

# TEACHERS' SURVEY RESULTS (SPLIT, AUGUST 2019)

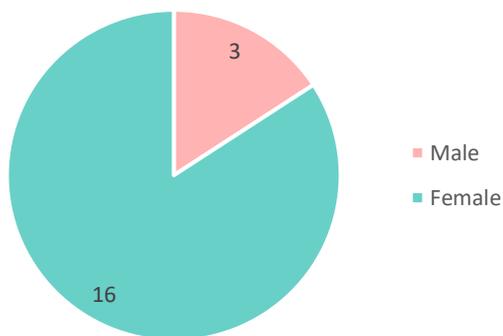
**María Heras**  
**Isabel Ruiz-Mallén**  
**Universitat Oberta de Catalunya**  
**(UOC)**

## Profile of participant teachers

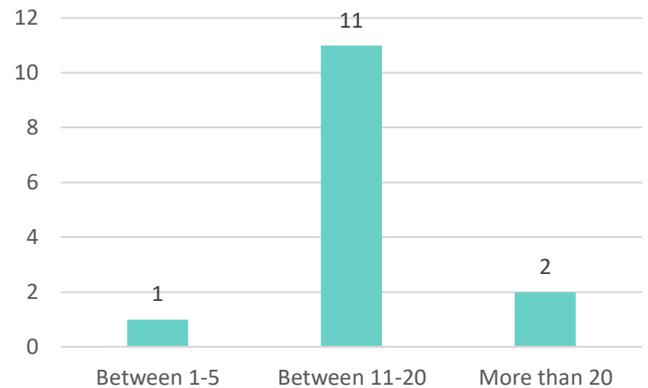
Nineteen out of 20 teachers answered to the survey delivered before attending the SPOON Summer Science Teacher Factory workshop in Split in August 2019.

According to their answers, the sample was unbalanced in terms of gender with a major presence of women (16 out of 19 teachers). Most of the teachers had more than ten years of experience and less than 20 and were dedicated to primary and secondary school teaching. The STEM subjects covered by these teachers were represented mostly by Maths, Physics and Biology (see figures below).

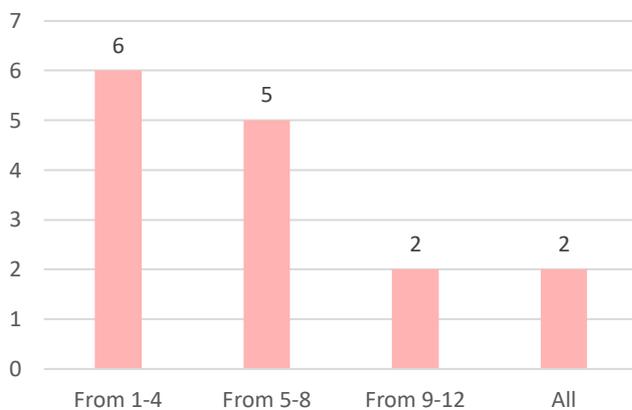
Gender



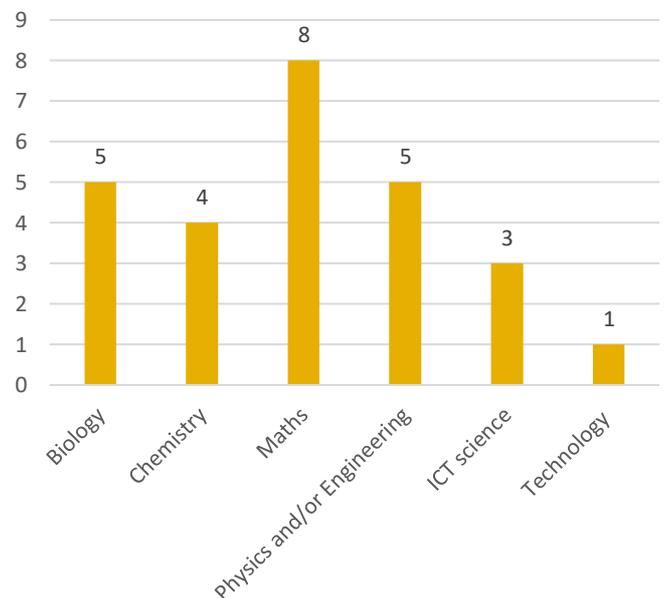
Years of teaching experience



Teaching Grades



STEM Subjects



## Teachers' motivations to join the training

### *What motivated you to join this training?*

19 out of 20 teachers answered to this question in the pre-survey.

The most reported motivations to participate in the workshop were to learn new teaching skills and get to know new teaching methods (n=7 for both of them). The **learning of teaching skills** was formulated both for the benefit of the teacher and that of their pupils. Interesting, only one of these teachers explicitly mentioned improving 'communication skills'. Others connected this aspect more generally with personal motivations. See for instance the following quotes:

*My wish to improve my teaching skills, so my pupils can have benefits in the future*  
PP1

*Seek for new teaching methods, fun and develop my skills and competences*  
PP9

Connected to this, teachers also mentioned to be brought into contact with new methods that could inspire them in their teaching and help them moving forward, both as a response to personal motivations or curriculum needs. See for instance:

*The desire to learn something new; a new modern approach of teaching.*  
PP14

*Need for new methods due to new curriculum in Croatia; personal curiosity*  
PP5

*A desire to further educate myself and improve my teaching skills and methods*  
PP7

The search for inspiration was also identified in some of the teachers' answers to this question:

*New experiences, gaining new ideas to implement in my teaching*  
PP4

Furthermore, two teachers also reported the possibility to meet other teachers and do networking as a motivation to participate in the workshop.

## Impact of the workshop on teachers' competences

Several weeks after the workshop, participant teachers received an online survey. This post-survey aimed to explore their perceptions of the contributions of SPOON workshop to improve their STEM teaching competences, as well as key aspects to keep and to improve. Twelve teachers out of the 20 participants answered this survey<sup>1</sup>. Questions combined a battery of close-ended items to obtain a global picture of teachers' perceptions in relation to a set of competences and open-ended items to further explore such perceptions in-depth. The next sub-sections follow the same order.

### *In a scale from 1 to 5, how would you rate the contribution of the SPOON training to improve or reinforce the following teaching competences? (related to STEM areas):*

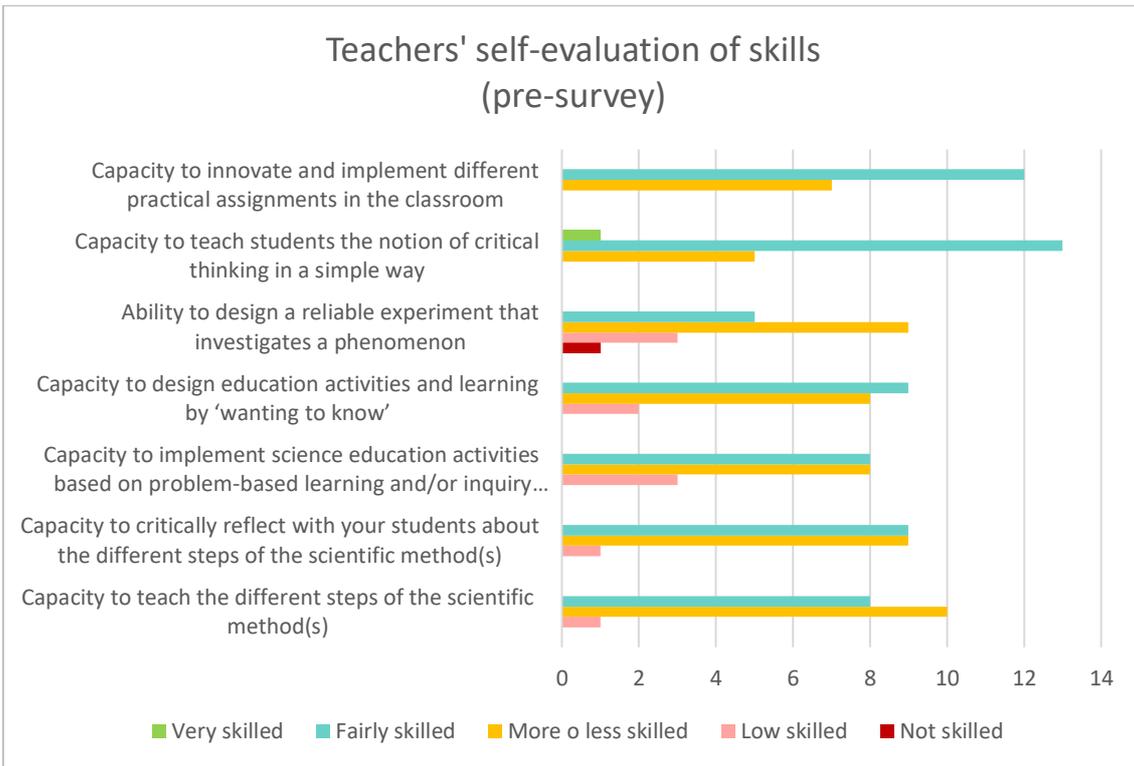
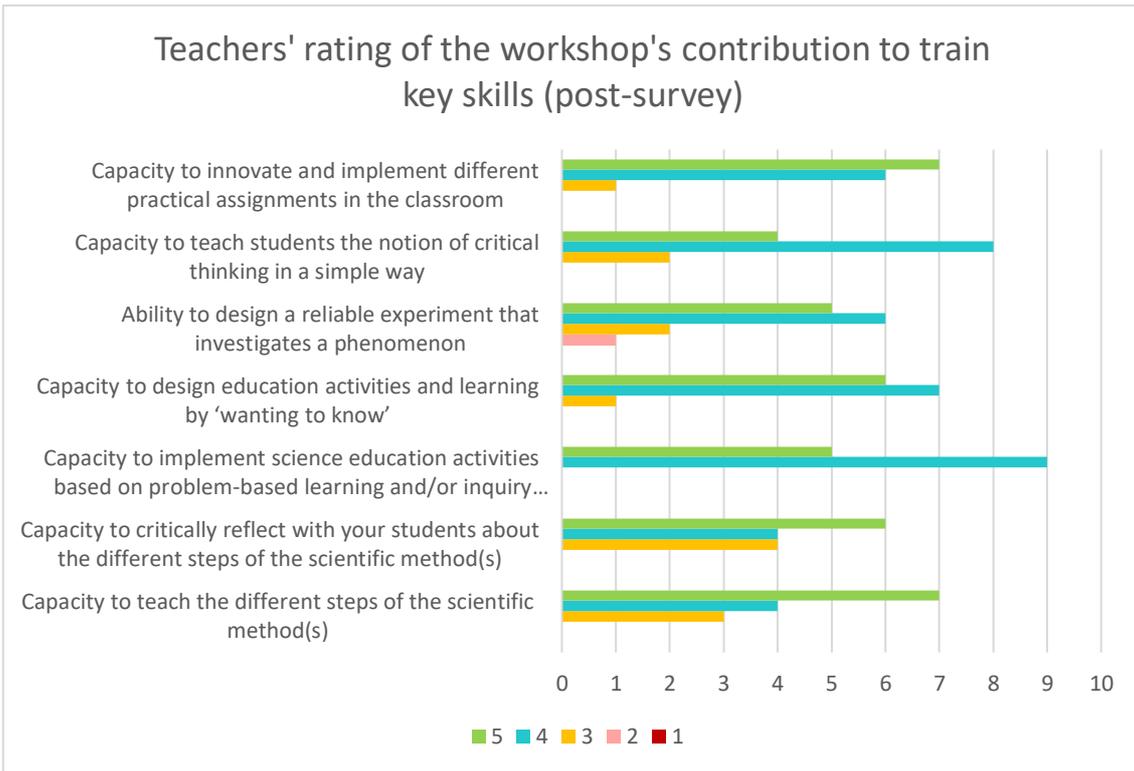
First, teachers were asked to rate the contribution of the workshop in a scale from 1 to 5 (being 1 'nothing at all' and 5 'a lot'), in relation to a set of 7 teaching competences and skills, selected due to their relation to the workshop's learning goals. In order to have data to contextualize these answers, we had previously asked the teachers in the survey delivered before the workshop (henceforth, pre-survey), to self-evaluate themselves in relation to these skills.

The two figures below represent teachers' answers to each question in the pre- and post-surveys. As the figures show, although in the pre-survey, in general, participant teachers already perceived themselves as "fairly skilled" in many of the capacities rated, their perceptions of the contributions of the workshop to train their skills were still high. As the first figure shows, there were almost no negative answers in teachers' responses in the post-survey being their responses distributed, for most of the contributions, between 4 and 5.

Within this general satisfaction, teachers considered that the workshop had especially contributed to improve or reinforce their capacities to: i) implement science education activities based on problem-based learning, ii) design activities fostering students' learning by wanting to know, and iii) implement different practical assignments in the classroom. This is relevant, since the ability to implement activities based on problem-based learning had been one of the less self-rated in the pre-survey (with 3 teachers perceiving themselves as 'poorly skilled' and 8 as 'more or less skilled'). Further evidence on the contribution of the workshop in this direction is also provided by teachers' testimonies (see next section).

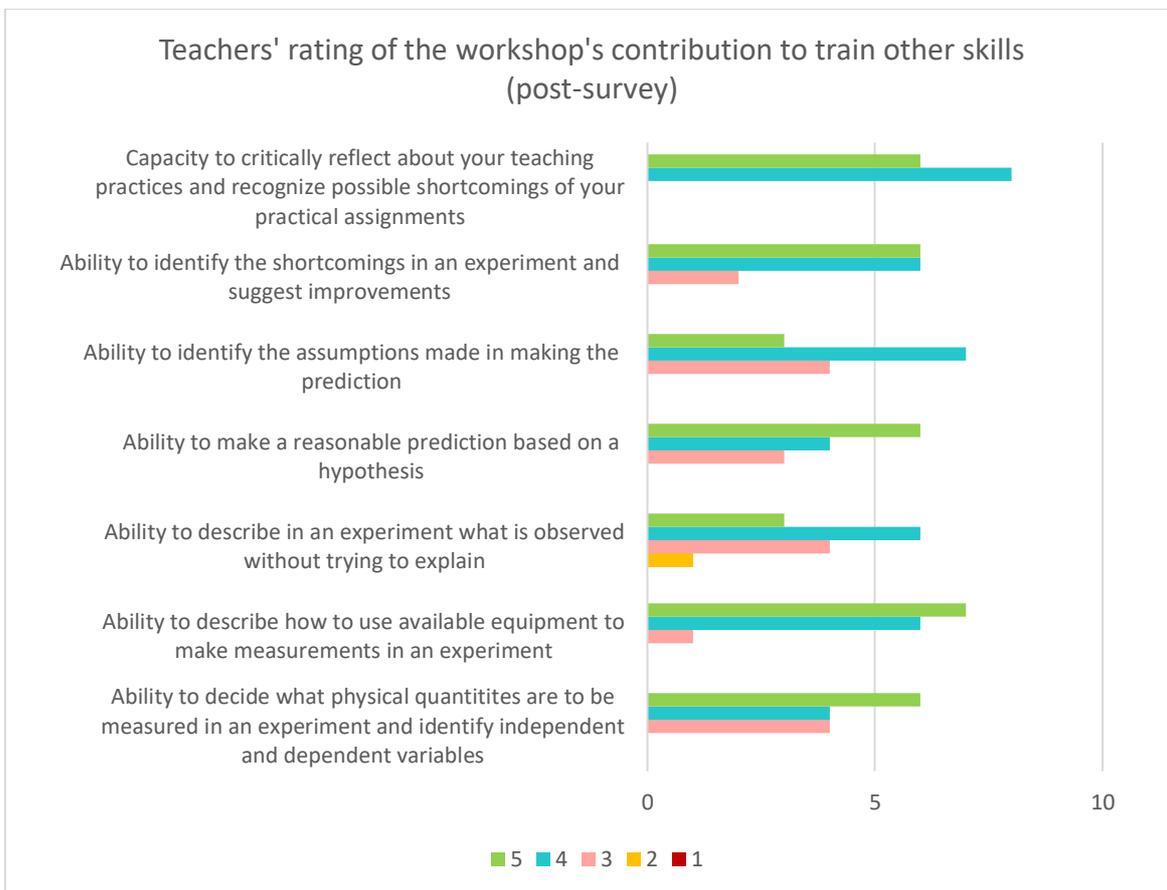
The contributions that were less emphasized by teachers (although still globally positive) were the contribution to their ability to design a reliable experiment that investigates a phenomenon (the only competence that got a negative answer) and to their capacity to critically reflect with their students about the different steps of the scientific method/s (with 4 teachers giving an intermediate mark). Both skills were also among the less rated in the pre-survey, suggesting that more emphasis on these skills might be needed in order to reinforce them through the training. The next section provides some suggestions by teachers in this regard.

<sup>1</sup> The sample corresponds to answers written in English.



Looking at the data qualitatively, these responses did not seem to be related to the number of years of experience in teaching. For instance, the number of years of experience in teaching went from 10 to 23 years in the case of those who provided less positive answers in relation to their self-evaluation of skills.

Finally, in the post-test participants were also asked to rate the contribution of the workshop to other more specific capacities that were approached during the workshop (see figure below). Responses were highly positive in general. For example, most participants perceived a high contribution of the workshop to their ability to describe how to use equipment to make measurements when doing an experiment or to critically reflect about their teaching practices.



The next subsections further explore teachers' perceptions of the workshop's contribution to train their teaching skills through open-ended questions about the workshop's impact and aspects to both reinforce and improve.

*As a teacher, do you think the SPOON training has contributed to reinforce or improve any of your teaching competences related to STEM?*

All the teachers that answered this question (n=12) considered that the training had contributed to reinforce or improve their teaching competences related to STEM. More specifically, their answers revolved around three key contributions: improving competences related to teaching through problem-based approaches, fostering their creativity and critical thinking skills, and providing new ideas and inspiration for the implementation of these activities in class.

Regarding problem-based learning, 4 teachers reported gaining knowledge and practical experience, or discovering other ways to approach it. See for instance the following quotes:

*[I have learnt] how to use a critical approach to measurements and conducting experiments. In general, I would say that I have gained good experience and knowledge about problem solving and experience-based learning in my classroom.*  
P5

*Yes, I become aware of another approach for problem based learning. It contributed to the development of critical thinking in science and forced me to get even further in implementing errors in measurement in my classroom.*  
P11

Six teachers also reported improving their creative and critical thinking skills, through the discovery of new and/or innovative ways to approach topics and through some of the exercises that required them to think differently:

*[The workshop has contributed] To help me think 'outside of the box' so I can now help my students to do the same.*  
P1

*I think SPOON is one of those programmes that encourages STEM teachers to be innovative and brave with new ideas, to feel free to have some critical thinking towards former methods and programs. This is what I feel I got from this training.*  
*Encouragement for new ideas.*  
P6

Closely connected to this dimension, it is the contribution of the workshop to inspire teachers and motivate them to implement similar activities in the classroom. Such contribution seems to stem from the practical dimension of the workshop and the reiterate encouragement to innovate in the classroom. Four teachers mentioned this aspect as one of the main impacts of the training. See for instance:

*Yes. (The workshop has contributed to) my willingness and ability to perform practical teaching with problem assignments.*  
P11

*Yes, I've received new ideas and inspiration.*

*Yes, some of the activities I have seen are in line with how I teach and are nice alternatives or even better versions of the things I do and I would like to implement them in my classes*  
P9

*What aspects of the SPOON training have been essential for the contributions you mention above?*

11 out of 12 teachers answered to this question.

The most reported positive aspect of the workshop was its **practical nature**, which was reported by all teachers. Teachers seemed to especially appreciate the experiential approach, with practical exercises and dynamic group interactions, as well as reflections upon practice.

**Facilitation** was also highlighted by 3 teachers, that explicitly mentioned it in their answers. Facilitation was appreciated in terms of: the positive energy of the trainers and the contextualisation of exercises in real school settings (using experiences from real teachers). Similarly, two teachers also reported the **expertise of the trainers** as key to leverage the contributions of the workshop. See for instance, the following quotes:

*For sure, that would be experience-based learning.  
Also, the problems that we were faced to were very interesting and motivating and teachers were supportive and patient.*  
P5

*Discover ways to approach problem solving from a student perspective*  
P3

*Examples from real teachers and real school. No matter where from in the world. Don't forget that we have too many workshops and training led by administrative staff from Agency od Ministry (in Croatia). Often we hear something that we cannot apply in the classroom.*  
P6

*The examples that you used contributed to all of the above and also expertise of the teachers.*  
P11

*And what aspects of the workshop could be improved in order to reinforce your competences?*

When asked to identify aspects to improve, 10 out of 12 teachers provided an answer.

Among the aspects of the workshop to improve, timing was the most reported by the teachers (n=4), most specifically, the lack of proper time. Such lack of time was both mentioned in terms of total time of the workshop and time allocated to specific activities. See for instance:

*The only thing that I would like that was different is the time limit. Activities were very interesting, and it's a shame that we had to rush at the end of the workshop so that we could finish in time. So, for future workshops, I would recommend better organisation in the aspect of time.*  
P5

*Some of the activities were too fast, a little bit extra time could be helpful.*  
P7

Furthermore, two teachers also considered that in order to better integrate activities in their classroom, the workshop activities should be contextualized in different STEM fields:

*I think STEM should finally be split into some specific themes on training like this. Very few examples I have heard applies to biology. This is not only on SPOON training but on all STEM training I 've participated. I think physics and mathematics are the most dominant.*  
P6

*If you organize the workshop for science teachers, you should give at least one practical example from each field. Some sciences are easier to modify to get the wanted result, I admit, biology was difficult for me. I couldn't invert my way of thinking in such a short time.*  
P11

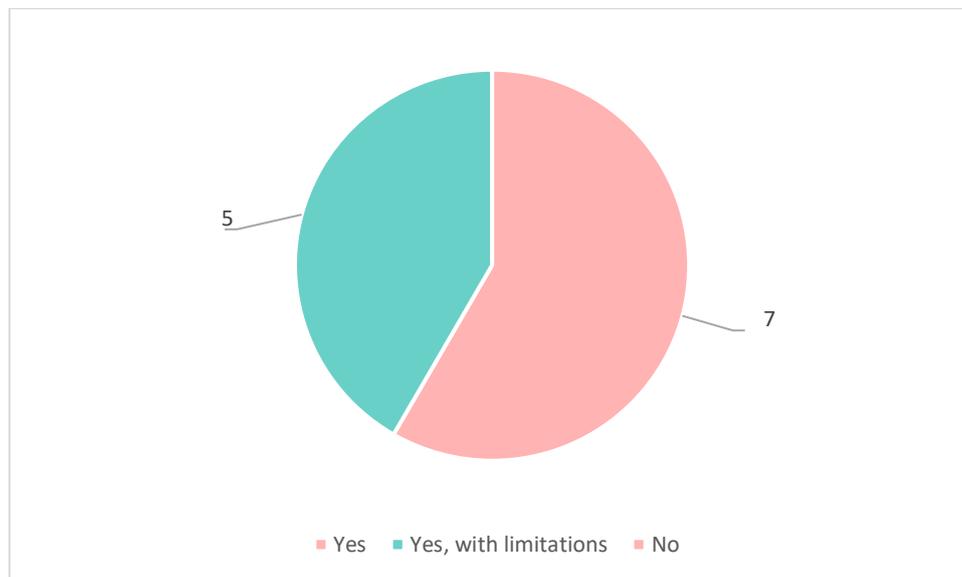
The structure of the workshop was also mentioned by two teachers, who would have preferred a different organization of the different formats proposed during the workshop day:

*Schedule workshop activities and lectures alternately to make us less tired for the workshops at the end and more prepared for self-evaluation.*  
P3

*The part about the trip to Antarctica was a nice story but didn't bring much in the way of improving competences. Both sessions later would have better used the time.*  
P9

Finally, two teachers reported that they would not change anything about the workshop.

*Do you see yourself able to implement with your students the activities facilitated in the training?*



The 12 teachers answered to the question in the post-survey about replication in their classroom. **All of them reported that they feel able to implement the activities by themselves.** Many of the teachers mentioned previous experience implementing similar activities and the applied approach as key to feel comfortable with the materials shared. **Four teachers reported already having applied some of the activities** shared in the workshop. See for instance:

*Some of them I already did implement (the measurement of area of paper) activity, and others I will surely use with some adaptations so they will fit the time I have in classes. All of them are good examples of things one can do to improve scientific skills of students.*  
P9

*Because I have experienced new teaching methods. I didn't listen about something or read from the screen or the book. Those methods made me challenge the way of thinking and the methods of my teaching. I have already implemented one activity in my work.*  
P5

However, 5 of the teachers, reported that they would have limitations to implement the activities. Among the teachers that elaborated an answer, two teachers mentioned time as the main limitation, while two teachers mentioned the topics and student profiles as affecting its applicability:

*Activities are very motivating for students. They cry for such activities. Activities are more or less easily applicable. The only restriction is time... and time management.*  
P10

*Depends on the students and the topics that are appropriate for this approach to teaching.*  
P3

*Ideas have good approach (something like Reverse engineering if I remember good), but I still have to work to implement this in my area, biology.*  
P6