

D2.3 Report on students' perceptions on working life skills

Project title:	Promoting Youth Scientific Career Awareness and Its Attractiveness through Multi-Stakeholder Cooperation
Project Acronym:	MultiCO
Project ID:	665100
Prepared by:	Lara Weiser, Jonathan Hense & Annette Scheersoi (UBO), with John Connolly (UCL), Inês Direito (UCL), Irene Drymiotou (UCY), Anu Hartikainen-Ahia (UEF), Jack Holbrook (UT), Tuula Keinonen (UEF), Tormi Kotkas (UT), Joanne Nicholl (UCL), Nicos Papadouris (UCY), Miia Rannikmäe (UT), Anssi Salonen (UEF), Shirley Simon (UCL), Regina Soobard (UT), Troodia Theodorou (UCY), Jillian Trevethan (UCL).
Date:	July 2016
Dissemination level:	PU (Public)

Contents

Introduction.....	2
Methods.....	3
Analysis.....	5
Results.....	6
References.....	9



1
This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 665100.



Introduction

This document has been written for the EU H2020 project “MultiCO - Promoting Youth Scientific Career Awareness and its Attractiveness through Multi-stakeholder Cooperation” as the outcome of Task 2.12 (= Deliver student workshops concerning working life skills, an analysis of their perceptions of these skills and the creation of a consortium-wide report on outcomes from the student workshop and student perceptions).

The aim of the MultiCO-project is to raise students’ awareness of careers in science and their aspirations regarding choosing science for study. The project focuses on developing scenarios for science learning environments, where discussions on careers in research and industry in the STEM fields are taken to be an integral part of science study. The project further focuses on counselling students and incorporating working life skills in action.

Skills associated with a multitude of careers, which European employers preferred were found to be the following (European Commission, 2010): team working skills, sector-specific skills, communication skills, computer skills, ability to adapt to and act in new situations, good reading and writing skills, analytical and problem-solving skills, planning and organisational skills, and decision-making skills.

Based on an analysis of relevant curriculum and assessment frameworks for “**21st century skills**”, Binkley and co-authors (2012) provide a list of ten important skills that they group into four categories (cf. MultiCO GA, Annex 1, p.22/23):

A. Ways of thinking:

1. Creativity and innovation
2. Critical thinking, problem solving, decision making
3. Learning to learn, metacognition

B. Ways of working:

4. Communication
5. Collaboration (teamwork)

C. Tools for working:

6. Information literacy (includes research on sources, evidence, biases, etc.)
7. ICT literacy

D. Living in the world:

8. Citizenship - local and global
9. Life and career
10. Personal and social responsibility - including cultural awareness and competence.

To describe these skills, Binkley et al. (2012) designed three categories within their KSAVE model: **K**nowledge, **S**kills, and **A**ttitudes/**V**alues/**E**thics. “Knowledge” includes all references to specific knowledge or understanding requirements for each of the ten skills. “Skills” are the



abilities, skills and processes which are developed in students and are a focus of learning. “Attitudes, Values and Ethics” refer to the behaviors and aptitudes in relation to each of the ten skills.

As pointed out in the Multi-CO project’s Conceptual framework (D 2.1), occupational images of working scientists, as well as stereotypical views of scientists and science influence the students’ career choices. Knowledge about careers may increase the students’ interest to choose science careers, particularly when careers match their interests and abilities. The aim of task 2.12 was therefore to find out about the students’ perceptions of working life skills in relation to different science careers.

Methods

First ideas how to organize a student workshop concerning working life skills were sent to all the consortium members in January 2016 for discussion. According to the partners’ feedback, a workshop description and workshop materials were developed (Annex 1) and sent around in February 2016 to be used by all the partners. The materials were translated into the different languages.

The aim was to ask 7th grade students to think about different science careers and to identify the working life skills that are needed for these careers.

In small groups (3-4 students), the students had to work on two different science careers where different skills are needed (Table 1). These careers (altogether 12) were chosen from a list that had been developed earlier by UEF as outcome of Task 2.7.

Group 1	Chemist	Air traffic controller
Group 2	Pharmacist	Software designer
Group 3	Pathologist	Production designer (food industry)
Group 4	Meteorologist	Nurse
Group 5	Geneticist	Horticulturalist
Group 6	Zoologist	Mechatronics mechanic

Table 1: Careers used in the students’ workshops on working life skills

Students were asked first to discuss what kind of knowledge/working life skills these careers require and write them down. Out of this list they then had to choose the three most important skills and explain in what kind of tasks and situations these are needed.

Sample



Student workshops were conducted in all the partner countries with a total number of 724 students. Conditions varied slightly in the different countries, e.g. concerning students' age, group size and workshop duration (see Table 2).

Partner	Schools	Number of Students	Groups	Students' age	Duration	Remarks
UBO	3 (one girls' school)	Total 154, 6 classes	3 to 4 students per group	12-13 years	45 minutes	Due to a mistake in translating the materials, students worked on the career "Product designer" instead of "Production designer"
UCL	3 (one girls' school)	Total 215, 9 classes	individuals, pairs and groups of 3 students	12-13 years	60 minutes	-
UCY	4 (one English school)	Total 86	4 to 5 students per group; 2 to 3 students per group (English school)	12-13 years	60 minutes, 40 minutes in the English school*	A list with major working life skills was provided to the students. *Due to a lack of time, not all the careers were used in the workshops.
UEF	3	Total 144, 9 classes, class size 13-18 students	Each group with approx. 3 students	13-14 years	45 minutes	-
UT	4	Total 125	4 students per group	13-14 years	45 minutes	Due to a misunderstanding, students worked on six careers that derived from UT scenarios.

Table 2: Sample



Analysis

For data analysis, UEF developed a table with different skills and categories (Table 3) based on the ones that have been proposed by Binkley et al. (see above).

1. Ways of thinking

Creativity and Innovation	Critical thinking, problem solving, decision making	Mindset and metacognition

2. Ways of working

Communication	Collaboration & teamwork	Personal attributes

3. Tools for working

Sector-specific skills	Sector-specific knowledge	Technology/ICT Literacy

4. Living in the World

Citizenship – local and global	Life and career	Personal and social responsibility

Table 3: Data analysis table

The table was used by the partners to categorize the skills that had been mentioned in the students' workshop (one table sheet per career, for an example see Annex 2 from UEF). Transferring the students' responses to the table, it was proposed to stick as close as possible to their original wording. The skills that the students had selected as "most important skills" were highlighted in bold letters. Per category, the skills were counted.

In the end, all the tables were sent to UBO to merge them.

Due to several differences in the partners' data (see above), the analysis' main focus has been on national data within the partner countries. The results will be used to inform the following research steps.



Results

The results from merged partners' data are presented in this report with 4 exemplary careers – two careers “in science” (chemist and geneticist) and two careers “with science” (nurse and software designer).

A bar chart is used to visualize the differences of the 4 careers in relation to the four categories (= Ways of thinking, Ways of working, Tools for working, Living in the world) and their subcategories (Fig. 1).

The most important skills per career that the students' have chosen are listed in individual mind maps (Fig. 2-5).

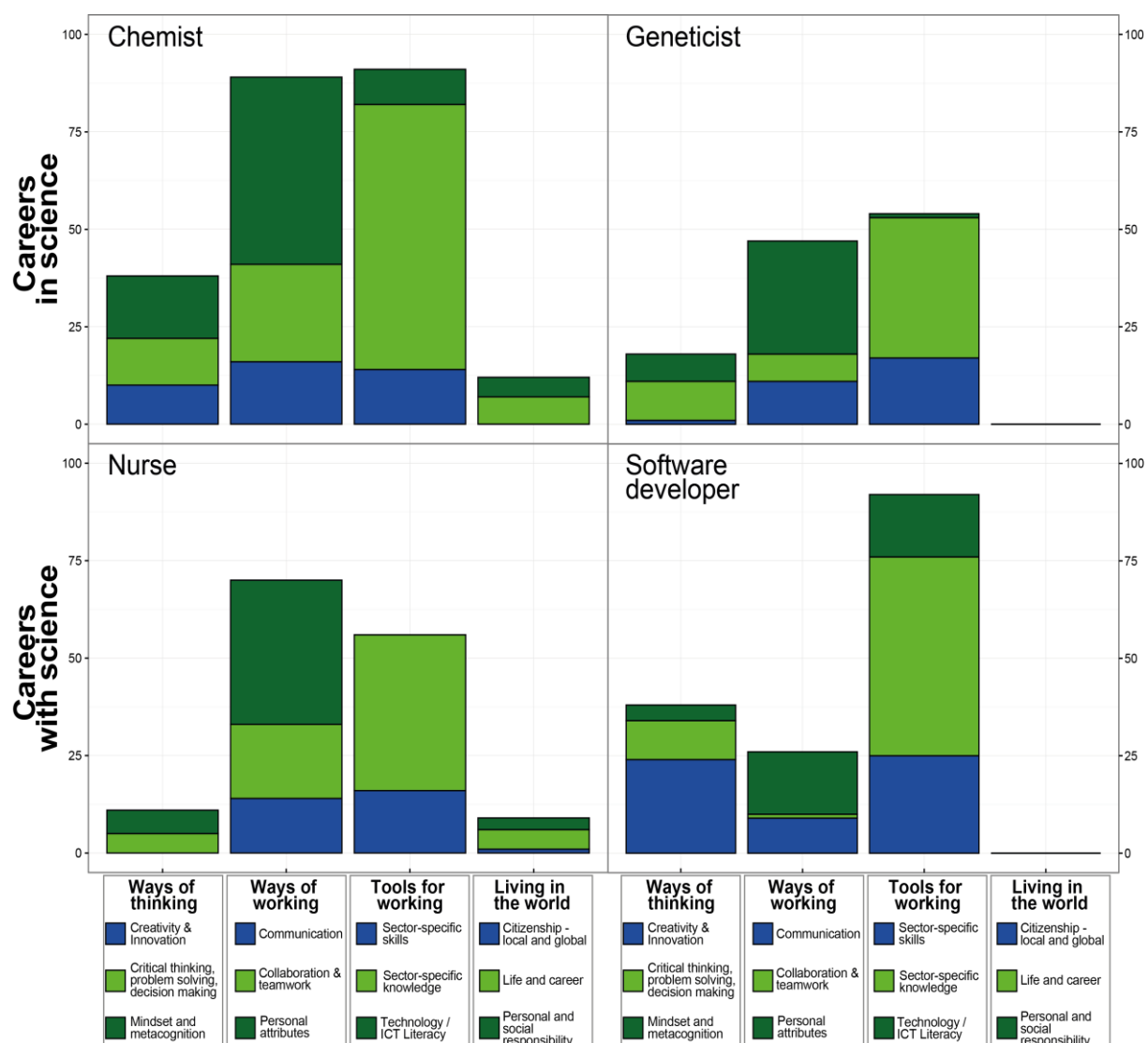


Figure 1: Comparison between the number of skills (most important skills) mentioned per career and category.



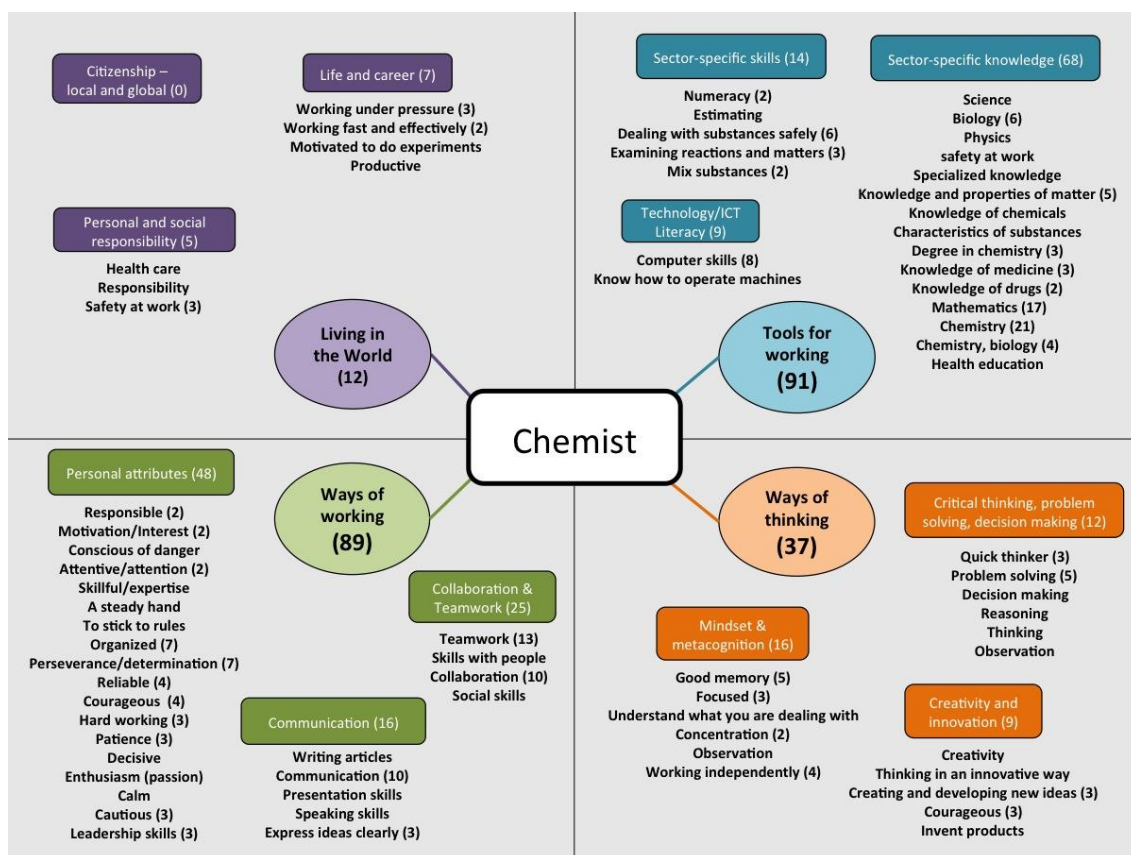


Figure 2: Chemist, mindmap with most important skills

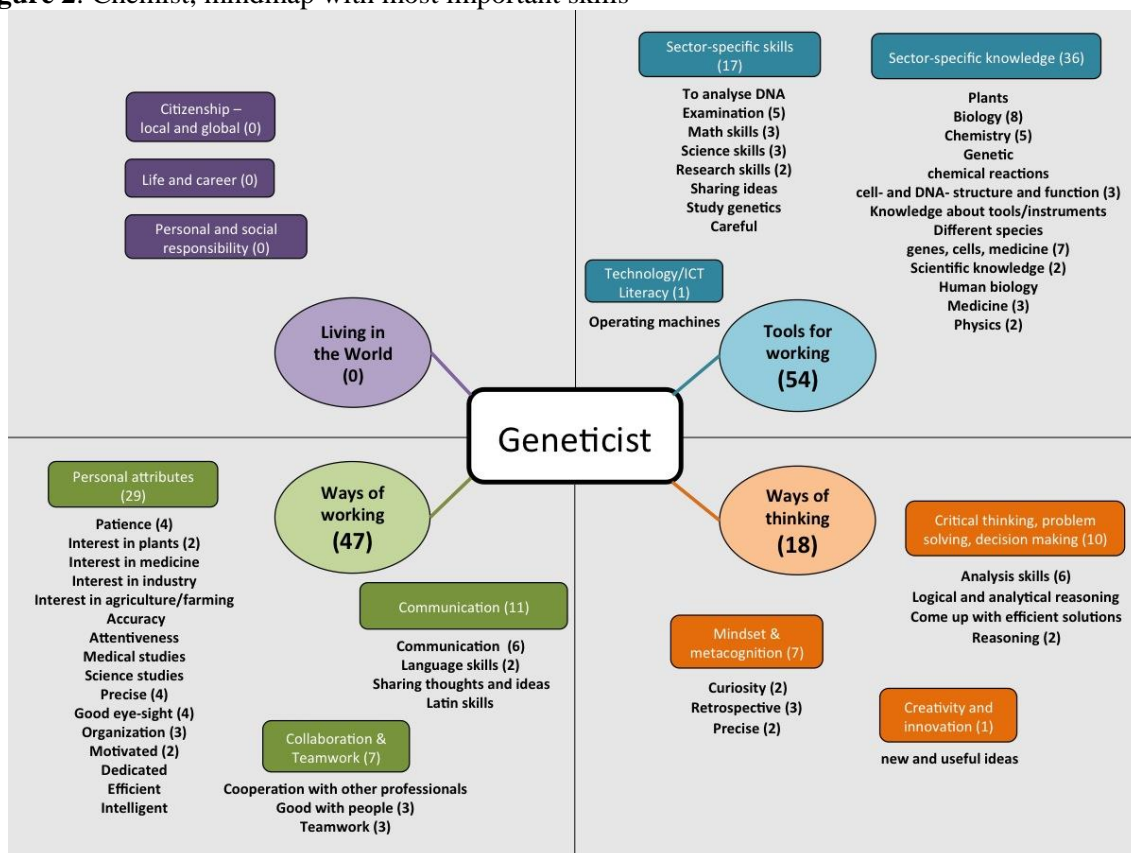


Figure 3: Geneticist, mindmap with most important skills



7

This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 665100.



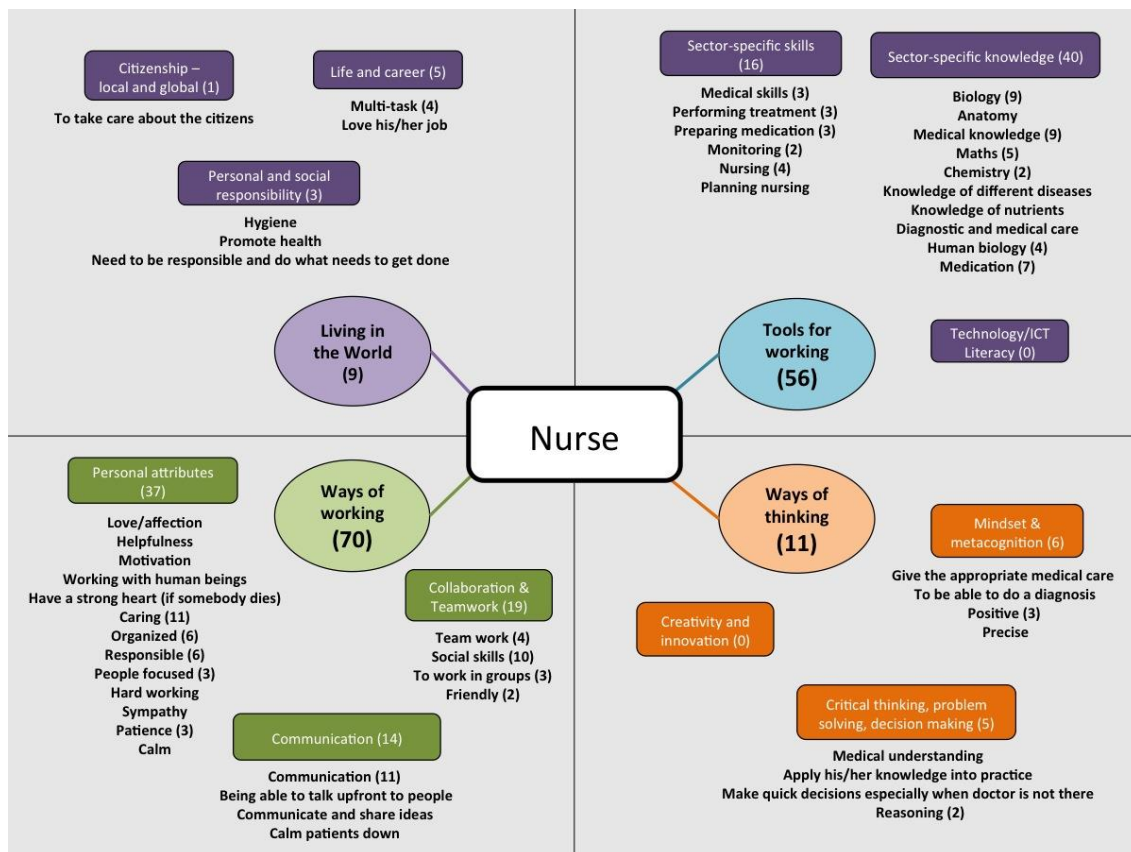


Figure 4: Nurse, mindmap with most important skills

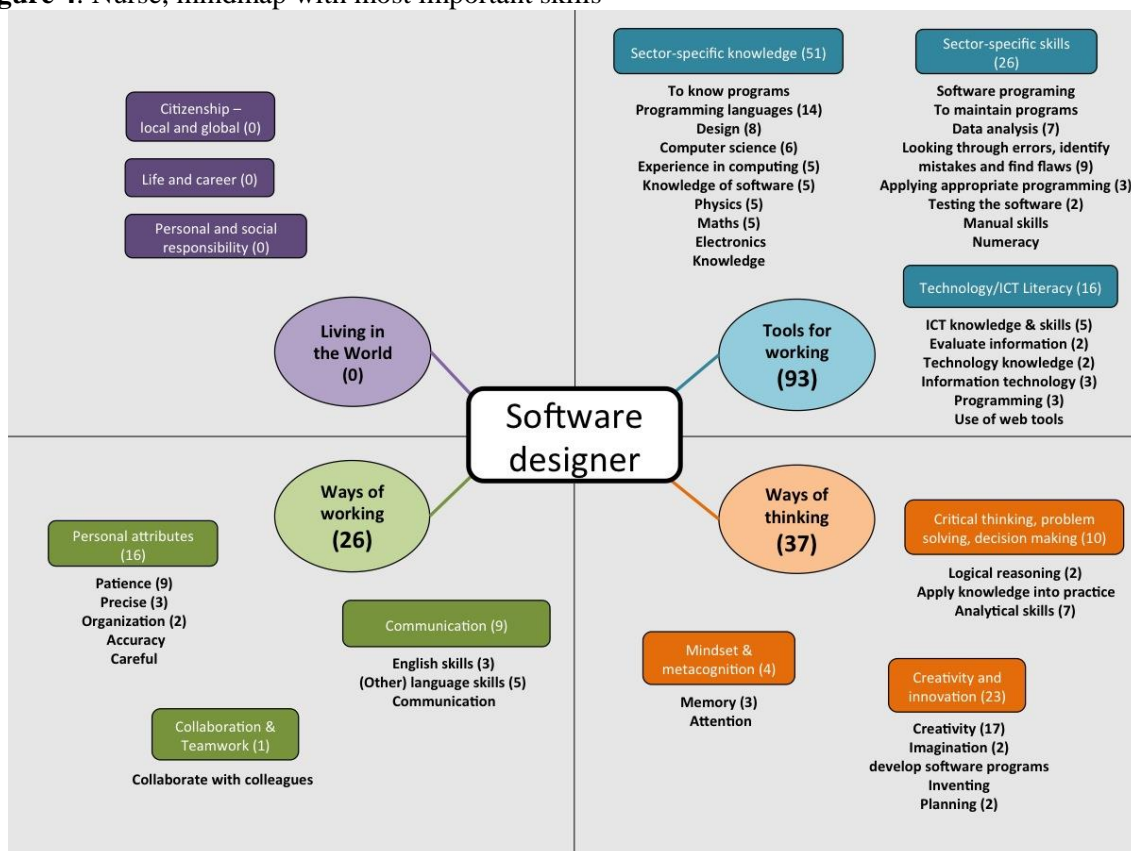


Figure 5: Software designer, mindmap with most important skills



References

- Binkley, M., Erstad, O., Herman, J., Raizen, S., Ripley, M., Miller-Ricci, M., & Rumble, M. 2012. Defining Twenty-First Century Skills. In P. Griffin, B. McGaw, & E. Care (Eds.). *Assessment and Teaching of 21st Century Skills*. Springer, 17-66.
- European Commission. 2010. Employers' perception of graduate employability. Analytical Report.

