“The FESTA project at school”

a pilot study on students’ perception about gender and mathematics

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Introduction

Despite improvements, female scientists continue to face discrimination, unequal pay and funding disparities. At most universities subtle biases persist that drive some women out of the science career (Shen, 2013).

WHY?

Some studies point out the genderization of the scientific disciplines and, specifically, the attribution of a certain degree of masculinity to mathematics as representative of the scientific domain (e.g. Brandell, Leder, Nyström 2007).

–Boys would be more likely to develop an interest in the natural sciences and engineering

–Girls would be more likely to develop an interest in biological and social sciences and humanities than boys (Eccles et al., 1998)

Aims

1. Explore high-school students’ perceptions towards mathematics
   - Are the traditional stereotypes about math confirmed?
   - Do students consider mathematics as a male domain?

2. Investigate the effect of the participation to gender-related lectures on students’ perceptions towards mathematics
   - Does the students’ attitude towards math change after the participation to the lectures?

Assumption

Monitoring and understanding students’ (stereotypical) attitudes and beliefs towards math can support educational researchers and practitioners in finding appropriate strategies for fostering equal opportunities at school and prevent from obstacle at the entry level of the scientific career.

Study Design

Phase 1: structured and self-administered online questionnaire (Time 1)

- Measuring gender stereotyped towards mathematics

Phase 2: participation to two gender-awareness raising events

- Kick off meeting of the FESTA project: experts held lectures about “Gender and Science”
- Lecture on gender stereotypes: implications on students’ choices

Phase 3: structured and self-administered online questionnaire (Time 2)

- The same online structured questionnaire as Time 1
- Verify possible changes in gender-related perception

Questionnaire

SECTION 1: school-subject preferences, university orientation and students’ performance in mathematics

SECTION 2: understanding students’ expectations of success towards *(by Bornholt et al, 1994)*

– ***Mathematics:***

Future performance (*“I think I will do well in math in the next years”*)

Perceived skill (*“I consider myself to be naturally talented at math”*)

Effort (*“I have to try hard to get good marks in math”*)

Difficulty (*“In general, math is hard for me”*)

– ***Personal/professional life:***

“It is important for me to have professional success”

“It is important for me to create my own family”

Totally disagree	Partially disagree	Neither agree nor disagree	Partially agree	Totally agree

SECTION 3: ***Who & Mathematics Questionnaire***

Investigate if mathematics is perceived as a male, neutral or female domain (Forgasz et al. 1999)

- 30 items, each with five item response categories

Mathematics is their favorite subject

Need math to maximize employment opportunities

Need more help in mathematics

Are not good at mathematics

BD – boys definitely more likely than girls	BP – boys probably more likely than girls	ND – no difference between boys and girls	GP – girls probably more likely than boys	GD – girls definitely more likely than boys

Results

Participants

Sample: 83 students, aged 18 years old, in the last year of the upper secondary school in Northern Italy.

The results here reported are based on 57 (out of 83) students: 61,4% (35 out of 57) are female students.

Results of the current study are not so strong to provide evidence to our intervention

Students’ favorite subjects

–Boys prefer scientific subjects while girls are more for humanities

Choice of the faculty

–Scientific areas are indicated by girls and boys in quite the same extent (Girls choice medicine and biology)

Genderization of answers (more for boys vs. more for girls) On average, participants think that:

Boys (more than girls)

–Like mathematics and need mathematics for increasing their professional chances

Girls (more than boys)

–Are less skilled at mathematics and therefore need more help and worry about their performances

–Do not like mathematics and consider it difficult

Perception of Mathematics: girls vs. boys

Girls more than boys think

–Mathematics is an easy subject for boys and boys need mathematics for their professional chances

Boys more than girls think

–Girls have to put much effort in order to succeed in mathematics

Comparison before and after the gender-related lectures (T1 vs. T2)

–At Time 2 girls result to be the ones to be more encouraged

Conclusions

Gender and science stereotype:

–Girls are reluctant to mathematics and science both in terms of skills and of interest

–Scientific professions are prerogative of men

–Mathematics is perceived as a male domain, seen as an opportunity more for boys than for girls, for increasing professional chances.

Little effect of our intervention

–Behaviours induced by stereotypes aren’t so easy to be modified

Useful unforeseen reactions from students

–To be recommended for making gender-aware interventions in the schools more effective.

Recommendations

Interventions should be integrated into curricula

- Related to a specific subject or as a transdisciplinary module on gender

Adopt a “user-centred” approach

- Involve students actively in the study (planning the actions, collecting and disseminating the data)

Equal opportunity rather than gender (in)equality

- Present goals desirable and achievable by both girls and boys
- Avoid that boys feel discriminated and girls underestimated

Stereotypes about men

- Boys may need more encouragement to emancipate from stereotypes

Literature cited

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Female Empowerment in Science and Technology Academia

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