Circles of Self-Education in Science: Innovative Methods to Mentor Talents

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Posted on **2011-03-16 9:05 pm By** Tamas from Hungary Edit Delete

Category: Outreach to Marginalized Communities

FINALIST

Category:

Outreach to Marginalized Communities

Project Description:

Background:

Science education is on the decline in Hungary in an extremely rapid and alarming fashion and is on the decline around the world as well. Hungary used to have excellent traditions in science education, which produced, among others, J. von Neumann, E.P. Wigner, and E. Teller, each of whom had a major impact on our world by providing key contributions to computer science, nuclear reactors and national defense. Based on the still-remaining traditions of science education and also on innovative applications of modern, internet based communication tools, a new form of science club: circles of self-education in sciences is proposed. The model for such small networks of self-education in sciences, or Science Clubs, has been already proven to be effective, inspiring and successful in one particular location in Hungary. There are several other locations with similar or "resonant" traditions that can be revived and revitalized in the same manner.

The main goal of this proposal is to spread the example of a proven model from the local to a national level, engaging 5 new locations across Hungary. By capturing new experience and inspiring new talents, a new kind of educational experience can be generated, pulling together scientists, students, teachers and parents in weekly or biweekly activities related to science that can be also utilized for the international mentoring of talents, and providing inspiration, motivation, training, and promotion of science talent.

We place emphasis on finding talent in remote, marginalized communities. We will organize Camps in small villages fighting for the survival of their schools in the face of low funding for local education, and Science Clubs in country towns where mentoring from active scientists is not yet organized.

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AEIF Information

- Instructions
- Guidelines
- *Q&A Live* on the AEIF
- Posted Project Ideas

Communities

Return to State Alumni H

Disability
Fulbright Community
Hungarian Fulbright Associatio
Literature Community

Activities include weekly or bi-weekly meetings of science clubs in middle schools during the academic year and summer mentoring camps organized for the most active and dedicated students, scientists, and teachers. The science clubs will hold an average of 30 meetings during the academic year, while at the one-week mentoring camps about 35 topics will be covered during the summer. Nearly half of these topics are forseen to be covered by researchers, scientist, similar number of topics is presented and discussed by students, while teachers talk rarely, only at about 10-15 % of the time. However the clubs have teacher patrons who are present at each occasion and who encourage the students to find a topic of their own choice and interest and provide directions and material. Such science clubs also include a scientist patron who gives more detailed direction and whose network among fellow scientists is utilized to involve them – so they are the contact points between the Science Club and the world of science. Students prepare their topic for discussion using modern internet based resources and mentoring help from scientists and teachers.

By May-June 2011 we will find the location of 4-5 new Science Clubs. The funding cycle will start from September 2011 and lasts till August 2012, covering the academic year followed by Summer Camps in 2012.

These science clubs are desired to be sustainable, so we are looking for all means to make that possible. We will base these clubs on volunteerism - 2011 is designated as the European Year of Volunteering. We will keep the expenses as low as reasonably possible. Three additional methods may be detailed in the 2nd round of evaluation.

Team Members:

The project will be implemented by US Alumni and supporting individuals (professors, researchers, teachers and students) and by supporting institutions.

Participating US Alumni include

professors, Doctors of Hungarian Academy of Sciences:

Cs. Bagyinka (biophys)

A. Csótó (physics)

T. Csörgő (physics, team leader)

D. Karátson (volcanology)

J. Kubassek (geography)

P. Gyarmati (math,informatics)

K. Nagy (dentristry)

L. Nánai (physics)

P. G. Szalay (chemistry, in US)

Á. Zsigmond (chemistry)

Researchers:

B. Botos (geography)

F. Borondics (chemistry, in Canada)

M. Csanád (physics)

I. Fórizs (geochemistry)

Á. Gali (physics)

E. Kirs (law)

Gy. Kovács (IP law)

Gy. Jordán (geology)

J. Laczkó (bioinformatics)

marketing specialist, engineers, consultants:

A. Kecskeméti (marketing)

A. Nováki (envir. engineering)

E. Márton (architect, in the US)

Ph.D students:

R. Vértesi (physics)

Other partners include:

- professors, or Doctors of the Hungarian Academy of Sciences

P. Ábrahám (astronomy, physics)

I. Scheuring (biology)

- researchers with PhD.

G. G. Barnaföldi (physics)

P. Ódor (biology)

A. Ősi (paleontology)

V. Müller (biology)

- PhD. students with M.Sc.

M. Vargyas (physics)

- Medical Doctor:

T. Solymosi (physician)

- B.Sc student

J. Csörgő (math and chemistry)

- teachers

T. Ádám (informatics)

Bognárné Nagy Éva (biology)

E. Császár, Kissné (mathematics, physics)

G. Endrész (biology)

M. Kiss (math, physics, informatics)

A. Kormos, Nézőné (math, physics)

K. Kopasz (math, physics)

L. Nagy (math, physics)

I. Pálinkás (English)

I. Szittyai (physics)

- middle school students

András Cs. (BerzeTÖK Science Club, Gyöngyös)

Martin B. (BerzeTÖK Science Club, Gyöngyös)

Institutions include

- Museums:

Hungarian Museum of Geography

Hungarian Museum of Natural History

- Research Institutes of the Hungarian Academy of Sciences

Biological Research Center, Szeged

Inst. for Geochemical Research

KFKI Research Inst. for Particle and Nuclear Physics

Konkoly Observatory - Inst. for Astronomy

Research Inst. for Solid State Physics and Optics

- Universities:

ELTE University, Budapest (several institutes)

Pázmány P. Catholic University, Budapest

University of Debrecen, Debrecen

University of Miskolc, Miskolc

University of Szeged, Szeged

- Consulting firms:

COWI Hungary Consulting and Planning Ltd, Budapest

QANDA Consuling, Budapest

- Supporting Middle and High Schools (secondary education institutions, for age group 14-18 years old)

Berze Sec. School, Gyöngyös

Dobó Sec. School, Eger

Németh László Sec. School, Hódmezővásárhely

Móra Ferenc Sec. School, Kiskunfélegyháza

Ságvári Sec. Sch., Szeged

Szent László Sec. Sch., Budapest

Szilády Protestant Sec. School, Kiskunhalas

Discussion with Schools will continue in May-June 2011.

Other supporting organization:

Hungarian Foundation for Innovation

(J. Pakucs, P. Závodszky)

Who will be affected :

250+ students

40+ scientists

10+ teachers

5+ middle schools

(in 2011/12)

On the long run, the Hungarian middle school system may potentially be revitalized.

Region:

Europe

Location:

This project will take place in Hungary, with a pilot project going on successfully in Gyöngyös, Hungary, since 4 years. Now the goal is to strenghten it and to spread its best practices to at least 5 locations, including other middle/secondary schools, predominantly in the Hungarian country-side.

By the second round of evaluation, the following supporting Middle and High Schools were identified. (These are institutions of secondary education, with students in the age group of 11-18 years):

Berze Middle and High School, Gyöngyös

Dobó Middle and High School, Eger

Németh László Middle and High School, Hódmezővásárhely

Móra Ferenc Middle and High School, Kiskunfélegyháza

Ságvári Middle and High School, Szeged

Szent László Middle and High School, Budapest

Szilády Protestant Middle and High School, Kiskunhalas

other Schools for example

Deák Ferenc Middle and High School, Szeged and Radnóti Middle and High School, Szeged as well as the Evangelist Middle and High School in Békéscsaba also are being contacted and may join the project at a later stage.

Innovation:

It mixes good old traditions with modern communication tools. Trains scientists in communication with 14-18 years old students and teachers. Trains students and teachers in modern sciences and in web-based communication of science results. Utilizes web-based tools like archiving best presentations on youtube videos and talks in .ppt and .pdf files so that they could be used again by other science circle talks at different schools. These new educational channels will provide a local community that is educated and embedded to modern science and the tools and archives will useful for students at more remote locations too.

For high level reports on one of the outcomes of the prototype science club, and its innovative nature, see the following article in the prestigeous Science Magazin and at the web-page of a US National Lab:

Science Magazin vol 331, no. 6014 p. 129 (2011)

http://www.sciencemag.org/content/331/6014/129.4.full?sid=da6b0100-5b46-45b3-a2fb-fc57aa5d4ae9

Quarks Matter at RHIC, feature story, Brookhaven National Laboratory, Upton, NY, USA, January 4, 2011:

http://www.bnl.gov/rhic/news2/news.asp?a=2175&t=today

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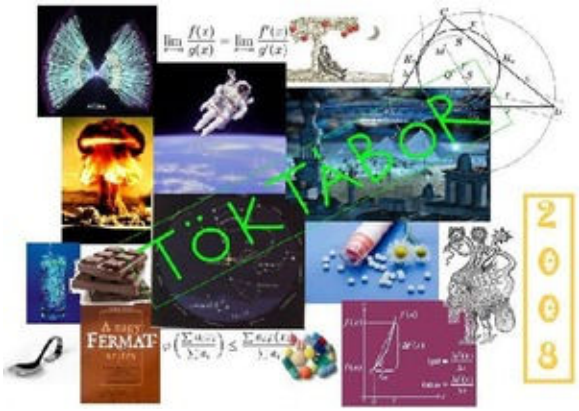
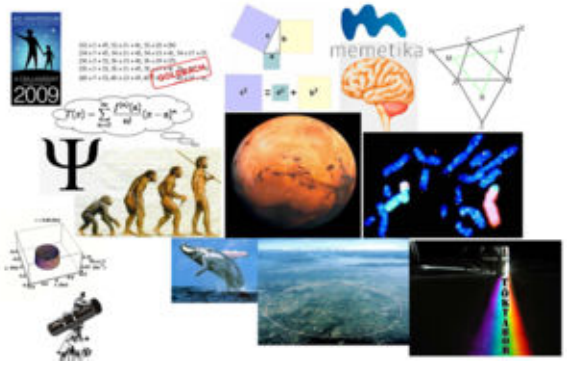


Poster for the 2008 Summer Camp of the Berze TÖK Science Club

Source: The picture indicates the kind of programs to be covered in such summer camps for circles of self-education in science



Poster for the 2009 Summer Camp of the Berze TÖK Science Club

Source: The picture indicates the kind of programs to be covered in such summer camps for circles of self-education in science

Poster for the 2010 Summer Camp of the Berze TÖK Science Club

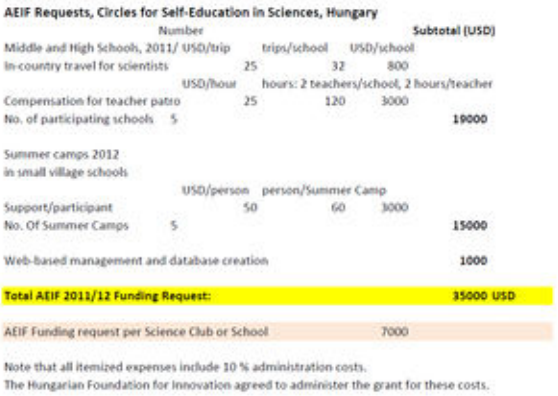
Source: The picture indicates the kind of programs to be covered in summer camps for circles of self-education in science

In-kind contributions, Circles for Self-Education in Sciences, Hungary

	Number				Subtotal (USD
Middle and High Schools, 2011/12		USD/hour/school	Hours	USD/school	
Room rent, normal		20	28	560	
Room rent, exceptional		50	2	100	
Compensation for researchers		50	30	1500	
Compensation for teachers		25	60	1500	
No. of participating schools	5				18300
Summer camps 2012					
Small village schools					
Room rent, normal		20	35	700	
Compensation for researchers		50	35	1750	
Compensation for teachers		25	35	875	
No. Of Summer Camps	5				16625
Total in-kind contributions					**34925**
in-kind contribution per school				6985	

Our own in-kind contributions, as estimated by the project team in USD

Source: In-kind contributions



AEIF Requests, Circles for Self-Education in Sciences, Hungary

	Number			Subtotal (USD)
Middle and High Schools, 2011/	USD/trip	trips/school	USD/school	
In-country travel for scientists	25	32	800	
	USD/hour	hours: 2 teachers/school, 2 hours/teacher		
Compensation for teacher patro	25	120	3000	
No. of participating schools	5			19000
Summer camps 2012 in small village schools				
	USD/person	person/Summer Camp		
Support/participant	50	60	3000	
No. Of Summer Camps	5			15000
Web-based management and database creation				1000
Total AEIF 2011/12 Funding Request:				**35000 USD**
AEIF Funding request per Science Club or School			7000	

Note that all itemized expenses include 10 % administration costs.
The Hungarian Foundation for Innovation agreed to administer the grant for these costs.

Our 2011/12 AEIF Funding Requests
Source: Funding requests, details

Goals and Objectives:

Quantitative objectives are as follows:

In every given Science Club, we plan to have about 25-30 annual meetings and a summer camp with 30-35 topical discussions. We expect that about 45 % of these topics will be presented by researchers, including former State Alumni, while about 40 % of the talks and presentations will be done by students. The rest 15 % of the events will be covered by teachers or parents.

At the end of the academic year, we will summarize how many students and teachers and researchers as well as how many parents attended these performances.

We will call attention to other forms of self-education in Science for example problem solving in Hungarian High School Journals for mathematics, physics and chemistry (KöMal and KöKél) and we will give visibility in the Science Clubs for those students who are active problem solvers. Out of the most important presentations, we will create shared video contents and will create a database of the presentations. We will also monitor how many high school students enroll to Universities on a Science or Technology related subject, and how many of them intend to be science teachers in middle and high schools? We expect that the number of such science teachers will be significantly increased in Hungary, by more than 20 %, due to this program, as compared to the current situation where data from the 2009/10 academic year are known.

The qualitative results should speak for themselves and could be judged by inspecting the archives of the talks, the programs of the Summer Schools and the youtube video archives of the presentations. We will promote the culture of voluntarism and self-determination as well as outreach about most recent scientific results to the Hungarian middle school system. We will create a friendly competition among these Science Clubs: Who has the best program? Who was the most active during the academic year, who had the best summer camp, who had the best student talk? Best researcher talk? Best teacher presentation? Best

contribution from parents? Best blog? etc etc.

In the beginning of the academic year and the beginning of the program, we will collect the expectations from the participants (students, teachers, researchers and parents). At the end of the academic year and at the end of the Summer Camps we will collect anonymous (and voluntary) opinions and evaluations from all participants again including students, teachers, researchers and parents. These outcome expectations and opinions will be handled confidentially but their totality will help us to improve and to sustain the Science Clubs and their Summer Camps, as a civil society educational and cultural, scientific outreach initiative in Hungary.

Outcomes also include coverage of this Clubs for Self-Education in Sciences in the media in local, national and global level.

We will disseminate information on science related competitions, challenges, innovation or problem solving competitions and call for actions on local, regional, national and global levels.

These international events will increase the prestige of the Science Clubs and will increase the awareness of the young Hungarian generation about globally important science related problems.

Recent example includes the science endeavour game Vanished that the Smithsonian Institute and MIT announced recently to increase awareness of science and environmental issues by middle and high school students, or the recent call for a Google

Science Fair.

Timeline and Activity List:

Preparations for the activities will start in this academic year, while the BerzeTÖK Science Club goes on with its programs and its started youtube broadcasting. This Science Club will have a summer camp in July 2011. Interested researchers/ teachers /students are invited on their own, minimalized expense estimated about 10-15 kHUF/week, in order to get experience and get the feeling.

We place emphasis on finding talent in remote, marginalized communities. We will organize Summer Camps in small villages fighting for the survival of their schools in the face of low funding for local education, and Science Clubs predominantly in country towns in such Middle and High Schools where mentoring from active scientists is not yet organized.

In the 2011/12 academic year, we plan to operate at least 5 such Science Clubs in Hungary. Their activities will

include weekly or bi-weekly meetings of Science Clubs in Middle and High Schools (age group: 11-18 years old) during the academic year and summer mentoring camps organized for the most active and dedicated students, scientists, and teachers. The Science Clubs will hold an average of 30 meetings during the academic year, while at the one-week mentoring Summer Camps about 35 topics will be covered during the summer. Nearly half of these topics are forseen to be covered by researchers, scientist, similar number of topics is presented and discussed by students, while teachers are forseen to talk rarely, only at about 10-15 % of the time.

these Science Clubs have Teacher Patrons who are present at each occasion and who encourage the students to find a topic of their own choice and interest and provide directions and material. Such Science Clubs also include a Scientist Patron who gives more detailed direction and whose network among fellow scientists is utilized to involve them – so they are the contact points between the Science Club and the world of science. Students prepare their topic for discussion using modern internet based resources and mentoring help from scientists and teachers. Parent Patrons may also help the Science Clubs with their network of connections and experiences, even with little things as telling a story or making tea or baking some cookies for the next meeting.

By the second round of evaluation, April 15, 2011 we have found the location of more than 5 new Science Clubs. These locations are specified above.

A new element of possible activities is that in certain research projects like the Hungarian Dinosaurus project of Attila Ősi, or in the determination of radioactivity of rainwater of István Fórizs, or in the determination of exposure to radiation due to mobile/cell phone technology by Viktória Finta, it is possible to collaborate with students in particular in the data taking periods. We intend to introduce these colleagues to several student communitites and advertize the research opportunities after the researcher is personally introduced to that given Science Club. In some of these projects, for example in the analysis of the composition of isotopes in the rain water, not only students but also High School teachers can contribute and participate. The time-lines of these research activities will be determined by the responsible researchers, for example dinosaur digging will be conducted during Summer 2012 while the collecting of rain-water will be continued during the academic year 2011/12.

Outcomes:

Who will be affected :

At least 250 students, each several times!

At least 40 scientists, based on their availability, each 1-3 times.

At least 5 Patron Scientistis several (20+ times).

At least 4 Patron Teachers, each about 50-60 times.

At least 5 Middle or High Schools (in the academic year of 2011/12).

On the long run, the Hungarian middle school system may potentially be revitalized. After testing the model in Hungary we would like to explore its potential for international spreading. In particular we may relate this project to the activity of the Bill and Melinda Gates Foundation and the Harvard Think Tank on Educational Reform. This effort emphasizes the efficiency of smaller schools and merit based evaluation of the educational efforts. For reference of these activities in the US, see the interview with Bill Gates entitled "Gates seeks plans to better teachers", Wall Street Journal, March 23, 2011, p. 9 and "High-tech tools for change - Wide ranging think tank promotes educational innovation" (Harvard Gazette, April 1, 2011). Education is not just the school and we will include researchers and parents, too.

This project also will connect the Hungarian Fulbright and other State Alumni communities by providing a common and meaningful project where they can work together on building a better society and providing a more enlightened future for the subsequent generations. Such a project will then also result in invaluable interconnectedness and networking opportunities among the members of the State Alumni community, and Hungarian communities of researchers, teachers, students and parents.

This project can also naturally be considered as a form to strenghten Civil Society in Hungary, spreading not only the culture of science and scientific problem-solving but also the culture of self-education, self-determination, voluntarism. Sustainability, puritanism and realism in the execution of the project also carry important values that point way beyond the goals of a simple educational program in sciences. We also will provide moral support and an educational pipeline for students and teachers of marginalized schools, science teachers and students in small country towns and villages, supporting their fight for survival and for quality science education in small communities.

We aim at developing the culture of scientific, critical thinking, giving the opportunity of independent and self-determined student exploration. We also will push the students to new, previously unexplored territories that correspond to modern, up-to-date and

relevant scientific problems and will mentor them so that they could make their first independent reviews or small contributions. We will encourage them to ask questions for themselves and to the presenters of topics and teach them the culture of scientific discussions and problem selection and identification. We also will help them to see excellent examples from the areas of Sciences, Technology, Engineering and Mathematics, and to help them to distinguish these areas. These topics will be represented by the selection and by the composition of the speakers during the academic year as well as in the summer camps. This implies that although we mainly focus on Sciences, our vision is broader and includes other areas of quantitative knowledge. We also will include certain areas of humanities in the spirit of spreading not only the culture of science but the totality of culture and knowledge in general.

Detailed Budget:

We have determined the value of our existing and forseen in-kind contributions, which are NOT to be covered by the AIEF funds. For these expenses no support is requested.

The total value of our in-kind contributions corresponds to 34925 USD for the September 2011-August 2012 period. This is detailed as image 4 below.

Our AEIF project funding request matches this in-kind contribution. It is detailed as follows:

In-country travel of scientists to science clubs:

on the average, 25 USD/trip, if possible on the expenses of other grants of these scientist.

25 USD/trip x 32 trip/(Science Club+Summer Camp) x 5 (Science Club + Summer Camps) = 4,000 USD

Operation of science clubs, compensation for teacher patrons:

(30 meetings/club/year) x (2 hours/meeting) x (2 teachers/meeting) x (25 USD/hour) x 5 science clubs =

15,000 USD

Science club summer camps:

15,000 USD

(3,000 USD/camp, 1 summer camp/club, 5 clubs.)

This is an estimate, based on the experience that the summer camps provide about the same number of lectures and mentoring opportunities as do the annual weekly-biweekly meetings during the academic year, but this will be refined if we pass on to the second round of evaluation. Details are as follows:

About 60 participants (students + mentors) can be expected to show up at these camps, a support of 50 USD/participant corresponds to 3000 USD support request per camp. Students will be expected to contribute, too, at a rate of about 50 USD/student, to cover expenses related to their meals and basic accommodation as well as for the travel of their mentors, this is an important cost-sharing model working towards the sustainability of the project. These summer camps are recommended to be organized in small villages in a rural area, close to a small school that has a good reputation but fights for its survival. One of the goals is to give mentoring help and moral support to these schools, to their students as well as to their teachers. This arrangement also helps in keeping costs down. We will also encourage merit based primary school/middle school/private sector partnerships to support quality education initiatives in marginalized Hungarian communities.

Administration, web based management: 200 USD/club, 5 Science Clubs:

1,000 USD

Thus the total AEIF Funding request is 35 kUSD, and the detailed requested budget is included as Figure 5.

Additional cost sharing is forseen to work as follows:

Supporting museums, research institutions and universities provide the salary for the professors and researchers who volunteer to visit Science Clubs.

The grant covers their travel expenses only.

Supporting middle schools provide the facilities and meeting places for the Science Clubs. The grant covers the extra time for participating teachers from those Schools.

Other supporting organizations assist in publicity and outreach to media and general public, in disseminating the results. The grant covers necessary project related administration costs for

each item, in particular if bookkeeping of the expenses cannot be organized on a voluntary basis. Experience indicates that bookkeeping costs about 10% of the itemized costs above and is at present included in each itemized expense.

Students are expected to contribute to about 50% of the minimized costs of the summer camps.

Total Funding Requested:

35,000 USD

Comments

2011-04-15 5:46 pm

Project Team: you must complete your project proposal before voting begins on Monday, April 18. Do not delay! The following sections of your proposal need to be completed:

Goals and Objectives
Timeline and Activity List
Outcomes

And, make sure your budget is detailed enough for the final round.

Good luck!
The State Alumni Team

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