

**Innovative solution
for**

**the department of occupational
and environmental medicine.**

"Eier"

Students

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Introduction

The document presents concept of the group work on a specific project which had the startup on 10th of March 2014. This document it's going through all of aspects and details regarding the project and the stages of development that went through. Detailed aspects about the the case and participants, companies, universities and any other parties which are related to the startup project. Showing all the work put together to build an new and innovative idea which has applications in medical and home care field.

INNOEVENT

Michael Lundorff-Hansen (Head of Department, Multimedia and IT at Lillebælt Academy of Professional Higher Education) arranged a week for students to collaborate with their innovative ideas for businesses, by forming the event called InnoEvent. From March 2010, there was already five editions. The purpose of InnoEvent is to gather students from three different universities (EAL, UCL, OUH) and let them work together in a group for creating innovative solutions for the hospital and the government. At this process students learn to work in the new environment for various cases.

CASE – OCCUPATIONAL & ENVIRONMENTAL MEDICINE

InnoEvent 2014 was divided for six different cases. One of them had to concern Musicians problem for the department of occupational and environmental medicine. The hospital representants presented to students a common situation, which occurs for professional musicians – nerves injures. Their carrier is very stressful, because it requires long hours of practicing, which damage their body (shoulder, neck, hand). The main problem is that nobody can predict the damage, before symptoms may occur. Moreover, it is difficult to heal injury of nerves without having any consequence after the operation, etc. Hence, this problem was given to six different groups at the Inno-Event 2014 and our groups is one of them.

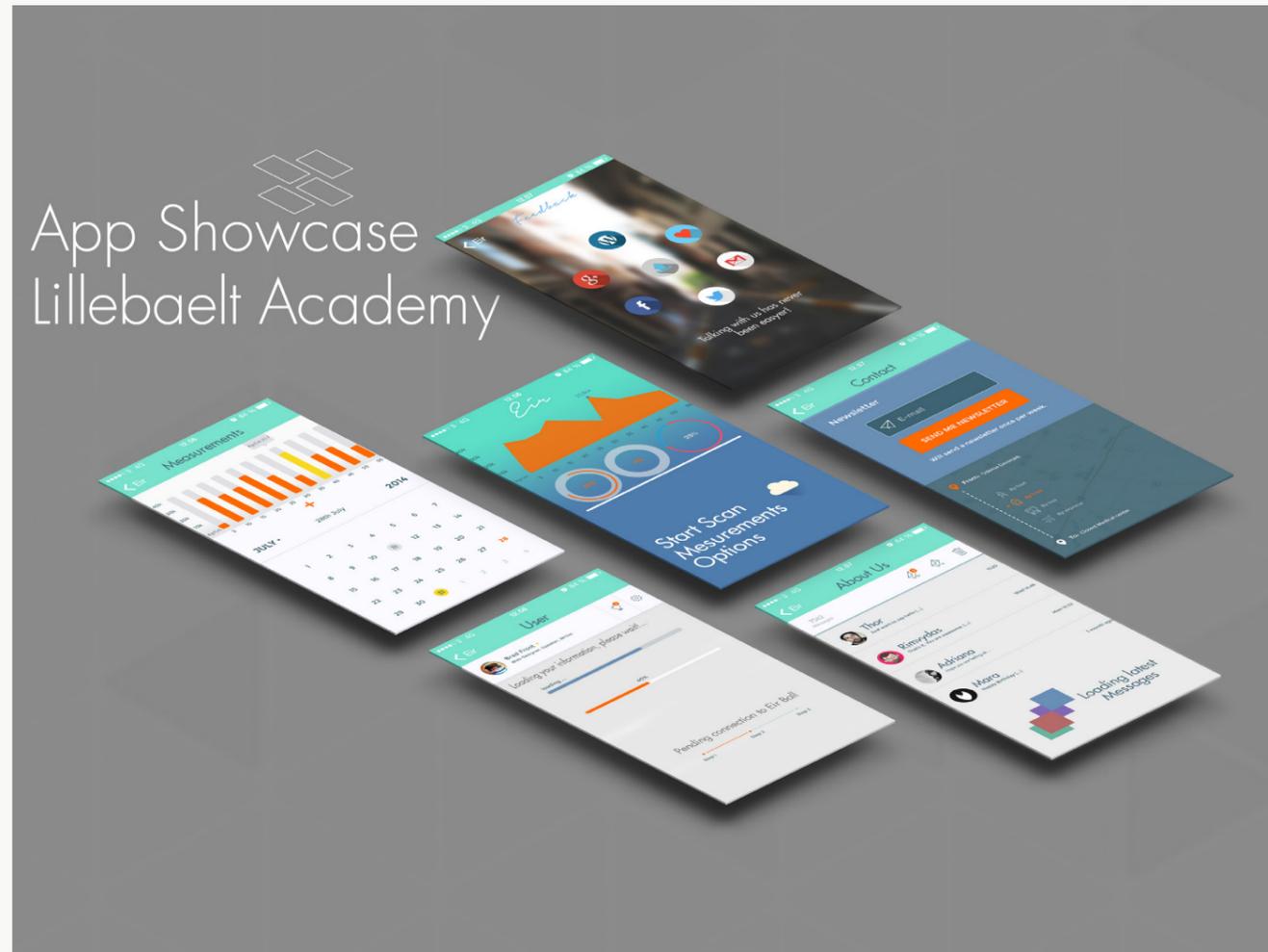
Description of idea

The idea with which we came up is the product named Eir (old nordic name 'the Goddess of medicine and healing), which measure the strength of grip. It is similar to dynamometer, but it's implemented with a new technology, which gives the user a much specific information and overview about their potentials nervs and muscle problems. Then we realized that 'Eir' is intended to everybody (not only people with nerves injures), which means that it can be used in every age and be treated as routine check examination for patients.

The product look is a ball, which the user should keep in his hand and squeeze it, to measure the strength of his grip. The data information is send via bluetooth to mobile application, at which the user can save all measurements and follow results and his evolution by day/week/month.



The mobile application presents the result of measurement from “Eir”ball. The structure is simple and easy to navigate. It is possible to make few users accounts on the mobile app for one ball product. User can start and stop scanning the strength of the grip, can see the result and history of them (in the calendar). This data can be also sent to local doctor, moreover, users can see feedback on news of “Eir” products and keep being updated. Also, it is possible to contact company members directly through this application.



Tehnological Background

The ellipse ball's shape is printed in a 3D printer so that it's made from a solid material. By using a 3D printer it's possible to have the proper shapes for air pockets and circuit boards inside of it. Each of the six finger holes are used as an air pocket where a pressure sensor is mounted from the inside of the ball. Containing all the circuits insides. Using amplifiers and a micro controller with allow energy bluetooth connection. The ball will be covered in a strong and light flexible material sealing each of the six air pockets.

The low energy bluetooth connection will connect to a smartphone with an app, streaming the data the pressure sensors collect in the ball over to the phone. The phone links this data op with a online server that stores longtime use for research and feedback to the phone.

Market of Reference

“Eir” is targeted to musicians, manual labor workers and computer users. All these subject have one common issue. They have unnatural arm positioning and movements.

Musicians have situations when almost continuous playing is required, the body segments that are directly involved in playing must be maintained in a limited position range for the duration. This causes accumulation of muscle waste products (lactic acid) since muscles don't have sufficient time to relax. Joints are required to remain in „non-anatomical” positions for prolonged periods, often resulting in ligamentous strain. Reports of numbness in the left index finger of a flautist demonstrate a possible effect of the position of particular body parts on the instrument. In this case, the flute's key was a source of excessive pressure against a superficial nerve in the finger.

Talking about manual labors the most common side effect of manual labor is muscle aches and strains. Improper posture when bending or lifting, or forcing or bearing too much weight on improperly trained muscles can easily lead to muscle injury. Symptoms include pain, swelling, and stiffness in muscles. Laborers that have jobs which include lots of lifting with arms experience pain in forearms, elbows and wrist mostly. Cubital Tunnel Syndrome is issue most common with manual labor workers. It is a pinching or compression of the Ulnar Nerve at the elbow. This nerve is often referred to as the “funny bone”. This condition can occur from working with flexed or bent elbows.

The keyboard is used by people all over the world. It offers a high range of features. Nowadays there's increase of people who cannot imagine their life entirely without a computer. Currently world faces significant increase in global internet people. Also, every day we see new variety of purposes using computer users. Localized pressure is one of most common issues related to muscle damage using computer. Direct pressure on nerves or tendons can cause damage in the long run. The wrist is one location of concern. Carpal Tunnel Syndrome is biggest treat for computer users. It is an irritation of the Median Nerve as it passes through the narrow Carpal Tunnel in the wrist. Symptoms include pain, numbness, and tingling of the first three fingers and the thumb. This nerve irritation can occur from swelling of the wrist tendons or from fluid retention and other conditions.

Originality and Differentiation

The reason this idea is unique is because of accuracy of data, portability and means of prevention.

The closest device to “Eir” is called dynamometer, it's a bulky device doctors use, which shows how hard you can squeeze and data is shown on simple scale. “Eir” on the other hand can be used at home, multiple times of day. Data is collected from each individual finger and is stored in mobile app. Using “Eir” you can see loss of strength in your hand or individual finger and consult doctor by presenting data you collected. This method allows to prevent further damage because doctors can see which muscle of your arm is getting damaged and prescribe medication or treatment. This method helps to prevent pains and even surgeries that would make patient lose time while being in recovery.

“Eir” a device that keeps you aware of your own health.

Project status

Our project started together with InnoEvent 2014, when our team was formed. That time, the idea was appreciated by judges and they offered us meetings after the event. We have decided to take this innovative idea further. Therefore, we have participated in the conference held in Odense Congress Center on 10th April 2014. We have received a good feedback from doctors of different departments.

Then, we started to look for options to make our project real. We had a meeting with business consultant, who told us how to form company and what possibilities do we have as students. Also, we've started to work on the other version of prototype for the "Eir" ball and mobile application.

At this moment, we co-operate with our school, Academy Lillebaelt and with the department of occupational and environmental medicine in Odense, Denmark. We plan to make this concept as a real product, because it is new, innovative and needed at European market.

Project Team

We are international team, which was formed randomly during InnoEvent 2014. At this moment we remain as six students educated in Computer Science, IT Technologist and Multimedia Design at Lillebaelt Academy in Denmark. Each member is unique, because of different origin (Denmark, Lithuania, Poland, Romania) and overall background.

Besides our various languages, culture, experience and thoughts, we have the same aim – by believing in our common idea, we will be able to make it real. That is why we are working further with the concept which we started at the InnoEvent and we try to develop it by co-operation with school and doctors.



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Role: leader
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Skills: design, project management



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Business Plan

MISSION

The mission of the „Eir „ product is to introduce to the people an innovative idea which will help them to prevent their injuries and their pain by using a very practice and helpful product .

Keys to success

- 1 Offering innovative help
- 2 Preventing pain by predicting it, so the user can take counter measures to prevent injuries
- 3 A reliable administration that is ready to serve the customers, inform with all the necessarily information that they need and maintain a close watch on the market and target group.

COMPANY SUMMARY

The „Eir „ company is a new company which so far developed just one big innovative idea with the purpose of preventing the pain . The product carries the name of the company and is called „The Eir Ball „. The company and the idea of the product is owned by 6 international students with different knowledge and backgrounds.

STRATEGY

The „Eir „ product will focus on becoming the number one innovative product on the market and hospitals which will prevent and measure the pain with just one grip .

SALES STRATEGY

Our sales strategy will have two distinct sales approaches :

for hospitals: doctors will need "Eir" product to examine patients

for consumers: patients can have "Eir" product at home

PRICE

The product price should be affordable for everyone. The item could be compare with high-tech products, for example: interactive watch, which mostly has high price, but which is still not too expensive for everybody. The reason of it, is that the construction of the ball – sensors and the main material cost. Estimating, the "Eir" product should cost: 134 euro.

REFERENCES

<http://online.musikeren.dk/musikeren/140/> (page 44)