SiOHCA: A Case Report on Strategies for Fostering Student Innovation

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OHCA Registry Slovenia project
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Abstract. *This report describes the effective partnership among students, academic mentors, and industry mentors in creating the SiOHCA registry for out-of-hospital cardiac arrest cases in Slovenia. SiOHCA project aimed to enhance clinical outcomes of OHCA patients by providing pertinent data to researchers and EMS personnel. The case report analyzes organizational strategies that led to significant advancements in a short time. The project demonstrated that motivated and empowered students can drive significant improvements, sometimes faster than larger enterprises. The project utilized remote work, digital communication tools, the University of Maribor's network and mentorship from both academic and industry partners.*

Keywords. OHCA, student project, work organization, student research, registry

1 Introduction

SiOHCA is the Slovenian out-of-hospital cardiac arrest (OHCA) registry project that showcases the results that can be achieved through successful partnership among students, academic mentors, and industry mentors. The SiOHCA project endeavors to provide researchers and EMS personnel with more pertinent OHCA data, thereby enabling them to enhance the clinical outcomes of OHCA patients.

Retrospective data is the only available source for studying OHCA [1]. Cardiac arrest registries are widely used in developed countries to monitor OHCA statistics and improve survival rates. [1]–[3].

Studies conducted by international researchers have illustrated the feasibility of round-the-clock data gathering throughout the entire nation [1], which facilitates optimal optimization of Emergency Medical Services (EMS). Our aim is to impart the expertise and experience from abroad to Slovenia.

The funding received enabled the establishment of a proficient and multidisciplinary team comprising of students and mentors, who provided the students with the autonomy to engage in innovative practices that were beyond the conventional norms. This article presents an analysis of the organizational strategies implemented in our work environment, which have led to significant improvements within a relatively brief timeframe. This serves as a compelling illustration of how students, when suitably motivated and empowered, can produce significant and prompt transformations, outpacing even big enterprises.

2 Methods

The SiOHCA student project was established on March 1, 2022, under the guidance of Professor Matej Strnad and in collaboration with the Emergency Medical Dispatch Service of Slovenia, with mentorship from Miha Brezovnik. The project was started due to insufficient data on OHCA in Slovenia [4]. Initial funding was obtained through the University of Maribor's "Študentski izzivi

(ŠI:UM)" grant. Our industrial partner at that time, Computel d.o.o., is a leading provider of EMS software in Slovenia with vast experience in the industry.

We obtained financing on December 1, 2022, through the public tender "Projektno delo za pridobitev praktičnih izkušenj in znanj študentov v delovnem okolju 2022/2023" [5]. We expanded the team by hiring a developer and a law student. During this funding round, we initiated the development of SiOHCA software version 2.0 and organized the data obtained from the EuReCa THREE study for which our software was used. Matjaž Gornik, CEO of Better d.o.o., and Jovan Pevićevič, International Markets Director at Better d.o.o., functioned as industrial mentors and contributed to the strategic planning of software and operative development. Their international software development experience in healthcare industry was highly valuable to the team.

We chose remote work over a physical workspace to enhance efficiency. Students used Discord, Zoom, Trello, and YouTrack for communication and task management. Email facilitated collaboration with mentors, who offered prompt feedback. Timely replies within 24 hours were crucial for progress. The mentors offered feedback-based guidance, allowing students to learn from their mistakes and successes.

The University of Maribor's (UM) network was crucial for our work. The software is hosted on Electrical Engineering and Computer Science's (FERI) servers with a backup on Academic and Research Network of Slovenia's (Arnes) servers. We acquired complimentary domain and email hosting services from Arnes, facilitated by UM's network. We leased a FERI professional studio and photography equipment for PR needs. One of the primary advantages was the ability to establish connections with professionals and advisors within the UM network, which accelerated our progress.

Attending EMS2022 Scotland and various conferences in Slovenia facilitated knowledge exchange and promoted the project to Slovenian EMS personnel. The Faculty of Medicine in Maribor provided us financial support to attend conferences and promotional gifts for our partners.

3 Results

Upon recognizing the absence of freely available software for the establishment of OHCA registries, we opted to release our code as open source. The source code for SiOHCA version 1.0 is readily available on our GitHub repository [6], encouraging the establishment of OHCA registries for other countries, particularly in developing regions where financial constraints may be an obstacle. The inaugural release of SiOHCA version 1.0 was formally introduced on September 1, 2022, with the intention of enabling its implementation for the EuReCa THREE study. [7].

The data collection process for the EuReCa THREE international OHCA study in Slovenia was digitized through the utilization of the SiOHCA software. The study conducted over a period of three months demonstrated the successful use of the registry in a clinical setting [8].

Our work resulted in important contributions to the scientific community.

Table 1. Publications

Title	Date
V Sloveniji potrebujemo register predbolnišničnih srčnih zastojev = The need for an OHCA registry in Slovenia [4]	16/06/2022
Siohca : nova iniciativa in preliminarni podatki = Siohca : new initiative and preliminary data [8]	30/09/2022
SiOHCA: Informacijsko-komunikacijska rešitev za vzpostavitev registra predbolnišničnih srčnih zastojev [9]	12/10/2022
Stanje digitalizacije NMP v Sloveniiji [10]	08/11/2022
How can out-of-hospital cardiac arrest (OHCA) data collection in Slovenia be improved?	In press (Medicina, MDPI)

4 Discussion

Our aim was to show the need and possibility of creating a registry for OHCA, as well as a successful collaboration between University of Maribor and the industry. The team was structured to prioritize agility and remote collaboration, resulting in swift progress and the timely presentation of the minimal viable product (SiOHCA version 1.0) on September 1, 2022, for use in the EuReCa THREE study [7]. Our mentors have emphasized that the cultivation of self-motivation in students and the provision of autonomy in problem-solving are crucial for achieving the results mentioned above. Promoting a safe space for mistakes and fostering creativity resulted in innovation and efficiency among students. The project resulted in a future-ready workforce, with medical students gaining IT skills and developers getting familiar with medical projects.

The SiOHCA registry was created due to inadequate OHCA data in Slovenia and was inspired by the EuReCa TWO study [11]. SiOHCA initiative demonstrated the potential of academic-industry partnerships in promoting healthcare projects by collaborating with students, academic mentors, and industry mentors.

Despite the accomplishments of SiOHCA, there is room for further improvement. Successful implementation and sustainability of SiOHCA depends on financial support, mainly through grants. Maintaining the registry's longevity may face challenges related to finances, logistics, and organization. Maintaining the registry necessitates reliable funding and support for ongoing data collection, software updates, and system upkeep.

5 Conclusion

The SiOHCA registry was developed through a partnership between scholars, educational mentors, and corporate mentors. The methods implemented in our work culture showcased an innovative strategy for achieving change in healthcare IT, a process that is considered by many to be challenging and slow, frequently hindered by burdensome paperwork. The presented structure for student projects has demonstrated its efficacy. We suggest that a greater number of students should partake in such experiences, as it would yield young professionals possessing invaluable expertise that could potentially drive innovation both domestically in Slovenia and internationally. It is our recommendation to investigate a framework that facilitates the implementation of such projects on a larger scale.

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