



Promoting Youth Scientific Career Awareness and its Attractiveness Through Multi-stakeholder Cooperation

Newsletter 4

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Welcome to the 4th MultiCO project newsletter

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Dear MultiCO friends,

We are working with the last tasks and we will present the results of the project in the final conference in Joensuu. We will show how we have used career-based scenarios to promote students' interest towards science and science studies.

The last project meeting, before the final conference was held in London in March, and the rest tasks were discussed. Three manuscripts in journals are in the review process and five manuscripts are in process. In Warsaw, in EC-RICE2018, the project will be promoted in several presentations.

Career-based scenarios and interventions, as well as students' interest development, will be presented in the final conference. Partners, stakeholders and other EU projects will present their views in science education particularly related to career aspect in science education. The program of the conference is on the website of the project and the registration is open until the end of July.

You are welcome to join us in Joensuu and share experiences and ideas in developing science education and science education research.

Greetings from Joensuu.

Tuula Keinonen

Coordinator

Inside this issue:

UEF: Experiences from the interventions: "BLACKOUT"	2
UCY: Findings from the intervention studies	3
"It gives me lots of ideas about how to inspire children .."	3
MultiCO goes Zaragoza!	4

UEF: Experiences from the interventions: "BLACKOUT"

The electricity is a subject studied in many grade levels. 9th grade physics in Finland includes electric grid as a learning topic. Many professions are involved in electric grid and therefore career-based scenario and career-related instruction are a good way to study it. Hence, a scenario called "Blackout" was developed.

Five teachers used this scenario in two different schools each having a little different way of implementing the scenario. However, all of them included multiple careers such as designer, electrician, forester, production manager and customer service in the scenario. The main part of the scenario included a quiz part where students picked up a device using electricity and gave hints to other students how this device is helpful and what would happen if there is no electricity. Others tried to guess the device. Some groups then found out about the careers with the help of a career circle and choosing one of the professions from the circle for further exploring.

They made a job advertisement (Figure 1) about the chosen profession during their inquiries. Other groups concentrated on the electric grid and made mental models (Figure 2) of the grid. All groups later visited a power plant or other parts of the electric grid.



The Biofore Company UPM

We are looking for
ELECTRICIAN

Versatile and fun work to do for persons interested in electrical engineering.

Job includes:

- installing, fixing and maintaining variety of electrical devices and equipment, lightning and measuring equipment.
- coupling, connecting and wiring

We require from applicants:

- education of electrical engineering from a vocational school or institution of adult education
- hands-on mentality and activity
- knowing safe working methods and following them

If you are interested, please fill in the application at the website:
<http://www.upm.fi/tyopaikat/Pages/default.aspx>

Please fill the application before the end of this month, 30.11.

GOOD LUCK FOR RECRUITING PROCESS!

Figure 1. Job advertisement

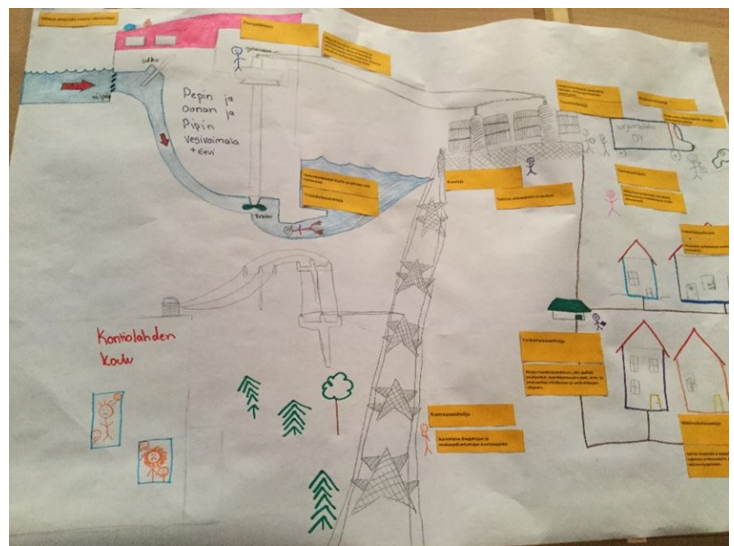


Figure 2. Student's mental model

In general, the topic is interesting for the students, but they were even more excited about the different kind of learning methods. The students also appreciated the possibility to choose a career from variety of professions and that the career part of the instruction continued throughout the intervention. The teachers also found this helpful to maintain the focus on the careers.

UCY: Findings from the intervention studies

The career-based scenarios used as an introduction to science teaching units seemed to have facilitated students' engagement through references to real-life socio-scientific issues presented in a personally relevant context. However, it was indicated that students' engagement was achieved when there were clear and strong connections between the scenario, the science teaching unit (constant revisit and full compatibility with learning objectives) and students' prior knowledge corroborating previous findings that such activities should be integrated in normal lessons. The presentation of the scenario was seen as an influencing factor to trigger students' interest. Attractive (e.g. use of media) and interactive (not text-based) presentations can develop positive emotions and keep students' focused.

The sustainability of students' situational interest seemed to depend greatly on the following factors:

- The variety of novelty and active- active-learning opportunities: the students seem to perceive such activities as meaningful. For example, collaborative 'missions' promote students' collaboration and the autonomy to undertake decision-making responsibilities taking on the role of a professional/expert. Activities promoting collaboration with scientists and the industry succeeded in enhancing students' interest in science learning and encouraging them to consider STEM fields as a future profession. Moreover, new stimulators can arouse situational interest (e.g. hands-on activities, contact with practising scientists/experts/professionals).
- The interestingness of the scenario topic: if the topic is personally relevant to the students and provides useful knowledge it can sustain students' interest.
- Lack of experience in working in a PBL environment: both teachers and students may not be experienced in working in a learning environment that follows the PBL approach. Sometimes, barriers as such fail to sustain interest.

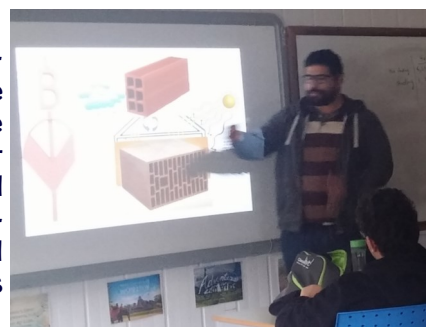


Students presenting a recycling company.

Regarding the career aspect, qualitative data indicated that students' interaction with practicing scientists/experts/professionals (i.e. school visits to industries, students interviewing professionals, having joint projects) should be considered since the students seemed to value the importance of learning 'authentic'/reliable information. It is worth noting that such interactions must not be like a lecture-type/theoretical presentation rather than a discussion that would exceed the standard line of dialogue meeting students' curiosity half way using media (e.g. photos; videos; simulations) and perhaps equipment used in the work place.

Recalling the career-related information by revisiting the scenario and stressing the contribution of the professionals throughout the teaching sequence seems to facilitate the promotion of career awareness. For this reason, during the planning of the instructional sequence in lessons that incorporate the career-based scenarios tasks that promote reflection on the career-related information would be useful to consolidate knowledge and make clear and successful connections between theories taught in class and professional practice and career advice.

Some professions presented to the students throughout the interventions (e.g. acoustic engineer, transportation engineer) were unknown to the majority of the students. In other cases when the students claimed knowing the professions, they had an unclear understanding or their familiarity with the professions was judged to be superficial (i.e. they only knew the title of the job) confirming previous findings (e.g. Maltese & Tai, 2010). It was also noted that after the intervention students' perception about the careers was influenced by the way these careers were presented in



An architect presenting insulation techniques.

the context of career-based scenarios. Hence, promoting the interdisciplinary perspective of STEM careers could help young people consider STEM disciplines connected to each other and not only attached to the corresponding school subjects. This also highlights the importance of presenting science-related careers in a context where the students can understand their importance in society which was also noted in a previous study conducted by Osborne and Dillon (2008).

In general, even though the career-based scenarios had a positive effect in broadening students' awareness about science-related careers, the majority of the students did not choose the careers presented in the intervention studies as possible future options with minor exceptions. The main reason for rejecting these options was the lack of relevance with students' personal interests and career aspirations highlighted also previous studies (e.g. Aspden, Cooper, Liu, Marowa, Rubio, Waterhouse & Sheridan, 2015; Taskinen, Schütte & Prenzel, 2013).

References:

- Aspden, T., Cooper, R., Liu, Y., Marowa, M., Rubio, C., Waterhouse, E.-J., & Sheridan, J. (2015). What Secondary School Career Advisors in New Zealand Know about Pharmacy and How that Knowledge Affects Student Career Choices. *American Journal of Pharmaceutical Education*, 79, 1-8.
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- Taskinen, P. H., Schütte, K. & Prenzel, M. (2013) Adolescents' motivation to select an academic science-related career: the role of school factors, individual interest, and science self-concept. *Educational Research and Evaluation*, 19(8), 717-733.

“It gives me lots of ideas about how to inspire children to get involved in science for a career.”

This was the view of one of our secondary science PGCE students here at the UCL IoE who had participated in the MultiCO Pre-service teacher course in May and June this year. This view was typical of the students' views.

The UCL IoE team were delighted by the success of the course which was rated as good or very good by 93% of our trainees in terms of the usefulness of the course to their teaching practice.

Over two sessions, a total of 44 students were introduced to the MultiCO project and explored the process of developing career-based scenarios for science lessons to promote students' career awareness and enhance aspiration to pursue future science studies and careers. The trainee teachers first reviewed two of our existing scenarios (Nuclear Medicine Technologist and Chemical Design Engineer), identifying their strengths and how they might be improved in light of the evaluations by pupils in schools. In small groups, they then chose a career (using the 20 MultiCO Career Stories) and a curriculum link, and developed a plan for a scenario using a story –board template. Groups presented their scenarios to each other for peer and tutor feedback using the design features and success criteria presented on slides. The UCL IoE team were impressed by the creativity of the students and the quality of the scenario plans developed by the students.



The UCL IoE secondary PGCE tutors will make changes to the Pre-service teacher course in light of the student suggestions and, as a result of the positive feedback from trainee teachers, it will become a key feature of the programme in future years, so that all our students can benefit from learning about this approach.

MultiCO goes Zaragoza!

The MultiCO project's background, aims and findings were presented at the twelfth Conference of European Researchers in Didactics of Biology (ERIDOB) in Zaragoza, Spain from July 2nd to July 6th 2018. Researchers from all over Europe and beyond took part and discussed their research and findings. Our project received lots of interest and has been considered as very meaningful. We thank our colleagues for their constructive feedback and the organisers from the Universidad de Zaragoza and Universidad de Santiago de Compostela for this successful conference and their hospitality!



Prof. Annette Scheersoi and Lara Weiser from UBO at ERIDOB.

about MultiCO

MultiCO is a three-year project and has started in August 2015. The University of Eastern Finland acts as the project coordinator and the consortium partners represent the following European universities: University College London (UK), University of Tartu (Estonia), University of Bonn (Germany) and University of Cyprus (Cyprus). The main goal of the project is to promote students' awareness about possible career choices in science and technology. [Learn more...](#)

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