



## Teaching Learning Analytics – A Case Study

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# Teaching Learning Analytics - A Case Study

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## Keywords

Learning Analytics, Visualization, Student Success Technology, Blended Learning, Game-based Learning, Collaborative Learning, Agile Methodologies Teaching, International Student Teams, Short-term Student Mobility.

## 1. SUMMARY

The idea behind learning analytics is to gain insight into students' study progress. It is used for example at the University of Kentucky [UK15] to identify students at risk completing their degree in order to provide them with personalized counselling services. But as data is the new oil, education on data science in general becomes more crucial. This is reflected in new master degree programs, but how to give students in "ordinary" curricula the opportunity to peek into this field?

In our poster we share experiences from our short intensive courses on learning analytics. At first, we provide key details on context and concept of the course. Following, we will showcase the most inspiring student projects. For example, they recommend students electives similar students attended and visualize, if students attended a course earlier or later than intended in the program and its result on the average grades in the exams. Finally, we briefly discuss operational elements that other EUNIS institutions can transfer to setup a similar course on their own.

## 2. COURSE OUTLINE

ATHENS is a network of 23 universities in 14 European countries that enables students from their third year of study to attend a 10-day exchange program at partner institutions. Twice a year about 60 one-week scientific intensive courses are offered in each session. Topics come from the research fields at the partner institutions and focus on engineering, natural sciences and mathematics. Roughly 4,000 students participate annually in the program, about half of them attend a course abroad. [PT17]

Since 2015 we offer a course on learning analytics within this program. Due to the tight time frame as a one-week block course, we apply a blended learning approach for quickly diving into the necessary theoretical knowledge. Ahead of class, participants research independently one topic from agile software development and business intelligence. With ICT supported communication and shared data in the cloud (Google Docs), students prepare a short introduction for the upcoming block course. For some, this is their first presentation in English - an element that becomes more important later in their studies as well as professional life.

We also use a game-based learning approach for in-class exercises with selected playful activities accompanying the presentations by the students. With these so-called "agile games" [MM15] students experience the differences between agile software development and classical methods of project management and practice typical challenges in professional life and international collaboration in heterogeneous teams despite the limited course length.

The second pillar of the course week and the focus of our poster are the learning analytics projects of our students. Students design, implement and test their application in teams of 4 or 5 members to foster project-based collaborative learning [SK12]. Thus, participants gain first-hand experience with agile methods that they can also apply to their studies. For example, they can use effort estimation techniques for other group work or time boxing routines when writing term papers or their master thesis. The block course ends with a short project presentation as well as a sprint retrospective [BR13] for feedback and review on the collaborative work.

### 3. LEARNING ANALYTICS PROJECTS

The modular study structure at European universities deriving from the Bologna process allows students to choose individually some parts of their studies. To support the selection, learning analytics and good visualizations for study program options gain importance.

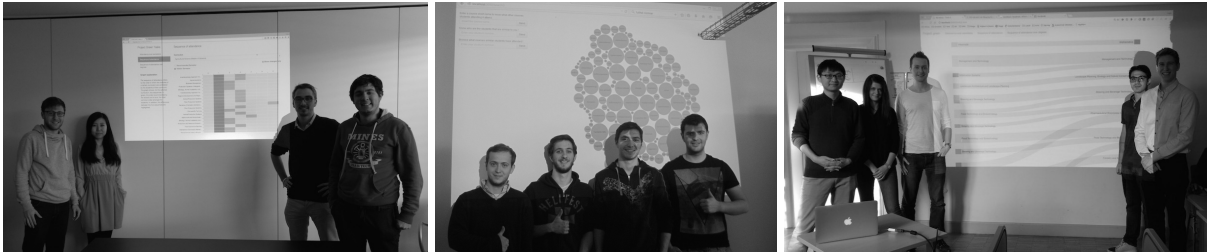


Figure 1: Students' Learning Analytics Projects

The student teams in our course week determine the needs of the future users of their applications. From students for students, they present in which sequence students attended the courses in a degree program, they illustrate which electives similar students attended and they recommend courses based on the choice of previous students.

However, learning analytics is not just for students. Also lecturers and examiners as well as study program designers and student counsellors can gain insights into students' behavior. Thus, one team showed lecturers the different degree programs of students attending their course and another demonstrated to examiners which average grade students achieved depending on the semester students took the exam. The distribution of students' attendance in a curriculum is revealed to student counsellors by one team and if students attend a course in an earlier or later semester than intended in the program. Another team visualized certain courses in the Bachelor's degree program that are specific milestones for a subsequent Master's degree program.

### 4. DISCUSSION

By deciding on appropriate visualizations for different aspects of student data, participants get the opportunity to lay hands on some basic data science in a context they are very familiar with. Hence we can recommend to other institutions to offer such "appetizers". But which operational elements would we suggest to facilitate the setup of similar courses?

A one-week block course puts on a tight time frame, but the advantage is that participants don't have several other courses at the same time. To give students a head start in prototyping their apps, we provide them with a pre-installed virtual machine and a basic software development infrastructure.

The biggest challenge is the data. For the teams' projects we use anonymized data on students' progress, courses and exams from our university's student information system. To ensure privacy is here as important as selecting meaningful data. The amount of varied aggregated data should also give sufficient flexibility for students' ideas on learning analytics.

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## 6. AUTHORS' BIOGRAPHIES



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