**Abstract**

JOBSTEM Project is a four-year longitudinal study that aims to address the formation and dynamics of interests for STEM-related fields (Science, Technology, Engineering, Mathematics) during primary schooling by using insights from contemporary theories of academic achievement, self-competence beliefs and vocational interests.

**1 Research team**

JOBSTEM brings together 14 researchers from 4 countries: Croatia, France, Hungary and the United States.

Dr. Jacqueline Sue Eccles – consultant

5 senior researchers: Josip Burusić, Tom Bakac, Marija Šakić-Velš, Iztok Endoros, Zoran Drasaka

4 post-docs: Proning Kala, Dubravka Glassen, Ivan Dević, Juraj Petrović

5 PhD students: Mia Kanđegević, Mirsa Bilas, Mira Šimčević, Tomažević Zaljagić

**2 Methodological approach**

Our study encompasses longitudinal, experimental (STEM intervention), and qualitative methodological approaches:

- The cross-sectional design includes three cohorts of primary school students assessed through three successive years.
- The first wave of measurement included a cohort of fourth grade students (age 10), a cohort of fifth graders (age 11) and a cohort of sixth graders (age 12).
- Each cohort is followed through three measurement waves: the youngest from grade 4 to 6 (age 10 to 12), the middle from grade 5 to 7 (age 11 to 13), and the oldest from grade 6 to 8 (age 12 to 14).
- To evaluate the effects of the STEM intervention, this study encompasses two-group pre- and post-test randomized experimental design (Figure 1).
- Each STEM intervention in the experimental group is followed by focus groups with students.

**AIMS OF THE PROJECT**

- Examine how students’ general and specific STEM vocational interests are formed and change over time.
- Examine how students’ school achievement and self-competence beliefs relate to their general and specific STEM vocational preferences and how the pattern of these relations changes during primary schooling.
- Examine how students’ general and specific STEM career aspirations are shaped by their families and their gender.

**OUTCOMES SO FAR**

Children do not perceive STEM interests as a uniform field of vocational interests. They differentiate between interests in Science, Technology, Engineering and Mathematics.

Children’s perceptions of parental encouragement of STEM interests mediate the relation between parents’ reports on this behavior and children’s values of STEM.

No differences in self-concept in science between boys and girls were obtained.

There is a “fickle” student in the science self-concept towards higher school year.

Regardless of prior school achievement, students who have stereotype-consistent interests in school subjects tend to show stronger stereotype endorsement.

Students are mostly satisfied with the STEM activities of the intervention – they mention increased knowledge and show positive attitudes towards STEM areas.

**FUTURE PLANS**

- Building a national STEM platform
- Preparing STEM-related materials for classes
- Initiating European cooperation

**3 Sample**

Our sample includes approximately 640 students in three age cohorts, for a total of 1920 students. This sample is divided into two sub-samples depending on their exposure to the STEM intervention.

- The schools were randomly assigned to experimental and control groups from four clusters of equally urbanized schools. Schools in the experimental and control groups are comparable in terms of socio-economic status of students and their families, as well as availability of information about STEM occupations and exposure to the STEM environment.
- For each student, a parent or guardian also participates in the study.

**4 STEM experimental program**

The main objectives of the STEM intervention were to increase students’ interest in STEM subjects, help them develop positive attitudes towards STEM, and give them more information about possible future educational and career choices.

- The intervention outcome measures were carefully designed and used to provide data about its possible effects on students’ interests, achievements, self-competence beliefs and career decisions. The intervention was implemented twice for the experimental group cohorts and encompassed 12 hours of workshops per student in total.
- Intervention activities included STEM workshops in students’ schools and visits to higher education and scientific institutions in STEM fields – Faculty of Electrical Engineering and Computing, Faculty of Mechanical Engineering and Naval Architecture, Faculty of Chemical Engineering and Technology and Rudjer Boškovic Institute.

**PAPERS PRESENTED AT**

- European Conference on Educational Research, University UCC, Copenhagen (5 papers) (August 2017)
- New York Academy of Science, New York, USA (April, 2016)
- University College Dublin, Dublin, Ireland (4 papers) (August, 2016)
- The American Educational Research Association (AERA), Washington, USA (April 2016)
- 20th Psychology Days Zadar, Zadar, Croatia (May, 2016)