

FYKOS - Physics Education through Correspondence Competition and Camps

Karel Kolář, karel@fykos.cz

(inter)national wide project

Faculty of Mathematics and Physics, Charles University in Prague, Czech Republic



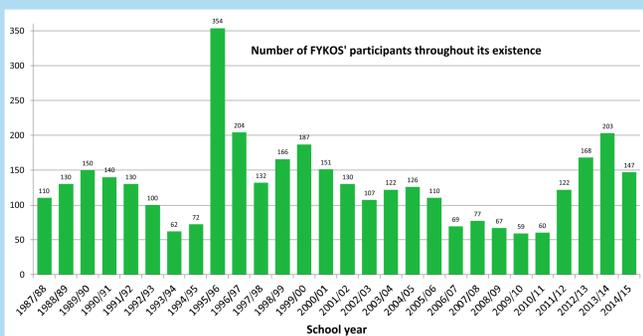
FACULTY OF MATHEMATICS AND PHYSICS
Charles University

About FYKOS

- ✗ Participate can high school students (ISCED 3)
- ✗ Organizers are university students (ISCED 5, 6, 7)
- ✗ Main goals of FYKOS are: **popularization** of science, especially Physics, primarily among high school students; improve quality of students of our faculty through education of high school students; promote our faculty; create environment for creating social connections among participants and organizers.
- ✗ Basic information is below, more can be found at [1].

Correspondence/online competition

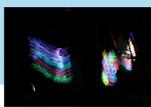
- ✗ Participation is possible in Czech, Slovak or **English**.
- ✗ More than 1100 CZ problem assignments on web (500 EN) [3]
- ✗ More than 800 CZ solutions on web [4], [5]
- ✗ Each year of FYKOS consists of 6 series of 8 different challenging physics problems.
- ✗ Any high school student able to send solutions in CZ/SK/EN by post/electronic system can participate.
- ✗ Participants can join anytime during year.
- ✗ Participants receive feedback from organizers and points for their solutions



Camps [6]



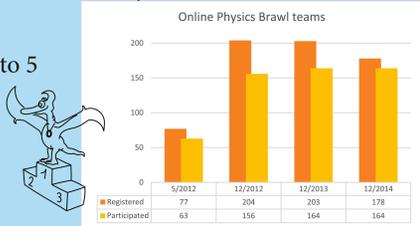
- ✗ The camps are held twice a year for a week (spring and autumn)
- ✗ The best participants of correspondence part are invited
- ✗ During 28 years – 52 camps, more than 1300 participations, more than 100 organizers
- ✗ Educational program - both formal and informal
- ✗ Lectures
- ✗ Experiments
- ✗ Games
- ✗ ...



Other activities

FYKOS started as a correspondence competition but now it has many more activities such as:

- ✗ Online Physics Brawl [7]
 - ✗ The internet competition for teams of up to 5
 - ✗ Three hours of solving physics problems
 - ✗ Assignments in Czech and **in English**
 - ✗ **Opened category for anyone**
- ✗ FYKOS' Physics Brawl [8]
 - ✗ Similar to Online Physics Brawl but it is held in Prague
- ✗ Days and weeks with physics excursions [9], [10]
 - ✗ Days are every year on our faculty and on other sites in Prague
 - ✗ Weeks were to CERN (2012), to DESY (2014) and it's going to be to CERN again.
- ✗ Lectures [11]



The study of participants of FYKOS

- ✗ Organizers are investigating feedback after every activity, the most complex feedback on all activities of FYKOS was conducted 2012 – 14 by the author of this poster [2]. Some of the interesting characteristics of participants are here. Conclusions can be important for FYKOS as well as for other organizers who want to improve their existing competition or create a new one.
- ✗ Main methods used for gathering data were semi-structured interview [12] ($N = 18$, 25 ~ 120 min) and questionnaires ($N = 196$, $N = 81$).

Sources of information about competition

- ✗ If some competition wants to have participants, it needs to spread information about its existence among target group of potential participants. Various ways of promotion can have great difference in their impact. The most common ones:
 - ✗ Leaflet delivered to school by letter (33 %)
 - ✗ Friend, but not schoolmate (21 %)
 - ✗ Internet (17 %)
 - ✗ Leaflet delivered home by letter (14 %)
 - ✗ Schoolmate (14 %)
 - ✗ Leaflet on noticeboard in school (12 %)
 - ✗ Teacher (12 %)
 - ✗ Physics Olympiad (6 %)
 - ✗ Sum is greater than 100 % because some were informed through more ways.

Why did they start to participate?

- ✗ It's not enough that people know about some competition. It is good when someone solves problems for themselves but even better for the competition is to participate in it, so information about what motivated participants to send their solutions in the first place is vital.
 - ✗ Improve herself/himself in physics, learn to solve physics problems, general interest in physics (38 %)
 - ✗ Interesting (complex, not straightforward) problems in FYKOS (28 %)
 - ✗ Competition, be better than others (15 %)
 - ✗ Camps (11 %)
 - ✗ Interest in continuing of solving some seminar (9 %) (There are also seminars for lower secondary school pupils (ISCED 2) in Czech Rep.)
 - ✗ Boredom (6 %)
 - ✗ Other motivation (below 5 %): friends, schoolmates, teacher, preparation for future studies, family, opportunity to make new friends, visit of CERN...
 - ✗ Sum is greater than 100 % because more motives were important for some.

Why have they continued in participation?

- ✗ If seminar wants to hold to its participants, it has to motivate them further. We discovered that the motivation of continuing in participation differ
 - ✗ Camps (39 %)
 - ✗ Competition, be better than others (26 %)
 - ✗ Interesting problems (22 %)
 - ✗ Improve herself/himself in physics (22 %)
 - ✗ Entertainment (16 %)
 - ✗ Friends, reunion with them (15 %)
 - ✗ Other activities of FYKOS other than camps (6 %)
 - ✗ Learn something new (6 %)
 - ✗ Other: visit of CERN, teacher, school, good feeling, comments on solutions...
 - ✗ Sum is greater than 100 % because more motives were important for some.

Professional development of former participants

- ✗ Among respondents - most of them continued their study in the field of science or medicine. There are only a few exceptions who study/studied art or social science.
 - ✗ Most of them study physics, technical subjects, maths and informatics. More than half of them study/studied at our faculty (Bc. and Mgr. 91/173, Ph.D. 21/41).
 - ✗ Some respondents are workers in these fields:
 - ✗ Science and technology ($N = 19$) - research and innovations...
 - ✗ IT ($N = 14$) - software developers, app developers, testers...
 - ✗ Other ($N = 22$) - teachers, dentists, financial advisor, senior portfolio manager, real estate agent, internal auditor...

References

- [1] Organizers of FYKOS: FYKOS - The online Physics Competition, <http://fykos.cz> (CZ) or <http://fykos.org> (EN)
- [2] Kolář K.: Fyzikální korespondenční seminář na MFF UK - reflexe a rozvoj (diploma theses), 2014, <https://is.cuni.cz/webapps/zzp/detail/130102/>
- [3] Organizers of FYKOS: Problem assignments of FYKOS, <http://fykos.org/problems>
- [4] Organizátoři FYKOSu: Archiv letáků a ročníků, <http://fykos.cz/ulohy/archiv>
- [5] Organizers of FYKOS: Search the Problems, <http://fykos.org/problems/search>
- [6] Organizers of FYKOS: Camps, <http://fykos.org/events/camps>
- [7] Organizers of FYKOS: Online Physics Brawl, <http://physicsbrawl.org/en>
- [8] Organizátoři FYKOSu: FYKOSí Fyziklání, <http://fyziklani.fykos.cz>
- [9] Organizátoři FYKOSu: Den s experimentální fyzikou, <http://dsef.fykos.cz>
- [10] Organizátoři FYKOSu: Týden s aplikovanou fyzikou, <http://tsaf.fykos.cz>
- [11] Organizátoři FYKOSu: Přednášky FYKOSu pro středoškoly, <http://prednasky.fykos.cz>
- [12] Dawson, C.: A Practical Guide to Research Methods; A user-friendly manual for mastering research techniques and projects, 3rd edition, Glasgow, 2007.

Acknowledgments

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