A Design Approach for Risk Communication, the Case of Type 2 Diabetes

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Abstract: Type 2 diabetes continues to grow significantly around the world as a result of nutrition transition and obesity. Prevention methods depend on how well individuals at risk adapt to a healthy nutritional lifestyle and increase their physical exercise. It is an emergent situation for diabetes risk communication and education programs specifically in vulnerable societies. This study leverages an interactive platform for diabetes risk communication using human-object interaction. The approach is based on an ‘object-based learning’ method for communicating risk.

The designed object has elements to motivate and support the community toward an increase in physical activity and a healthy diet. Furthermore, this research looks at risk perceptions and stakeholder engagement of lay people from vulnerable communities. Understanding risk perception and misconception is important to provide diabetes educational services in accordance to local demands.

Keywords: Risk Communication, Design for Behaviour Change, Human-Object Interaction, Mental Model

1. Introduction

The spread of diabetes has emerged as a major health concern around the world. It is estimated that there will be 592 million people with Type 2 diabetes by 2035 compared to 382 million in 2013 (Guariguata, et al 2014). Diabetes is a long-term disease that has significant impact on an individual’s lifestyle; for instance, in order to manage this disease, it is vital for individuals to control their blood sugar, possibly by taking medicine such as insulin, and by changing their eating habits.

Studies have emphasized that awareness is an important component of the control and prevention of diabetes. Prevention of diseases such as diabetes is connected to the social
awareness and level of education in each community (Feinstein 2006). Education is a powerful tool, proven to effect healthcare, both directly by increasing awareness of disease prevention (Hammond 2002) and indirectly by influencing people’s behavior and actions toward their health (Hammond 2004; Ross & Mirowski 1999). Preventive education can be effective “if designed and delivered appropriately to address particular notions about health and illness” (Feinstein 2006) A designed risk communication and educational platform can facilitate informational transformation in society.

In the process of risk communication for diabetes awareness, critical questions are recommended for applied researchers to address. This study addressed: 1.) how risks of diabetes are understood in the community and typically communicated, 2.) what are the perceptions and important misconceptions about diabetes in the targeted society; and 3.) promote healthy eating and weight control as well as physical activity at the individual level.

1.1 Perception and Mental Model
Alongside awareness, perception and misconceptions were shown to influence disease preventative action. It is very important to understand these perceptions as they will likely impact a patient’s decision to take action or not regarding their disease (Noë 2004). “Lay people bring to any risk a web of beliefs, called mental models, that reflects some mix of knowledge, misinformation, and ignorance” (Fisher, et al 2002). The mental model reveals individuals’ thoughts about their surroundings and how something works. The personal perceptive recognition of the risk event will create the mental model about that specific risk. Information needs to be tailored based on the community’s mental model to help advance individuals’ understanding of risk (Fisher, et al 2002).

1.2 Feeling and Emotion
Effective risk communications can help people adapt to preventative and in-advance community action (Fischhoff, Bostrom, and Quadrel 1993). The way people behave and perform during a risk event is not completely a cognitive process and it may not be fully in accordance with the individual’s knowledge. Emotions and social processes play a significant role in this reaction process (Fischhoff, Bostrom, Quadrel 1993). There are different models that explain how people perceive risks. A popular approach suggests that people perceive risk based on how they feel about the risk more than what they know about the risk (Epstein 1994; Slovic, et al 2004).

Risk managers, however, paid less attention to how people felt about the risk; instead, they exclusively provided risk-related knowledge to the vulnerable population. Conversely, the public ignored important messages in several instances and tended to emphasize their feelings about the risk; and their behavior was based on their perception of risk.

Overall feeling and experience of participants play an important role for the success and effect of risk communication strategy. According to Slovic, et al (2004), an individual assimilates risk based on two fundamental systems: “Analytical system” and “experimental
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system” (Table 1). Analytic system uses normative rules and formal rules and participants receive the knowledge and information through analytical system.

**Table 1 Experimental System Vs. Analytical System (Slovic, et al 2004)**

<table>
<thead>
<tr>
<th>Experimental System</th>
<th>Analytical System</th>
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<tbody>
<tr>
<td>Holistic</td>
<td>Analytic</td>
</tr>
<tr>
<td>Emotion and affect</td>
<td>Logical</td>
</tr>
<tr>
<td>Rapid processing and immediate action</td>
<td>Thinking and slower action</td>
</tr>
<tr>
<td>It is valid because of self belief or experience</td>
<td>It is valid because of evidence and logic</td>
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</tbody>
</table>

This system acts on a highly conscious and rational process. Conversely, the “experimental system” is intuitive, a mostly automatic and relatively subconscious process. The experimental system relies heavily on images and associations linked by experience to emotion (Slovic, et al 2004). These two systems should rely on each other to be effective. However, the difference of the two systems in risk communication is important to be recognized. Although analytic system is certainly important, emotion in experimental system has a quicker, easier effect on decision-making and a more efficient way to navigate in a complex, uncertain and dangerous world (Slovic, et al 2004). As a result, the important question in risk communication is how do we apply ‘reason’ to trigger ‘emotional appraisal’ to manage risk?

2. Hypothesis

The hypothesis of the object-based experiment in this research was associated with the idea of "indwelling" in terms of learning through processes of knowing, playing and making (Garber 2013). In designing the educational platform for risk communication, this study looked at the indwelling theory to understand how knowledge is transferred to a learning stage in which people take preventative action to avoid risks such as diabetes. “We only truly learn when we indwell what we want to learn” (Garber 2013). Standing outside an event will rarely foster learning; rather, individuals learn when they step in to explore and learn about the risk themselves.

This project proposed an experimental and object-based method providing an environment in which people interact physically with a mechanically powered blender to make smoothies (pedaling on bicycle to power a blender). The system was designed with attention to the core diabetes preventative actions, including physical exercise and a healthy diet.

According to Fogg Behavior Model (FBM) (Figure 1), “behavior is a product of three factors: motivation, ability, and triggers” (Fogg 2009). Learning alone cannot guarantee a participant’s decision to take diabetes preventative action and make behavioral change.
Fogg suggests that individuals might decide to change behavior if they are sufficiently motivated, have the ability to perform the behavior, and are triggered to perform the behavior.

![Figure 1](image)

**Figure 1**  Fogg Behavior Model (FBM), (Fogg 2009)

The Kinzie (2005) model is also a five-stage instructional strategy that provides a general guideline and instruction for applying a method of communication for behavioral change. The model is designed for field researchers to communicate health information to a community.

The model in table 2 suggests starting the program with an attractive announcement to gain people’s attention. In the second stage, people are ready to receive the stimulus service and materials. Transferring information in the third stage is the challenge and the significant stage in the process for behavioral change. The learning guidance should be simple, clear and effective for the audiences.

The fourth note in the Kinzie (2005) model suggests conducting observational and qualitative research in parallel with analyzing an individual’s reactions. It is important to receive feedback of the targeted community about the designed educational platform. Finally, encourage retention strengthens the program’s impact for behavioral change and thus support the future stages in the study.

**Table 2**  Five-Stage Instructional Strategy for Behaviour Change (Kinzie 2005)

<table>
<thead>
<tr>
<th>Step</th>
<th>Stage</th>
</tr>
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<tbody>
<tr>
<td>Gain attention</td>
<td>1</td>
</tr>
<tr>
<td>Present stimulus material</td>
<td>2</td>
</tr>
<tr>
<td>Provide Learning guidance</td>
<td>3</td>
</tr>
<tr>
<td>Elicit performance and provide feedback</td>
<td>4</td>
</tr>
<tr>
<td>Enhance retention and transfer</td>
<td>5</td>
</tr>
</tbody>
</table>
2.1 D-Pedal Diabetes Educational Platform

Some studies suggest combining techniques for behavioral change communication. As an example, Brisco and Aboud (2012) suggest that due to the complexity of behavior change process, an effective intervention in a community would depend on a platform of education to integrate techniques at four levels: behavior level (performance techniques), social level (social support, interpersonal media), sensory level (materials, media), and cognitive level (problem solving, information).

We centered our study in the multinational neighborhood of Mouraria in Lisbon and gave our project the code name D-Pedal. We worked in collaboration with Technical University of Lisbon, IN+ Center for Innovation, Technology and Policy Research. D-Pedal was designed to be a core object in our educational platform to be tested in Mouraria neighborhood in Lisbon, Portugal. Mouraria is the neighborhood in the historical part of Lisbon, with immigrants from China, India, Africa, Pakistan and other Arab countries who live alongside elderly Portuguese citizens. This neighborhood is considered a vulnerable and multi-national neighborhood in Lisbon.

The D-Pedal brand name was developed to embed the main components of Diabetes (D) Prevention (P), Education (E), Design (D), and an Active (A) Lifestyle (L). D-Pedal focuses on
Diabetes and Pedal (as the verb) in order to magnify the cycling action by promoting an active lifestyle.

Based on the Kinzie (2005) model, gaining attention should be the first stage of the communication strategy for behavior change. In this experimental educational platform, the first goal was to collect qualitative data on emotional impacts of the D-Pedal experience and to observe participants’ reactions and analyze the appraised emotions in the study. We were interested in understanding how the emotions of D-Pedal experiences might influence the process of communication and the participants’ engagement, and to understand how object-interaction might be applied for creating a conducive environment for risk communication.

Our second goal was to look at knowledge/information transformation in the D-Pedal experiment. An open conversation about diabetes could provide information about the community’s perceptions and misconceptions about the disease, as well as how the D-Pedal platform might effectively create a community network and information transfer system in vulnerable societies.

2.2 Appraisal Emotion - Emotion Theory

Emotions are associated with specific appraisals. According to appraisal theory, each emotion can cause a specific reaction or decision in people. “Emotions predispose individuals to appraise the environment in specific ways toward similar functional ends. Each emotion activates a predisposition to appraise future events in line with the central appraisal dimensions that triggered the emotion” (Lerner, Keltner 2001).

To further analyze the impact of appraisal emotions in the D-Pedal experience, this study explored emotion and affect theories. Lerner & Keltner (2000; 2001) illustrated the appraisal-tendency framework and suggested a model of emotion-specific influences on judgment and choice.

This model was used to analyze the impact of D-Pedal in appraising emotions of ‘surprise’ and ‘pride’ and reduce the emotion of ‘fear’ and how this might influence our communication process. According to “Emotion appraisal tendency model” by Learner and Keltner (2000; 2001), fear has the potential to generate a negative perception that the risk is unpredictable and beyond one’s control. As long as fear is dominant in the environment, risk communication for health prevention, management and control becomes beyond access.

However, appraisal emotions will support the conductivity, trust and social network tie in D-Pedal experiment which is the first essential stage for communicating diabetes risk in a community. This early stage does not relate to behavioral change but sets the right conditions that instill an optimistic and motivational mood in people, opening them up to acquire new information. According to experimental system, emotions accelerate actions
and effect how people decide; however, it is important to analyze the correlation of emotion and reactions of individuals in the experiment.

D-Pedal brings ‘surprise’ and ‘excitement’ to the targeted society (with unexpected elements) by integrating bicycle and blender. It therefore has the potential to attract individuals to explore the system by pedaling on the bicycle while powering the blender. The system is designed to be experimental, playful and exploratory. Participants need to pedal for a few minutes to make a smoothie and then receive a cup of the drink as their reward.

The diabetes risk communication platform of D-Pedal was designed to engage two important aspects:

Hypothesis 1. during the knowledge transformation or risk communication, D-Pedal applies a playful and explorative mechanism to fully engage participants and transfer information to the community.

Hypothesis 2. In the second stage, D-Pedal can also provide a conductive environment to share information. This design provides researchers in D-Pedal testing with significant information about diabetes misconceptions and perceptions in the targeted society.

3. Method

This study implemented an ethnographic field research. Testing sessions were held in different settings with various ages and groups in Mouraria, Portugal. In collaboration with IN+ Center for Innovation, Technology and Policy Research in Lisbon, D-Pedal was built and tested. In each session, observational research and interviews were done by a psychologist and a designer in the field. Observations, video and picture analysis and interviews were conducted with residents of all ages, NGOs, the diabetes association of Lisbon and two nurses who were in our focus group. In this multinational community, a group of four researchers in the field might have to speak Portuguese, English, Arabic, Italian or Romanian with residents. In order to build communication in this multi-lingual context, we identified the five clusters as the sampling zones for the interviews and testing D-Pedal.

Table 3  Four different locations for testing D-Pedal

<table>
<thead>
<tr>
<th>Settings in Mouraria</th>
<th>Cluster</th>
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<tbody>
<tr>
<td>In front of the medical van</td>
<td>1</td>
</tr>
<tr>
<td>In front of the local shopping center</td>
<td>2</td>
</tr>
<tr>
<td>In the main street of Mouraria (Local Bazaar)</td>
<td>3</td>
</tr>
<tr>
<td>Dia Center (center for elder Portuguese)</td>
<td>4</td>
</tr>
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Prior to testing D-Pedal, the research group conducted a pilot study in the community by randomly choosing 11 community members and asking semi-structured questions about diabetes. Figure 3 is the demography of the participants. We included Portuguese and non-Portuguese in the study in order to provide a realistic sample of the community.

<table>
<thead>
<tr>
<th>Lisbon Semi-Structure Interview</th>
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<tbody>
<tr>
<td><strong>D-Pedal</strong></td>
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<tr>
<td><strong>Diabetes risk factors in Mouraria</strong></td>
</tr>
<tr>
<td>- Do you know diabetes?</td>
</tr>
<tr>
<td>- What is diabetes for you?</td>
</tr>
<tr>
<td>- Does anyone in your family or friends have diabetes?</td>
</tr>
<tr>
<td>- What kind of problem does your friend face to manage diabetes?</td>
</tr>
<tr>
<td>- Where is the closet clinic in this area?</td>
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**Figure 3** the demographics of the participants of pilot study (11 individuals) in clockwise order: a) Age b) Nationality c) Gender d) Semi-structured interview, list of questions

For D-Pedal test, D-Pedal research group developed collaborative research with Associação Protectora dos Diabéticos de Portugal (APDP)¹ (diabetes association of Portugal) to conduct field research in the neighborhood and get their feedback on the D-Pedal device. Together with APDP, a questionnaire was developed to collect general information about diabetes prevalence in Mouraria and to observe how the community would possibly react toward questions about diabetes.

¹ http://www.apdp.pt/
To better understand the community’s reaction toward D-Pedal, this study used focus group, qualitative research and mixed methods of observation. Semi-structured interviews gave us the flexibility to interpret social interactions, culture, beliefs, age, ethnicity in the setting and dynamics of the community.

This study used focus group method to have open discussions in a social and group context and using a fundamental degree of flexibility (Robson 2011). As Robson points out, the advantage of focus groups is that it encourages all people to not only participate and talk about a problem together but it also builds a communication session. These sessions allow those people who usually are reluctant to speak to share their opinions. “This technique is
highly efficient for qualitative data collection since the amount and range of data is increased by collecting from several people at the same time” (Robson 2011, p. 294). In fact, D-Pedal support the creation of group and building trust in the study.

Figure 5 is demographic of D-Pedal participants. The 46 participants were in different age group including children and elders. Participants were from diverse nationalities. The excitement of D-Pedal experience motivated the community members to create D-Pedal group to share their experience.

3. Outcomes

This study was designed in two stages: pilot study and D-Pedal test. The D-Pedal test demonstrated a high level interaction of individual in different ages with D-Pedal, and its impact on level of engagement, trust and confident of participants in the study. Thereby, we collected data on individual’s perception about diabetes risk.

During the pilot study we did not introduce participants to D-Pedal. we presumed that open conversation about the disease would be a difficult challenge in our study. After spending considerable time in Mouraria to find random volunteers for interviews and open conversation about diabetes with them, we could only conduct interviews with 11 people of which two individuals decided not to continue the conversation. In terms of social groups, e.g. families, genders and nationalities, we were not successful to include diversity in our pilot research in terms of nationalities, the number of male Bangladeshis and adult Portuguese (25-65) were dominant.

The outcome of the pilot study suggests that three out of 11 interviewed individuals had radical perceptions about the diabetes risk, such as “diabetes is a cause of death” or “blindness” or “losing a leg.” Based on these extreme perceptions, people mentioned diabetes risk as an uncontrollable and unmanageable disease. The community was also conservative in discussing diabetes healthcare problems. People seemed not confident to talk about their own healthcare issue and ignored the diabetes risk problems. Those who named a diabetic case in the interviews referenced the case to a person in their family or among their friends. The pilot test in Mouraria indicated that although people have some knowledge about diabetes, they have noticeable misconceptions about this disease as well.

3.1 Emotion and Action

Results from the D-Pedal tests demonstrated ‘surprise’ and different stages of ‘pride’ in the participants. The unexpected combination and association of blender and bicycle disrupted perception and caused surprise. On the other hand, accomplishing the pedaling task and receiving smoothies as a reward generated different stages of pride in the D-Pedal social group.
Lerner and Keltner (2000; 2001) explained pride in their model as an emotion that can increase the level of control people feel. Lerner and Keltner (2000; 2001) highlighted the unique effects of pride on helping behavior and sticking to a task. People with pride perceive a positive event as something they created and the individual’s own responsibility. Pride emotion and feeling of responsibility could potentially support individuals to make decision in accordance to a healthier life.

Adults demonstrated pride as a sense of power and ability in cycling very fast and making a better smoothie in less time. For the elder participants, D-Pedal is familiar, as they know how to ride a bicycle. as opposed to more technical tools that are not familiar and they cannot interact with easily. ‘Pride’ showed on their faces when they persistently made an effort to mount the bicycle and start pedaling. Even though the exercise was difficult, they were persistent. In some cases, the D-Pedal team helped them to keep seated and even operate the pedal with them.

Children became proud when they competed with other children. When they could not even reach the pedal, they stood up so they could run the blender. These accomplishments induced a state of pride for the participants.

In order to reduce fear and create an environment of support, the research team used positive motivators of pride and surprise in the object experience. The “emotion appraisal tendency model” suggests that surprise increases enjoyment and therefore, people perceive the event as positive. However, according to the model, since the sense of control is medium regarding “surprise,” people would likely still perceive a positive event beyond their control and something controlled by others. To surprise people, D-Pedal team designed a bike-blender, a blender powered by pedaling. Surprise in the communication environment became a place to motivate and engage participants.
Figure 7  Testing D-Pedal in different locations, pedalling on bicycle and after the exercise
Figure 8 Testing D-Pedal in different locations, pedaling on bicycle and after the exercise
3.2 Transforming Information and creation of D-Pedal Community

The unexpected benefit of D-Pedal was the excitement and fun it brought to the community. Because of this generated excitement, the goal was reached to effectively engage individuals, to transfer diabetes information. D-Pedal research team recorded and analyzed videos and pictures of the participants’ actions in D-Pedal tests to find out and report a meaningful definition of the actors in the field.
This study applied the affect theory to demonstrate different actions of participants in relation to D-Pedal experience. According to Russell (1980), the experience of core affect is a single integral blend of two dimensions: valence (from unpleasant to pleasant), and the vertical axis representing arousal (from calm to excitement)” (Figure 10) “The various positions on the core affect figure are illustrated with examples of affective responses that can be experienced in the user-product interaction.”

Figure 10  Circumflex model of core affect with product relevant emotions (Desmet, Hekkert 2007; Adapted from Russell 1980)

Forty-six individuals participated in the D-Pedal experiments in four different locations in Mouraria (table 4). D-Pedal was set up in four locations as denoted in Table 3. D-Pedal researchers observed and recorded all the stages of the experiment.

Looking at the core affect model, we designed Ax4 biaxial map (Figure 11) to illustrate participants’ action in the experiment. Individual reactions to D-Pedal categorized in terms of their level of participation (pedal on D-Pedal or not) and their level of curiosity in exploring information and receiving knowledge in regards to diabetes.
Figure 11  Biaxial Map, observational research results, community groups categorized in reaction to D-Pedal education program

Adventurers

These individuals accounted for 67% in our D-Pedal study, actively experienced D-Pedal and spent a considerable time with the research group to ask questions about diabetes and the goal of D-Pedal program in their neighborhood. The impact of object experience was substantial in developing the sense of confidence among participants. The role of adventurers proved to be fundamentally important in urging the community to join the experience. They were accurate and fully focused on details in order to spread a factual message about diabetes education within their neighborhood. D-Pedal research team recognized adventurers as potential candidates for transferring knowledge in their society. The outcome of the study suggests that social elements such as dress code, religious beliefs and familiar signs, language, etc. are important factors in creating better communication with people.
Enthusiastic Socializers

Few participants accounted for 9% of participants engaged with D-Pedal but additionally demonstrated interesting capabilities in promoting social communication. They brought humor, excitement, and motivation to the community and encouraged others to participate in the program.

Enthusiastic Socializers gradually became members of the research group and supported the study by convincing other locals to consider the program and join in. The Enthusiastic Socializers can bring an exceptional competence into building community if the field-testing program is designed for open participatory engagement. Recruited Enthusiastic Socializers can act as research members.

Browsers

This group, accounted for 24% of participants did not engage in the bike-blender exercises. This group was curious and interested to observe, read the flyers and sometimes join other participants to form a group. Browsers sometimes asked questions of the researchers in the field to gain comprehensive information about the D-Pedal program in their community. This group made comments and suggestions; also, they shared their concerns about diabetes with the research group.
Passersby

The passersby were residents who did not participate in any of the D-Pedal program and exercises in the community.

The context, as well as cultural factors, are important factors in building trust. The Chinese society, for example, was a group who did not agree to participate in the D-Pedal program. Generally, the Chinese community was conservative, and in our field research, we did not enhance the context of D-Pedal with Chinese cultural signs and language to promote their participation. In addition to the Chinese, we observed other pedestrians who were not motivated to participate in D-Pedal program. The catalogs and flyers could possibly transfer part of the diabetes information to the passersby group.

4. Conclusion

The salient problem of diabetes is recognized as one of the main contemporary health concerns around the world. Nutrition transition plays a key role in the prevalence of diabetes especially in disadvantaged communities. It is strongly suggested that increased physical inactivity also contributes to widespread obesity and diabetes.

Diabetes organizations, such as American Diabetes Association, and many pilot studies have made clear that education, prevention and the final impact on behavior change is the most important system approach to support, manage, and control the spread of diabetes.

Although all the studies and organizations confirm the significance of diabetes education for society, the challenge appears when the objective is to have impact on behavioral change. Even in the first stage of education and transferring knowledge in a society, the process is critical and demanding. This necessitates careful research to uncover misconceptions of residents about diabetes, as well as prevailing attitudes of the culture and the community setting.

The initial studies in Mouraria recognized the generic and incipient information held by residents about diabetes. Residents heard about healthy diet and the effects of genetic heritage in diabetes, but they usually did not have precise information to explain what exactly these terms mean. Residents mentioned healthy diet and healthy food in the interviews, but people did not generally have the knowledge of the exact foods and
vegetables that are helpful. Some interviewees thought that diabetes cannot be prevented and saw it as a sudden and unpreventable disease. Prevention, as studies suggest, has a very significant correlation with diabetes. As a result of our research, the D-Pedal team suggests that it is critical for the concept of diabetes prevention through physical exercise and healthy nutrition be spread in the community. Accurate information with effective knowledge transferring systems could potentially address these misconceptions and enhance the level of awareness in society.

Although the interviews in pilot stage demonstrated the extreme reticence of some residents to explain their own problems of diabetes, D-Pedal demonstrated that it can increase individual’s confidence and trust to share and discuss more personal issues with the disease.

This study had a short-term impact based on qualitative research in the field. Evaluating the impact of the educational systems, such as D-Pedal, on behavior change needs long-term research in the community to gather self-reported information coupled with clinical reports about changes in the status of diabetes in the neighborhood. This study therefore suggests a further stage to test D-Pedal in a control study environment to report the impact of the system in learning or behavior change. Theories of behavior change were reviewed in this study and it suggested a positive potential of D-Pedal platform for risk communication and behavior change.

D-Pedal’s educational strategy was a design-based approach with emotional impact that measured surprise and pride effects on participants. Integration of bicycle and blender disrupted perceptions to trigger the participant’s memory about diabetes and associate a new memory with meaningful preventative physical exercise and a healthy diet. D-Pedal was designed not just to motivate but to have an indirect, simple and precise message through participatory action for possible diabetes prevention alternatives.

We observed a gradual creation of social network and community around the system. D-Pedal created an environment of trust and confidence for knowledge transformation. Some participants felt confident enough to initiate the conversation, share diabetes problems, and explore diabetes information in our flyers. In the risk communication process, beginning the conversation is critical and will be a big challenge to achieve a level of confidence that allows individuals to share their personal issues with the risk.

This study also explored characteristics of the D-Pedal community to discover the most effective systems to transfer diabetes information in the local setting. Four groups, identified as the key players and characters in the program, were passersby, enthusiastic socializers, adventurers, and browsers. Our observations suggest diverse strategies are needed to deliver diabetes prevention messages to the four groups as well as encourage them to spread the message in their community. The children networks and curiosity, the community-building power of enthusiastic socializers, and the careful attention of adventurers and browsers proved to be significant deliverers of diabetes information. The
research group suggests the children network as a powerful and quick system for transferring diabetes educational messages to their neighborhoods. For instance, children in the experiment were excited to take their smoothie cup to their parents and share their experience with them. This outcome suggests that in a future design the team could recruit children to deliver educational packages to their neighborhoods.

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5. References


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