

Teacher Training at Chemistry Faculties – Mutual Benefits? A Case Study Based on the Example of the IRRESISTIBLE Project

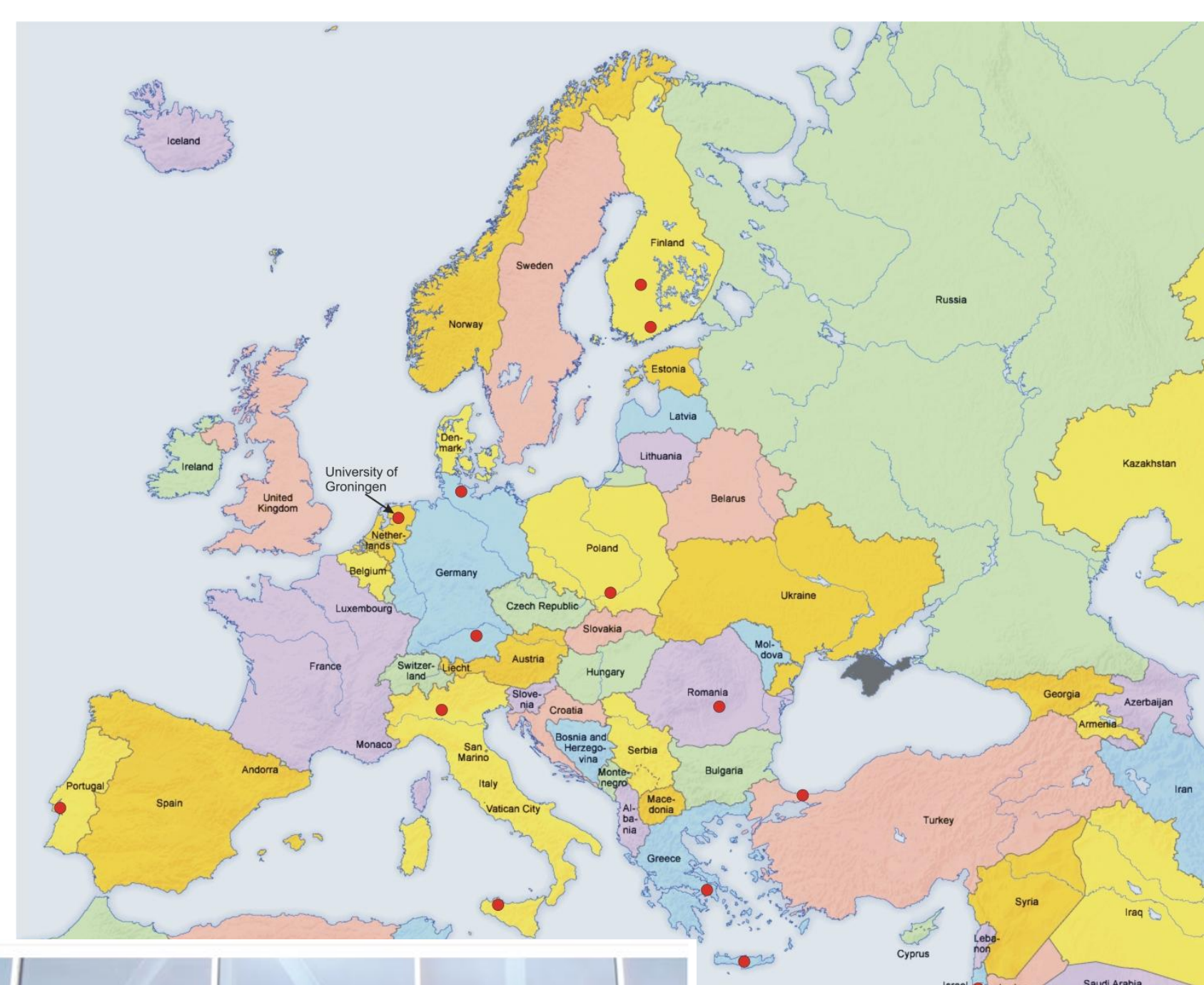
Iwona Maciejowska¹, Jan Apotheker², Pawel Bernard¹, Pawel Bros¹, Malgorzata Krzeczowska¹

¹Jagiellonian University in Krakow, Poland, ²University of Groningen, the Netherlands

Teacher education at a Faculty of Science or at a Faculty of Pedagogy? – the Jagiellonian University case

- 1917/18 - chemistry teacher education established at the Faculty of Philosophy ; teachers well educated in pedagogy and psychology, less in science
1972 - teacher education moved to the Faculty of Chemistry; future teachers obtain Master in Chemistry, additional qualifications for chemistry students, cooperation between the Faculty and secondary schools,

Partners Institutions



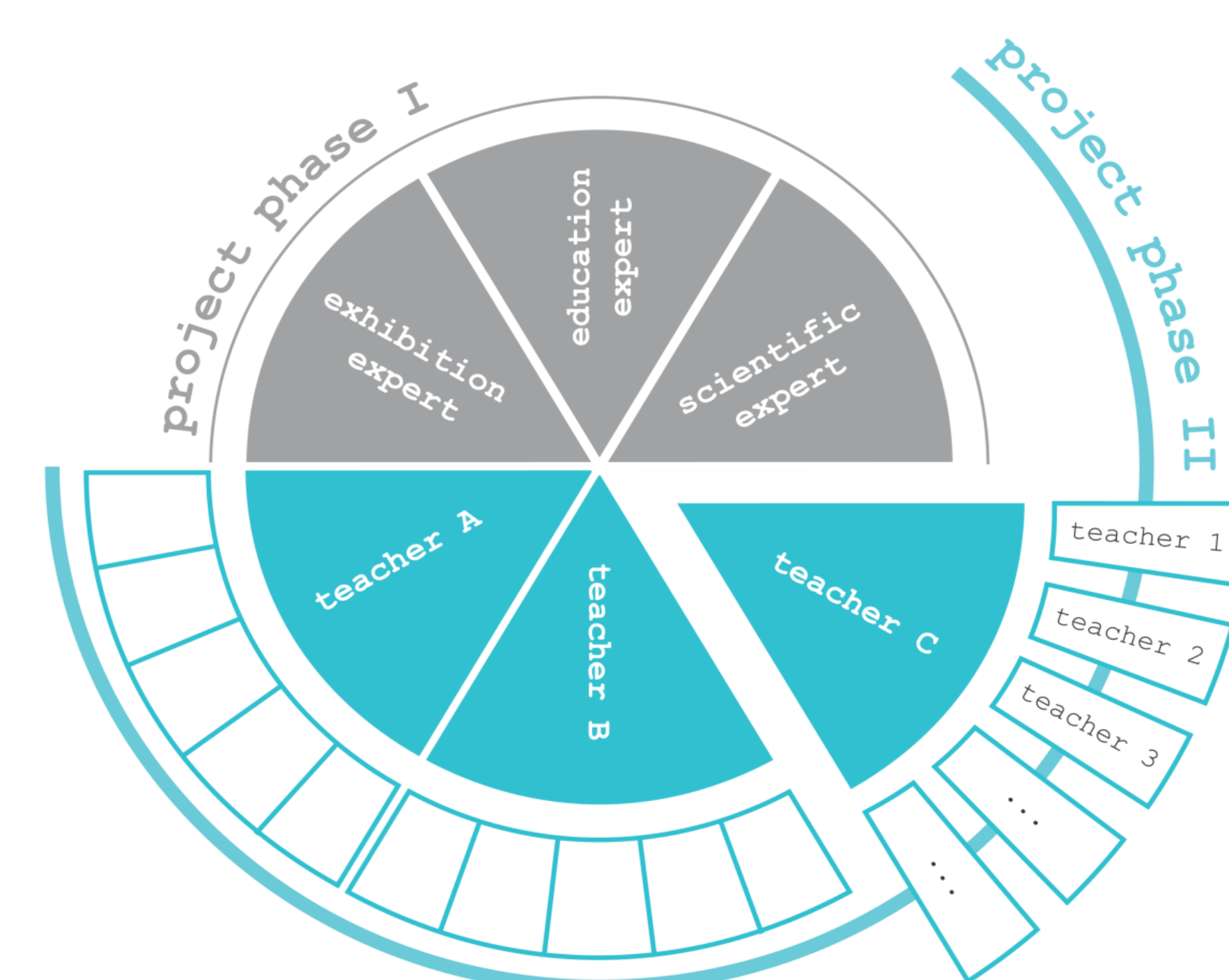
IRRESISTIBLE

EU FP7 Project 2013-2016

The goal of the project is to design activities that foster the **involvement of students and the public** in the process of **Responsible Research and Innovation (RRI)** by using formal (school) and **informal** (science center, museum or festival) **education**. In each of the ten partner countries a Community of Learners will develop **a thematic module**. **IBSE** approach in the form of 5(6)E will be recommended.

<http://www.irresistible-project.eu>

Community of Learners



Evaluation questionnaire was prepared based on the PMI(Q) evaluation tool: *Plus, Minus, Interesting (Questions)* developed by Edward de Bono. To the original questions the following expressions were added: difficult/easy, known/unknown. All Col members completed that questionnaire.

Semi-structured interviews with some Col members - scientists employed by JU (also academic teachers) were conducted: A1 –Associate Professor, 25 years of experience in academic work/university teaching; A2 –Associate Professor, 10 years; A3 –Full Professor, 28 years. According to the results of the interviews – the scientists had no prior significant contact with schools, and the contact was limited to that through their own children (A1, A3), upper secondary school graduates beginning their studies at JU (A1, A2), occasional lectures/workshops for teachers (A1, A3) or students (A1, A3), family talks (A3).



As a result of cooperation with school teachers, some lecturers realized **how important it is to adapt the language and content of the message to the recipient...**

„It is a different world, every time you need to think about what and how you want to convey, whether you are sure that the message will get to the other person (a teacher or a student) and it will be understood „ (A2)

The participation in workshops with teachers was **inspiring in terms of teaching methods...**

„I can see that the **active methods** have their advantages and I will try to use them during my classes“ (A1)

„RRI or that **6E** rule are very general things, and they fit everywhere, no matter what level of education you deal with.“ (A3)

„Young people have changed a lot; I still remember what our chemistry clubs looked like (...) we did not work as a team at all, (...) and I really like that **[students' group work]**, as well as focusing on **[student] projects**, which, incidentally, are also missing when studying at universities, (...) and they should be the basis of learning, because then when we construct research teams they need to be interdisciplinary; people must cooperate.“ (A3)

Scientists realized **how much they may help education:**

„I realized that the interaction with teachers is significant; they asked a **whole bunch of questions**, both formal and informal ones, and it reached its apogee when we met in [research] labs with their students' (A3)

„Teachers were saying many times that they needed from us sometimes some very **specific knowledge**, for example we say “active sites”, but to make it clear to them what an active site is... to make them able to tell young people whether it is a single atom or a group of atoms?“ (A3)



The contact with students and teachers delivered **new knowledge about school, which will be possible to be used in university education.**

„When implementing the project, we talked much about **the chemistry curriculum in schools** (...) now we will have the graduates who had a different curriculum [than the previous ones] followed; I learned more about what they [students – upper secondary school graduates] **know and what they don't know**; I need to take that into account when doing my course [for 1st year university students] „(A1)

„Students are the same everywhere – if there is something that makes them interested, they will be encouraged [to learn], but even if there is something interesting (from the perspective of a scientist) but not “sold” well, students will not be interested. **It is not enough to have an interesting and useful topic; we need to have it “well-packaged”.**“ (A2)

Other remarks:

„As a result of the CoL monthly meetings (...) when I do research now, I think about **RRI; we incorporate it into our discussions in the research team**“ (A2).

„I wish that contact [with schools] was better in the future, because it seems to me that there are **two separate worlds** – “**school**” and “**university**” – and a “**band gap**” between the two levels. If we managed to combine the two, it would be for the benefit of everyone.“ (A3)

„Meetings with students also made me realize **how we, as the scientific community, are isolated from the society**. They pass on what they heard somewhere from older mates or parents, and that [the image of a scientist] was surprising. (A3)

6E structure of IBSE activities (also during Col meetings)

