

MIND THE GAP



ERASMUS+ PROJECT

Need Analysis Summary

April 2015



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PART I – INTRODUCTION

• NEED ANALYSIS

After 6 months of intense work by the partners of the Mind the Gap project, we introduce here a summary of the elaborated documents that have analysed the current situation in the 3 countries that are represented in the project (United Kingdom, the Netherlands and Spain) in studies in technological fields and the relationship between them and gender in the educational stage.

PART II – WORK CHRONOLOGY

Mind the Gap project's process started in October 2014 with a research by the partners involved: The Sheffield College (UK), Inova Consultancy (UK), VhTO (the Netherlands), Citilab (Spain) and WiTEC (Spain). All organisations elaborated a document based in the research and with the objective to develop the following documents:

1. Desk Research: This document collects all data that is interesting from the point of view of STEM studies and gender. These documents introduce each country's relevant data and figures, and how this information is important for the project's development.
2. Focus Groups: the 3 countries were in charge to organise a focus group that allowed us to get opinions and useful and verified arguments to elaborate a basic criteria for a Training, which is one of the main objectives of the project.

There were 1 focus group per country addressed to two different agents: firstly, to the students and secondly, to the teachers. All impressions and feedback from these sessions were collected in a report summarise in this document.

3. Online surveys: More than 130 surveys were sent to students and 118 answers were received. There were sent more than 60 surveys to teachers, but only 49 were answered. The comparison between answers in the 3 countries is the interesting of this document.

→It is needed to specified that as it is aimed in the project, the surveys were elaborated following some common criteria agreed by all partners. The methodologies followed to get the results were also agreed by the partners, as well as the research process to find the right focus groups (whom were addressed to) for answering these surveys.

The actions carried out during 6 months of work followed carefully the project activities established in the WP1 and WP2 sections in the project.

PART III – KEY IDEAS

On this document, we accepted the responsibility to collect all data and do a comparison between the documents elaborated by all partners of Mind The Gap project.

From our point of view, what highlights from this analysis is the similarities and differences that exist in the diverse European frameworks, as well as the strengths and weaknesses we can find in every context. Recognising the similarities helped us to elaborate a better and more real framework.

In our first analysis we explain the Key Ideas of every country according every document elaborated: Desk Research, Focus Group and On-line Surveys. Next, we indicate the similarities existing and also the differences between the 3 case studies.

• **THE NETHERLANDS**

Key Ideas Desk Research

- 1 Representation in STEM Girls and women are underrepresented in science, engineering, technology and (to a lesser degree) mathematics (STEM) compared to their male counterparts - not only in the Netherlands.
- 2 Implicit or subconscious gender-stereotypical beliefs and associations can influence how girls and boys perform and to what men and women aspire with respect to STEM.
- 3 When it comes to STEM, girls have much fewer role models to emulate than boys after all, most girls have few to no female STEM professionals as an example in their immediate environment.
- 4 The educational system forces the students to choose their future vocation at the age of 12.
- 5 The Dutch upper secondary VET works towards developing talents of its highly heterogeneous student population – from students who transfer to higher education right down to students for whom obtaining a minimal basic qualification is too difficult. VET has to be accessible and attainable for all target groups.
- 6 It has become clear in recent years that girls and women are no less capable in STEM than boys and men.
- 7 After all: Society needs more STEM specialists in order to face up to current and future challenges. STEM companies and institutions benefit from employing a wider range of professionals, including women, because this provides more ideas and lines of approach when it comes to tackling social issues.
- 8 Contact with female STEM professionals is essential to the decision-making process of female HAVO and VWO pupils. They can have a positive impact on the main questions that influence the decision-making process.
- 9 Female role models can help to improve girls' negative self-concept in relation to STEM by setting girls positive examples in these areas. Moreover, bringing girls into contact with role models from a range of STEM positions and careers gives them an idea of the full range of possibilities within STEM.
- 10 Gender awareness must form part of the basic knowledge of every teacher, and must therefore be embedded in the curriculum for teacher-training courses and teaching refresher courses.
- 11 When developing policy and activities designed to successfully attract, retain and ensure the graduation of both female and male students, schools will have to take into account a number of preconditions.

Key Ideas Focus Group

- Improve the link between the marketing and the teachers
- Realistic marketing material and open day activities
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- Invite female students to give feedback on the marketing material, for instance the website, social media and open days activities
- Incorporate the gender awareness training in the already existing training activities
- Have regular face to face meetings with the female students
- Have exit meetings with girls who drop out
- Invite parents to open days, have specific session for parents of daughters to inform them about STEM
- Organise 'female students only events', always link the event to content, (not only a high tea but try and organise an interesting event and invite only the female students), connect first years students with third and fourth year students. Set up a community of female students to create a sense of belonging

Key Ideas Online Survey

Students

- Students argue that they speak mostly with their parents about the choice they have to make (in contrast to speaking with teachers and school counsellors).
- They agreed on the lack of role models.
- Big influence of parents (more than teachers or school counsellors)
- Big influence of peers
- Most of them didn't know any females working in STEM
- The ones who are STEM-students, all have a family relative (mostly fathers) working in STEM
- Widespread use of social media, most students say that their schools use a 'WhatsApp-group' per class

Teachers

- The vast majority of participants were male with an average age of 50.
- Most of them teach a subject within the STEM-area;
- some of them taught more general subjects and they all studies a STEM-subject themselves
- according to the teachers, parents are essential
- Striking is that the teachers are not interested in a specific training that could give tools to support girls in STEM.
- As those replies indicate, the area of 'gender and stem' is very sensitive, people tend to either react politically correct or feel 'attacked'. The first and most difficult step is to raise awareness.

• **SPAIN**

Key Ideas Desk Research

- 1 The representation of women in technological and innovation fields continues having the influence of gender stereotypes, and even here we can talk about more subtle stereotypes than past years.
- 2 The presence of women in Science fields and mostly in Engineering is still minority. Having said that the minority of this presence, the progress of the proportion of female enrolled students in Engineering has been higher in Spain (30%) than in UE-15 (25%).
- 3 It is exactly at knowledge areas of Natural Sciences, Engineering and Agriculture Sciences, the proportion of PhDs is higher than UE-15, despite the lower proportion of women's presence.
- 4 Women are 54% of the total of University students, have better grades and finish their studies before men; but in technology degrees they stay at 26%. The academic year of 2004-2005 they represented 27,1% in the branch of engineering. In the world, 80% of engineers are men.
- 5 Girls are better in reading but worse at maths. Spanish students, in general terms, have always shown this skills and incompetence, even the differences between their male classmates are more widen year after year.
- 6 In A levels, the majority of girls (55%) choose Humanities and Social Sciences; other 36% prefer Nature & Health Sciences; 5% are enrolled in Arts. Only 4% choose Technology.
- 7 The representation of women in the fields of technology and innovation continues to be influenced by prevailing gender stereotypes.
- 8 Although there have been a clear progress in recent years in this direction, statistics show that in many careers and studies traditionally held by women or men, now are trends are more balanced, so the occupation tends to be by both sexes; however, there are still areas that are still dominated by a majority of girls or boys.
- 9 Like in the rest of the European Union, women are in the minority in scientific jobs in Spain, reaching only 37.5% of the research staff in public universities (in 2009). On average women represented 37.5% of the researchers in higher education and 43.6% in the public sector.
- 10 Role models: teachers, media and family are role models that have great influence on the decisions for the future of young people. The lack of women on boards and in the upper echelons in STE companies is one of the main causes that young women have no role models when they reflect on their decision to choose science and technology fields.
- 11 Especially in technological fields, there are some aspects of the technological knowledge that do not seem to be interesting to young students, especially young women.

Key Ideas Focus Groups

➤ Teachers

- Generally speaking, on entering the 14-18 year stage in life, female pupils show themselves to be insecure, and this is reflected, above all, in mathematics.
- Female pupils are good, hard-working students. There should not be differences when it comes to choosing science and technology degree courses.
- When female pupils choose science courses, these are generally related to care for people (health sector or biology).
- Models are very important. There are very few models related to technology in schools. There are no technology teachers, whether male or female, and no social or employment models that can serve as examples.
- Families tend to be a major barrier with regard to daughters choosing careers in technology.
- The media do not promote science and technology models that might be attractive to young women.
- Technology does not present a friendly face that might attract women.
- Co-education is a transversal subject in schools, and should not be implemented from an individual perspective or by a small group of teachers.
- Co-education is not a subject exclusively the concern of female teachers. Male teachers should also be involved.
- Specific training in these issues would be very useful.
- Careers guidance processes still fail to promote STEM studies amongst young people in general, and even less amongst women.

➤ Students

- the pupils confirm that there is insecurity, particularly when it comes to mathematics. This insecurity is the cause of female pupils' lack of interest in technology and science).
- The pupils are good, hard-working students, and note that they also do well in other subject areas, such as languages and the humanities.
- Their interest in science and technology is linked to such fields as health, business, and biology. None of the group mentioned any interest in working in clearly technical fields).
- Models are very important. The pupils reveal that their teachers were key in deciding their interest or lack of interest in different subjects. Family models were also important.
- None of the pupils reported any difficulties in their families with regard to the subjects they decided to study.
- Technology does not present a friendly face that might attract women. There also exists a crisis amongst boys as regards choosing technology-related careers.
- None of the pupils can see themselves taking technological vocational training – electricity, information technology, mechanics.

Key Ideas On line Surveys

Students

- Among all 47 students answers, only 17% like more Scientific studies opposite to 48,9% like Humanities subjects.
- Most of them are not into Science and Technology. They rather study Social studies instead.
- It is remarkable that 3 of the most important reasons for not studying scientific and technological studies are: because they don't like the subjects, maths are an obstacle and they do not identify themselves doing these studies.
- The students that have chosen scientific/technological studies is because they see professional future and because of their family's approval.
- Half of the students do not have a person in their families that can relate to STEM studies or careers
- Even in English language cannot be appreciated, most of the students have answered about scientific and technological jobs in male gender, what shows the image of certain job positions in the market.

Teachers

- More than 50% of the teachers think that the lack of interest is the main reason why girls do not choose STEM subjects for their future, apart from gender stereotypes and advertisement and media in general.
- Some actions that could help to drive out differences between girls and boys are the use of language and co-educational actions.
- Some suggestions from the teachers to encourage girls to choose STEM subjects:
 - Let them know that they have those options too.
 - To give them more information about these languages.
 - There are more real role-models to be visibilise.
 - Attend conferences.
- 70% of teachers would like to have more information to give their students to promote girls in STEM and to develop tools to encourage them.
- It is a highlight that the majority of teachers say that they see differences between girls and boys but they do not apply measures easily in their classrooms.
- Teachers are not aware of co-educative measures in the classroom and most of the time they do not have tools to improve this situation.

• **UNITED KINGDOM**

Key Ideas Desk Research

- 1 Especially in engineering diverse teams made up of both males and females have shown to produce better results and to be more innovative. Since the number of girls studying STEM subjects is currently very low it is important to not only get more people to study STEM related subjects in general but especially get more girls interested.
- 2 In the UK, results have shown that many girls do like science subjects at school but many decide not to study them further when it comes to choosing A-level subjects, at the age of 16.
- 3 Possible reasons for “leaky pipeline” this are strong stereotypes and attitudes from mostly male colleagues. This leads to a very male dominated working culture in which many women do not feel very comfortable.
- 4 Long working hours also pose a problem for women who try to combine work and family duties.
- 5 Clearly a discrepancy between what girls like and what they think they can do, resulting in a ‘that is not for me’ attitude exists.
- 6 This is especially puzzling since girls on average achieve better results in science subjects than boys.
- 7 Girls are especially influenced by the support or view held in their family.
- 8 Other factors influencing girls’ decisions are: friend’s assumptions, stereotypes and a lack of role models.
- 9 Many also miss important knowledge about the possible jobs open to them and how transferable STEM knowledge is to other jobs.
- 10 Many teachers also being unaware of all the jobs open to students studying STEM related subjects.
- 11 It is therefore better to encourage more girls to study in STEM field and to raise awareness in these areas therefore making quotas unnecessary.

Key Ideas Focus Group - Teachers

- Most teachers agreed that they are affected by stereotypes, mainly due to many examples of workers (in text books, case studies etc) being very male oriented and it therefore being easy to fall into using these kind of examples in their class.
- Because most do not have many or even any girls in their classes, this is not always seen as an obvious problem.
- Teachers all seemed very interested in potentially taking part in this type of
- All teachers, especially the few female ones, stressed the importance of family when deciding on which subjects to study or which career to pursue. Especially the support or discouragement of parents is seen as having a big impact on young girls.
- The teachers pointed out that most girls and their parents have the wrong idea about what STEM subjects really entail. They have an incomplete picture that is often based on false stereotypes and make a decision based on this.
- Normally institutions only offer taster events that last one day if at all. All teachers agreed that this is not enough time to give girls a full understanding of all aspects of a subject.
- The VET teachers agreed that the two main problems keeping girls from studying STEM related subjects is a lack of information about the subjects and what they can do with them career wise and the lack of support, especially from parents.
- The teachers pointed out that most girls and their parents have the wrong idea about what STEM subjects really entail. They have an incomplete picture that is often based on false stereotypes and make a decision based on this.
- When asked about the retention rate of girls in their classes, the teachers said that once girls decided to study their subject they normally stuck with it and completed the course.
- Problems arise when they start looking for a job, due to many STEM employers having reservations against hiring girls.
- This difference between how boys and girls study is also the reason why some of the focus group participants do in fact, admit to teaching them differently.
- Due to the boys behaviour being so important in making the girls feel welcome some teachers questioned if it would be possible to also give some kind of training to the boys. This could be something which could be worked into the training course, providing a section training the teachers to discuss the issue openly with all students in their classroom, to ensure male students are also aware of the gender gap in STEM.
- When talking about practical issues, the teachers pointed out that it is important to contact The Sheffield College very early on to make sure the teachers are given the time to go to the training sessions, as it is often difficult to get time for training.

Students

- The participants were surprised about the low number of girls in STEM since they know some girls who study it, including themselves and were not aware that they were in a minority.
- The participants were surprised about the low number of girls in STEM since they know some girls who study it, including themselves and were not aware that they were in a minority.
- Many had a passion about STEM subjects from an early age and had always been aware that they wanted to do something in that area.
- The girls all had experienced that it could sometimes be difficult to study in a classroom where they were the minority as they often felt that the boys did not take them seriously, but most participants said that this just encouraged them to show the boys that they could do it.
- The girls had also experienced a feeling of being treated differently by their male teachers which was interesting as this had not been recognised as strongly by the teachers themselves.
- The girls did recognise (as some of the teachers had) that they were often given more attention than the boys.
- They were very keen to be treated as equal to the boys and not given more support unless it was needed (not just because they are female).
- The girls in the group said that most of the time their choice was respected by parents and friends.
- When asked about the kind of help or support the girls would like to get in order to help them continue on this path, they mentioned more work experience would be important in order to get a better idea about what working life is really like.
- In terms of soft skills they agreed that it would be good to be more assertive so that they could talk with their teachers and fellow classmates about the issues they do not like and would have more confidence to stand up for themselves in a male-dominated environment.
- According to the girls, teachers should be more aware of the girls in their class.
- They also felt that it would be nice to have better communication between teachers and students concerning career aspirations.
- Students are very interested in the Mind the GAP programme and potentially participating.

Key Ideas Online Surveys

- Teachers and parents had the biggest positive outside influence but many girls also said that they encouraged themselves without any outside help.
- The most negative influence came from friends, followed by teachers but many girls said they haven't encountered any negative influence at all.
- Around 75% would like to receive further information on Mind the GAP but a lower number is interested in actually taking part in the Career Circles™.
- Interestingly not many want to receive information through social media. Most girls prefer to get contacted by phone (per text) or through email.

PART IV: STRENGTH & WEAKNESSES

There are some points in common and others that are different among all 3 countries in their research processes and data, as are found in the studies and actions carried out in each country.

These are the common denominators:

1 The data analysed in every country is low according to the presence of women in STEM studies.

2 The influence of stereotypes define a male vision and apart from the technological jobs and studies.

3 The lack of role-models in studies and jobs, especially in technological fields.

4 The environment of the girls is very important when the time of choosing their academic plan. Their family is one of the most influential environments.

5 The lack of information about career opportunities linked to STEM studies.

6 There is not a clear academic and professional orientation process that gives support to the girls in technological studies.

7 The lack of self-confidence of girls in the face of technological studies is common between the countries.

8 The most men's presence in STEM studies and jobs, does not help to create a confident environment for the girls.

9 Teachers, even getting noticed about the problem existing in choosing STEM studies, do not know how to face the situation.

10 In general, teachers need some educational tools to solve educational situations as we deal in this project.

11 All countries agreed that is necessary to organise specific activities and actions to promote STEM studies among girls.

12 The connection with the labour market is important, and it stands out the demand in STEM sectors.

13 Teachers are interested in receiving information and training relating this topics.

Denominators that make a difference:

1 The educational system establishes de differences when girls and boys need to choose their academic and professional paths.

2 Teachers are aware of this situation but not in the same way in each country. It seemed that in the UK, the teachers were less worried about gender differences when choosing a STEM study.

3 The co-education concept showed up only in Spain in the teachers focus group.

4 In the UK, students pointed that teacher's attitude is very important when they have to choose about their future studies and they do not always receive their support.

5 Spain and UK students and teachers agreed that Maths is a barrier when choosing STEM studies.

6 In the Netherlands, all activities that promote girls in STEM are not recorded.

7 UK specified that some work days in STEM jobs could be noticed as a barrier to incorporate girls.

8 Students in the UK showed interested in receiving information about the project's activities.

9 UK suggested the need to create communication channel between teachers and students.