

Sources of motivation of high school students for participation in physics competitions

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This study tries to determine the key factors which motivate (or demotivate) high school students (ISCED 3) for participation in physics competitions. This summary shows a glimpse inside these motivations. Focus is for competitions which runs throughout entire school year, namely correspondence competitions.

Design of this study can be described as a mixed since it is combination of qualitative and quantitative parts. These findings arise from authors 8-years long experience as an organizer and former participant of some of those activities. That is reason why we can consider this also as an action research. During those eight years author has led many conversations, discussions with many participants of such activities and their organizers (who are usually also their former participants) and several questionnaires. Some of what was a part of these of the author (2014) which was concerned by deep reflection and development of the Physics Correspondence Competition (FYKOS). There was also a new internet questionnaire

administered among participants of the last six years of FYKOS and its organizers. Percentage in motivation questions showed below are from this last questionnaire

- 191 respondents (30 % of 632 addressed) - 186 participants (53 current) & 45 organizers (21 current), 129 men & 61 women
- The sum of percentages is more than 100 %, because participants usually mention more sources/motivations.

There are a very few public studies focused to similar goals, but the information obtained can be very helpful for organizers. Although, these conclusions cannot be simply generalized for each competition but they might be similar.

Something more about this feedback for FYKOS is (only in Czech) at web page <http://fykos.cz/zpetna-vazba>

Information sources

- At the beginning, there must be some information about the activity students can participate. Without knowing they cannot participate.
- Many students mix answers to questions „Where have you heard about competition XY” and „Why have you decided to participate in XY”. On the one side, it can hide the real reason why they chose to participate. On the other side, the information source can be also motivation for someone to participate. Therefore, it can be closely bound with primary motivation factors.
- Data below are from registration forms of seminars FYKOS and Výfuk for last 5 years (N = 920). This is better source than questionnaire because every participant must fill it to send online registration form, but there is only question about info-source, not about motivation.
- A letter (40 %) - the Faculty sends (or used to send) paper and e-mail correspondence to many high school, upper secondary school students and their teachers.
- Recommendation from school or teacher (21 %) - it is probable that also some letter from the Faculty helped the teacher to remember, or was put on the noticeboard
- Recommendation from some other person than teacher (17 %)
- The internet, links on other web pages, leaflets (12 %)
- Activities of seminars FYKOS & Výfuk (8 %), e.g. they have continued after Výfuk in FYKOS
- Activities of Faculty, not of FYKOS & Výfuk (4 %), e.g. Open days, other correspondence seminars
- Activities not organized by Faculty (8 %) - e.g. Physics Olympiad

Decision for participation

- Decision for participation is formed but for long term competitions is question whether they continue during the school year.
- E.g. only 31 % participants of FYKOS on average sends the last (sixth) series of the school year (the average is for all the 30 years of FYKOS).

„Demotivational” factors

- It is usually harder to obtain information from former participants why have they ended. Although some of them have shared the information.
- Many participants from those willing to answer questions end their participation by the end of high school (maturita exam) - 95 % from organizers respondents.
- Maturita exam - sometimes they finished participation before the last year of high school to have time for preparation for the maturita exam, sometimes they finished in the last year of study.
- Lack of time in general - they had too many other activities so decided to finish; solving of the seminar took too much time
- They have realized that they cannot participate on the camp - sometimes the date of the camp is public a long time ago
- Laziness
- The problems were too hard, they thought that they are not good enough
- They have changed their main field of interest (e.g. for informatics, mathematics, biology, medicine)
- Someone did not like texts in Slovak language (some part of solutions, which is written by Slovaks, stays in Slovak because the Czech language is quite similar)

Primary motivational factors

- According to many respondents, the motivation often shifts during participation. It is because they often realize that they like activities organized by correspondence seminar like camps.
- The motivation of people can be complicated and vary. Many people mention more than one motivation factor, but it is almost sure that many of them do not mention all the factors, but when we look at individual testimonies we can make ourselves a picture.
- General interest in physics, like physics... (18 %)
- Get better in physics, learn something, improve themselves (17 %)
- Interesting tasks/problems, more interesting than in school (17 %) - the problems are really more challenging, more complicated and try to be also more interesting than in school
- They have participated in seminar Výfuk (for lower secondary) before and it seemed natural to continue in FYKOS (for upper secondary) (13 %)
- They wanted to get to the camp (11 %) because they wanted to improve themselves, meet their friends or just heard that the camps are great
- Letter (11 %) - even the letter from which they have get to know about seminar, motivate some of them
- Friends (10 %) - recommendation or wanted to meet them again
- Hard tasks/problems (8 %)
- Competitiveness (7 %) - they wanted to be better than others, it was challenge...
- They „just wanted to try it” (6 %)
- Teacher (5 %) - although we would like the teachers were one of the strongest motivation factors, it seems they neither inform much about competitions like FYKOS, nor motivate their students (in general - there are exceptions)
- Physics Olympiad (5 %) - they had taken part in the PO and they get information from organizers of the PO or they wanted to prepare for the PO
- Interestingness (5 %) the seminar seemed interesting to them
- It is fun to solve a seminar (5 %)
- Schoolmate (4 %)
- There are also some reasons that were mentioned by only some participants, but are interesting - e.g. they mention some concrete organizer who convinced them; because they were bored/had too much free time; someone wanted to have similar hobbies like his/hers partner; someone wanted to find a partner; parents, siblings; they wanted to better know the school/faculty they planned to study at; some of them live in Jihomoravský kraj, where they can receive stipend for participation in educational activities; some of them receive some points at their school...
- Only several people do it for prizes (other than camp) - they receive some books and other prizes, they can also acquire certificate of successful participant if they gain at least 50 % of points. That certificate can be used as an alternative to entrance examination to the Faculty of Mathematics and Physics.

Secondary motivational factors

- As it was mentioned, the motivation often shifts, but it is not the same for each participant. Some of them were decided to participate because of they had heard about camps and they continue from the same reason. Some of them are interested in physics and interesting problems and never go for any face-to-face activity like camp.
- But in general, the motives are similar.
- Improvements in physics (34 %) - they often realize that they are not so good in physics when they face the advanced physics on camps or in the complex problems
- They wanted to participate on the camp (31 %) or they mention that the participation on the camp was great experience (20 %)
- Interesting problems (18 %)
- They like to participate (16 %)
- Interest in physics (13 %)
- Friends (8 %)
- Competitiveness (8 %)
- Preparation for future study (3 %)
- Physics Olympiad (3 %)
- They had enough of a free time (3 %)

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