

SMART PROJECT

Report on the 3rd International Meeting

Topic: Planning of activities; presentation of training modules and materials and of the Project platform; financial issues

Location: Chalmers University - Gothenburg (Sweden)

Duration: 4th - 6th May 2015

Participants:

Applicant/Beneficiary:

Carlo Anti School (Italy): Claudio Pardini, Laretta Zoccatelli and Chiara Tacconi

Partners:

MIUR (Italy): Anna Brancaccio

University of Roma Tre (Italy): Settimio Mobilio and Carlo Meneghini

University of Torino (Italy): Marina Marchisio

Accademia delle Scienze (Italy): Alberto Conte

Confindustria Vicenza (Italy): no representative taking part in the meeting

TU Delft (Netherlands): Meta Keijzer-De-Ruijter

Chalmers University Gothenburg (Sweden): Jan Stevens, Stephan Lemurell and Tommy Gustafsson

St. Thomas Gymnasium (Germany): Elisabeth Mayr and Stephan Markthaler

Radnoti School Pecs (Hungary): no representative taking part in the meeting

Activities performed:

4th March, Mallvinden, Mathematical Sciences, Chalmers Tvärgata 3, Chalmers University of Technology

13.00 – 14.00 Welcome and Lunch

Jan Stevens and Tommy Gustafsson welcome the meeting participants and, after a quick lunch, illustrate the three days meeting programme.

14.00 – 14.30 Introduction of Chalmers University

Tommy Gustafsson introduces Chalmers University that has two campuses in the centre of Gothenburg, the second biggest city in Sweden with 500,000 inhabitants. Education at Chalmers includes an Engineering preparatory year, BScEng programmes (3 years), Nautical engineering (4 years), MScEng and March programmes (5 years), Master's programmes and Doctoral programmes. There are 11,000 students with a lot of departments, some of them in collaboration with Gothenburg University, among which Mathematical Science.

The University was founded in 1829 following a donation by William Chalmers, a director of the Swedish East India Company. He donated part of his fortune for the establishment of an "industrial school". Chalmers was run as a private institution until 1937, when the institute became a state-owned university. In 1994, the school was incorporated as an aktiebolag under the control of the Swedish Government, the faculty and the Student Union. Chalmers is one of only three universities in Sweden which are named after a person, the other two being Karolinska Institutet and Linnaeus University.

On 1st January 2005, the old schools were replaced by new departments: Applied Information Technology, Applied Mechanics, Applied Physics, Architecture, Chemical and Biological Engineering, Civil and Environmental Engineering, Computer Science and Engineering, Energy and Environment, Fundamental Physics, Materials and Manufacturing Technology, Mathematical Sciences, Microtechnology and Nanoscience, Product and Production Development, Radio and Space Science, Shipping and Marine Technology, Signals and Systems and Technology Management and Economics. In addition to these, Chalmers is home to six national competence centres in key fields like Mathematical Modelling, Environmental Science and Vehicle Safety.

Approximately 40% of Sweden's graduate engineers and architects are educated at Chalmers. Each year, around 250 post graduate degrees are awarded as well as 850 graduate degrees. About 1,000 post-graduate students attend programmes at the university and many students are taking Master of Science engineering programmes and the Master of Architecture programme. From 2007, all Master's programmes are taught in English for both national and international students. This was a result of the adaptation to the Bologna process that started in 2004 at Chalmers, as the first technical university in Sweden. Currently, about 10% of all students at Chalmers come from countries outside Sweden to enroll in a Master's or PhD program.

Around 2,700 students also attend Bachelor of Science engineering programmes, merchant marine and other undergraduate courses at Campus Lindholmen. Chalmers also shares some students with Gothenburg University in the joint IT University project. The IT University focuses exclusively on information technology and offers Bachelor and Master programmes with degrees issued from either Chalmers or Gothenburg University, depending on the programme.

Chalmers confers honorary doctoral degrees to people outside the university who have shown great merit in their research or in society.

Chalmers has partnerships with major industries mostly in the Gothenburg region such as Ericsson, Volvo, and SKF. The University has general exchange agreements with many European and U.S. universities, too.

14.30– 17.00 Presentation of the on-line course Sommar matte and the use of MapleTA

Chalmers University programs are focused on research and teaching within technology and natural science, and mathematics is foundational to all technical programs offered at Chalmers. Since 2008, they have been using Maple T.A. to deliver, administer and grade mathematics courses. What started as a tool to deploy online summer courses turned into a technology to teach and grade parts of several mathematics courses all year round. The benefit of using Maple T.A. was so evident that the university recently adopted it for all 15,000 of its students and staff. Maple T.A. is a testing and assessment system that supports complex, free-form entry of equations and intelligent evaluation of responses, making it ideal for science, technology, engineering and mathematics (STEM) education. Summer Math has been developed by Chalmers in collaboration with Gothenburg University in order to facilitate the transition gymnasium-university (Commissioned by the Government, 2007). The course is a good opportunity for those many students who are currently taking a break after secondary school before going to university.

The three main aims of the Sommermatte course are: to reach those students who plan to start a maths intensive training; to repeat and reinforce students' maths skills before they start their education; for the individual students it should become a better start and easier to complete for their studies.

Sommermatte is a distance learning course in all parts; materials and communication are implemented through the LMS (Learning Management System) Ping Pong; there is a support centre staffed by talented students at the end of their education; examinations are performed with Maple TA.

There are currently more than 2,500 students enrolled per year and Maple TA generates and corrects 48,000 test sets and 340,000 questions. The number of students who logged into LMS has been increasing steadily from 2009 to 2015.

Students' reactions to Maple TA are generally very positive: they say the summer course really helped them and it was very good for their preparation.

Tommy Gustafsson illustrates what the students see when they access the system: there is also a progress bar which shows what the student has completed and what is still missing. There are also registered lessons (voice and screen sharing): the teachers explain with the aid of an electronic panel that they use like a sort of blackboard. The students can download the materials and use and reuse them. Tommy Gustafsson illustrates some example activities.

The Sommermatte activities are not compulsory for all students who are going to attend Chalmers University: in fact some students who do them, will not enroll at Chalmers. The materials are all in Swedish. There are also forums for students who can ask questions: teachers, but also talented students answer them and give their explanations. There is also a phone support (but not with Skype: only voice). The students have to register on a national site (www.antagning.se) in order to access the courses.

After that, Jan Stevens illustrates some examples of multiple choice questions and short answers for mathematical questions with the possibility of immediate automatic correction. There are very easy quizzes as well as more difficult multiple choice questions. The students can see their score as well as the details (what was correct and what was wrong) in the exercises they have just done.

Marina Marchisio informs the partners that next June there will be a Maple TA Summit in New York: on her request, a specific time (a 20 minutes contribution) will be dedicated to the SMART Project, as Maple TA is going to be used in the SMART Project Open Online Courses.

For the Open Online Courses, the University of Turin will prepare some problems on which Chalmers University will create some questions/exercises/quizzes on the model of those illustrated during this third meeting by Jan Stevens and Tommy Gustafsson.

5th May, Mallvinden, Mathematical Sciences, Chalmers Tvärgata 3, Chalmers University of Technology

9.00 – 15.00: Illustration of some examples of didactic materials in Mathematics and Science; Open on line courses structure: in depth study of the proposals according to the curricula of the schools experimenting them by Anna Brancaccio (MIUR), Settimio Mobilio, Carlo Meneghini, Marina Marchisio and the partner schools

Settimio Mobilio summarizes the four modules for Science agreed during the previous meetings with the specification of the OECD topics which have been chosen:

1. **Methods in Science**: Measuring and uncertainty, Modelling and data fitting and Deductive scientific reasoning
2. **Chemical and Physical systems**: Structure and properties of matter, Physical and chemical transformations, Force and motion, Energy transformation and Energy matter interaction
3. **Living organism**: Cell, Human body, Animal and plant life, Biosphere and Ecosystems
4. **Earth Science**: Structure and energy of the earth, Earth modifications, Earth history and Earth in the space

Then he shows and illustrates the structure of the teaching unit in Science, based on “Believe, know, understanding”. In Italy they are promoting the lab methodology with the travelling laboratories: these materials and methods will be also used within the SMART Project. He shows the homepage of the LS OSA Project with the materials for Optics, Biology, Chemistry, and Earth Science: they are open to anyone who is interested.

Carlo Meneghini explains that one very important aim of the lab methodology is to let teachers and students understand that the laboratory is everyday life, not a place only for scientists. He shows the structure of the activities performed in the travelling laboratories. There is a summary of the experiment, the prerequisites, the objectives and competences involved in the specific activities, the time and materials required (with also the indication of where to find them) and the illustration of the experiment itself. He illustrates an experiment on refraction (“A look into the mirrors”): there are questions to help students reflect and arouse their curiosity and motivation and also some problems that are of interdisciplinary type (Physics, Chemistry, etc.). Students are asked to observe, reflect, discuss and describe. There is also a dedicated space for questions and suggestions of teachers and students.

For Science, the University of Roma Tre will prepare the activities and Delft TU will build the evaluation materials on those activities and publish them on the platform.

For Mathematics, University of Turin will prepare the activities and Chalmers University will create the evaluation materials on those activities and publish them on the platform.

Elisabeth Mayr agrees with all the topics proposed, except with the Earth Science ones because they aren't included in the German School Curriculum. Anyway, the experiment on Earthquakes is so interesting and related to Physics that she thinks it can be administered to her school's students.

Then the participants discuss on the evaluation issues: there will be many different types of evaluation: student evaluation, self evaluation of the teacher, on the materials and the suggestions on how to perform the methodology in the class with the students. Each didactic unit will contain a selection of tests and task activities, prepared with the automatic evaluation system, which allow the teacher to assess both the knowledge and the competences reached by the student. The questions of the task activities permit the insertion of answers containing literal and numeric expressions as the system is able to evaluate the answer correctness regardless of the form of the expression chosen among the innumerable possible ones. The automatic correction can provide some feedback for the student and the task activities will be accompanied by an assessment rubric that the teacher can decide to use or not. At the end of each module some tests with automatic assessment are provided also for the teachers: they will allow them to get a rating of the proposed activities in terms of clarity, feasibility and effectiveness in order to select and update topics and contents of the didactic modules.

Jan Stevens would like to know if there is the possibility of an evaluation of teachers who carry out the Open Online Courses. At this stage it seems not possible to give these teachers a formal evaluation but they could be offered the possibility to answer some questions about the activities performed (on the content of the experiments, on the methodology, etc.) which is a sort of self-evaluation. In the future the Open Online Courses, could be disseminated in the form of MOOCs of Consortia of Universities and Institutions dealing with education and training, and an attendance certification will be given to in service teachers who want to refresh their competences and to initial teachers who are going to enter the school world.

Marina Marchisio explains how the work on the platform on the SMART website will be organized. The browser automatically selects the language of the participants among those of the partnership.

“Classes” is the area where students and teachers will work. The students will start the experimenting of materials on 10th September 2015. By 7th February, teachers will have to complete a questionnaire on the experimentations in order to get a first feedback on the materials.

“Open online courses” is another area on the platform: the role of “teacher” (= they can upload files, modify them, etc.) is given to Claudio Pardini, Marina Marchisio, Carlo Meneghini and Alice Barana; the other partners have the role of “students” at this stage of the project.

“Project Activities” is another area: it contains the section “Training teachers” dedicated to the teachers of Hungary and Germany. There are some materials in English on Moodle, Maple and Maple TA. Another section is “Virtual environment: Tutoring”: here there will be some online meetings next June: 1 for Moodle, 3 for Maple and 3 for Maple TA. The dates must be decided and will be published later, according to the indications of Hungarian and German teachers.

Marina Marchisio illustrates an example of a Maple TA assignment on “Geometric transformations”.

“Work group” is another section: here the role of “teacher” is given to Michele Fioravera, Marina Marchisio, Carlo Meneghini, Settimio Mobilio and Claudio Pardini.

Marina Marchisio illustrates the section “Open Online courses - Mathematical Modelling” with the topics already chosen during the last meeting, and the titles of some problems for each of them. There are also introductions to the PP&S methodology, Moodle, Maple and Maple TA.

At the end and during the implementation of the Open Online Courses, it will be possible to look for and find connections with other subjects like Electronics, Physics, etc. There are some materials which have already been prepared. An introductory lesson will be put at the beginning of each Open Online Course in order to illustrate and introduce its content.

Marina Marchisio asks the German teachers to let her know the topics and contents that they are going to develop during the first part of next school year so that some targeted precise materials could be prepared for the experimentation. In this way, there will be some immediate feedback on the innovative materials before making them available to the scientific community.

Work Package S.3.3, which is about the “Implementation of materials on the chosen media”, will be implemented by the universities of Turin, Roma Tre, Chalmers and Delft. The University of Turin will support the organisms which have less experience in doing this as they have ten years’ expert practice in Information Technology.

15.00 – 16.00: Multiplier Events by Claudio Pardini (Carlo Anti School) and Marina Marchisio (University of Turin)

The two SMART Project multiplier events had originally been set in Brussels and Athens because of a misinterpretation of what the Project Guide stated regarding the necessity of not holding them in the partners’ countries. A following document has made clear that the multiplier events have to be held in the beneficiary’s country, which is Italy: for this reason, they will take place in this country.

1st and 2nd Multiplier event title: Updating of in-service teachers in the Maths and Science competences on an international scenario.

Description: Presentation of the intellectual outputs produced in the SMART Project during the first year of work.

The first event will be organized by the Carlo Anti School and will be held in Verona during the Job&Orienta exhibition, an important fair, which takes place every year in November, in which schools and universities introduce all their activities and illustrate their training offer to the public.

The second event will be organized by the University of Turin and will take place in spring 2016, perhaps during the Book Fair.

Both multiplier events will see the participation of the project stakeholders. The results (innovative materials) of the first year of work will be presented analytically. The results of the Analysis Output could also be an object of reflection for the Ministries of Education in the various European countries, so that they can be used for the elaboration of new curricula for the students in Mathematics and Science and for the elaboration of training courses for teachers in initial training as regards the contents of Mathematics and Science.

1st Multiplier event: 30 local participants + 20 foreign participants;

2nd Multiplier event: 30 local participants + 30 foreign participants.

There will be a grant of 100 Euros for each local participant and of 200 Euros for each foreign participant, so that Carlo Anti School will get 7000 Euros and University of Turin 9000.

16.00- 17.00: Definition of learning objects (videos and their financial costs, recordings, simulations, etc.). Financial issues and involved professional figures (assignments) by Anna Brancaccio

Anna Brancaccio shows the draft of the appointment document that each partner has to draw for each professional figure involved in the project. The document will have to be signed by the organism legal representatives or by a person that has been delegated by them. All the professionals will also have to prepare a time sheet document indicating all the days dedicated to work for the project. The names of each professional figure involved are collected.

Anna Brancaccio announces that there has been a change in the partnership composition: Risorse in Crescita will soon substitute Confindustria. Then she illustrates the “Financial and contractual rules – Annex III” of the Erasmus + Project.

In the next weeks all partners will get the 60% of the budget which has been assigned to them regarding the project management, the transnational meetings and the intellectual outputs. The applicant school will also get a grant for the exceptional costs. Moreover, Carlo Anti School and the University of Turin are involved in the multiplier events. Another 20% will be distributed by 31st December and the final 20% after the end of the project.

Anna Brancaccio shows how the grant for the exceptional costs has been divided:

- Open Online Courses - Roma 3 (video, assembly, etc.): 9000 Euro
- Open Online Courses - Turin : 9000 Euro
- Translation: 12000 Euro
- Support platform (site, newsletter, maintenance): 4000 Euro
- Report & documents (printed paper): 3000 Euro
- WeBex (software for the webinars): 871,2 Euro
- Various materials: 2108,8 Euro

This budget is managed by the Carlo Anti school. Formal subcontracts will be drawn up for external resources while for internal people there will be written appointments.

Finally, Jan Stevens thanks everyone for their participation and contribution to the meeting and distributes the certificates of attendance.

6th May, Universeum, Södra Vägen 50

8.45 - 12.00: Guided tour of the science centre Universeum, followed by free visit

All the participants visit the science centre Universeum.

12.00: Departure of all project partners