# Topic: Development of a design framework for innovating on accessible and inclusive digital health systems in Colombia

According to the World Health Organization (WHO), improving the equity of health service's access and quality is of paramount importance, especially in developing countries like Colombia, because despite improvements in Universal Healthcare Coverage, a big part of the population is still not able to access the care they need due to economic, geographic, epidemiological, or cultural barriers [1]. In this context, several stakeholders from the healthcare industry have reoriented their efforts towards achieving Access to Care [2]. For example, Siemens Healthineers AG, as a leading medical technology company that strives to deliver healthcare for everyone, everywhere, has the explicit ambition to: "make quality and affordable healthcare accessible and available to all by supporting low- and middle-income countries increase access to healthcare, thus helping countries to achieve the UN Sustainable Development Goals by 2030" [3].

To achieve such purpose, there are two relevant concepts: 1) Primary Health Care, 2) Social Innovation in Healthcare. On the one hand, Primary Health Care (PHC) is a whole-of-society approach to effectively organize and strengthen national health systems to bring services for health and wellbeing closer to communities through three (3) main components: integrated health services to meet people's health needs throughout their live; addressing the broader determinants of health through multisectoral policy and action; empowering individuals, families and communities to take charge of their own health. Primary healthcare thus makes it possible for health systems to address the health-disease stages of an individual, including prevention and promotion, diagnostic, treatment, and rehabilitation in a comprehensive, egalitarian, and economical way [4]. In regions like Latin America, best practices on institutional commitment, multisectoral action, community participation, and person-centered services are being implemented and recorded to lead the path towards achieving access to care [5]. On the other hand, as a response to the complex challenges that healthcare systems are currently facing, healthcare and educational institutions worldwide are aiming to enhance their self-innovation capacity and with it co-create tailored solutions to meet the needs of their students, patients, and workforce [6]. As such, initiatives coming from the industry like the Innovation Think Tank from Siemens Healthineers, are being developed with the aim to empower partner healthcare and academic institutions to reinvent themselves, cooperate and co-create customized solutions to their challenging problems [7].

Hence, considering that Social Innovation in Healthcare it's a concept that: "is advancing down a path of recognition in the region (Latin America), defining its role as an important field of study on social transformation in health and development" [8], this thesis will aim to support the ongoing cooperation between the Universidad Nacional de Colombia and Siemens Healthineers AG (to establish a cross sectoral self-innovation capacity infrastructure), from a research perspective by providing a comprehensive design framework that could help design accessible and inclusive technological solutions. Specifically, considering that breast cancer is a growing challenge for the healthcare system in this country and that there is plenty of opportunity for improvement in terms of promotion and prevention, e.g. in 2021 it was discovered that in 33% of cases the diagnosis of breast cancer was made in advance stages [10]; a case study on solutions for breast cancer will be performed to serve as an example on how such a design framework could be developed, integrated, and evaluated.

In other words, the research question of this thesis is: *how to provide a design framework to help nursing students and professionals in Colombia design accessible and inclusive digital health systems considering a primary health care approach?*

The proposed work consists of the following parts:

1. Literature review on collection of accessible and inclusive digital health solutions for breast cancer promotion and prevention (including early diagnosis).
2. Universal Design Framework - Perform a design space analysis to build a design framework for designing accessible and inclusive digital health systems considering a primary health care approach.
3. Validate the theoretical formulation of this framework through a series of semi-structured interviews with five (5) relevant Key Opinion Leaders from different backgrounds (academy, government, industry, and social organization) that can orient the discussion on novel accessible and inclusive digital health systems for promoting and preventing breast cancer.
4. Iterate the design framework according to the feedback received from the experts.
5. Evaluate the practical implementation of the design framework through one (1) workshop with a focus group in Colombia that includes at least five (5) nursing students.

The thesis must contain a detailed description of all developed and used algorithms as well as a profound result evaluation and discussion. The implemented code has to be documented and provided. Extended research on literature, existing patents and related work in the corresponding areas has to be performed.

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