Factors inspiring secondary students to study physics. A study of Hope EU project

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Abstract.

It is well known that also students interested in physics do not study physics in each case. The goal is to gain insight into factors that act positively on the choice of physics as field of study and to shed light onto the conditions of this choice. We focus on the transition school-university with a particular attention on the factors motivating talented students to study physics. They should be highly interested in physics and be involved in the decision process about their field of study or even already have chosen it.

The research questions are:

1) Does the group of students with positive attitude towards study of physics show a special pattern of interest?
2) Which image student have as concern the physicists? 3) Which aspects of physics or doing physics have contributed to their choice?

For this goal the work group has developed a questionnaire which was administered by several partners of the HOPE-project.

The questionnaire consisted of four parts:

1) Evaluation of the interest in physics in several dimensions according to the interest construct following Kripp.
2) Open questions concerning factors influencing the choice of a career as well content-related aspects as social aspects such as the image of a physicist
3) Factors inspiring young people to study physics
4) Information about the student such as gender, age, type of school and intention of study.

In order to reach the pre-defined target group the questionnaire was distributed in events with physics content mostly taking place at universities, research institutions or at similar occasions. In order to identify promising activities information on the type of event, its characteristics and the process of selection of students were collected.

The scenario on the data collected in 7 EU countries will be presented, and the preliminary data analysis will be discussed.

SSQ - organised in 4 parts:

A) Evaluation of the interest in physics in several dimensions (following Kripp)
B) Open questions concerning factors influencing the choice of a career as well content-related aspects as social aspects such as the image of a physicist
C) factors inspiring young people to study physics
D) Information about the student (gender, age, type of school, intention of study)

Materials sent to the partners of the SSQ community
1) SSQ questionnaire (1 sheet – 2 pages)
2) Template for sample description (half page)
3) Template for data collection even (half page)
4) Pre-Prepared Excel sheet for data collection
5) Guidelines for administering and preliminary analysis, with examples and operative definition of qualitative categories.

QS1 partners activities:
- SSQ Partner sheet: responsible, N of data collection events, N of students - Sample selection
- Translation of the questionnaire
- Administration of SSQ to particularly motivated and talented students
- Report data in the database (Excel file)
- Report on event and sample.

Preliminary analysis

Two preliminary studies using SSQ1 and SSQ2 versions

Research questions
RQ1) Does the group of students with positive attitude towards physics show a special pattern of interest?
RQ2) Do they accept for themselves the role model of physicists?
RQ3) Which aspects of physics or doing physics have contributed to their choice?

Preliminary data analysis: students attending IPPG masterclasses

Methods for data analysis:
- Item analysis
- Cluster analysis
- Factor analysis
- Qualitative analysis of answers of students decided to study physics

N1=57 (15 F, 34 M) selected from all Italian schools attending the 2014 IPPG masterclasses
N2=29 (10 F, 19 M) students selected from all Italian schools attending the 2014 IPPG masterclasses

The students have very good values in all three factors (K-L-I). Half of those who do want to study physics are in Cluster 2.

Results from preliminary tests
- The most obvious factor for studying physics is a deep interest in physics
- Doing it in free time
- Being interested in fascinating topics like Astrophysics, dark matter.
- The most prominent traits of a physicist are curiosity and the urge for inquiry.
- A positive choice seems to be correlated with positive emotional attitude and the desire to know more deeply and understand the better world
- The older the students the less decided are they to study physics
- It seems important to stabilize interest in last years of school
- Physics seems to require special innate gifts
- This seems to deter students from studying physics
- Physics seems attractive mainly for mathematically thinking students
- It seems important to show the societal role and possibility of studying physics
- Studying physics needs deep interest, resulting in doing it in free time
- It seems important to provide adequate opportunities for students

Future work:
- Analysis of the full sample according to different methods:
  - Rasch, Factor, Cluster analysis of Likert scale items
  - Analysis on subsample considering: event of collection, students decided to apply a physics degree, male-female
  - Qualitative analysis of the open question and correlation with other parts results
  - Report: for the full sample and for the national samples

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