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RESEARCH ARTICLE

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DESIGN THINKING FOR INNOVATION IN THE HEALTH AREA

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ABSTRACT

Introduction: Society evolves daily, as do companies, markets, and forms of consumption. Companies and people are tasked with creating relevant solutions (innovations) centered on the needs of human beings. A crucial aspect of Design Thinking is that its focus should be on people, that is, a solution that can solve a people problem or be able to create a new experience for people. **Objective:** To present the principles of DT for use in healthcare innovation. **Methods:** Design Thinking (DT) is a model of thinking centered on the human being, and is based on three main pillars: Empathy, Collaboration and Experimentation. This innovation development methodology is divided into four different phases: Discover, Define, Develop, and Deliver. **Results:** The DT creative process involves users from the beginning and is co-participatory. DT users seek solutions that add and generate value and that can be rapidly tested, validated, and brought to market or used for the user's benefit. DT is widely applicable in the field of Healthcare and to all actions that directly or indirectly involve the prevention and/or treatment of diseases, with the goal of exponentially improving the experiences of healthcare users. **Conclusion:** Combining this methodology and traditional scientific methodology could improve healthcare innovation, because the main focus is on the individual / patient / customer / service.

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INTRODUÇÃO

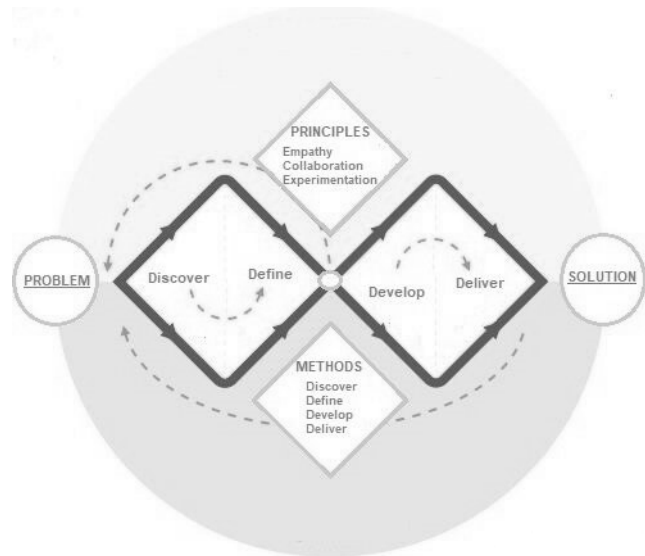
The challenge of developing increasingly competent, practical, and effective devices in healthcare is constant. Innovation skills must be continually trained to meet the needs of patients and professionals.^{1,2} However, both stakeholders are not always considered when new interventions or devices are designed, resulting in products that remain unused with little user compliance because they do not take into account human context, need, or fallibility.³ This impersonal, or non-user-centered, approach also likely contributes to the large gap between intervention development and implementation.⁴ Design Thinking (DT) offers an alternative to these problems. They have the potential to offer more creative approaches that incorporate the needs and feedback of the users and professionals involved. The external process of DT involves users from the beginning and is co-participatory. DT practitioners seek solutions that add and generate value and that can be rapidly tested, validated, and brought to market or used for the benefit of the user.⁵ The origin of Design Thinking is credited to Herbert A. Simon in his 1996 book "The Sciences of the Artificial"⁶ being considered a creative way of thinking as powerful as scientific and academic methods.⁷

It is based on three main pillars: Empathy, Collaboration, and Experimentation. Such methodology has been widely applied in the field of healthcare^{8,9} and in the development of new devices in this area.¹⁰ The objective of this study is to describe how the design thinking methodology can be used in the making of devices in healthcare innovation.

METHODS

DT is a human-centered thinking model. Empathy, the first pillar of the technique, involves our ability to understand the feelings or reactions of the individuals involved in the problem situation. The second pillar, Collaboration, involves working as a team to achieve a common result. Finally, Experimentation seeks to elicit observations and experiences in different circumstances.⁵ A simple way to describe the DT process was developed by the Design Council (UK) in 2005, the Double Diamond diagram.¹¹ The diagram is divided into four different phases, discover, define, develop and deliver. The first phase ("Discover") corresponds to an immersion in the scenario involved, exploring the context of the need. Some techniques can be used in this phase, such as conducting interviews with users and Desk

research, which includes database analysis, market research, ethnographic research, among others.



Picture 1. Graphical way of describing Design Thinking.

The next phase ("Define") represents the phase in which patterns are identified and conclusions are made from the collected data. It allows the problem to be defined and the activities and information to be organized. The third phase of the Double Diamond model ("Develop") aims at generating ideas and idealizing prototypes. It comprises brainstorming with the team and with the final users, further defining the ideas from the problems. Finally, the last phase ("Deliver") focuses on the additional adjustments and refinements that must be made to produce more mature prototypes in the medium to long term. The main activities and goals during this phase are testing, tweaking and validating the prototype.

RESULTS

The current literature survey presents numerous health innovations developed from the DT technique. The model is widely applicable in all actions that directly or indirectly involve the prevention and/or treatment of diseases. DT users seek solutions that add and generate value and that can be rapidly tested, validated, and brought to market or used for the benefit of the user. The "Discover" phase was employed in the creation of an application that searches for reliable information about antibiotic use. This device was developed from an initial data collection by means of a questionnaire applied to users. The questions applied assessed user satisfaction with existing information sources and their usability.¹² In addition, Empathy, the first pillar of DT, was also explored in this study by understanding the feelings of the individuals involved.¹² A microsurgery training model created from the DT defined its main criteria based on data obtained from interviews with experienced microsurgeons, desk research (literature search and prior art search), and analysis of a learning simulation scenario. Among the conclusions obtained, it was defined that the device should be complete in skill training, and its accessibility and portability were essential. Thus, the "Define" phase of the device was fulfilled.¹³ The Complications and Quality of Life Working Group EBMT, in 2016 developed an app, "eGVHD App", using the principles of the DT.¹⁰ In order to produce it, a team consisting of information technology and usability experts and graft versus host disease (GvHD) experts was assembled. After interactive, human-centered discussions among the team, an algorithm was developed that guides the diagnosis of GvHD and facilitates scoring the severity of the disease. The production of this app exemplifies the "Develop" phase, as brainstorming sessions were held by the team and users for ideas to be conceived. Moreover, it also expresses the second pillar of DT, collaboration.¹⁰ Experimentation, the third pillar, was practiced in the deployment of the SMARThealth mobile device, as the prototype was tested and validated by healthcare professionals

after its creation. Developed to assess and manage the risk of cardiovascular diseases in underserved populations, its features were tailored to the requirements of the end users and the environment in question, thus being finalized with the "Deliver" phase of the Double Diamond model.¹⁴

DISCUSSION

DT is a thinking model that has been used for the development of innovative prototypes capable of bringing relevant solutions centered on the needs of human beings. These tools have the ability to achieve real changes in society, since they are based on a humanistic approach that involves users from the beginning of their production. They propose solutions that add and generate value, and that can be quickly tested, validated, and brought to market. The end result is the benefit to the patient and the improvement of learning and working conditions for health professionals. The literature review has shown that health interventions delivered using the TD technique have promising and positive results. When compared with traditional intervention, the DT presents higher rates of usability and user satisfaction.¹⁵ Moreover, it plays a key role not only in the development of an effective intervention, but also in the implementation of the device.⁴ The Double Diamond model allows the mapping of divergent and convergent stages of the design process, admitting different ways of thinking. Unlike the scientific method, which defines all procedures before the project begins and proceeds gradually in a unidirectional manner, DT follows a process with predictable inputs and outputs.⁵ Flexible thinking makes it easier to pay attention to needs that may be overlooked by other approaches. Thus, this technique can be especially useful in designing interventions in underserved populations, allowing for more active community participation and potentially reducing health disparities.¹⁴ There are still several challenges when considering the application of TD in health care. The divergence between what users want and what providers and researchers believe to be beneficial based on research and experience can occur and create tension.¹⁶ A balance must always be sought between creating interventions that are effective and feasible for them to be used by providers and patients. Another challenge is the conclusions drawn from a small sample of users; such outcomes must be tested in larger populations to be sure of their applicability.¹⁵

CONCLUSION

The systematic approach to innovation in health or in promoting social innovation needs organizational as well as behavioral changes. Combining the methodology of DT with traditional scientific methodology could improve the quality of studies in the health field, because the main focus of DT is on the individual / patient / customer / service.

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