

IoT in Elementary School for Everyone - A Research Plan

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Abstract. We propose a tentative research plan to increase students' mental health in elementary schools by implementing Internet of Things (IoT) technology. The research plan should answer how to support students' mental health using IoT solutions and the critical factors influencing testbeds for IoT solutions with the previously mentioned purpose. Our intended research method is Design Science, which we plan to use stepwise.

Keywords. Internet of Things, elementary school, research plan, design science research

1. Introduction

It can be seen today that school contributes to the decrease in children's and young people's mental health. Today, the health status of children and young people is occasionally measured through manual tools such as interviews and questionnaires. With this project, we want to find more accurate ways to measure elementary school students' health. One way of measuring is by using Internet of Things (IoT) Technology. IoT is any device connected to the Internet, usually a physical object including sensors, such as wearable devices [1]. The project aims to design, develop and evaluate IoT solutions for improving students' mental health in an elementary school. Therefore, this paper aims to present a tentative research plan for "IoT in elementary school for everyone".

2. The project

The pilot school for this project is an elementary school in the west of Sweden. The school is located in the central part of a smaller city, within walking distance to the city library and a swimming and multisport hall. The school is designed for 'home spaces' to avoid unnecessary classroom movements to reduce stress. One overall strategy for this school's staff is working with mental health among students, long-term school absences, and developing inclusive and accessible learning environments. Students' health data is today collected through physical meetings and conversations with students and their

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guardians, compiled in a regional database. This provides a basis for the school's work to reduce risk factors and strengthen protective factors for students. However, the data only shows the value from a given time and measurements for entire groups of students are also distributed over the year.

This project intends to gather and provide in-the-moment data to the school on an ongoing basis. The project's activities involve developing and testing innovative IoT ideas using the school as a testbed to reach the goal. Because schools are complex environments, it is not possible to duplicate artificially. Hence this project will be embedded in the school, with safeguards to protect the identities and welfare of staff, teachers, and children. There are few such testbeds, and by gaining knowledge, learning and experiences from the project, more actors, such as entrepreneurs, municipalities or schools, can participate in the results and use them for their activities to further develop systems for reducing risk factors and strengthening protective factors for students. Therefore, one activity in the project is to invite companies and entrepreneurs to propose IoT solutions which can be safely tested through this project in a natural school environment. The resulting benefits to business and entrepreneurship also benefit schools and students by allowing businesses to develop tools that are more likely to fit the needs of the students. With this, we want to contribute to the work with users' requirements and thereby benefit societal development.

The research methodology for this study is design science research (DSR) that consists of a five-step process: 1) to explicate the problem, 2) to define requirements for an artefact, 3) to design and develop an artefact, 4) to demonstrate the artefact and finally 5) to evaluate an artefact [2]. We will use purposive sampling [3], listening to teachers, school nurses, social educators, principals, and special educators while gathering requirements. There are several ways to listen to them, like individual or group interviews, focus groups, and workshops [3]. We can then develop prototypes based on the gathered requirements. These prototypes are expected to result in insights into possible services and work processes that give the school better conditions for promotion and preventive student health work, which contributes to strengthening the health and learning of the individual.

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