

Application of Agile Methodologies for Design and Development of HealthTech products: Bio Testing Device

**Catalina de León Santos, Sergio Eduardo Anaya Alvarez, Azael Jesus Cortes Capetillo,
David Güemes-Castorena, Jorge de-J Lozoya-Santos**

Escuela de Ingeniería y Ciencias
Tecnologico de Monterrey
Monterrey, N.L. 64849, México

A01192396@itesm.mx, A01176117@itesm.mx, azael.capetillo@tec.mx, guemes@tec.mx,
jorge.lozoya@tec.mx

Abstract

Agile methodologies center around the concept of iterative development, where requirements and solutions evolve as project advances in its development. The big advantage of agile development is that it allows teams to deliver value faster, with higher quality, predictability, and with a better ability to respond to change. Agile methodologies have been widely used in software industries where they have had proven results. However, development of new technological devices for the healthcare industry is traditionally a very long and arduous process that takes years from its conception to its market release. The use of agile frameworks has the potential to dramatically reduce the time to market for healthtech products as well as improve the final product. This thesis is a study of agile methodologies in the development of healthtech products. This involves a study of the current literature of how agile methodologies are currently applied and the application of said methods to the design and development of a new biotesting device by using SCRUM and agile digital boards. The result is the development of a UTI diagnostic device and a thorough analysis of the advantages and pitfalls that the use of agile methodologies had in the design and development of this new product.

Keywords

Agile Methodologies, SCRUM, Product Development, Health Tech, Biomedic Product Design.

Acknowledgements

A sincere thank you to CONACYT and Tecnologico de Monterrey for granting the scholarships that are making this investigation possible and providing the resources needed.

Biographies

Catalina de León Santos is a Master's in Science and Manufacturing Systems student at Tecnologico de Monterrey in Monterrey, México. She earned a Bachelor's Degree in Innovation and Development Engineering with a minor in Industrial Design and Manufacturing in 2019. She is the lead in an entrepreneurial project developing a home bio testing device for UTIs.

Sergio Eduardo Anaya Alvarez is a Master's in Science and Manufacturing Systems student at Tecnologico de Monterrey in Monterrey, México. He received a Bachelor's Degree in Innovation and Development Engineering with a minor in Data Science and Artificial Intelligence from the Tecnologico de Monterrey, Campus Monterrey in 2019. His research interests are image recognition for medical purposes.

Azael Jesus Cortes Capetillo is a PhD graduate from the University of Leeds, and a full-time professor at Tec de Monterrey. His research work focuses on innovation management, product development and technology-based entrepreneurship and intrapreneurship. He has experience as Technology Innovation Leader in the automotive industry in Mexico and product development engineer in the HVAC industry in the UK. Working on developing new products,

incremental design of existing products, disruptive innovation, technology research, development, and management, launching new ventures, and discovering new business models. He is the Director of the Innovaction GYM at TEC de Monterrey and the National Director of the Innovation and Development Engineering program at Tec de Monterrey.

David Güemes-Castorena is a Full Professor of Strategic Management of Technology and Innovation at Tecnológico de Monterrey, Campus Monterrey. He received his D.Sc. from The George Washington University in 2001. His research interest involves technological strategy and applied technological foresight. In 2018-2019 he was a visiting scholar at the MIT Sloan School of Management, studying regional innovation systems.

Jorge de-J Lozoya-Santos received a BE in Electronic Engineering in Instituto Tecnológico de la Laguna, Torreón, México (2000), a Master Science in Automation (2005) and PhD Degree in Mechatronics and Advances Materials (2013) from the Instituto Tecnológico y de Estudios Superiores de Monterrey, Campus Monterrey, Monterrey, México with research stays in GIPSA-Lab, INPG, Grenoble, France. Jorge has ongoing collaborations with Politecnico di Milano, Italy; Institut Polytechnique de Grenoble, France; Università degli Studi di Modena and Reggio Emilia, Italia among others. He is a member of the National System of Researchers in Mexico Category 1. He is part of the national network of reviewers of CONACYT projects. Besides, He is a reviewer of international journal articles. He has more than 25 international conferences, 10 indexed journals and 4 patent applications. His research interests are intelligent transportation systems, modeling and control of systems, applied automatic control and automotive systems. He has experience in industry as process engineer and automation leader, and in academia as Professor and Director of Scientific Research. Dr. Lozoya Santos is Research Professor in Tecnológico de Monterrey, School of Engineering and Sciences.