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INFORMAL PHYSICS TEACHER TRAINING IN THE CZECH REPUBLIC:  
A POSSIBLE INSPIRATION

## INTRODUCTION

Teacher training is a very important and really necessary part of their professional career. We would like to present two long-term activities aimed at Czech physics teachers. These activities are based on voluntariness principle; teachers attend them because they want, not because they are forced to be there by somebody (e.g. their headmaster). The activities described here are: “The Heureka Project” (Heureka, 2016) and “Elixir for Schools” (Elixir, 2016). These projects can be taken as examples how informal system of teacher education can be created and developed as a useful counterpart to a formal in-service teacher training system.

## THE BASIC DESCRIPTION OF THE ACTIVITIES

*Heureka* is a project existing for about a quarter of a century. It was described in detail in (Dvorakova, 2014) so it is sufficient to remind just a few details. It includes a two-year cycle of weekend seminars for new participants (ten seminars altogether), some further seminars and an annual conference “The Heureka Workshops”. All activities of the project are very informal. Their main goal is to help teachers both to improve their understanding of physics, and their physics teaching at their schools. Although teachers do not obtain any formal credits for their career advancement when attending the seminars, they perceive the activities so useful that they come back for further seminars and events. Apart from some other ways of finding out the impact of the seminars this is a very important informal feedback for us.

Three years ago, the experience and “human resources” of Heureka provided the basis on which the project *Elixir for schools* was built. This project established 21 regional centres in the whole Czech Republic. Leaders of these centres are experienced physics teachers, often teachers who “passed through” Heureka seminars. Once a month, an afternoon seminar is organized in each centre with a program prepared mostly by the leader of the centre but sometimes also by some participants themselves. Also, there is a possibility to borrow some teaching aids; sometimes teachers go on some excursion, invite some expert to give them a lecture, etc. The project also established its own conference to help interconnect teachers from different regions. *Elixir for schools* attracted additional physics teachers who did not participate in the *Heureka* project. Although it has existed just a few years, the project seems to have potential to become long-lasting activity. Also, it appeared that both projects positively influence and inspire each other.

## THE MAIN CHARACTERISTICS OF THE BOTH ACTIVITIES

We would like to describe which characteristics are (in our opinion) important and critical for our long-term teacher training.

*Active work*

Maybe it is self-evident that the seminars for teachers should be led the active way. Nevertheless, we consider it so important, that we mention it here in the first place. The active work is a key learning approach in our seminars. Teachers solve problems, do experiments, and make various simple teaching tools. We are firmly convinced that it would not make sense just to lecture (to a passive audience) about active ways of teaching-learning approach. Our experience confirms that teachers appreciate the active way of the seminars quite a lot.

*Community*

Being a teacher is quite often a lonely profession. According to teachers’ feedback the possibility to meet other colleagues, share ideas, problems, etc. is one of the most important reasons for attending our seminars. We know it, so when preparing the program of seminars we try to let enough time for informal discussions.

*Voluntary and free of charge;  
Informal*

These characteristics are maybe the most specific for our seminars in comparison with other teacher training in Czech Republic. As it was mentioned above, teachers attend our seminars and meetings because they want to, not because they are forced to go there by some authorities. Also, we want teachers not to depend on the decision of their headmasters, whether they allow them to attend the seminar or not. Therefore, activities in both projects are organized during teachers' free time– Heureka seminars during weekends, Elixir for Schools meetings in the afternoon. For the same reason all our activities are free of charge. If teachers had to pay the market price for the seminars, many of them could not afford it.

All these aspects are very closely related with informal nature of our seminars. Seminars and meetings take place in schools. Participants of the weekend activities of the Heureka project sleep in classrooms in their sleeping bags and they take care of their food by themselves. This enables spontaneous evening discussions and sometimes experimenting till late night and helps to develop friendly relations in the whole group of teachers.

*Long-term*

To change one's mind takes time. It is not a problem you can solve in several minutes or hours. So, if we want to help teachers to teach better, we need a lot of hours for working with them. New participants of the Heureka project are invited to the course, which takes ten weekend seminars in two years, altogether about 180 hours. (In spite of such time demands we still have enough applicants; in the school year 2016/2017 the ninth cycle of seminars has started, each of them with about 25 participants).

The project Elixir for Schools has a bit different character. Meetings of the regional centres are open; everybody can come whenever he or she wants. However, almost 70% of participants come regularly, so their attendance is also long-term. This proved to be effective. The data from feedback and evaluation show that 83% of participants feel that their attendance in the centres affected their teaching. They say, that they more frequently include experiments into their lessons and use equipment manufactured or borrowed from the centre. Also, 52% of participants feel more confident in physics.

*Extensive and growing*

Both our activities are extensive and growing. Although Heureka started in the early nineties originally as an activity of just a few people, now there are almost three hundred teachers involved in the project. More than 120 participants and lots of their children come to the annual conference of Heureka. In the school year 2015/16, a new cycle of seminars for new participants has started, as well as a new cycle of seminars for high school physics teachers. Nowadays, three parallel cycles of seminars run.

The project Elixir for school has not such a long tradition. However, on average almost three hundred of participants came each month to the centres (together for 21 centres) in the school year 2015/16, so about 14 participants attended each centre in a month.

Our seminars and meetings are attended by physics teachers from all types of schools from the whole Czech Republic. Among them, there are teachers, who have no formal education of physics, but they were asked to teach it in their schools, as well as experienced physic teachers who can offer their ideas and opinions to their colleagues. On the other hand, there are few participants, who do not teach physics at school at all, but they take their participation in seminars as their own brain training.

*Support*

It is evident, that such broad projects require from their leaders a lot of "human energy", enthusiasm and also willingness to be open and learn how to push things further. Nevertheless, some money is needed, too. Heureka ran for some initial years practically without any financial support, than the situation improved. Nowadays it is supported by the Faculty of Mathematics and Physics, Charles University in Prague and by the Depositum Bonum Foundation; this allows organizing of all the seminars and meetings. Faculty of Mathematics and Physics gives the Heureka project not only financial support, but also all the necessary background – administrative, technical and scientific. Thanks to the Depositum Bonum Foundation the project Elixir for Schools was started and is still under development. People from this foundation organize meetings for leaders of the centres, they provide project administration, organize annual conferences of the project, etc.

## CONCLUSIONS

Both projects described here proved to be viable and useful for the physics teachers in the Czech Republic. We hope that our experience can be inspiring and important for people who would like to organize similar activities. Our main message is positive: building and developing such informal teacher training activities is demanding but very rewarding; and also much appreciated by the teachers.

## REFERENCES

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