EUNIS 2017: Template for Submissions

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Keywords

Quantified student; learning analytics; study success;study improvement;good practice;real life demos;privacy;really smart mobile

1. SUMMARY / ABSTRACT

It is a simple idea, really.

Learning is all about feedback. Runners, for example, use apps like the RunKeeper. Research shows that apps like that enhance engagement and results. And people think it is fun. The essence being that the behavior of the runner is tracked and communicated back to the runner in a dashboard.

We wondered if you can reach the same positive effect if you had a dashboard for Study-behaviour. For students. And what should you measure, track and communicate? We wondered if we could translate the Quantified Self Movement into a Quantified Student.

So, together with students, professors and companies we started designing & building Quantified Student Apps. Apps that were measuring all kinds of study-behaviour related data. Things like Time On Campus, Time Online, Sleep, Exercise, Galvanic Skin Response, Study Results and so on. We developed tools to create study – information and prototyped the Apps with groups of student. At the same time we created a Big Data Lake and did a lot of Privacy research.

The Big Difference between the Quantified Student Program and Learning Analytics is that we only present the data to the student. It is his/her data! It is his/her decision to act on it or not. The Quantified Student Apps are designed as a Big Mother never a Big Brother.

The project has just started. But we already designed, created and learned a lot.

1. We designed and build for groups of prototypes for Study behavior Apps:

    a. Apps that measure sleep & exercise and compare it to study results, like MyRhytm;

    b. Apps that measure study hours and compare it to study results, like Nomi;

    c. Apps that measure group behavior and signal problems, like Groupmotion;

    d. Apps that measure on campus time and compare it with peers, like workhorse;

2. We researched student fysics to see if we could find his personal Cup-A-Soup-Moment (meaning, can we find by looking at his/her biometrics when the concentration levels dip?);

3. We created a Big Data lake with student data and Open Data and are looking for correlation and causality there. We already found some interesting patterns.

In doing so we learned a lot. We learned it is often hard to acquire the right data. It is hard to create and App or a solution that is presenting the data in the right way and presents it in a form of actionable information. We learned that health trackers are still very inprecise. We learned about (and solved some) challenges surrounding privacy.

Next year (2017) we will scale the most promising prototype, measure the effects, start a new researchproject and continu working on our data lake. Things will be interesting, and we will blog about it on www.quantifiedstudent.nl.

2. PAPER

2.1. Introduction

Suppose I am a runner and I would set myself a simple goal. In a half year I would like to run the half marathon (21 km) in one hour and 45 minutes. So every other day I put on my running shoes and start to run. I do not use tools like a Google Maps or a timer. I just run like I feel is best. The last few weeks for the half marathon I intensify my schedule and I run every day. Then, the run starts. I feel I am ready. Two hours and 3 minutes later I finish. Well, I think, let's try again in 6 months and this time I have to train harder.

Sounds a bit absurd, right? Why didn't I use a Runkeeper-kind-of-App? A smart schedule and constant feedback about my running would have helped me greatly to a achieve my goal. And it probably would have been more fun too.

Still, a lot of our students are studying like the runner-without-an-app. They think they study hard, but do they really? They think they make the right decisions for study success, but do they? They have almost no data/information about their studybehavior. **Wouldn't it be interesting to provide them with the data and find out if it helps them be a better student?**

We see it everywhere in the consumer market. People are starting to measure themselves with devices like Fitbits and Jawbone, or Apps or smart tools (like Body Analyzing Scales). Inspired by this Quantified Self Movement we decided to start a program in December 2015 to try an find some answers. We called the program **The Quantified Student**.

2.2. Phase One. Design Guidelines & Goals

We started the program by drafting some design guidelines and goals for the first year. We thought it really important to create a strict framework in which this program would take shape. The guidelines were:

1. All work done will be **part of our education**. Groups of students will work on assignment, students will write their masterthesis on this subjects. Professors will be fully involved;
2. We will **NOT start a scientific discussion** about the pros and cons of this idea. We will start doing things from the start. We will create prototypes, calibrate students, collect and analyse data and so on;
3. We will be **very aware of privacy – issues** and make sure all our efforts are within the boundaries of privacy law and our moral code;
4. We will be **very transparent** and blog about all our findings on www.quantifiedstudent.nl;
5. **Failure is a option.** This project is all about learning so we created a safe environment in which failure was celebrated as much as success.

Our goal was to start 3-5 projects in 2016 that should all be very concrete. All projects were to result in hands on, showable prototypes. In 2017 our goal is to start 5 new projects and take one of the projects of 2016 and try to scale it to the University level.
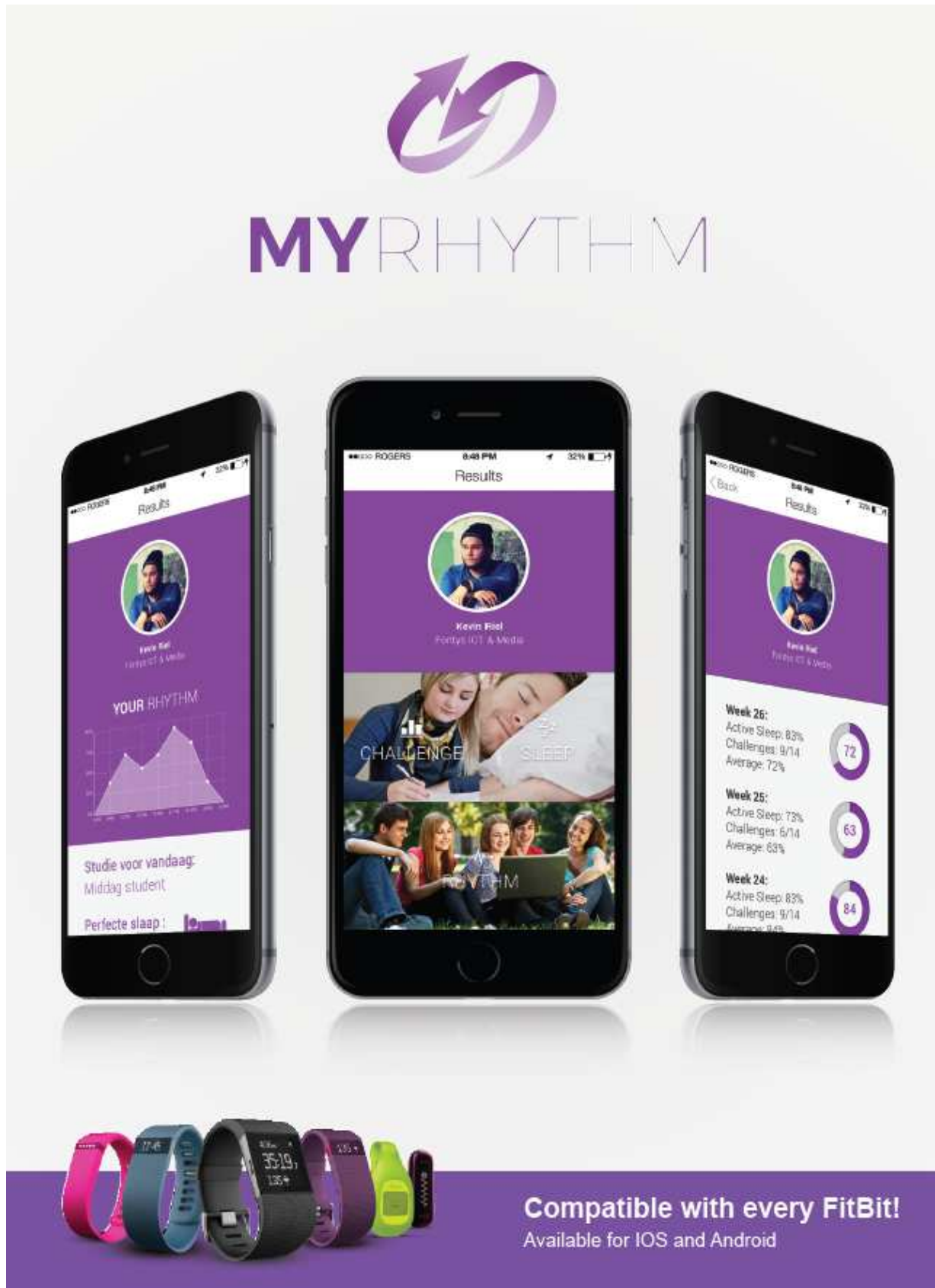
2.3. Phase Two. Run Projects

Starting januari 2016 we decided three totally different projects. We will describe the projects and the results in more detail on the next few pages.

Project 1. ProtoTyping Studybehavior Apps

Can you design and create an App that helps students become better students? That was the central questions we asked 120 students divided in groups of 10. They worked on a answers for 4 months and we will highlight some results and also talk about some challenges we faced during this project.

Prototype number One. The MyRhytm App.

A few group of students set out to create an App that finds and shows patterns into a students sleeping habits and his/her study results. One of the groups created the MyRhytm App. An App combining reaction time with sleeping patterns. The working premise was a study that showed a correlation between reaction time and study results. The idea was simple. A few times a day the App was challenging you to do a simple reaction test (you had to pinpoint your girlfriend in a group of photos) and the results were compared with your sleeping patterns. If bad sleeping patterns were negatively impacting your reaction time you got suggestions for improvement. By monitoring the improvement slowly a 'MyRhytm' per student was established.

Of course the practical use of such an App is low but building it learned us about privacy challenges and the difficulty of tapping in to the FitBit data.

Prototype Number Two. Nomi.
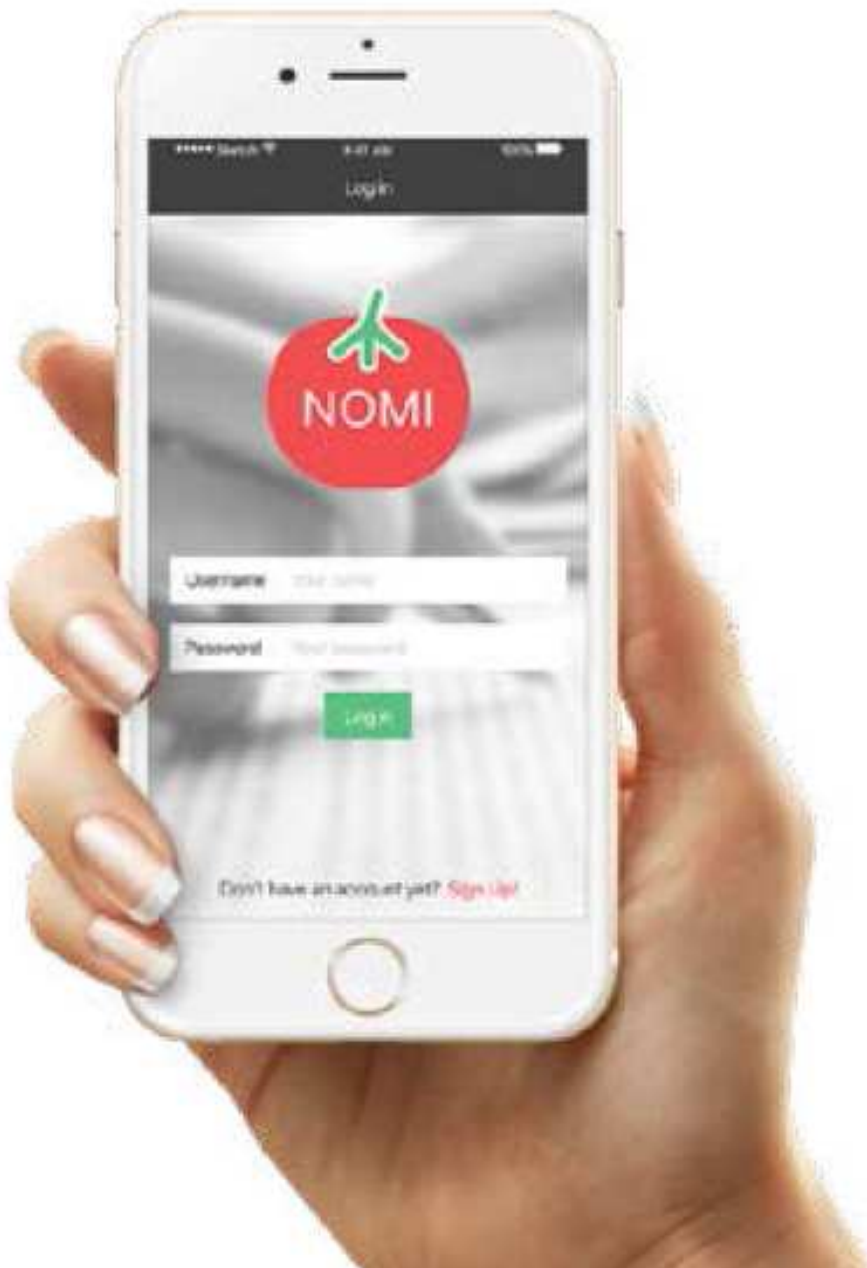
Other group of students tried to create an App that was focusing on plain, old studytime.One App was called Nomi and focused on High School students. In the Netherlands a lot of high schools have

all their assignments and homework registered in a central student information system called Magister. The App tapped into Magister so the student could see what had to be done. Everytime the student started a task he clicked on the Nomi App that consequently blocked the phone for 20 minutes. This way the student gained insight in the hours he/she spent for studying for an exam compared to his/her fellow students. So, in the past you might thought you studied hard. Now with Nomi you know for sure.

The students that created the App started a StartUp company and are currently in discussion with Magister and some High Schools to build a production version of the software.

**Prototype Number Three. GroupMotion**

Students that work in groups a lot hate two things: people that do not really contribute and snitches. So they built an App called GroupMotion that quantifies the movement and emotional state of the group. By using GPS data and asking group members about their well being they were able to pinpoint problem areas like a student not moving with the group or a student feeling uncomfortable. These problem areas were communicated back to the student so he/she could make some necessary adjustments.

The software worked like a charm although the moral, privacy and ethical consequence of an App like GroupMotion are complex. As a prototype it truly was a thought provoking piece of work.

Prototype Number Four. The WorkHorse

Finally we had some groups of students that concentrated on translating the WIFI – data into insight in study behavior. Fontys University has a very large network (over 2500 Access Points and 30k concurrent users) and almost everyone instantly connects when they walk into our buildings. Still, if you ask someone how many hours are students are spending on campus, nobody knows. Ofcourse they can check the schedule, but that is only paper. So students started working with this WIFI – data and build the build the WorkHorse App.
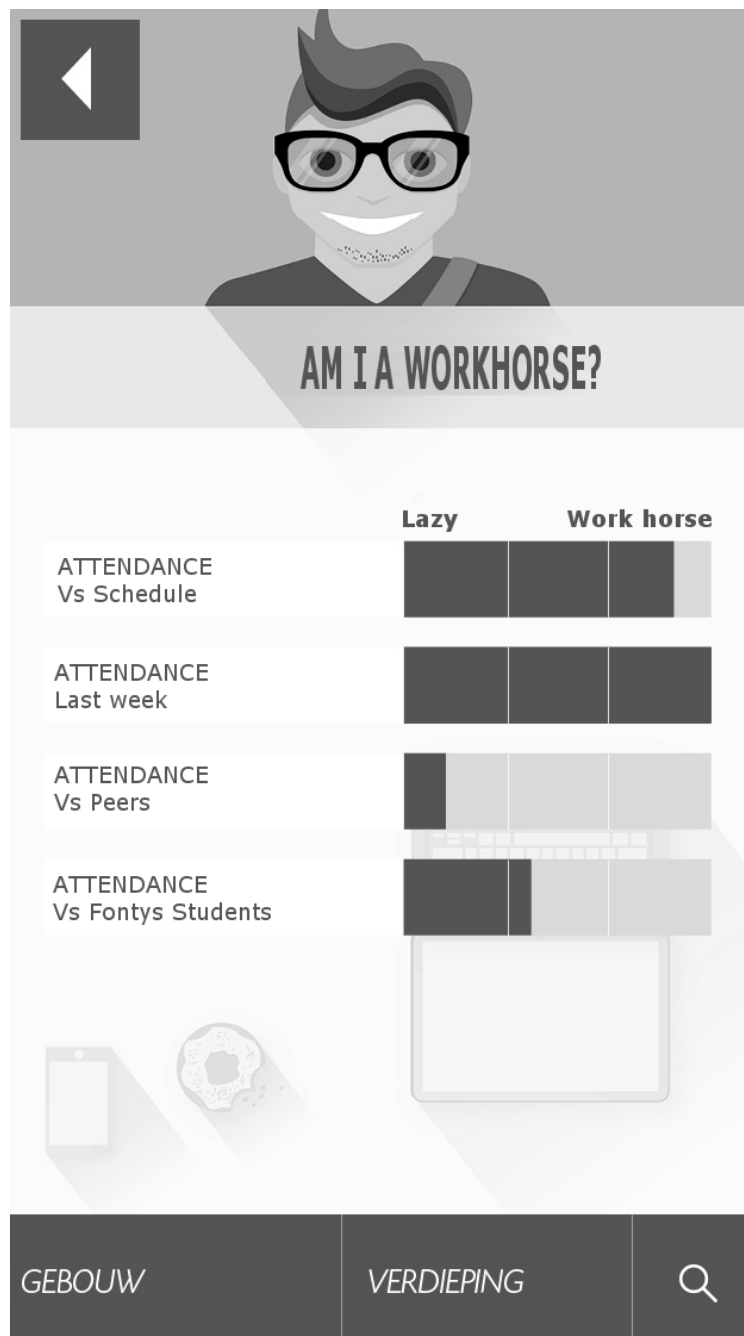
This App showed the attendance of a student and compared it to its schedule, its peers and all students of Fontys University. Playfully it showed if you are putting in more or less hours than average. Are you a workhorse or not? The idea is that you receive some suggestions that can help you change your behavior and you can also share this data with your counselor (if you like!).

Project 2. Your Personal Cup A Soup Moment

We had two students working on their master thesis in 2016. One student psychology and one student ICT. Together they designed tests for groups students and while they were doing the tests they were measuring the biometrics of the students. The idea was to try and find a causality or correlation between the results of the test and the biometrics. This way it would be possible to

measure when concentration levels dip and students better take a break (in the Netherlands we call this a cup-a-soup break). Wouldn't it be great if you were wearing a system that could warn you to stop studying and take a mini-break?

Early results showed some promise, but also showed that the measuring equipment is not precise enough yet.

Project 3. Swimming in a Data Lake

At Fontys University we have a Minor specializing in Data Science. In this minor we adopted a Quantified Student project. A lot of data is collected, anonimized in a large data lake. Think WIFI – data, e-learning statistics, data from health trackers, open data from our buildings (like temperature and so on), study results and all kind of Open Data (such as weather, public transportation, trending on social, daylight, etc…).

The Data Scientist are looking voor correlation or causality in the Data Lake. One of the first things they found was the relation between daylight and attendance of students. Some schedules were improved accordingly.
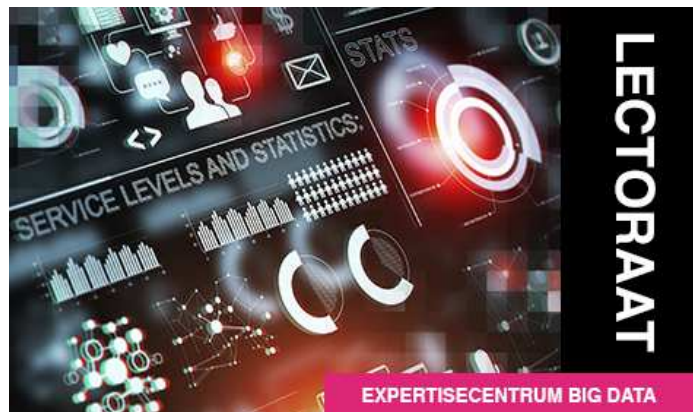
2.4 Fase Three: 2017

In 2017 we will do (at least) three projects in the Quantified Student Program. **First** we will scale the WorkHorse Prototype App. We already made some arrangements with a company that helps us organising the WIFI data & we aim to add the functionality to the common Fontys University App. Before the summer every student at Fontys University will be able to see the number of hours spent on campus compared to his/her schedule and peers. And we will act with privacy laws.

Secondly we will start a new reseacrh project to try and find biometric indicators for concentration levels. This time we will use better measuring – instruments. We already have selected some wearables that are not available on the consumer market yet.

Third, we will keep adding data to our data lake and start new project with students. One of the extra things we will do is challenge our students to create visualisations of the activity on campus. For example, how many students are on campus now? How are they divided by type of education? Men or women? Do men start earlier, make longer days? Or women? And so on. These visualisations will become an integral part of our culture.

3. AUTHORS' BIOGRAPHIES

Rens van der Vorst is Head of IT Innovation at Fontys University. His aim is to enhance education by using IT. Rens also works as a technophilosopher. In this role he helps education to prepare students for functioning in a society that is determined by technologie. Before his current role Rens was CIO and Head of Operations at Fontys and before that he worked as a program-manager-for-hire.

Rens has a major in Political Science and is very active in the Dutch Educational Community. He leads Advisory boards on HE-connecting infrastructures, has a seat in the Advisory Board of Cisco, was one of the fouding fathers behind an IAAS solution for all Dutch HE and he is also responsible for the success of the Dutch Benchmarking Initiative.

Rens is a gifted presenter who did some TedxTalks about different subjects and is very active on all kinds of conference and other meetings. He mainly speaks about the future of thecnology and the impact on us humans and society. Rens is also writer for CIO.nl and runs a platform called technophilosophy.com.

Rens is 45 y/o, has a wife and two kids and like all Dutch people he is an incredible gifted soccer player, or so he thinks.