



@DrJaneWalsh

Designing Interventions for Health Behaviour Change An Introduction

Dr Jane Walsh

Connected Health Summer School, Florence

<u>June 2018</u>





National University of Ireland, Galway



mHealth Research Group in NUI Galway





You are here > HOME > FACULTIES & DEPARTMENTS > PSYCHOLOGY

THE M-HEALTH RESEARCH GROUP AT NUI GALWAY

What we do

?]

People Research Publications

Research Focus

The M-Health Research Group was established in NUI Galway in 2014.

The particular focus of this area of research, M-Health, which is led by <u>Dr.</u> <u>Jane Walsh</u>, is an abbreviation for mobile health, a term used for the practice of medicine and public health supported by mobile devices (e.g. mobile phones, tablet computers and PDAs), for health services and information, but also to affect emotional states. M-health applications include the use of mobile devices in collecting community and clinical health data, delivery of healthcare information to practitioners, researchers, and patients, real-time monitoring of patient vital signs and direct provision of care (via mobile telemedicine).

M-health research encompasses a variety of possibilities, including increased access to healthcare and health-related information (particularly for hard-toreach populations); improved ability to diagnose and track diseases; timelier, more actionable public health information; and expanded access to ongoing medical education and training for health workers.



5 Colleges & Schools



CLASSIFICATION OF DIGITAL HEALTH INTERVENTIONS v1.0

A shared language to describe the uses of digital technology for health

WHAT IS IT?

The classification of digital health interventions (DHIs) categorizes the different ways in which digital and mobile technologies are being used to support health system needs. Targeted primarily at public health audiences, this Classification framework aims to promote an accessible and bridging language for health program planners to articulate functionalities of digital health implementations. Also referred



1.1 TARGETED CLIENT COMMUNICATION

1.1.1	Transmit health event alerts to specific population group(s)
1.1.2	Transmit targeted health information to client(s) based on health status or demographics
1.1.3	Transmit targeted alerts and reminders to client(s)
1.1.4	Transmit diagnostics result, or availability of result, to client(s)

UNTARGETED CLIENT

COMMUNICATION

Transmit untargeted

undefined population

Transmit untargeted

health event alerts to

undefined group

health information to an

1.2

1.2.1

1.2.2

ON-DEMAND CLIENT TO CLIENT 1.3 1.6 INFORMATION COMMUNICATION SERVICES TO CLIENTS Peer group for clients 1.3.1 Client look-up of health 1.6.1 information PERSONAL HEALTH 1.4 TRACKING CLIENT FINANCIAL 1.7 TRANSACTIONS Access by client to own 1.4.1 medical records Transmit or manage out Self monitoring of health 1.7.1 of pocket payments by 1.4.2 or diagnostic data by client client(s) Transmit or manage Active data capture/ 1.4.3 vouchers to client(s) for documentation by client 1.7.2 health services Transmit or manage CITIZEN BASED 1.5 incentives to client(s) for 1.7.3 REPORTING health services Reporting of health system 1.5.1 feedback by clients

Reporting of public health events by clients

1.5.2



WHO Creates mHealth Adoption Research Standards Guide

This 16-step guideline created by the World Health Organization will ideally help create higher quality and more transparent mHealth adoption research.



- Content
- Stakeholder involvement
- Context



Evidence review and advice ndependent

assessment

NHS

Usability best practice

Impact / value: Usage

Effectiveness

Stage 3

Cost saving

Stage 4 Behaviour change

Other user outcome factors

However the ensuing report found NO CONSENSUS between stakeholders on definition of '<u>EFFECTIVENESS</u>'



February 2016 - March 2017





Reminding technologies - REMIND



So what's the problem?















Behaviour change interventions can be effective

A gender-sensitised weight loss and healthy living programme for overweight and obese men delivered by Scottish Premier League football clubs (FFIT): Lege 2014 38:121-21 tic randomised controlled trial



Kate Hunt, Sally Wyke, Cindy M Gray, Annie S Anderson, Adrian Brady, Christopher Bunn, Peter T Donnan, Elisabeth Fenwick, Eleanor Grieve, Jim Leishman, Euan Miller, Nanette Mutrie, Petra Rauchhaus, Alan White, Shaun Treweek





Figure 2: Mean weight (kg, 95% CI) in participants allocated to the Football Fans in Training weight loss programme or waiting list comparison group

Behaviour change is complicated!



100,000 Apps on market Do they work?





(Hint: NO)



HOW ARE TECHNOLOGY INTERVENTIONS DEVELOPED?

Many interventions designed according to the ISLAGIATT principle

It Seemed Like A Good Idea At The Time

Patient has changed their behaviour! Intervention worked!

But how did it work?

Can we do it again?

Can we train others to do the same?



This slide is used with permission of the UCL Centre for Behaviour Change www.ucl.ac.uk/behaviour-change



























- 1.1 Goal setting (0.53%)
- 2.2 Feedback on behaviour (17.37%)
- 2.3 Self-monitoring (16.84%)
- 3.1 Social support (unspecified) (1.58%)
- 4.2 Information about the antecedents (0.53%)









INTERVENTIONS MUST BE EVIDENCE-BASED TO WORK







DESCRIBING INTERVENTION Need for specificity



Of 137 interventions, only 53 (39%) were adequately described





Need for a common language Biomedicine vs Behavioural Science



Which of these could you explain to someone else?



This slide is used with permission of the UCL Centre for Behaviour Change www.ucl.ac.uk/behaviour-change



Summary: So what's the problem?

- Poor definition of interventions
 - Limited ability to develop science/theory
 - Limited ability to generalise findings
- No understanding of **mechanisms of change**
- If effective, unclear why it worked, can't replicate...
- If ineffective, not sure why...





IMPORTANCE OF SCIENTIFIC METHODS



BMJ. 2008; 337: a1655. Published online 2008 Sep 29. doi: <u>10.1136/bmj.a1655</u> PMCID: PMC2769032

Developing and evaluating complex interventions: the new Medical Research Council guidance

Peter Craig, programme manager,^{⊠1} Paul Dieppe, professor,² Sally Macintyre, director,³ Susan Michie, professor,⁴ Irwin Nazareth, director,⁵ and Mark Petticrew, professor⁶

Author information
Article notes
Copyright and License information







How to improve behaviour change interventions

- 1. Specify target behaviour precisely
- Use behavioural theory to develop interventions systematically
- 3. Describe **mechanisms** through which these work
- 4. Specify **behaviour change techniques**, linking these to theory
- 5. Improve **reporting**, using standardised, shared terminology
- 6. Facilitate combining evidence in systematic reviews to inform practice





Behaviour Change Process





A Guide to using the Behaviour Change Wheel



DEFINING BEHAVIOUR

Step 1: Define the problem in behavioural terms







What is Behaviour?

- Anything a person does in response to internal or external events.
- Behaviours are physical events that occur in the body and are controlled by the brain

What is a health behaviour?

"...any activity undertaken for the purpose of preventing or detecting disease or for improving health and wellbeing." (Conner and Norman, 1996)



What is Behaviour?

- 1) Walking in the park
- 2) Having the confidence to ride a bike

 \checkmark

 \checkmark

X

- 3) Taking a statin tablet 🗹
- 4) Losing weight 🔀
- 5) Intending to eat 3 pieces of fruit a day
- 6) Washing your hands
- 7) Reducing cholesterol









Step 2: Select the target behaviour



- Multiple potentially relevant behaviours
- Consider:

Impact, Likelihood, Spillover, Ease of measurement





Step 3: Specify the target behaviour



- More precise the better
- Will help in developing and evaluating intervention





The COM-B Model

Step 4: Identify what needs to change







Step 4: Identify what needs to change

- Target behaviour identified and specified
- But why not currently being carried out?
- Need to understand behaviour change in context
 - Population
 - Environment
- Need to understand **predictors** of the behaviour




Theories of Behaviour Change

NUI Galway

OÉ Gaillimh

The behaviour change wheel: A new met characterising and designing behaviour of Susan Michie ^{1*} , Maartie M van Stralen ² and Robert West ²	hod for change interventions	Comprehensive
* Corresponding author: Susan Michie <u>s.michie@ucl.ac.uk</u>	 Author Affiliations 	
For all author emails, please <u>log on</u> .		Coherent
Implementation Science 2011, 6 :42 doi:10.1186/1748-5908-6 Published: 23 April 2011	5-42	
Abstract		Minimum number of factors
Background		
Improving the design and implementation of evidence-based practic change interventions. This requires an appropriate method for chara	ce depends on successful behaviour acterising interventions and linking	
them to an analysis of the targeted behaviour. There exists a pletho change interventions, but it is not clear how well they serve this put formeworks, and develops and evolutions a new formework simple	ora of frameworks of behaviour rpose. This paper evaluates these	



The Capability Opportunity Motivation – Behaviour (COM-B) Model



The COM-B Model



The COM-B Model: Behaviour: Attending this talk



Use the COM-B Model to identify what needs to change

EXAMPLE: Non-adherence to medication

			ehps.net/ehp applying COM-B to medication adherence
Table 1. Applying COM-B to facto	rs associated with adherence		original article Applying COM-B to medication adherence
CAPABILITY	CAPABILITY MOTIVATION OPPORTUNITY		A suggested framework for research and interventions
The individual's physical and psychological capacity to engage in the behaviour*	All brain processes that energise and direct behaviour	All factors lying outside the individual that make performance of the behaviou possible or prompt it	e ur
Psychological Capacity to engage in necessary thought processes	Reflective Evaluations and plans	Physical Physical opportunity provided the environment	by
 Comprehension of disease and treatment Cognitive functioning (e.g. memory, capacity for judgement, thinking) Executive function (e.g. capacity to plan) 	 Perception of illness (e.g. cause, chronic vs. acute etc.) Beliefs about treatment (e.g. necessity, efficacy, concerns about current or future adverse events, general aversion to taking medicines) Outcome expectancies Self-efficacy 	 Cost Access (e.g. availability of medication) Packaging Physical characteristics of medicine (e.g. taste, smell, siz shape, route of administration Regimen complexity Social support HCP-patient relationship / communication 	e, .)
Physical Capacity to engage in necessary physical processes	Automatic Emotions and impulses arising from associative learning and/or innate dispositions	Social Cultural milieu that dictates th way we think about things	he
 Physical capability to adapt to lifestyle changes (e.g. diet or social behaviours) Dexterity 	•Stimuli or cues for action •Mood state/disorder (e.g. depression and anxiety)	•Stigma of disease, fear of disclosure •Religious/cultural beliefs	
*statements in italics represent d	efinitions given by Michie et al. (2	2011)	

Г

statements in italics represent definitions given by Michie et al. (2011)

Target behaviour: Taking medication as prescribed by doctor			
COM-B Component	Possible examples for target behaviour		
Capability: Physical	Inability to open pill box		
Capability: Psychological	Not sure of pill purpose and dosage		
Opportunity: Physical	Cost of medications		
Opportunity: Social	Religious beliefs, taking medication during Ramadan		
Motivation: Reflective	"I'm on so many medications I rattle"		
Motivation: Automatic	Changed routines		





It's important to develop apps using a *'person-centred approach'* '(Yardley et al., 2015)

In-depth qualitative research is conducted with the users before the digital intervention is developed. This data is used to develop **"guiding principles**" that state the key intervention design objectives









DOI 10.1186/s12875-015-0333-5 BMC Medicine 2015 Giynn et al. BMC Family Practice (2015) 16:119

ESEARCH ARTICLE

Open Access

Family Practice

BMC



Patients' views and experiences of technology based self-management tools for the treatment of hypertension in the community: A qualitative study

Liam Glynn^{1*}, Monica Casey¹, Jane Walsh², Patrick S. Hayes³, Richard P. Harte⁴ and David Heaney⁵

Abstract

Background: Patients with hypertension in the community frequently fail to meet treatment goals. The optimal way to organize and deliver care to hypertensive patients has not been clearly identified. The powerful on-board computing capacity of mobile devices, along with the unique relationship individuals have with newer technologies, suggests that they have the potential to influence behaviour. However, little is known regarding the views and experiences of patients using such technology to self-manage their hypertension and associated lifestyle behaviours. The aim of this study was to explore patients' views and experiences of using technology based self-management table for the trastment of hundrancian in the community



The Behaviour Change Wheel

Step 5: Identify intervention Functions



- The Behaviour Change Wheel: a procedure for intervention development
- Allows the selection of selecting intervention functions and policy options





The Behaviour Change Wheel







Sources of behaviour

Intervention functions



9 Intervention functions: Broad categories through which an intervention can change behaviour

Intervention function	Definition
Education	Increasing knowledge or understanding
Persuasion	Using communication to induce a positive or negative feelings or stimulate action
Incentivisation	Create expectation of reward
Coercion	Create expectation of punishment or cost
Training	Imparting skills
Restriction	Using rules that limit engagement in the target behaviour or competing or supporting behaviour
Environmental restructuring	Changing the physical or social context
Modelling	Provide an example for people to aspire to or imitate
Enablement	Increasing means/reducing barriers



Step 6: Identify Policy Categories

Policy category	Definition
Communication/ Marketing	Using print, electronic, telephonic or broadcast media
Guidelines	Creating documents that recommend or mandate practice. This includes all changes to service provision
Fiscal	Using the tax system to reduce or increase the cost
Regulation	Establishing rules or principles of behaviour or practice
Legislation	Making or changing laws
Environmental/ social planning	Designing and/or controlling the physical or social environment
Service provision	Delivering a service

The BCT Taxonomy

Step 7: Identify Behaviour Change Techniques







BCT Taxonomy (2013)

ann. behav. med. (2013) 46:81-95 DOI 10.1007/s12160-013-9486-6

ORIGINAL ARTICLE

The Behavior Change Technique Taxonomy (v1) of 93 Hierarchically Clustered Techniques: Building an International Consensus for the Reporting of Behavior Change Interventions

Susan Michie, DPhil, CPsychol • Michelle Richardson, PhD • Marie Johnston, PhD, CPsychol • Charles Abraham, DPhil, CPsychol • Jill Francis, PhD, CPsychol • Wendy Hardeman, PhD • Martin P. Eccles, MD • James Cane, PhD • Caroline E. Wood, PhD

Published online: 20 March 2013 © The Society of Behavioral Medicine 2013 Consensus study with experts



Descriptions of "behavioural counselling" in two interventions

Title of journal article	Description of "behavioural counseling"
The impact of behavioral counseling on stage of change fat intake, physical activity, and cigarette smoking in adults at increased risk of coronary heart disease	" <i>educating</i> patients about the benefits of lifestyle change, encouraging them, suggesting what changes could be made" (Steptoe et al. <i>AJPH</i> 2001)
Effects of internet behavioral counseling on weight loss in adults at risk for Type 2 diabetes	" <i>feedback</i> on <i>self-monitoring</i> record, <i>reinforcement</i> , recommendations for change, answers to questions, and general support" (Tate et al. <i>JAMA</i> 2003)



This slide is used with permission of the UCL Centre for Behaviour Change www.ucl.ac.uk/behaviour-change



An approach to developing behaviour change interventions





No.	Label	Definition	Examples		
1. Goa	1. Goals and planning				
1.1	Goal setting (behaviour)	Set or agree a goal defined in terms of the behaviour to be achieved Note: only code ^d goal-setting if there is sufficient evidence that goal set as part of intervention; if goal unspecified or a behavioural outcome, code 1.3 , Goal setting (outcome); if the goal defines a specific context, frequency, duration or intensity for the behaviour, also code 1.4 , Action planning	Agree a daily walking goal (e.g. 3 miles) with the person and reach agreement about the goal Set the goal of eating 5 pieces of fruit per day as specified in public health guidelines		

Behaviour change techniques - App – (Michie et al, 2013)







EXAMPLE OF BEHAVIOUR CHANGE INTERVENTION USING BCT



Using a smartphone app to increase walking behaviour in students





Only **13–32%** of university students meet guidelines



Accupedo app





Step count group





Control group



Table 1. Linking intervention functions, COM-B model, TDF and BCTs to promote the use of a pedometer smartphone

application.

СОМ-В	Barrier	TDF	Interventio	BCTs from BCT
			n function	Taxonomy v1
Psychologic	Lack of	Procedural	Enablement	6.1 Demonstration of
al capability	awareness/	knowledge	Education	behavior
of students	information		Training	4.1 Instruction on how to
	about app	Skills		perform a behaviour
	functions and			2.1 Monitoring of behaviour
	ability to use app			by others without feedback
	effectively			2.4 Self-monitoring of
				outcome(s) of behaviour,
Reflective	Lack of	Goal	Education	1.3 Goal setting (outcome)
Motivation	awareness about	Setting	Training	66

USING APP STEP COUNT GOALS WORKED!



67





JMIR MHEALTH AND UHEALTH

Walsh et al

Original Paper

An mHealth Intervention Using a Smartphone App to Increase Walking Behavior in Young Adults: A Pilot Study

Jane C Walsh^{1*}, PhD; Teresa Corbett^{1*}, MSc; Michael Hogan², PhD; Jim Duggan², PhD; Abra McNamara^{2*}, BA

¹mHealth Research Group, School of Psychology, National University of Ireland, Galway, Galway, Ireland
²National University of Ireland, Galway, Galway, Ireland

^{*}these authors contributed equally

Corresponding Author: Jane C Walsh, PhD



PATIENTS WITH CHRONIC DISEASE

 Glynn et al (2014) found this app used in a primary care setting increased Physical Activity, decreased weight & BP compared to controls.









WHY/HOW DID IT WORK?

- Qualitative work suggested that using app facilitated an interactive process of positive change in patients' exercise behaviour through increase in:
 - Knowledge
 - goal setting
 - use of feedback

(Glynn et al., 2015)

So what's the Solution?







- Understand/define the problem
 - Medical, behavioural, impact
- State-of-the-art scientific evidence
 - Content, Methods, New technology
- Partnership with Industry
 - Bring evidence-based solutions to market faster












Personalised solutions are key STAKEHOLDER INVOLVEMENT ('Person-based' approach)









Quality multidisciplinary research is key...

Technologist meets Psychologist meets Doctor meets Entrepreneur meets Economist!







@DrJaneWalsh

THANK YOU! QUESTIONS?

Dr Jane Walsh

Connected Health Summer School, Florence

<u>27 June 2017</u>



