



# GAMIFICATION

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+ about me....



UMC Utrecht

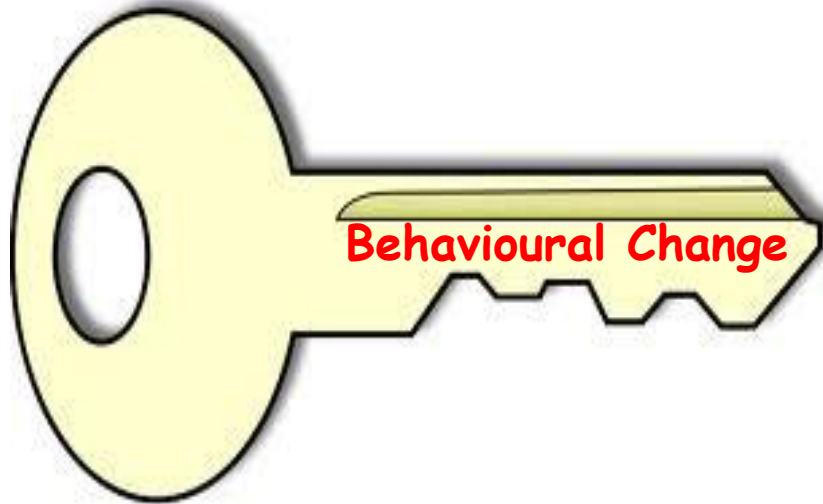


**SGI**  
Serious Games Institute



# + Intro to Gamification and Health

*Gamification is the application of game design principles and techniques for non-entertainment purposes*





# Intrinsic vs. Extrinsic Motivation



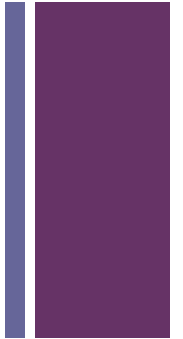
- **Intrinsic motivation** refers to doing something because it is inherently interesting or enjoyable
- **Extrinsic motivation** refers to doing something because of something external to the person like a reward or a law or a social norm

# + Healthcare of the Future

Needs to promote:

- Patient empowerment both within and outside the healthcare setting
- Effective, efficient and safe healthcare practices

Gamification can be applied to these goals.



# + Example of Patient Empowerment

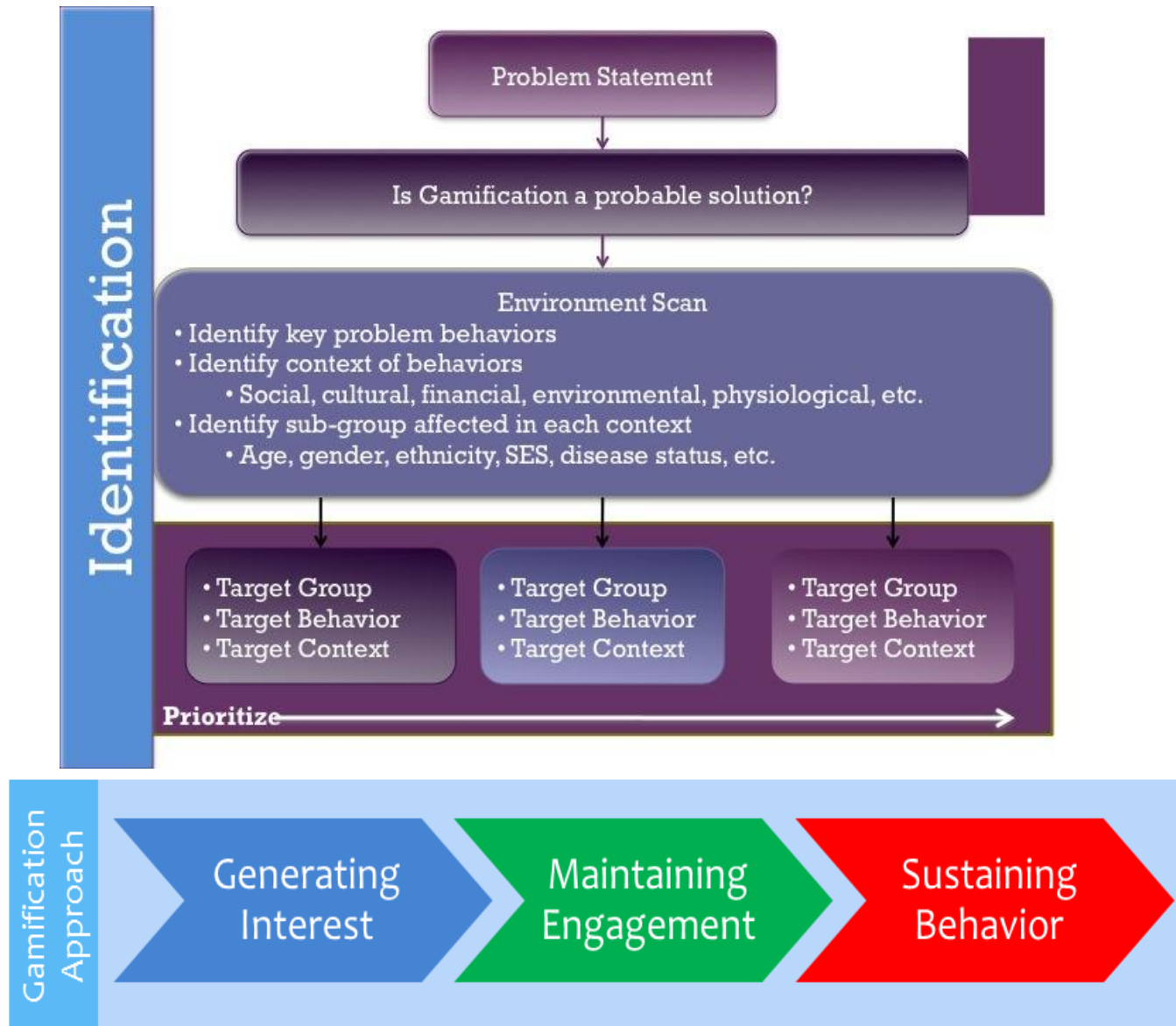
- Ministry of Health Holdings Singapore Health Gamification Framework Document



- Health Insurance Company in South Africa



# MOH Framework Overview



# + Gamification Approach



*From Gamification by Design, by Gabe Zichermann and Christopher Cunningham, 2011, O'Reilly Books.*



# Tools

Generating Interest

Maintaining Engagement

Sustaining Behavior

On-boarding



Levels



Health Ambassador



Engagement Loops



State of Flow



Challenges & Quests



Player's Journey



Social Networks



Points System



Feedback



Leader-boards



Badges



Mastery



Feedback



Status



Rewards



# + Examples of Tools

- Onboarding
    - Registration process
  - Levels
    - Blue, Silver and Gold Tiers
  - Point system
    - Based on miles
- Rewards
    - Redeem points for upgrades, flights, reward nights at hotels, “a fantastic range of products and services from the Emirates High Street”



# + Healthcare Examples of Tools

## Rewards, Points, Challenges

- 5 prescriptions refilled on time = free pill box
- 1 day of blood glucose levels within target range at target times = 100 pts (ramp up for levels)
- Increase intake of vegetables by 10% in one week = “best beginner” badge
- Increase intake of water by 10%, Yellow sticker

## Leaderboards, Social Ties, Status

- Kris 50 pts, Pam 75 points, Karin 200 points HIGH SCORE
- “Kris just challenged you to a pushup competition, Video contest at 12:15 p.m. on skype”
- “Karin is AWESOME! She just completed a year of maintaining her activity goals and is now a Health Ambassador!”

# + South Africa's Gamified Insurance Company!

- Discovery Health
  - Lower your premiums by joining a gym
  - Discounts for going to certain restaurants and ordering healthy meals
  - Up and running for over 2 years!

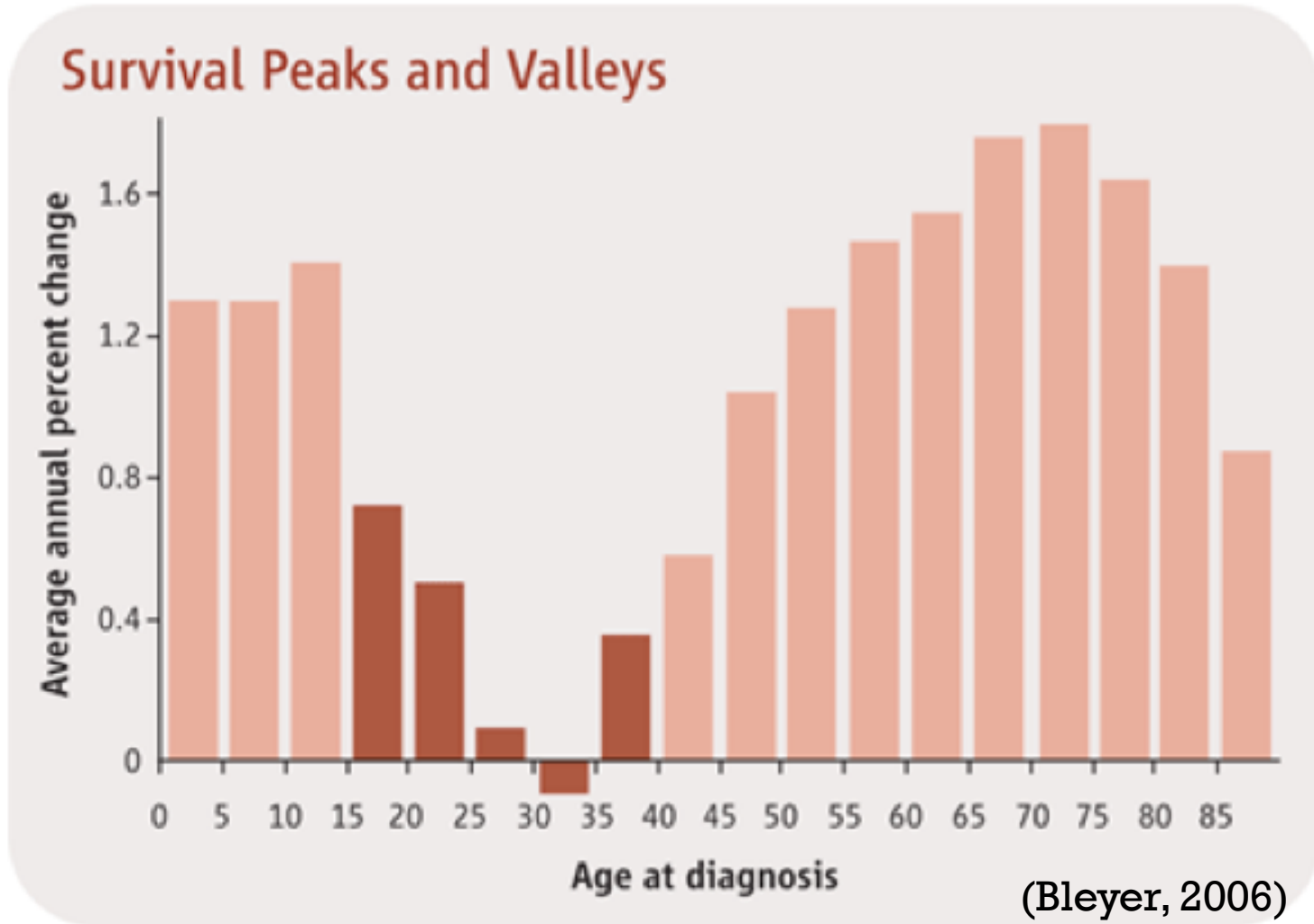


# + Game for Patient Empowerment



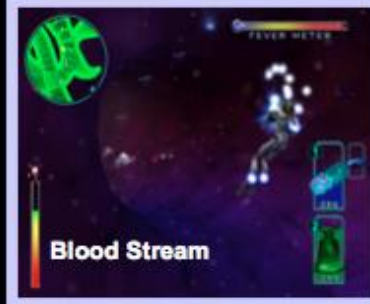
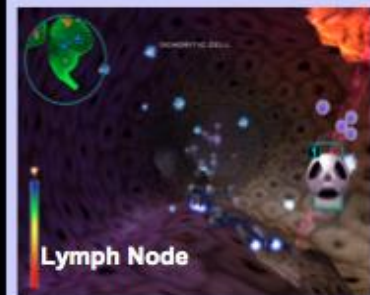
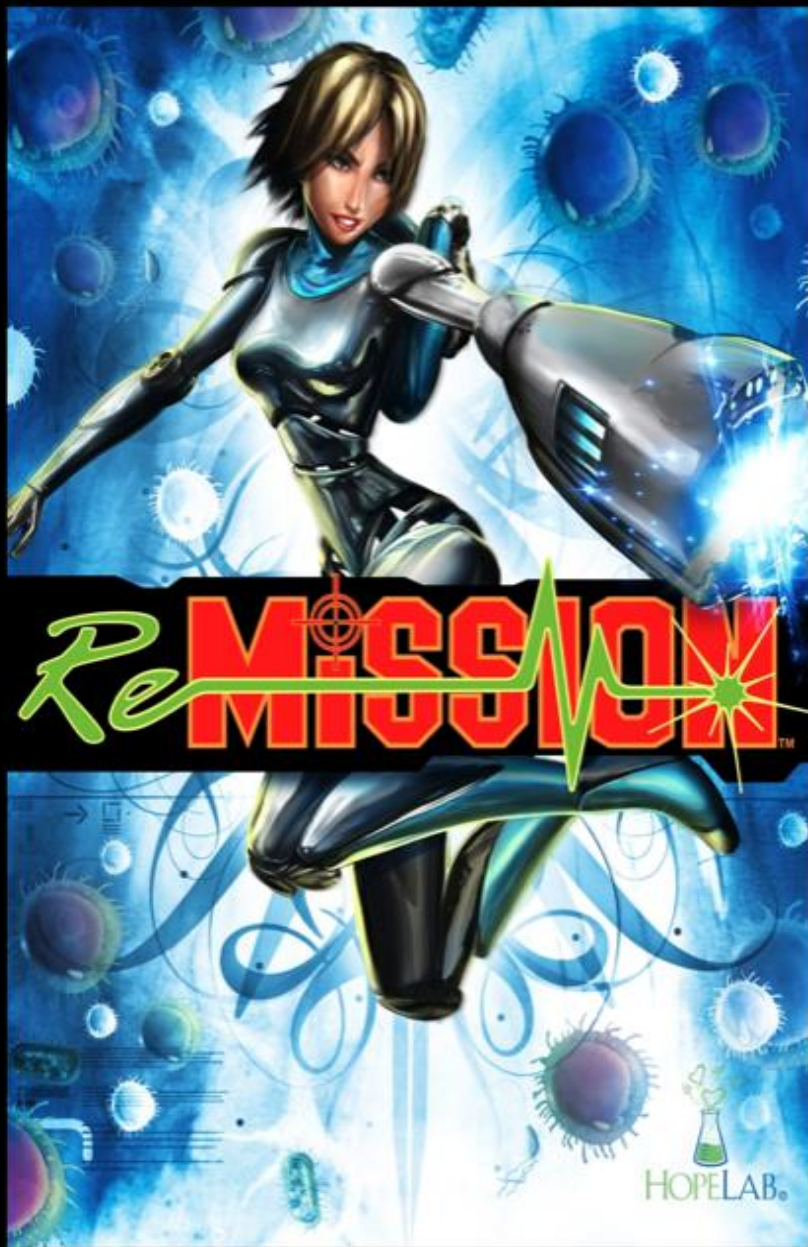
HOPELAB®

# + The Problem



Target problem and group:

Treatment adherence among adolescents and young adults with cancer



**Re-Mission  
7 Cancers**

- ALL
- AML
- Osteosarcoma
- Brain tumor
- Hodgkin's
- Non-Hodgkin's
- Ewing's Sarcoma

**19 Patients**

Diverse:

- Gender
- Ethnicity
- Age
- Location
- Disease stage

**20 Levels**

Adaptive difficulty

Diverse missions:

- Chemotherapy
- Radiation
- Metastasis ctrl.
- Infection ctrl.
- Stress mgmt.
- Pain mgmt.
- Bonus: immunotherapy

**1 Intrepid Nanobot**



# Re-Mission RCT Research



n=374 young people with cancer

34 medical centers

Design

Control game vs. Control game + Re-Mission

Primary outcome = Adherence to treatment

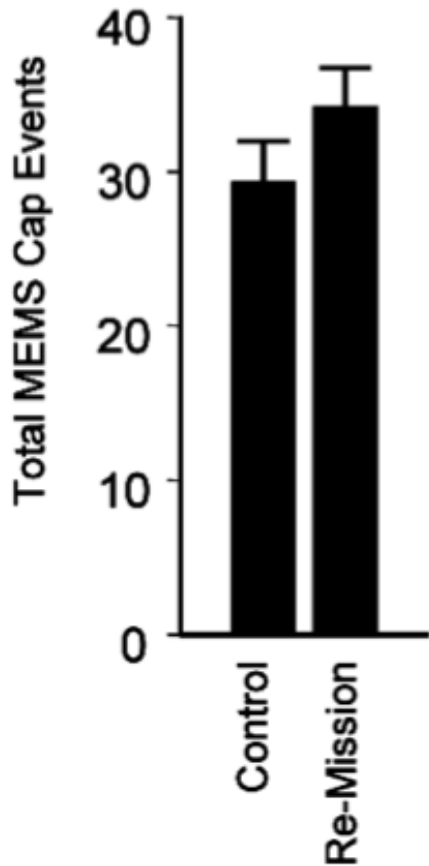




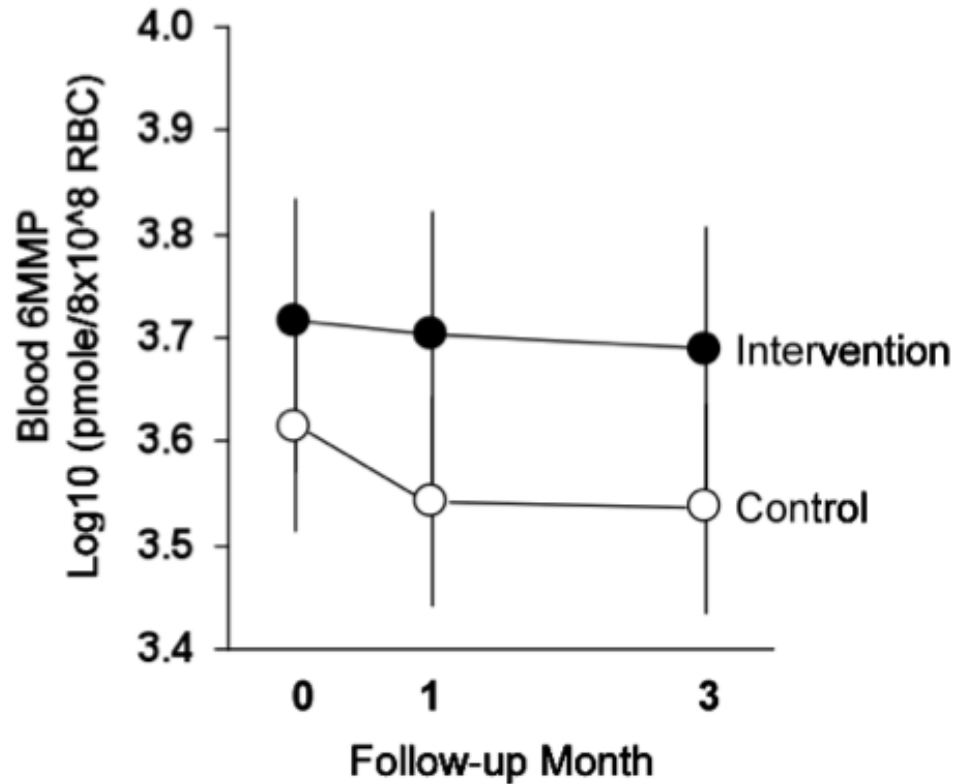
# Adherence



### Total MEMS Cap Events



### 6MMP





# PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

**A Video Game Improves Behavioral Outcomes in Adolescents and Young Adults  
With Cancer: A Randomized Trial**

Pamela M. Kato, Steve W. Cole, Andrew S. Bradlyn and Brad H. Pollock

*Pediatrics* 2008;122:e305

DOI: 10.1542/peds.2007-3134

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# + Re-Mission Today

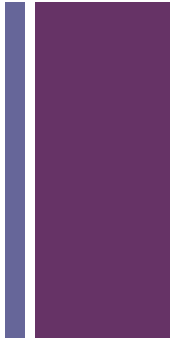


- Available at [www.re-mission.net](http://www.re-mission.net)
- Over 200,000 copies distributed world-wide
- Follow-up research showed that interactivity responsible for improved motivation to adhere
- Re-Mission 2 is out!

Cole, S.W., Yoo, D.J., Knutson, B. (2012). Interactivity and Reward-Related Neural Activation During a Serious Videogame. PLoS ONE.



# Gamification in Medical Training



- Underground
- Air Medic Sky 1

# Surgical Training



- Experts (surgeons) were 111% faster than novices (internists) in playing Underground
- Performance was highly correlated with a standard method of laparoscopic skills ( $r = 0.81$ ,  $p < .001$ )

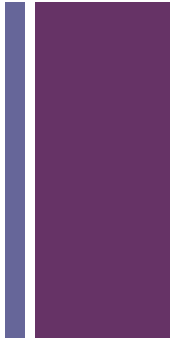


2011

INTERNATIONAL  
**SERIOUS PLAY**  
AWARDS

Best of Show

# + A Gamification Myth





# Myth: It's all about "Rewards"



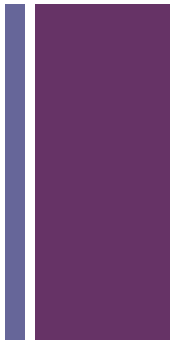
- It's also about losing
  - Failure is OK
  - There is no engagement or challenge if one is rewarded for EVERY target behavior
  - It is also about an expectation of rewards
- It is also about identity, belonging, esteem
  - It's not just how I feel, but how you might also feel about me
- Rewards can also undermine self-esteem
  - Good player award, volunteerism



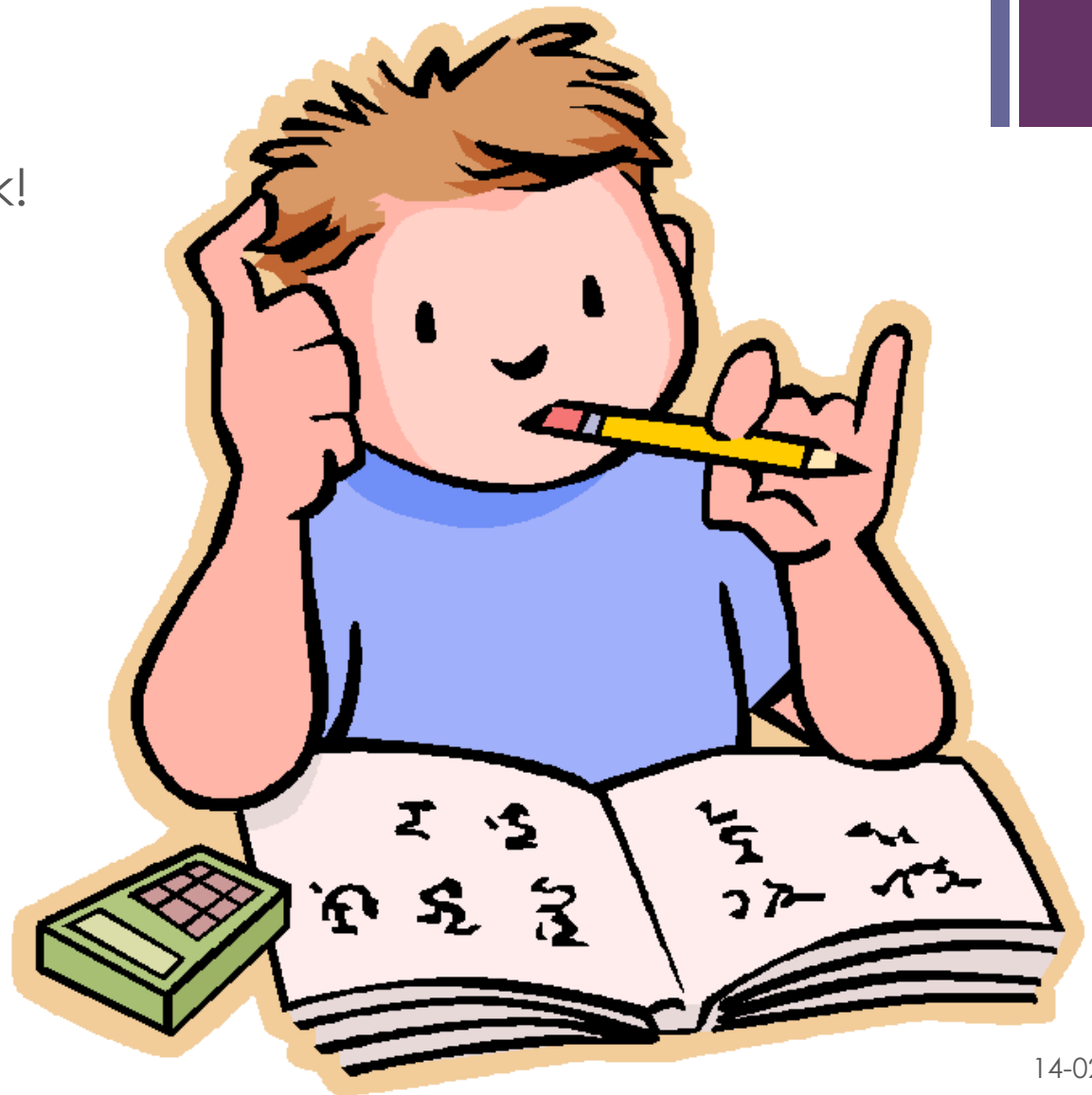
# + Keys to success



+ # 1



- Do your homework!



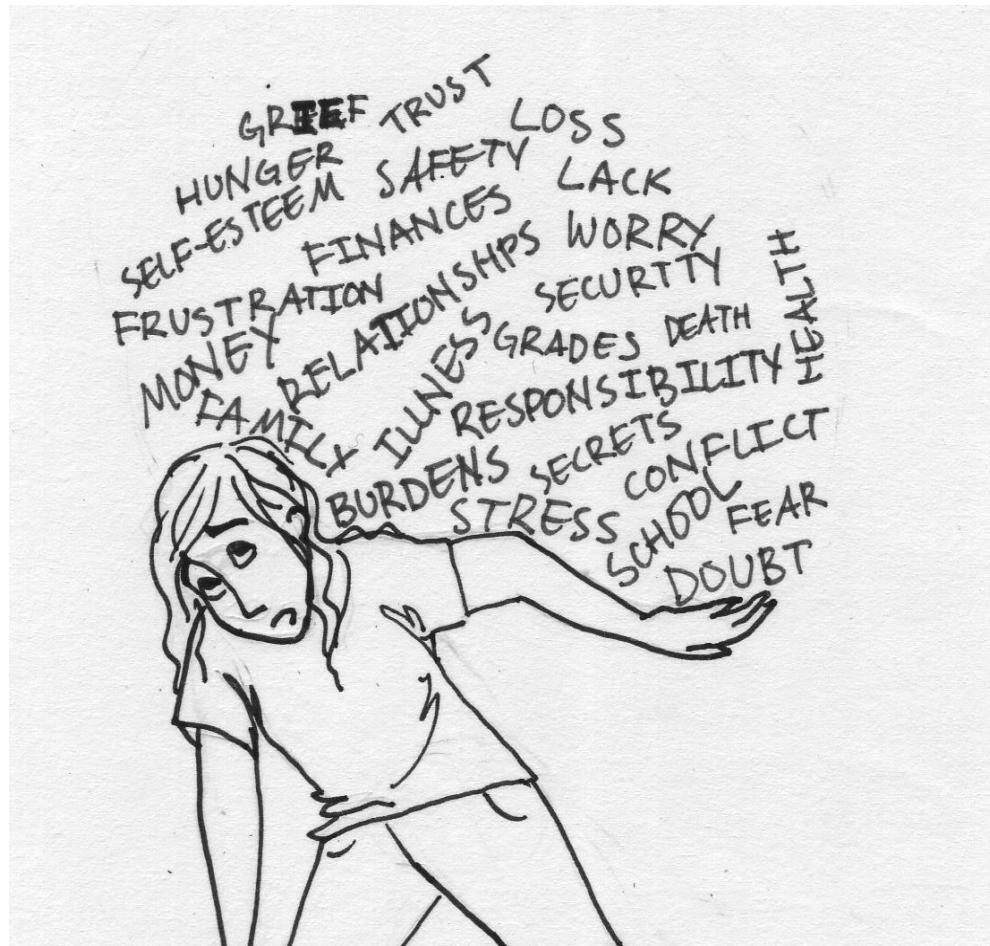
+ Does your game “fit” into a system?



# + Talk to your target group



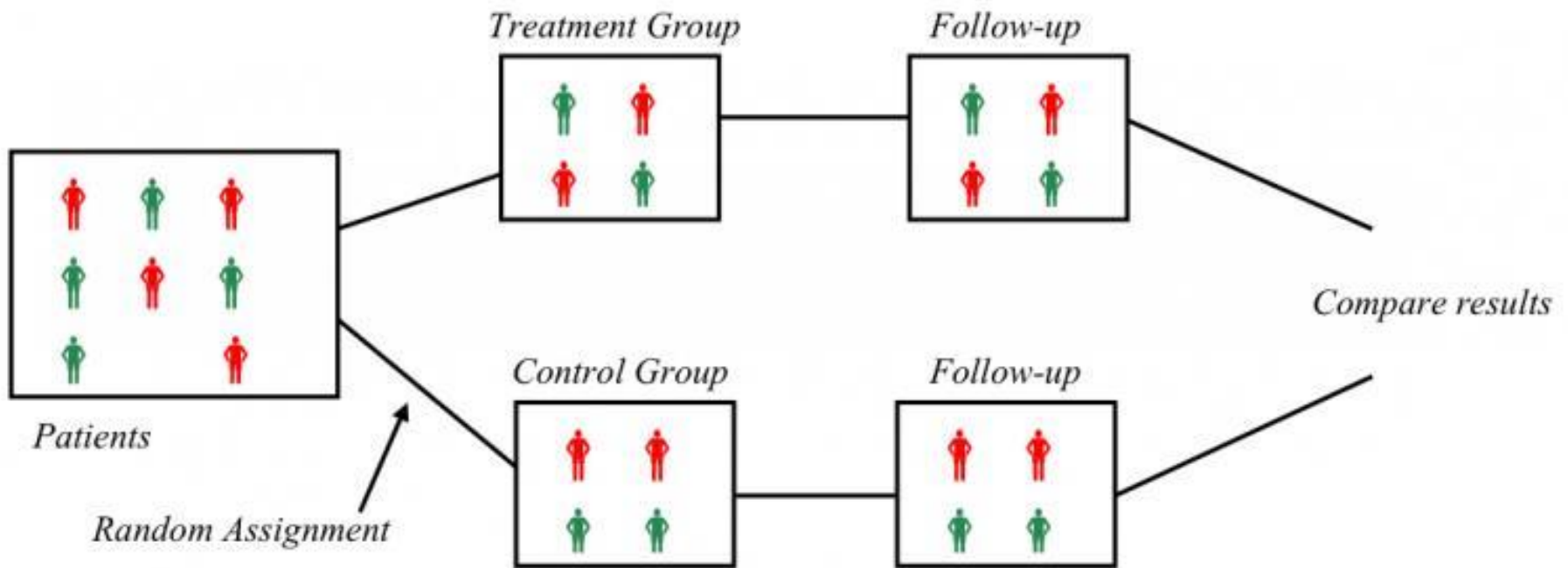
+ Find a big enough problem to solve



# + # 2



- Plan to evaluate if your game works!



# + SPARX



- N=187 ages 12-19, seeking help for depressive symptoms
- SPARX vs. traditional therapy for 4 to 7 weeks
  - Higher remission in depressive symptoms (44% vs. 26%) with SPARX
  - Mean reduction in depressive symptoms and response rates as good as from traditional therapy

# + # 3



- Plan to involve a business person from the start!





2011

INTERNATIONAL  
**SERIOUS PLAY**  
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Best of Show

+ # 4



- Play the game!



# + # 5



- Get your expert interdisciplinary team talking and working together.



# + # 6

- Actively involve your target group for feedback at every step!



# + #7 Conduct Quality Assurance Tests



# + Keys to Success



1. Do your homework!
2. Plan to evaluate if your game works!
3. Plan to involve a business person from the start!
4. Play the game!
5. Get your expert interdisciplinary team talking and working together
6. Actively involve your target group for feedback at every step!
7. Conduct Quality Assurance Tests



# Conclusions



- Gamification can be used to address pressing issues in healthcare
- Careful planning is key for success!
- Gamification can be a powerful tool to change behaviors but it takes a lot of collaboration, thought, and hard work for success
- Good luck!

# + Selected Publications



- Kato, P.M. (2012). Evaluating efficacy and validating health games. *Games for Health: Research, Development, and Clinical Applications*, 1(1), 74-76.
- Kato, P.M. (2012). The role of the researcher in making effective serious games for health. In S. Arnab, I. Dunwell and K. Debattista (Eds.) *Serious Games for Healthcare: Applications and Implications*. Hershey, PA: IGI Global.
- Kato, P.M. (2010). Video games in health care: Closing the gap. *Review of General Psychology*, 14(2), 113-121.
- Kato, P.M., Cole, S.W., Bradlyn, A.S., & Pollock, B. (2008). A video game improves behavioral outcomes in adolescents and young adults with cancer: A randomized trial. *Pediatrics*, 122(2), pp.e305-e317.



+ Thank YOU!



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- Phone: +44 777 0566 251

Contact us for upcoming workshops on gamification and serious games and for collaboration opportunities!

**SGI**  
Serious Games Institute

# Identification

Problem Statement

Is Gamification a probable solution?

Environment Scan

- Identify key problem behaviors
- Identify context of behaviors
  - Social, cultural, financial, environmental, physiological, etc.
- Identify sub-group affected in each context
  - Age, gender, ethnicity, SES, disease status, etc.

- Target Group
- Target Behavior
- Target Context

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**Prioritize** →

# Identification

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**Prioritize** →

# + When to use Gamification as a tool


- Caveat: it is not a cure-all, it works in a context



# + Context of Behaviors

- Adolescents and young adults often don't adhere because
  - They are present oriented
  - They have difficulty understanding the concept of dividing cancer cells and killing every last one of them
  - They understand the consequences of adherence are looking bad and feeling bad and being isolated
  - They don't know how to manage their side effects well
  - It's not cool to be a patient with cancer
  - It's not cool to talk about cancer with your friends
  - Ultimately, they are not motivated to take their oral chemotherapy!!





# Is Gamification a probable solution?



Yes! If the problem is rooted in BEHAVIORS

It also is particularly useful if

- ◆ The problem is due to a lack of motivation
- ◆ People aren't engaging in the behavior because the behavior is "uncool"
- ◆ Are these gamifiable?
  - ◆ medication adherence, using with a diet tracking app that crashes a lot, wearing a helmet when riding a bicycle

## Environment Scan

- Identify key problem behaviors
- Identify context of behaviors
  - Social, cultural, financial, environmental, physiological, etc.
- Identify sub-group affected in each context
  - Age, gender, ethnicity, SES, disease status, etc.

- Identify the behaviors involved in the problem
  - For adherence, is the problem refilling prescriptions? Taking medication on time? Taking medication in the proper doses? Taking the right combination of medicines? Reporting and managing side effects?
- Identify the different contexts in which the behavior occurs
  - When financial resources are scarce, when access to a pharmacy is difficult, when medications have a lot of side effects, when medication regimes are complex,
- Identify subgroups affected in each context
  - Elderly with mobility issues, cancer patients, elderly with dementia issues, etc.

- 
- Target Group
  - Target Behavior
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**Prioritize** →

- List each possible target group (based on subgroups identified), the target behavior (e.g., refilling prescriptions), and target context
- They prioritize each one in terms of needs
  - Behavior that is most dangerous (e.g., overuse of a drug)
  - Target group for whom the consequences are most severe or frequent (e.g., elderly with restricted financial resources)
  - The context in which the behavior occurs most frequently (e.g., at home or when schedule is disrupted)
- The results will lead you to being able to more clearly state your target group, behavior, and context that you will address through gamification



# + How do I Gamify??



## Start with theories!

- Why focus on theories?
  - They are the key ingredients in the “secret sauce” of effective behavior change approaches!
  - Help to brainstorm and structure the solution



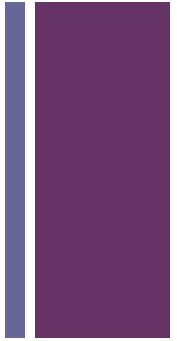
# Some Health Behavior Change Theories



- Health Belief Model
  - Change perceptions of the illness and barriers to behavior change and behaviors will change
- Social Learning Theory
  - Increase confidence in engaging in behavior through opportunities for skill mastery, verbal encouragement, vicarious learning, stress management
- Stages of Change
  - People go through different stages in terms of their readiness to change behaviors and once they change, relapse should be prevented and quick recovery from relapse should be supported
- Operant Conditioning
  - Behaviors that are reinforced and rewarded will be practiced more often



# Game Mechanics To Help It all Work Together



- What is winning?
  - The person with the most days of alcohol abstinence wins!
  - Gain points by daily connecting with your social network to report your status, check in, support others, can support from others
- How is progress/skill tracked?
  - Points
  - Pictures of food
  - Pedometer
- How are target behaviors rewarded?
  - Points, status, rewards, access, privilege
- How is challenge increased or adjusted?
  - Increasing levels of difficulty (increase water intake by 10%, 15\$, 30%, 60%, 100% or some variation thereof)

# + Conclusions



- Conclusion and closing (30 mins)
  - Lessons learned/feedback
  - Award ceremony!

Thank you for your participation!

# + Agenda

<b>12:30 – 13:00</b>	<b>INTRO</b>
<b>13:00 – 13:05</b>	<b>WELCOME BY MOHH (TIKKI)</b>
<b>13:05 – 14:00</b>	<b>GAMIFICATION IN HEALTHCARE (PAMELA)</b> OVERVIEW OF GAMIFICATION THE GAMIFICATION FRAMEWORK APPLYING THE FRAMEWORK
<b>14:00 – 14:15</b>	<b>MINI BREAK</b>
<b>14:15 – 14:30</b>	<b>BRIEFING FOR BREAKOUT</b>
<b>14:30 – 15:15</b>	<b>BREAK-OUT SESSION</b> REVIEW & ANALYSE PROBLEM STATEMENT ATTEMPT A GAMIFICATION SOLUTION
<b>15:15 – 15:45</b>	<b>TEA BREAK</b>
<b>15:45 – 16:45</b>	<b>GROUP PRESENTATIONS</b>
<b>16:45 – 17:00</b>	<b>CONCLUSION</b>





## Problem Statement

- The Framework begins with working on identifying the specific outcomes you want to achieve through gamification
- You will probably begin with a general problem statement and then you “do your homework” by evaluating the context in which the behavior is occurring to further refine your understanding of the frequency and severity of the problem and the different angles you could strategically take to effectively address it through gamification
- Note: The actual Framework is more broad and goes into more depth than the simplified version presented here.