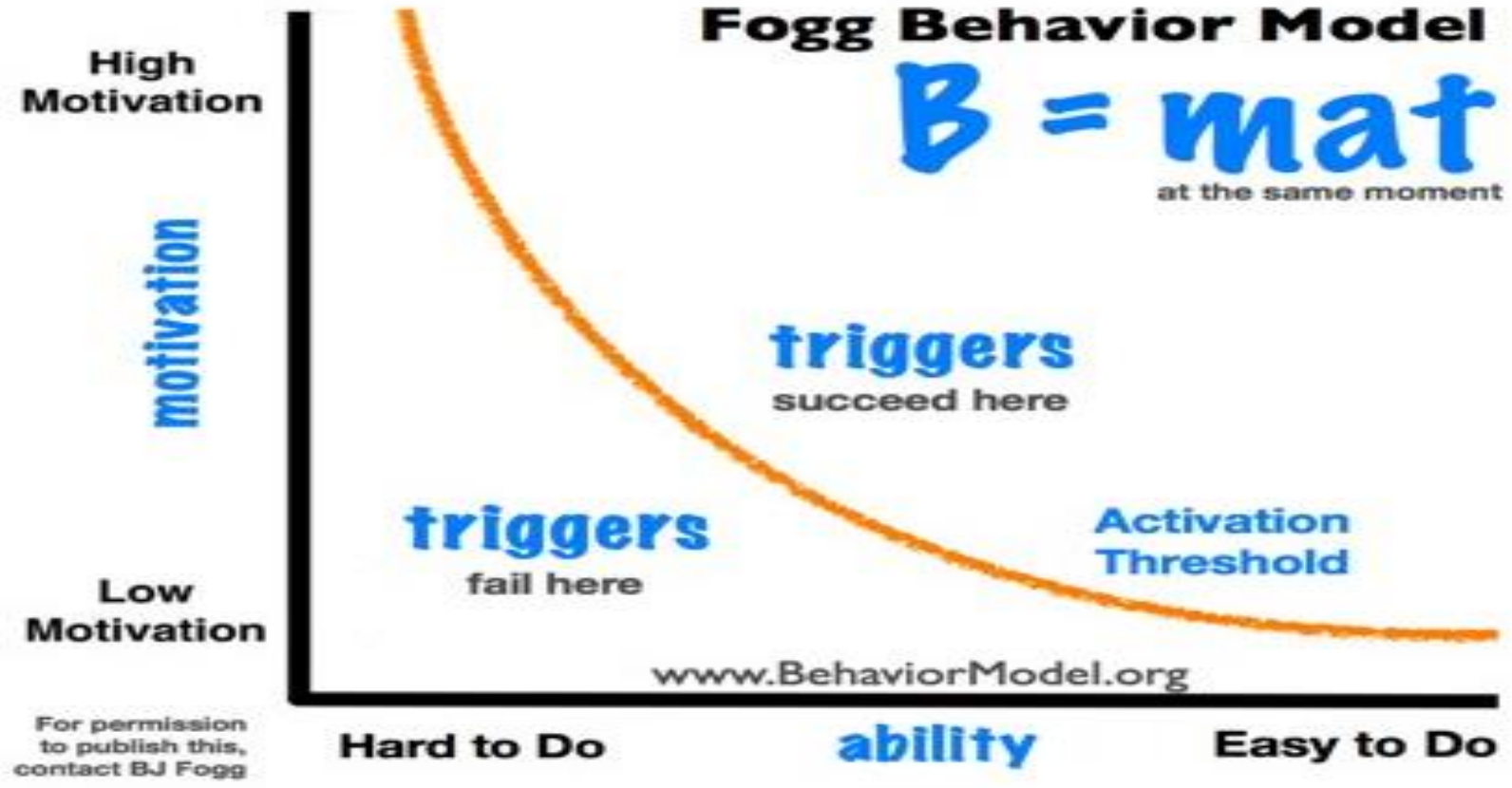
business modelling, eHealth, human-centred design, persuasive design

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.



Design for Adherence

PSD-Model: Oinas-Kukkonen

Persuasive system design-model

Primary Task Support	Dialogue Support	Credibility Support	Social Support
Reduction, Tunneling, Tailoring, Personalization, Self-monitoring, Simulation, Rehearsal	Praise, Rewards, Reminders, Suggestion, Similarity, Liking, Social role	Trustworthiness, Expertise, Surface credibility, Real-world feel, Authority, Third-party, Verifiability	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. bewezen 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

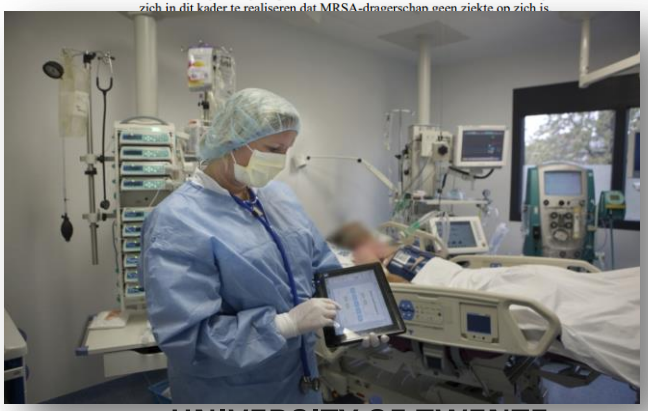
- Patiënten die minder dan 2 maanden geleden langer dan 24 uur in een buitenlands ziekenhuis werden verpleegd. Patiënten die korter dan 24 uur in een buitenlands ziekenhuis werden verpleegd maar die waren geopereerd, of een drain of katheter kregen of werden geïntubeerd of huidlaesies hebben of mogelijke infectiebronnen zoals abcessen, 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 geen 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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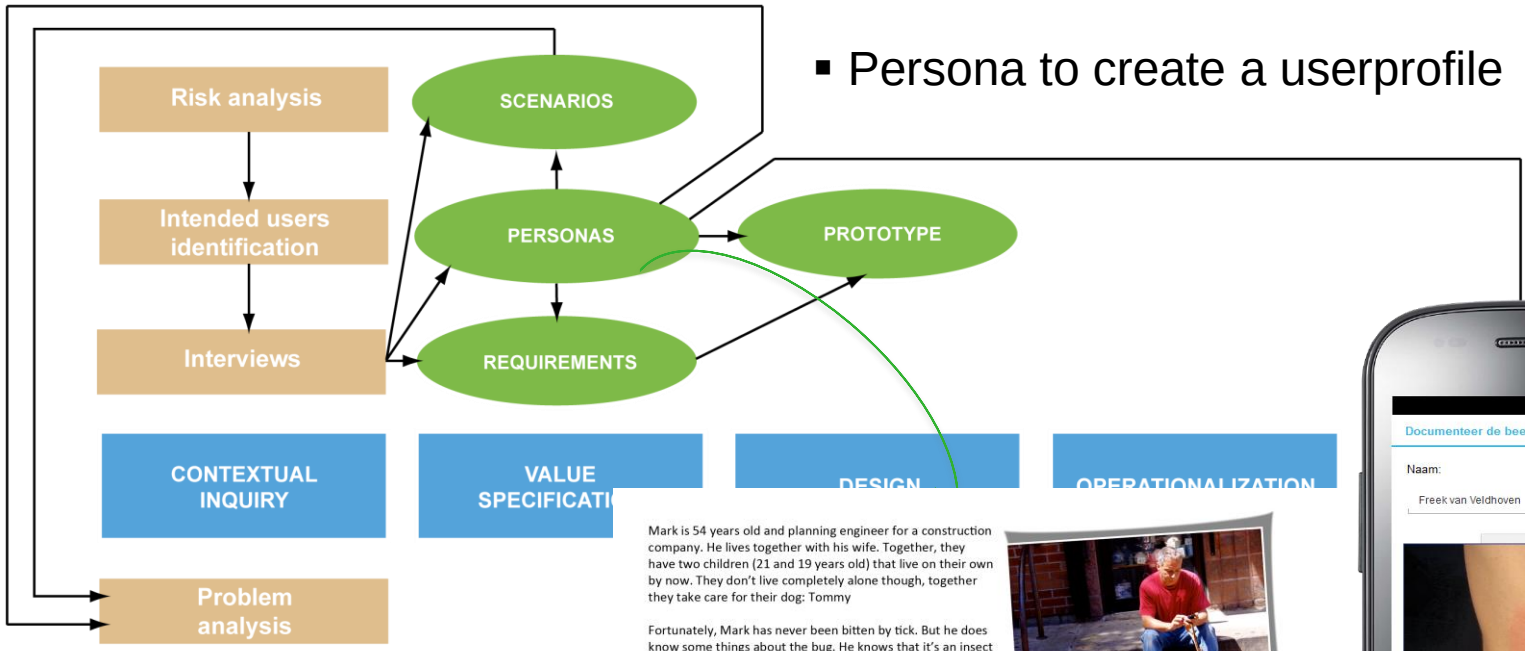
Persona for Personalization
ePublic Health Risk Prevention

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



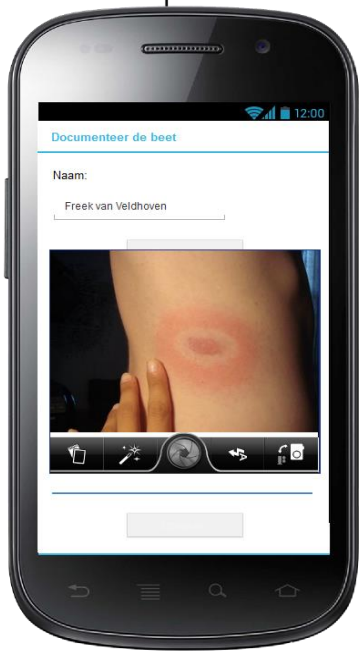
Mark is 54 years old and planning engineer for a construction company. He lives together with his wife. Together, they have two children (21 and 19 years old) that live on their own by now. They don't live completely alone though, together they take care for their dog: Tommy

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.

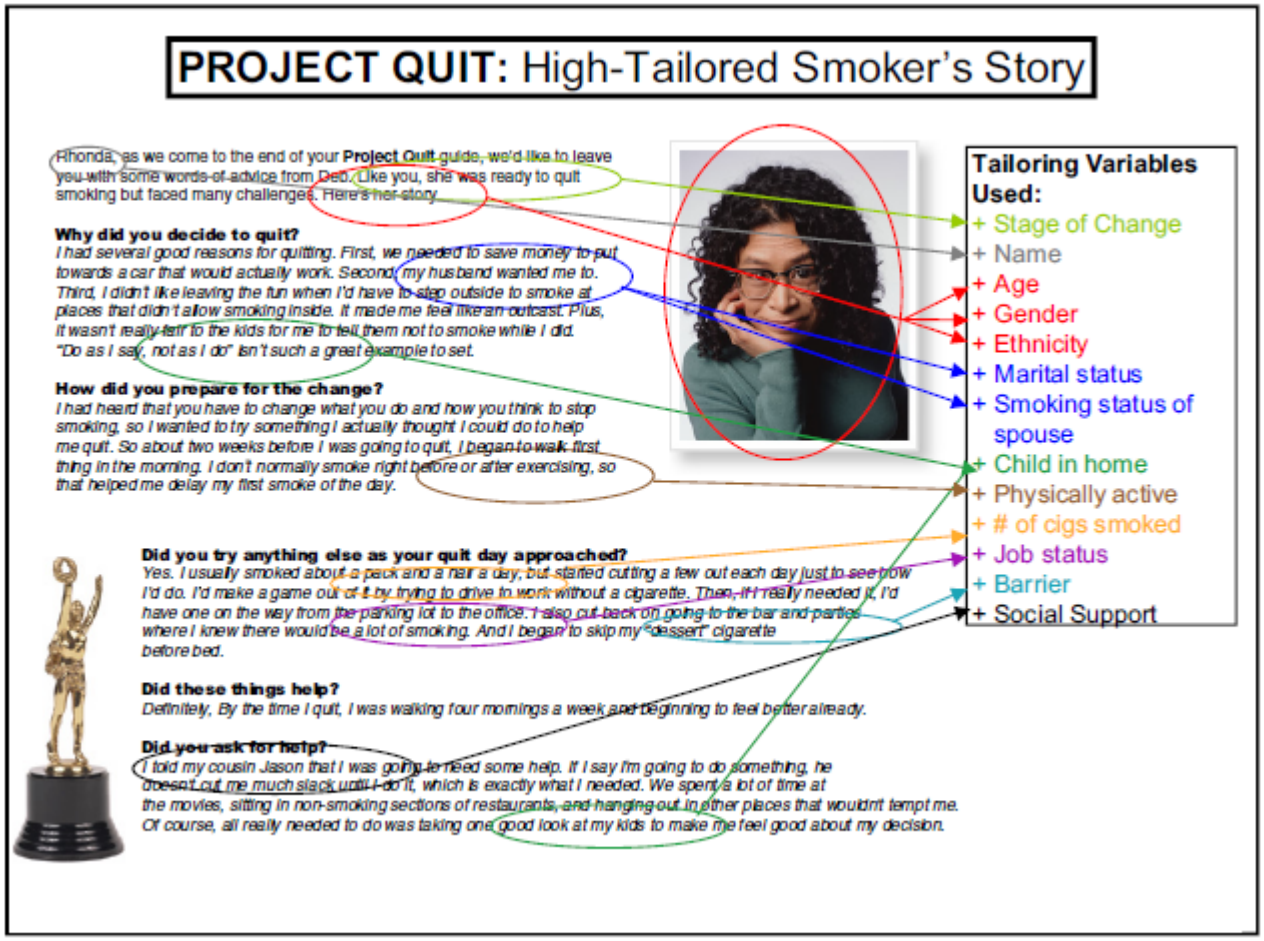
His digital skills are perfectly fine, Mark thinks. After all, he thinks it's fun to try out new technology and he has numerous apps on his iPhone 4g. He takes his phone everywhere and never turns it off. Mark will only start to search for information about ticks on the Internet or on his iPhone when 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: ChrisGoldNY, used under creative commons license



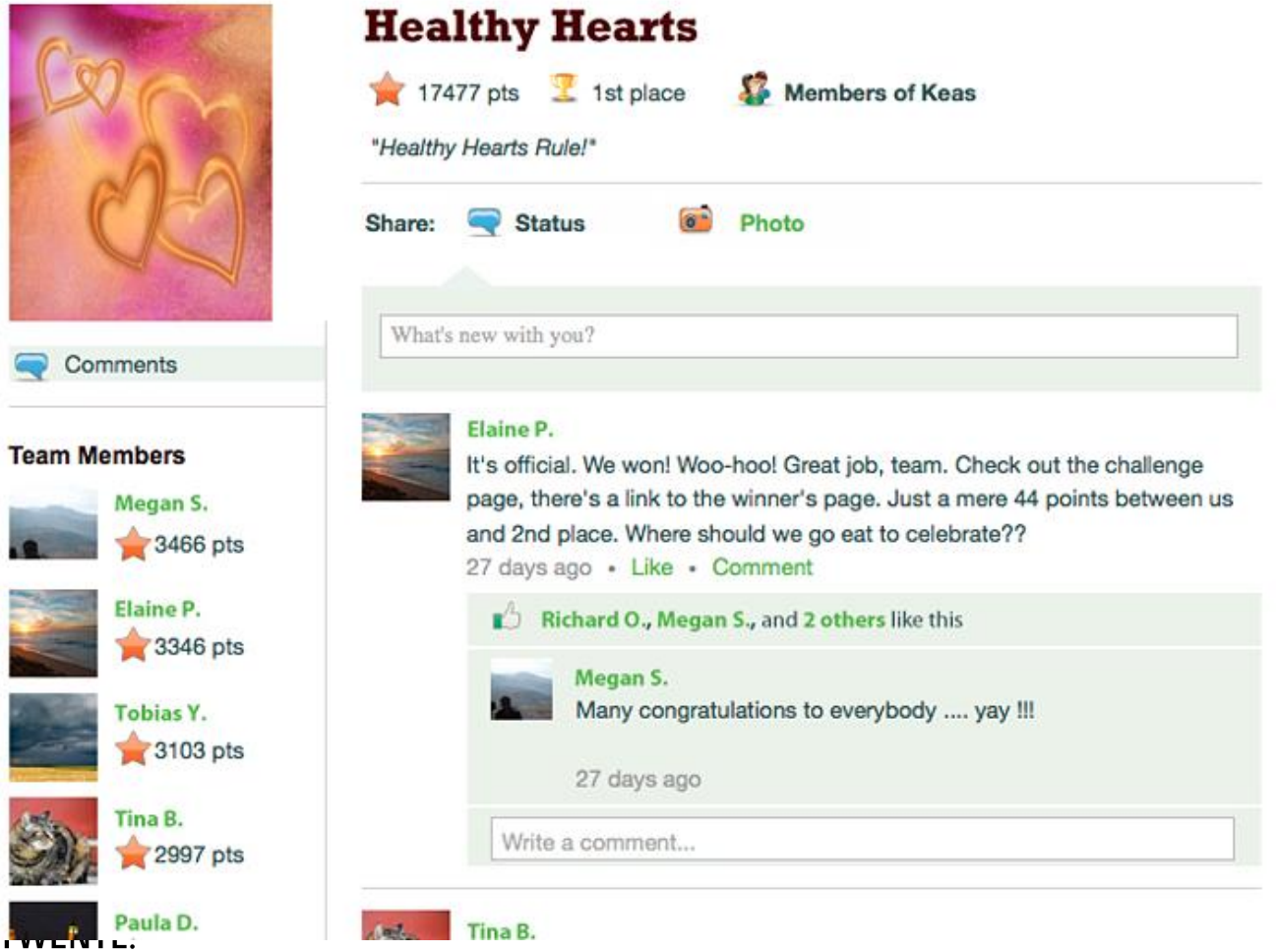
Dialogue Support

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



Social Support

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



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),

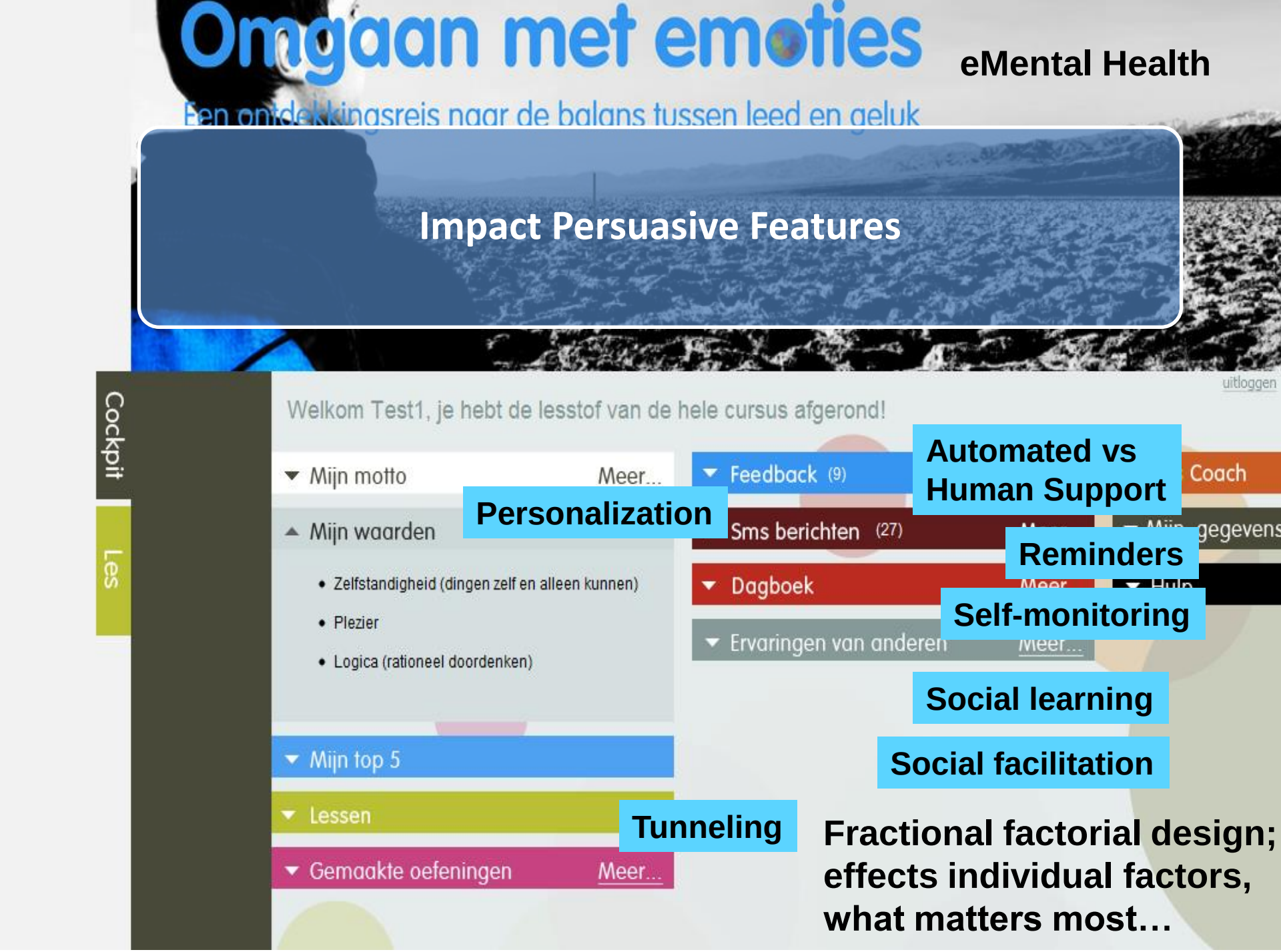
Block wise enter: 1context, study design, 2 interaction mode, 3 system&content&interaction mode, RCT, 4 PSD

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
Een ontdekkingsreis naar de balans tussen leed en geluk
eMental Health
Impact Persuasive Features
Cockpit
Les
uitloggen
Welkom Test1, je hebt de lesstof van de hele cursus afgerond!
Mijn motto
Meer...
Mijn waarden
Zelfstandigheid (dingen zelf en alleen kunnen)
Plezier
Logica (rationeel doordenken)
Feedback (9)
Coach
Sms berichten (27)
Dagboek
Ervaringen van anderen
Meer...
Mijn top 5
Lessen
Gemaakte oefeningen
Meer...
Personalization
Automated vs Human Support
Reminders
Self-monitoring
Social learning
Social facilitation
Tunneling
Fractional factorial design; effects individual factors, what matters most…

Dialogue Support

- **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

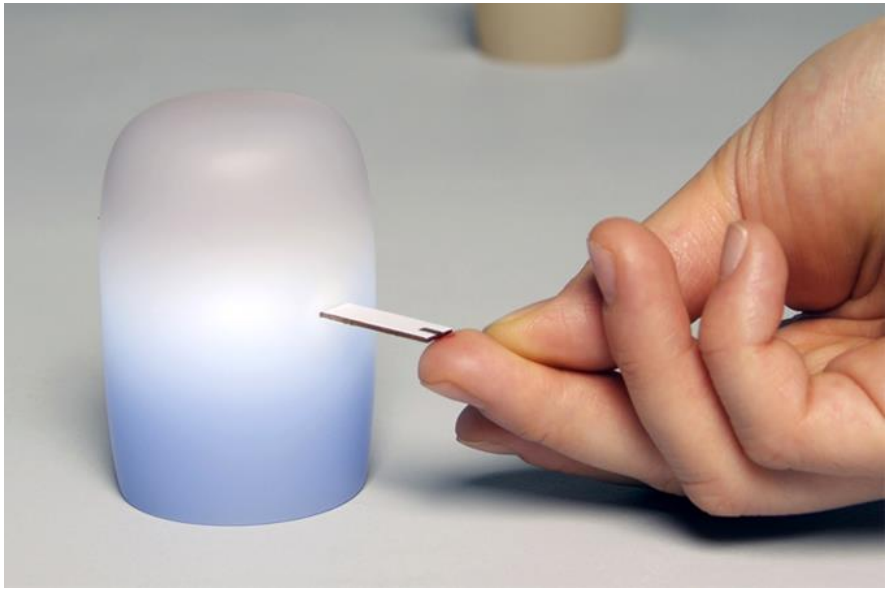
Outcomes
CES-D
HADS-A

Baseline/post/follow up

Automated vs Human support

- Reduction in depression and anxiety CES-D;HADS-A (post/follow up)
  - Resp. whith *human support* improved more *during* intervention; improvement stagnated between post-followup-time
  - Resp. whith *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?



Mickael Boulay

Slow Tech: An Idea Whose Time Has Come
Design for experience

- 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.

- MOBILEDIA, JULY 19, 2012

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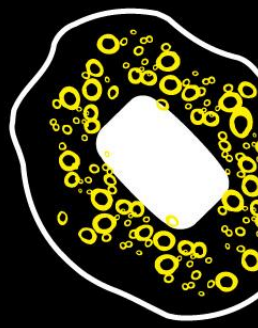
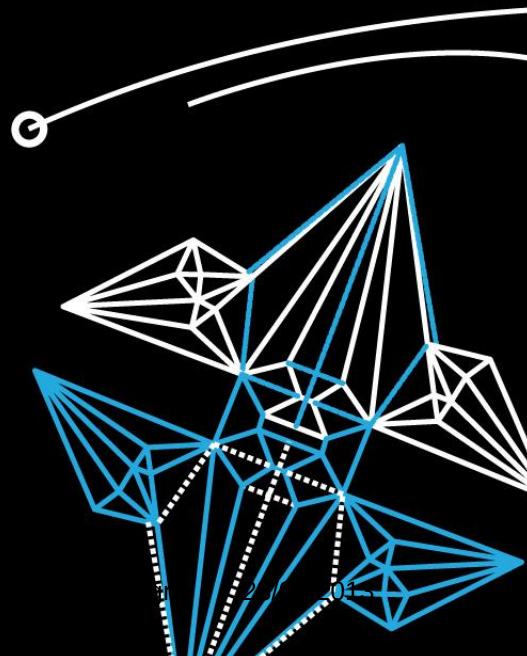


Productive Technology



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

Drop outs: week 4/5 critical points for persuasion

Diabetes eCoach

logfiles to identify drop outs and usage patterns

Mean number of hits

Appendix X. Overview of activity patterns in months

		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	2	16	0	1	2	7	2	5	3	0	0	0
H	4	10	50	9	1	20	5	6	49	3	2	11	44	0	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	59	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	8	6	0	3	3	0	8	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	1	1	7	0	0	22	3	3	0	0	1	0	2	0	2	1	0	0	0	0	2
L	13	10	14	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0
L	14	2	12	0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0
L	15	27	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	16	6	4	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	17	38	41	8	0	68	2	0	0	1	0	0	2	0	2	13	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		
L	20	6	7	0	20	5	0	56	12	0	4	22	9	43	9	2	0	0	0	0	8	9	14	0	0
L	25	1	84	4	1	0	45	15	11	7	0	1	4	0	0	0	0	0	0	5	8	0	12	0	0
L																									
L																									
L																									
L																									
L	45	22	28	33	41	59	40	24	23	24	24	6	9	1	6	3	9	0	0	0	0	0	0	0	0
I	22	6	0	0	3	2	14	12	0	2	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0
I	23	15	8	0	0	3	7	16	0	0	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0
I	26	76	24	10	18	0	16	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0
I	29	6	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I	30	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I	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
I	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
I	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
I	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
I	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
I	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
I	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
I	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
I	46	22	3	0	0	0	4	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0
I	50	38	0	33	5	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 …

POSTS

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

Posted on 08 Nov | 1 comment

Is this mental health?

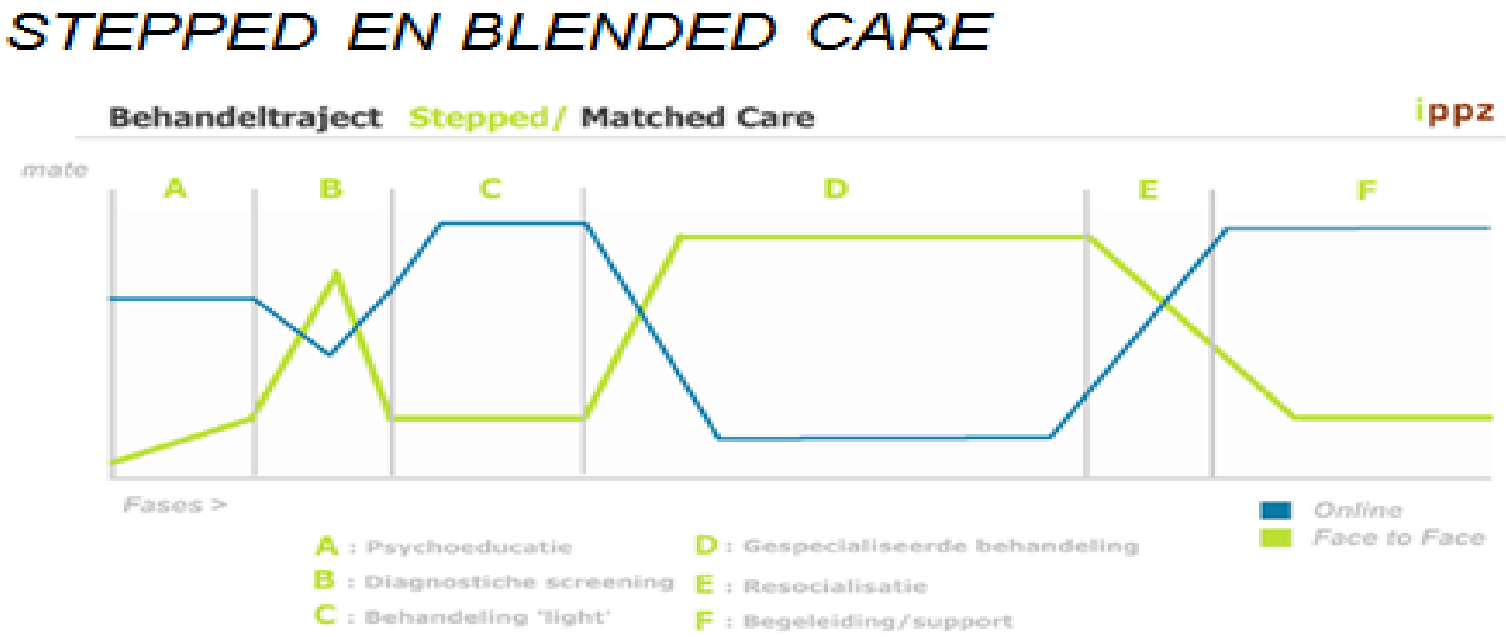
The medical model draws a significant amount of critique in clinical psychology these days, especially from existential and humanistic psychologists, and for good reason. The medical model is deeply flawed in its basic assumptions, including its construction of mental illness and conceptualization of 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.

Productive therapies Blended Approach

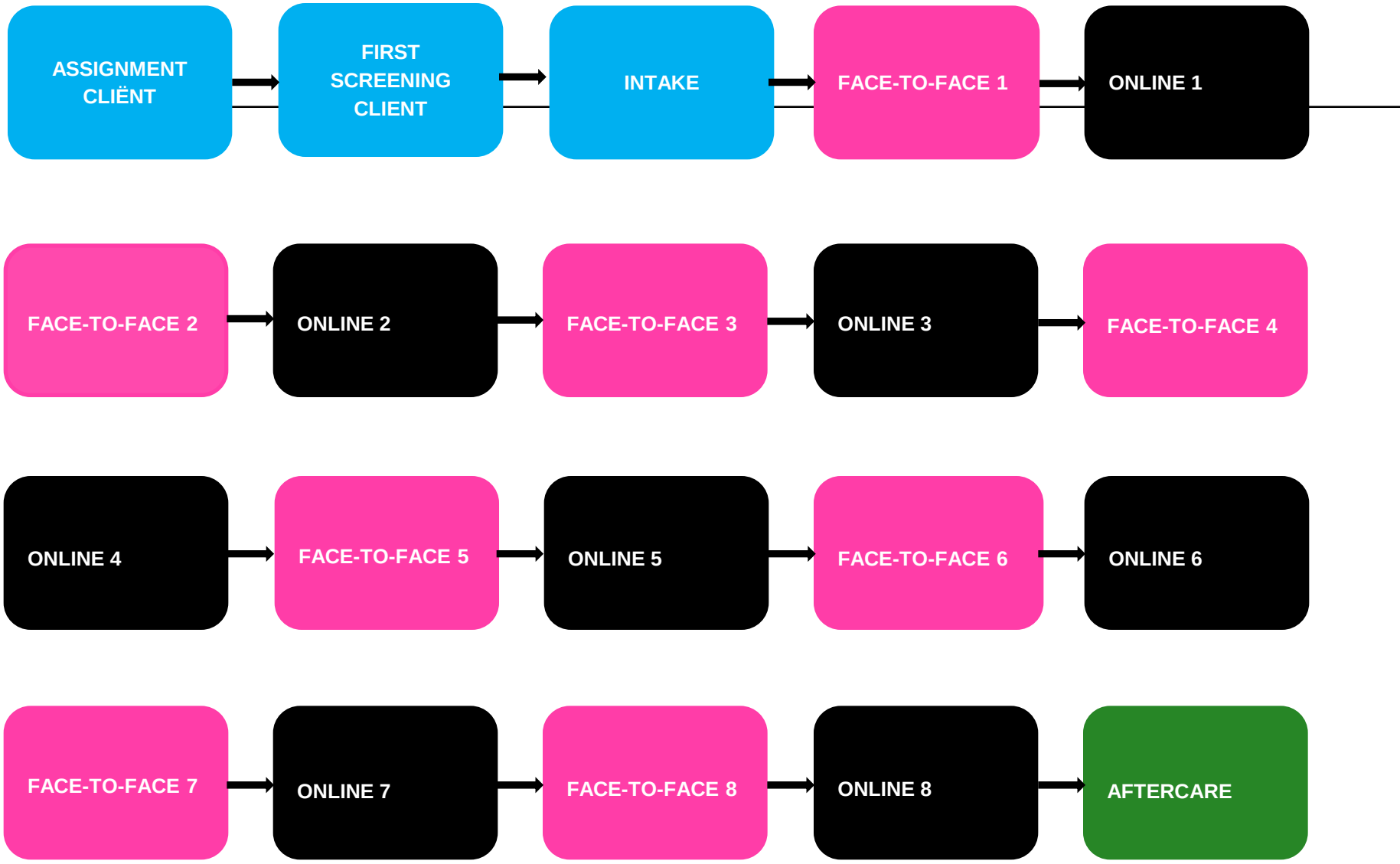
- Integration of online and face-to-face therapy
- Objective = increase efficient and effective treatment
- Not applied systematically in health care

Productive Blended Approach

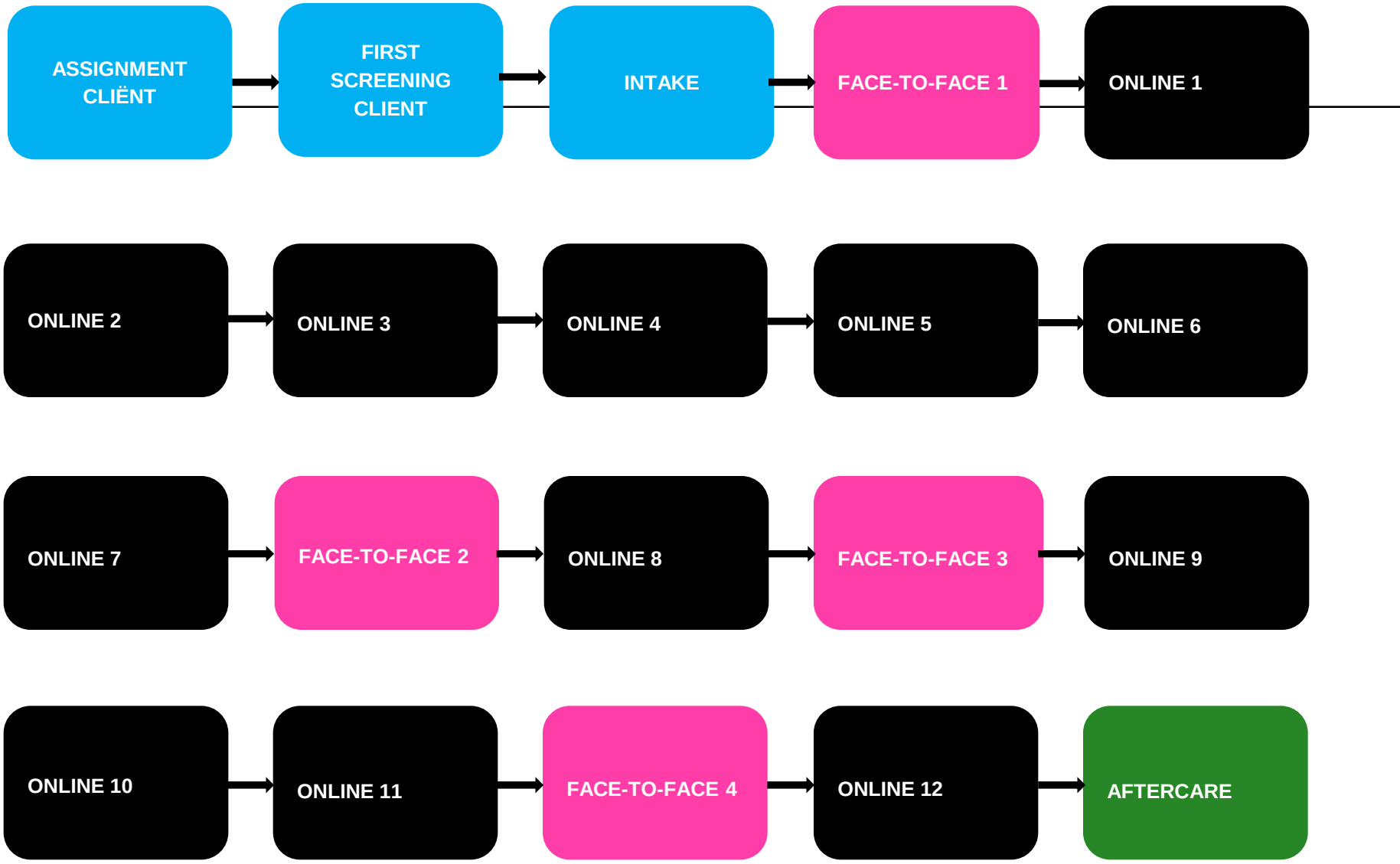
What dose, intensity, timing, mode of online and face to face support?



50% FACE-TO-FACE & 50% ONLINE



25% FACE-TO-FACE & 75% ONLINE



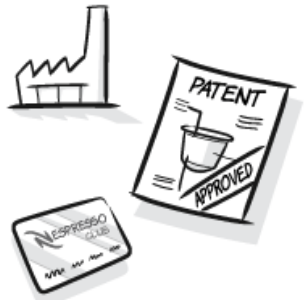
Blended treatment approach

- 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



KEY RESOURCES

VALUE PROPOSITION

CUSTOMER RELATIONSHIP

DISTRIBUTION CHANNELS

CUSTOMER SEGMENT

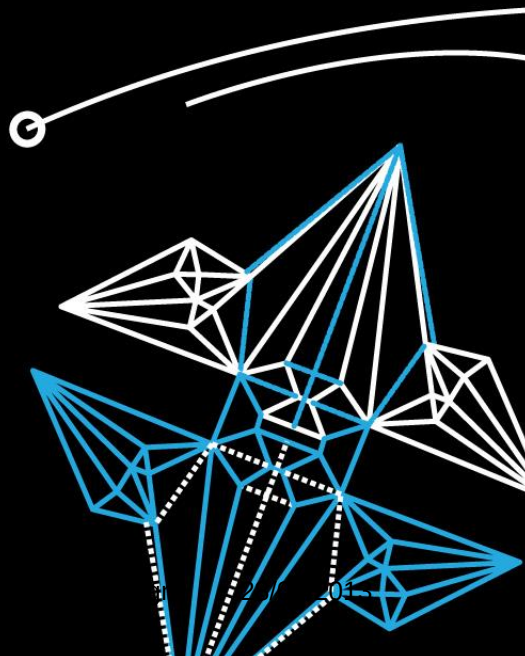
System
Content
Service

COST

REVENUES

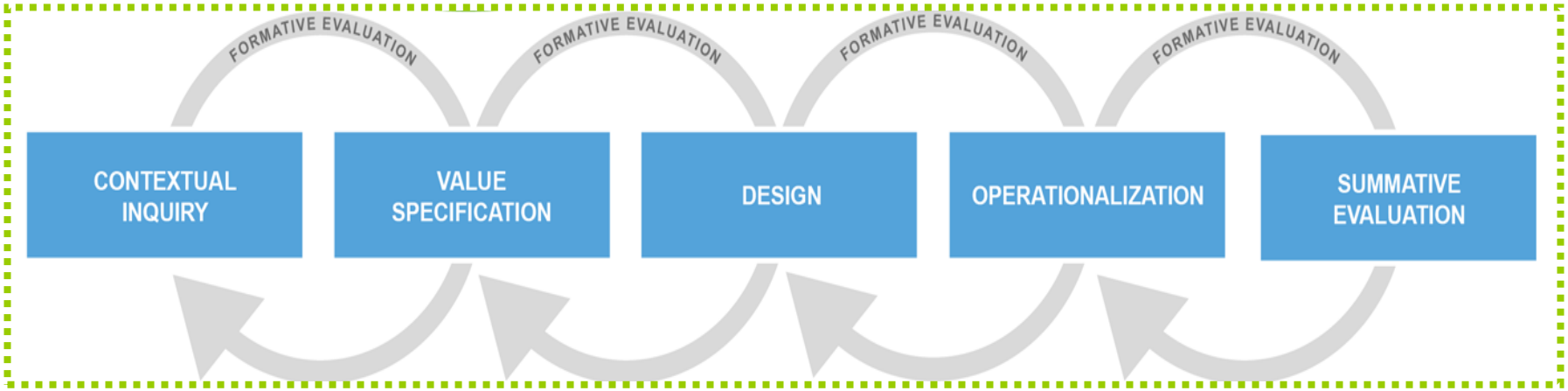
UNIVERSITY OF TWENTE.

Comprehensive evaluations



Comprehensive evaluation

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



Performance System&Content	Productive
What is the reach and adherence rate? What usage patterns emerge? What features are used? What aspects of use provide more benefits?	What values are achieved? How service oriented is the eHealth intervention?
Who are the hard-core users? Who are the drop outs? Who are the re-starters? What user profiles can be identified?	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)
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?	What kinds of business models can be developed to achieve the added values?

Toolkit Research

- 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

- 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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