Use Smart Phones to Promote Diabetes Self-management for Robust Elderly in China

Cindy LeRouge, Associate Professor
Jiao (Maggie) Ma, Assistant Professor
Saint Louis University
Overview
Users
Context
Multi-level Architectural Vision
CADA Prototype
Next Step
Future Aspirations
Q & As
Goal and importance

Multidisciplinary Research Team

Primary collaborators
Phase I – User Requirements Gathering

Phase II – Design, Prototyping & Testing

Phase III – Proof of Concept Field Evaluation
<table>
<thead>
<tr>
<th>Primary Principles</th>
<th>Definition</th>
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<tr>
<td>Reduction</td>
<td>Making complex tasks simpler</td>
</tr>
<tr>
<td>Tailoring</td>
<td>Tailoring information based on personal needs</td>
</tr>
<tr>
<td>Kairos</td>
<td>Technology intervention at the “right” opportune time</td>
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<tr>
<td>Self-Monitoring</td>
<td>Eliminate tedium of tracking</td>
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<tr>
<td>Conditioning</td>
<td>Operant conditioning that uses positive reinforcements to shape complex behavior</td>
</tr>
<tr>
<td>Liking/Attractiveness</td>
<td>Persuasion by liking is creating an environment that a user likes to use</td>
</tr>
<tr>
<td>Praise</td>
<td>Offering praise to make people feel good</td>
</tr>
<tr>
<td>Convenience</td>
<td>Easy accessibility</td>
</tr>
</tbody>
</table>
Target User Populations

- Primary: Urban vs. County vs. Rural Patients
- Secondary: Providers
- Secondary: Caregivers
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>&quot;Urban&quot;</th>
<th>&quot;Country&quot;</th>
<th>&quot;Rural&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational Level, Intellectual Abilities, Skills of the User</td>
<td>All over the board from some high school to high school and college graduates.</td>
<td>All over the board from some functionally illiterate to high school and college graduates.</td>
<td>All over the board from some functionally illiterate to high school and college graduates.</td>
</tr>
<tr>
<td>Learning Style</td>
<td>Mentioned games. Preferences for Chinese and symbolic characters to test.</td>
<td>Mentioned games. Prefer audio outputs to reading. Do not want the language to be &quot;doctor&quot; language.</td>
<td>Mentioned games. Do not want the language to be &quot;doctor&quot; language.</td>
</tr>
<tr>
<td>Diabetic physical capabilities</td>
<td>Consistently robust elderly population.</td>
<td>Consistently robust elderly population.</td>
<td>Consistently robust elderly population.</td>
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</tbody>
</table>

**Health Value Schema (PATH)**

- **Health Beliefs**: The most predominant group of urban patients can be described as avid information seekers for information on health treatment, price, nutrition, and healthy diet. They are price sensitive regarding health care, but not price prohibitive. They tend to be decision makers for the family (self or spouse) regarding health care. Urban patients are usually proactive and pay attention to preventive care.
- **Health Beliefs**: The most predominant group of county patients can be described as information seekers for information on health treatment, price, nutrition, and healthy diet. They are price sensitive regarding health care. They tend to be decision makers for the family (self or spouse) regarding health care. In comparison to the urban patient, the county patient tends to be more reactive and pay less attention to preventive care.
- **Health Beliefs**: The most predominant group of rural patients depends on health insurance. They prefer to have more relationships with doctors and may consult with doctors outside of their care plan.

**Technology Intent/Adoption**

- **Existing Computer/Internet Skills**: Available to all levels.
- **Technology Adoption**: All over the board from low to high.
- **Technology Adoption**: All over the board from nonexistence to non-existent.

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**Urban Patient**

**Personal Profile**

Shuxi Gao, a 63-year-old accountant, lives with her husband in a comfortable 3-bedroom apartment in Beijing. With a family history of diabetes, Mrs. Gao was first diagnosed with gestational diabetes in 1974. Starting her mid 50’s, Mrs. Gao tried to control her blood glucose through diet. But this did not work and she switched to oral medications in 1998. Mrs. Gao’s retina suddenly started bleeding, eventually she lost her left eye because diabetes induced glaucoma. She is now on insulin.

A few years back, many primary hospitals in Beijing started offering health seminars. Mrs. Gao likes attending the diabetes seminars. Although the seminars often present too much information each time for her to digest and remember, she enjoys making friends with other diabetes patients. Unfortunately, Mrs. Gao also became a Type 2 diabetic patient. Mrs. Gao is not able to attend those seminars as often as she would like because commuting to the seminars takes a lot of time. Through the seminar, she has mastered the basic knowledge of diabetes and her blood glucose level is pretty much under control.

Mrs. Gao tests her blood glucose level often, at least once every three days. She learned from the seminars that she should record her glucose test results to see how she is doing over a period of time. Mrs. Gao only occasionally uses the logbook that the glucose meter company provided, as it is such a hassle writing things down each time. Mrs. Gao knows that diet is important, but struggles with managing her diet during special family meals with her children and grandchildren and especially when they go out to eat. Mrs. Gao often forgets how much or how many she eats hours later when she tries to write down what she ate in her log. Mrs. Gao enjoys group ribbon dancing in a nearby park every morning.

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**Shuxi Gao 高树新**

"I want to help other diabetics."

**Background**

- Lives with her husband of 58 years, both have stable pensions.
- High school graduate with an accounting certificate.
- Enjoys cooking, knitting, and learning how to play poker games on computer with her husband.

**Attributes**

- Outgoing and warm-hearted
- Has a clear goal in diabetes management and likes to plan ahead
- Feels empowered by diabetes knowledge she has accumulated over the years and wants to share with others
- Avoids information seeker (e.g., nutrition, healthy diet)
- Decision maker for the family regarding health care

**User needs**

- Easy and portable way to log and track daily, diet, glucose levels, and exercise.
- Better access to enjoyable diabetes education approved by her doctors.
- More time and individualized attention from her providers.
- Assistance to make diabetes self-management more convenient and fun at an affordable cost.
China Diabetes Chronic Care Model

Positive Policy Environment
- National project for diabetes management
- Guideline for Chinese diabetes prevention
- Bans on smoking and tobacco advertisement
- Government driven health insurance
- Diabetes prevention workshop for health professionals
- Beijing HOPE Project

No Formal Links

Community
- Informal grass roots organizations
- Websites for diabetes patients
- Participate in World Diabetes Day
- Neighborhood Association sponsored events

Health Care Organization
- No coordination and weak continuity
- No formal quality improvement projects
- No general guidelines for diabetes care
- Self-management via patient education
- Sporadic use of information system

Macro, Meso, Micro

Prepared
- Community Partners
- Informed
- Motivated
- Patients and Families

China Diabetes Chronic Care Model
Multi-level Architectural Vision
China Diabetes Chronic Care Model
Interactive and Iterative Prototyping

Evaluation Room
- Participant
- Facilitator

Observation Room
- Observer
- Participants work through a set of pre-defined tasks.
- Users were encouraged to "think aloud" narrating their thoughts.

The evaluation sessions are interactive with discussion led by a skilled facilitator.

In an adjoining room, an observer took notes on how well the site helped, confused, or defeated the participants.
Dancing Mask – Level 1 Only
Tile Game – Level 1 Only

点击寻找图案相同的两个图板

点击寻找图案相同的两个图板

点击寻找图案相同的两个图板

点击寻找图案相同的两个图板

适当的运动是糖尿病自我管理中的一架马车。
- 教育
- 饮食
- 锻炼
- 用药
- 自我监测
## Persuasion Design Principles

<table>
<thead>
<tr>
<th>Persuasion Design Principles</th>
<th>Manifestation in System</th>
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<tbody>
<tr>
<td>Reduction</td>
<td>Making complex meal tracking tasks simpler</td>
</tr>
<tr>
<td>Kairos</td>
<td>Smart phone intervention at the “right” opportune time, meal time</td>
</tr>
<tr>
<td>Self-Monitoring</td>
<td>Eliminate tedium of tracking meals</td>
</tr>
<tr>
<td>Conditioning</td>
<td>Reinforcement to eat well through trending</td>
</tr>
<tr>
<td>Liking/Attractiveness</td>
<td>Gaming</td>
</tr>
<tr>
<td>Praise</td>
<td>Offering praise with both games</td>
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<tr>
<td>Convenience</td>
<td>Smart phone easy accessibility</td>
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Next Step
Experiment vs. Control

Over an extended period of time

Assess the following at three time points:

1. knowledge tests about diabetes, particularly hypoglycemia
2. HgbA1C level and patients’ weight
3. satisfaction of physician
Extension of Research Pursuit

- Technical tools, e.g., Microsoft Health Vault
- Other organizations, e.g., China Red Cross
- US counterpart comparison, e.g., Missouri Health Foundation
- Psychosocial needs  -- “emotional” network
- Other high risk populations, e.g., overweight teens
Questions?