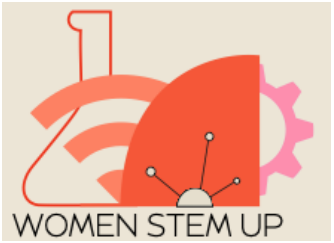
Co-funded by the European Union

Formative evaluation of the training programme

Capturing impacts



ERASMUS + KA220-HED - Cooperation partnerships in higher education

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Disclaimer

Background

To better understand the complex processes involved in increasing intersectional participation in science and technology areas (STEM), one can distinguish three political approaches to gender equality in these areas. (Meta-analysis of gender and science research. EUROPEAN COMMISSION Directorate-General for Research and Innovation Directorate B – European Research Area Unit B.6 – Ethics and Gender: Sector B6.2 – Gender. 2012)

The first of these approaches focuses on programs targeting women themselves in efforts to increase their participation in S&T. The second approach seeks to increase women's participation by reforming research institutions. The third focuses on

overcoming gender bias by mainstreaming gender analysis into basic and applied research. Increasing women's participation in S&T will, however, not be successful without restructuring institutions and mainstreaming gender analysis into knowledge production. In this project we have developed a training program that focuses on Gender and inclusion in the STEM areas, with the aim of equipping STEM university professors and lecturers with knowledge, skills and tools as well as issues included in the ESTEAM approach for creating a more inclusive learning environment.

We perform a formative evaluation of the training program to identify strengths and weaknesses of the outcomes as well as sources for improvement, and issues that contribute to improve quality of the contain of the programme.

The development of the online training program

The main idea when developing the training program has been that the dualistic notion of gender reinforces traditional gender stereotypes that associate men with technical skills and women with social skills. The dichotomy between the feminine and the masculine establishes gender stereotyping, gender roles and a gendered division of labour. We assume further that gender stereotypes are deep-rooted perceptions of male and female characteristics which support the continuity of specific gender roles and occupational segregation. We further assume that teacher-student interactions in the classroom play an important role for the understanding of gender and intersectionality and that applied and practical examples can contribute to a better understanding of the importance of gender and intersectionality in daily teaching.

The modules:

When developing the modules of the training program we focus consequently on the following issues:

1. **Gender balance through language**
   Linguistics aspects behind stereotypes. How and what kind of linguistics and terms can be used to diminish gender bias. Special attention is paid to the terms, verbs, adjectives and other characterizations used to describe the ways teachers can express themselves when interacting with students.

2.- **Gender balance teaching methods into practice**

The underrepresentation of women in the scientific community is currently on the agenda internationally. While fields such as engineering and ICT remain male dominated, women's representation in many areas previously dominated by men, such as medicine or biology, has increased in recent decades.

Specific examples of how to achieve gender balance and the use of different teaching models into practice as well as different alternative examinations, the choice of course

literature and use or selection of examples in different disciplines, are illustrated with practical examples and recommendations.

3.- Development of gender equitable inclusive teaching material

The existence of gender bias in teaching examples, how stereotypes can be reinforced using examples that embed gender bias and strategies to identify gender bias in courses and areas in which gender is not an obvious component are presented.

We also add selected references in case teachers are interested in learning more about how to develop and embed gender and intersectionality in STEM teaching material.

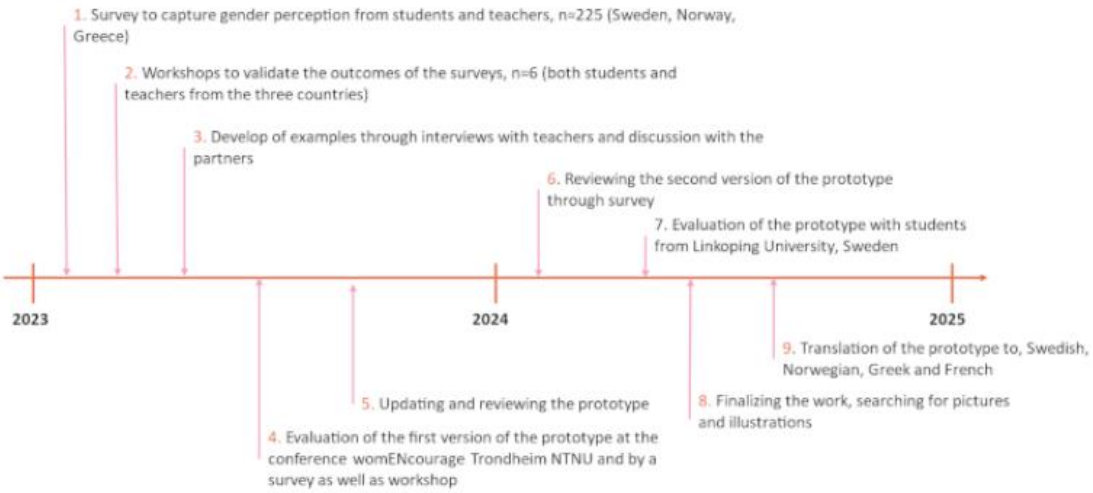
4.- Support, encouragement and recognition of women's academic careers

. Examples of role models, mentorship strategies and the importance of early networking are described. Videos and other resources are available at the module

Steps used to develop the training programme

a) We drew on an initial prototype framework developed based on the online course implemented at Linköping University (LiU). We used data sampled during January 2023 and February 2023 with the aim of capturing expected outcomes and the perception of gender from the students and teachers' perspective. Data was sampled in Norway, Greece and Sweden. A survey developed in collaboration between all the participants in the project was distributed in the three countries.
b) The outcomes of the surveys were validated in a focus group seminar where the results were presented to representatives of students and teachers. A guide with instructions on how to lead the focus group was developed and used in all three countries.
c) We developed a first version of the prototype that was presented in an international conference in Norway in November 2023: During a special session, with participation of more than 100 participants, we gathered comments, opinions and feedback for the first version of the prototype. We further in a workshop organized by NTU presented the prototype for teachers, students, and researchers with the aim of receiving input about the content and structure of the programme.
d) After developing the last version of the modules included in the prototype, an evaluation round in collaboration with a student organization with special interest in gender questions was performed with the aim of capturing the effectiveness of the modules. Then the program was reviewed by a native speaking American. In addition to this, in collaboration with two lecturers from Linköping University we analyzed the effectiveness of the checklists and recommendations developed in module 3 and module 4. The output of this

exercise ended with a review of the information offered to the students, a review of the examples included in the course and a review and re-formulation of the information about specifications, rules, and how to evaluate the outcomes of the students' learning process.



Capturing Impacts

To capture the achieved impacts, we developed a simple matrix consistent on 5 main principles, outputs from the evaluation of the outcomes in relation to the main principles and visualization of the indicators in relationship with every principle. See the table below

Table 1: matrix: principles evaluation and indicators to capture impacts of the training programme

Aim and Focus	Design	Evaluation outputs	
Capturing perception of gender, Students and teachers	Survey and workshop for students and teachers	Identification of issues and examples to be included in the training programme	
Understanding the context and limits of the STEM courses. Point of departure and objectives	Outputs of the survey and from the workshop	How challenges emerge, at which level and how to mitigate them	
Work with practices, processes and mindsets	Design of the modules. Used of existing course as point of departure	What needs to be changed or improved to cover STEM areas in general and gender and	

	Interview with two teachers on how they work with gender in their courses	intersectionality in particular	
Develop organizational learning	Evaluation of the prototype	Collected feedback and recommendation is used to improve the modules and to identify new types of examples needed Present the prototype to the management team at Linköping University twice. Presentation for teachers before the evaluation process. The programme will be presented at the pedagogical conference at Linköping University during spring 2025	
	Use of all inputs captured in different activities in which we have interacted with teachers and students	Review and improvement of the modules. Use of the comments and recommendations delivered by students' organizations as well as international experts. Last version of the modules available at the project web site	
Transfer knowledge	Between the project partners. Spill-over effects	Comparing outputs from different countries and reflecting about differences, pre-requisites, knowledge and training etc Develop of new Erasmus applications in which the state-of-the-art knowledge sampled in this project	One Erasmus application submitted by Linköping

		is expanded and reused.	
	Work-shop with international experts	On-development	

Questions and issues used to capture impacts of the training programme

1.- Capturing interest of the target groups

- Is the training program reaching the intended number of participants?
- Number of participants by country
- Have the staff been trained as expected?
- Number of participants by country

2.- Understanding the situation and the context. Point of departure and objectives

- Have we captured concrete examples on how to improve teaching and education developed by STEM teachers?
    - Number of examples at each module
- Have we received feedback about how to improve the training program from students?
    - Number of students or organizations that have giving some feedback

3.- Work with practices, processes and mindsets

✓ Have we developed enough examples that show

a) The importance of the use of different teaching models
b) Issues to consider diminishing gender bias
c) Is the material accessible (audios, descriptions, examples, links to websites etc)
d) Have we developed culturally competent materials (e.g. language translations)
e) Do we deliver a list of references to facilitate the further acquisition of knowledge?
f) Do we deliver instructions and descriptions on how to implement the different modules, how to work with the material and how to discuss the suggestions with colleagues?
g) Is the program being delivered as intended?
h) The degree to which the critical components of the program are distinguishable from each other and from other programs.

✓ Do we have examples of change and innovation in some STEM courses?

Any examples of teachers that have applied the knowledge delivered in the online training program to improve or review courses and educational material?

- ✓ Number of examples and type of example

a) Any examples of the implementation of the check lists delivered?

- ✓ Does the training program demand technical changes or improvements?

4.- Develop organizational learning

Has the knowledge sampled in the project been expanded to the participants in this project?

Has the knowledge sampled in the project been expanded to other areas, institutions, society?

5.- Transferring knowledge
New applications in which the knowledge sampled is expanded and re-used

6.- Un-expected issues captured during the formative evaluation

Photos and copyright and technical problems, layout

List of frequently asked questions is not yet developed

No information about the outcomes of the evaluations has been published

Comments

The formative evaluation performed allowed us to identify and describe the achieved outcomes, capture the impacts of the training programme and identify the relationship between outcomes and indicators and sources of innovation.

The evaluation allowed us also to reflect on the importance of the work performed, the possibility to generalize the training programme and the benefits for teachers and students of using a more inclusive and intersectional perspective in daily teaching.

An important outcome of the project is the interchange of knowledge between the participants of the project and the possibility to expand knowledge inside the project as well as to other organizations. The summative evaluation taught us that even when the work with the module is ended, according to the schedule of the project, it is possible to improve the outcomes in parallel with the work performed in other modules. The learning loop initiated through collaboration has influenced the work with other modules in the sense that we learn from practice making the work- processes more effective. The possibility of achieving a more similar level of gender and intersectional

maturity in the different universities participating in this project is, without any doubt, one of the most important outcomes of the project.

When focusing on eventual socio-technical impacts of the training program it is interesting to note that no technical challenges or change has been captured. The training program does not demand any change in the technical structure of the universities, and it is available on the Web, open to all potential users.

After applying the checklists and recommendations developed, teachers mentioned the need to review and update teaching material but also the need to discuss new or alternative strategies to implement gender and intersectionality issues in daily teaching as well as the need to design policies that contribute to develop and agile sustainable and innovative way to see the teaching from a more holistic perspective in which gender and intersectionality has a place.