






Design for Cancer Prevention: A Human-Centred Approach

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Abstract. The paper presents results of an applied research conducted in partnership between a university research group on design and a national foundation for cancer research aimed at propose a new design-driven culture of prevention to foster in young generation healthy behaviors for cancer preventions. The challenge has been to involve new targets in conscious behaviors for oncological risk awareness using human-centered design approach and techniques, for designing pleasant little products specifically conceived for engaging adolescents and young adults to face three critical goals: not smoking, eating a healthy and balanced diet, adopting an active and non-sedentary lifestyle.

Keywords: Design-driven prevention · young generation · healthy behaviors

1 Introduction: The Traditional Scenario of Cancer Prevention

Traditionally, actions aimed at the dissemination of public health-related content [2] and oncological diseases, mainly insist on the emotional leverage of individual fear. These actions, which are limited almost exclusively to the graphic and communication field (audiovisual campaigns, printed media or specific information products) are valid from the information point of view, but, often, they are ineffective in being able to generate a real impact in the behavior of people as they adopt an aggressive and, therefore, repulsive linguistic model, and a type of iconographic and semantic violence to which individuals are, today, addicted. Consider, for example, the global movement that provides, in addition to heavy taxation, information campaigns increasingly widespread and increasingly extensive bans, graphic application of alarm messages and explicit photographs on the packaging of cigarettes and smoking products. For a number of reasons, this global legislative trend has been applied because the cost of it is paid by industry, not by the legislator, which is particularly important for low- and middle-income countries. These measures also have a wide scope, being able to reach every single tobacco consumer several times a day, as well as his family and, in a general way, his relationships. They are, then, simple measures to understand, permanent and modifiable/upgradeable over time [3]. Despite this, especially in Western countries, the growth in the number of smokers does not stop: in 2021, according to WHO data more than 1.3 billion people in the world were smoking and 8 million are deaths related to tobacco consumption. The

trend, moreover, in recent years has been further consolidated and has also increased due to the diversification of the offer of emerging products, including e-cigarettes, Heated Tobacco Products (HTPs), and tobacco-free oral nicotine [7]. It is therefore necessary to test new strategies, new languages, new possible solutions capable of supporting and strengthening the already existing actions, which are not sufficient to concretely generate a change of trend on the demographic or local scale, neither global.

2 Changing the Approach to Cancer Prevention Narrative. Scare vs Share

A design driven approach can disseminate scientifically correct content by fielding interdisciplinary, multimodal, inter-target and multichannel actions using many different possible vehicles (products, communications, physical and digital spaces, events, etc.). The objective is not limited, therefore, only to inform, but aims to generate a choral dialogue with the aim of involving individuals on the scale of communities normalizing themes that tend to generate rhythms, phobias or taboo. The macro-objectives to be pursued are: overcoming resistance, facilitating the acquisition and processing of information, providing opportunities for social connection, representing risks and problems involving emotional, motivational and existential aspects [5]. By generating debate and social engagement, the conditions are created to foster a new possible narrative and, simply, a positive and active dialogue with people both as issuers and receivers and no longer an oppositional and passive relationship between institution/foundation/issuer-entity and individual-recipient.

3 Human-Centred Approach for Cancer Prevention Through Design

According to Fogg [4], to be persuasive, an artifact must operate on three directions: act as a tool, increasing the user's ability to achieve a certain goal; act as a media, involving him in a complete user experience, physical, sensory, cognitive and emotional; act as a social actor, stimulating with its use interpersonal relationships. For this reason, the design of objects that encourage users to adopt healthy behaviors must necessarily be based on a deep understanding of human factors and context [6]. In a human-centric perspective, each artifact is intended as a tool necessary to perform a given operation efficiently, ensuring the best psycho-physical conditions to the user. The support which the artifact must exercise derives from its suitability for the tasks to be performed by the user and from the extent to which its characteristics are consistent with the capabilities and limitations of the user, and responding to its needs and expectations, even implicit. For doing that, all the variables that define the context in which the user-artifact relationship takes place have to be evaluated and designed, considering the users, the activities, the behaviors, their mutual conditioning and their variability over time. The expected result will be a usable system, friendly in interaction, safe, easy and satisfactory in use and, for this, intrinsically healthy, because specifically designed to improve the well-being and quality of life of the user.

4 The Design for AIRC Project

4.1 Aims

A fundamental asset for shared preventive strategies is the urgency of placing the focus of future actions on young social groups [1] in order to coincide the importance of having a social perception of risk [8] with the effective social capacity to generate positive impacts in the medium to long term. Nevertheless, cancer prevention's initiatives launched by public and private institutions are usually conceptualized and effectively directed to adults targets of population as they seems to be more sensitive toward the health topics. Adolescents and young generation show a low disposition to be engaged in preventative behaviors and a general lack of personal connection to cancer [1], even if it is well known that awareness and prevention is crucial to lowering cancer risk in the future. The "Design for AIRC" research conducted in partnership between the Department of Architecture of the University of Naples Federico II and the Italian Foundation for Cancer Research (AIRC) is aimed at proposing a "new culture of cancer prevention" based on design. The challenge is to involve new targets in conscious behaviors for cancer preventions through the design of pleasant small products specifically conceived for engaging teen agers and young adults to face three critical goals: not smoking, eating a healthy and balanced diet, adopting an active and non-sedentary lifestyle.

4.2 Methodology

Human-centered design approach and techniques have been used both to the study of target and to identify how to engage youth on outreach strategies against cancer driven by design. The human-centred design approach have been mainly based on the studying of the target -adolescents and young adults, in order to gain insight about values, perspectives, inspirations, activities, and behaviors toward the three critical issue of cancer prevention (rapid ethnographic research combining journey mapping, personas and empathy mapping). The emerged framework of target's needs and expectations have been then translated into human-centred requirements and specifications supporting the design of concepts, according to an iterative process of trial-and-error, for verifying and modifying, progressively, the characteristics of use hypothesized for the target, also simulated with prototypes virtual and real mock-ups. Specifically, the project enrolled young design students in the double role of final users sample and designers, in three research steps: (1) a desk research and field research, through a rapid ethnographic analysis, for understanding needs and expectation on health lifestyle and the cancer preventions for the identification of concepts and requirements which are best suited for the young target of users; (2) a co-creation phase in which design students were asked to focus on one of the three prevention challenges for ideating and prototyping the new products according with the target needs and requirements; (3) a testing and refinement phase in which prototypes created by the team were reciprocally used by students for feedback and further refinement. These processes were used iteratively.

5 Results

A landscape of 30 small products, low-tech, low-cost, intuitive and self-explanatory for everyday use and targeted on young adults have been conceptualized and prototyped. The tools activate a set of persuasive strategies linked to the use of objects that act mostly on the antecedent, that is on the conditions that trigger the positive behavior in young people, sometimes discouraging the one at risk. The undirected strategies' goals are listed as follows: 1) making visible and comprehensible the principles connected with the desired healthy behavior, in order to encourage reflection on its desirability; 2) suggesting the appropriate course of action to be taken; 3) encouraging users through the ability to track and make clear the target actions of healthy behavior; 4) facilitating the assumption of healthy behavior, even outside the context in which this traditionally occurs; 5) compensating the emotive void that can generate the abandonment of habits at risk consolidated, to connect the assumption of healthy behavior to feelings of serenity and comfort through playful and emotional dimension. A selection of products is described in the following paragraphs.

5.1 Outcomes Against Tabagism

Smoker's face, is a make-up mirror that, thanks to a digital filter specially tested, allows to display on the smartphone, in real time, the aesthetic effects of smoking on the face. A game about appearing and recognizing oneself, which provides a probable projection capable of making people aware and, perhaps, pushing towards the idea of quitting smoking. *Frenzy ball* is a game tool designed to be a replacement object for soothing the gestural need of the smoker by keeping hands busy during the moments when the desire to smoke is felt. The typical gestures of smoking are, thus, revived, reburied and transformed into an occasion of fun and socialization. *Deep Breath* is a pendant made of a pierced straw containing a porous ball soaked in essential oil, to be used for full breathing exercises. The deep breath is facilitated by the action of blowing to push the flavored ball in the straw. *A-Rolly* is a wearable pendant made up of porous concentric spheres impregnated with essential oil. Rotating in each other it can be used as a fidget-toy that, when manipulated, promotes the emission of perfume and activates the relaxing action of aroma (Fig. 1).

5.2 Outcomes for Healthy and Balanced Diet

Sarada is a transportable lunch box that protects the contents from impact and pressure thanks to a ribbed structure. A cooling ring, which can be activated in the refrigerator and plugged into the lid when you leave home, is provided for puts to keep the salad fresh even if it is consumed several hours after its preparation.

The included fork and spoon can be used conventionally or hooked together to acquire the conformation of a small clamp, more suitable than common cutlery to grab salad leaves. The small containers stored in the lid of the box can be used to transport any condiments to be added at the time of eating the meal. The bio inspired aesthetic is proposed as a nudge that makes the object a kind of health symbol, to be worn hanging from the backpack or bag. An object therefore to be proud of, as you must be

proud to take care of your health. *Posate cromatiche* is a kit made of a plate and three cutlery which have on the handles decorations made with thermo-sensitive paint at body transition temperature performing as a nudge since they induce the users to eat slowly and, therefore, to chew for a long time. Thanks to the warmth of the hands, the textures appears when the cutlery are held. To make them disappear it is necessary to place them on the table and wait between twenty and thirty seconds, that corresponds to the correct time of chewing. The plate, however, has a geometric decoration with a hypnotic graphic pattern for both providing a visual system of dosing the different types of wings and attract the eye to focus on the food for acquiring awareness on that is being eating. Acer Bag aims to increase the intake of fruit by young people. It is a door-oranges transpiring and compactable, which facilitates the transport and consumption of citrus fruits in every place, maintaining its freshness. It can be attached to the backpack or bag without taking the risk that the citrus can be damaged. It consists of two half-balls of plastic connected by a net which, in addition to the transfer, allows the visibility of oranges. One of the two balls can accommodate the skins and contains a small cutter to peel the fruit, that in Italy, is one of the symbols of the fight against tumors (Fig. 2).

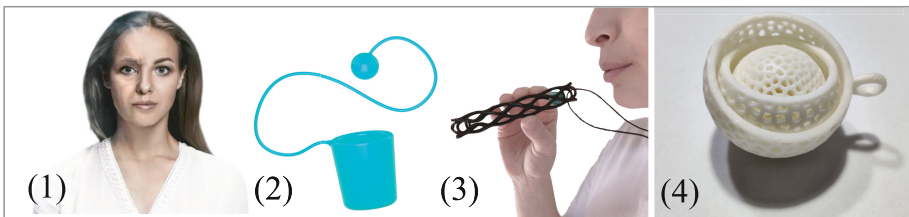


Fig. 1. Selection of outcomes for supporting the fight against smoking: (1) Smoker's face; (2) Frenzy ball; (3) Deep Breath; (4) A-Rolly,

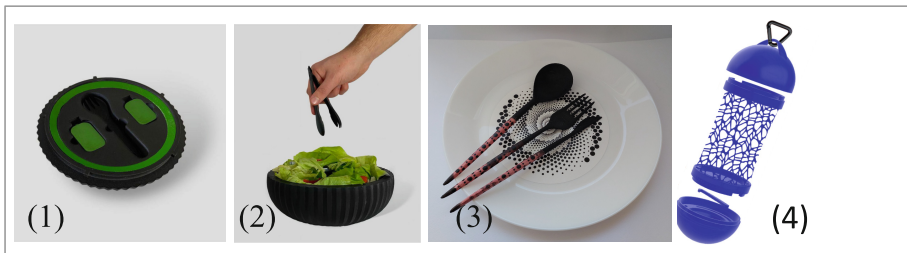


Fig. 2. Selection of outcomes for healthy and balanced diet: (1–2) Sarada; (3) Posate cromatiche; (4) Acer Bag.

5.3 Outcomes for Active Lifestyles

Moti-Fit is a bracelet that acts as a daily reminder for a specific routine of motor activities, graphically represented on interchangeable steel dowels applied to the silicone bracelet.

Each week, according to the schedule, five activities are selected to be completed each day with the corresponding number of activities. An online and paper guide helps you quantify and combine different activities based on your build, age, training level and user goals. *Wonder cards* are traditional Italian cards, with which you can play with specific rules designed to fix in your mind the best practices of prevention through aphorisms, jokes, short physical exercises, curiosity. Prevention, in this perspective, takes on a socializing and fun value (Fig. 3-4).



Fig. 3. Selection of outcomes for active lifestyles: (1) (2) Moti-fit; (3) (4) Wonder Cards.

6 Conclusion

Through a co-design approach based on interdisciplinary contributions, a landscape of target-oriented new artifacts and related services have been conceptualized and experimented. Viable and synthetic solutions capable of producing and testing new possible semantics of prevention have resulted, based on a shared language, friendly, pleasant, engaging, serene, scientifically correct; that is, capable of replacing the concepts of fear, death, solitude, passivity and illness with those of reassurance, “life”, knowledge, sharing, proactivity, wellbeing. New objects for new words and relationships, to support a new culture of prevention

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