Chapter 11
Diabetes Tracker and Volunteer+ Software Engineering for Sustainability

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ABSTRACT

In a world where sustainability is increasingly important, we must look for ways to promote it; the Sustainable Development Goals (SDGs) fulfill this function. In software engineering, one of the main challenges for the success of a software solution is to achieve sustainability. This chapter introduces the development of two mobile applications on Android: Diabetes Tracker and Volunteer+ that are inspired by the SDGs, incorporating the principles and dimensions of the Karlskrona Manifesto in relation to the software development phases. In this investigation, a customized adaptation of the Scrum agile methodology was used, with a concern to promote software engineering for sustainability. To achieve this end, an iterative approach is used, allowing the principles of the manifesto to be crossed to emphasize the various dimensions of sustainability. The main results can be seen in the applications developed, specifically to facilitate the control of the diabetes disease and promote quality health, as well as enhance the participation of citizens by promoting volunteering.

INTRODUCTION

Increasingly, issues underlying Sustainability are being addressed around the world in different areas, as well as some strategies designed to create a new global model to alleviate poverty, promote prosperity and well-being for everyone, protect the environment and fight climate change. The Sustainable Development Goals (SDGs) aim to improve the well-being of Human Beings as well as improve the entire environment that surrounds them, fulfilling the objective of promoting sustainability (UNDP, 2015). The Covid-19 pandemic has a real impact on the achievement of the SDGs, namely on poverty, employment, or inequality. In this sense, it is considered that the Pandemic represents a threat in the fight against poverty and the sustainable development model (Plataforma Portuguesa das ONGD, 2020).

The main motivation to develop this work focuses on the opportunity to present the development of sustainable software solutions that promote the SDGs. These solutions are intended to facilitate the search by citizens for voluntary actions, focused on helping the environment or people in need. On the other hand, volunteering was a great support for health structures during the pandemic, alleviating the pressure on medical professionals (Pickell, Gu, & Williams, 2020). It should be noted that many countries have expanded their health care capacity by mobilizing retired volunteers or health professionals (Aristodemou, Buchhass, & Claringbould, 2021). The Tech4Covid initiative (Almeida, 2020) also brought together volunteers to support healthcare professionals and hospital equipment, healthcare and education services, among others.

Considering the need to integrate sustainability into software development, this chapter presents the development of two mobile Android applications: Diabetes Tracker and Volunteer+ (Júlio, Torres, & Silveira, 2021) that are inspired by the Sustainable Development Goals and include the principles and dimensions of sustainability. The Diabetes Tracker application will allow the senior population to be able to have a platform focused on diabetes monitoring. The Volunteer+ application will enhance the participation of citizens to encourage volunteering and mutual help, promoting sustainability through various SDGs.

The chapter discusses several SDGs in general and, in particular, SDG 3, Good Health, and SDG 17, Partnerships for the goals, whose aim is to promote well-being for everyone, at all ages, as well as to promote solidarity. In this work, a customized adaptation of the agile Scrum methodology was used. This methodology is a way of developing software with great concern in balancing the cost, time, and quality of the product. To promote sustainability in software development, the principles of the Karlskrona Manifesto regarding software development phases were also incorporated. To achieve this end, sustainability concerns have been included from the requirements analysis stage.

This chapter is organized into five sections. The first is the introduction in which the need identified in the context of sustainability is presented, specifying the objective of the chapter. In the second section, the theoretical framework regarding the various themes that are addressed in the chapter is presented. The development of mobile applications is described in the third section in order to present concerns regarding sustainability. The fourth section describes the procedures underlying verification and validation. Finally, in section five, the main conclusions are included and proposals for future work are presented.

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