Having just returned from the 2016 GLPA conference in Flint, Michigan, I reflect on the great set of educational offerings there: in paper and posters, but also as the GLIPSA workshop, coordinated by Karrie Berglund.

As at IPS 2016 in Warsaw, planetarium educators shared many creative and useful ideas that can help improve each person’s local curriculum. Whenever possible, do attend conferences and seek out the offerings that relate to your own circumstances.

Following the meeting of the IPS Education Committee at IPS 2016, where we brainstormed project ideas for IPS, I inquired (via e-mail) which projects were of greatest interest and who could step forward to help. There is much support for increasing planetarium education information on the IPS website.

This project, however, probably will need to wait until the IPS Vision 2020 resolves what overall changes are going to be made in our website. Currently Alan Gould, a member of the Education Committee, and Planetarian Editor Sharon Shanks have done a lot to help website communication, and I know they will continue to do this.

Related to the topic of greater IPS website communication is a project goal of publishing some excellent planetarium lessons translated into different languages. We must identify website procedures and determine one or two best lessons to start this project. We will be constrained on the number of languages we publish for a lesson by the number of people who volunteer who have different language translation ability. If you are willing to translate a lesson into a particular language from English, would you please contact me at jeanneebishop@wowway.com.

Many who attended the summer meeting and others who are members of the Education Committee voice interest in educational research in the planetarium that will either or both 1) improve planetarium practices and 2) justify planetarium practices. Research expert and Education Committee member Shannon Schmoll thinks that a single project with research done at many planetariums worldwide would have problems, so that local individually-conducted projects are best. The Education Committee can and should take a position of offering ideas for local research and then helping to publicize results.

Some extrapolations should be possible, but since there are so many differences among local situations, extrapolation should be done with caution. At IPS 2016 Shannon, Julia Plummer, Chrysta Grant, and Ka Chun Yu gave an excellent workshop demonstrating how questions and topics important at the local level can be identified. Their previous Planetarian article, “Conducting Educational Research in the Planetarium,” will continue to serve as an excellent reference. (ips-planetarium.site-ym.com/?page=ConductingResearch)

Beginning with our spring column and in each succeeding Planetarian issue, we will present one or two ideas for educational research that you might initiate at your own planetarium.

Finally, Education Committee members are excited about continuing our video lesson project, led by Oded Kindermann. Please see the details of our video project now on the IPS website. (ips-planetarium.site-ym.com/?page=EdCommVideo)

Astronomy education in Czech Republic

I am delighted that Education Committee member Tomáš Gráf has completed his study of astronomy education in the Czech Republic, which follows on page 68. This seems an appropriate time to share his information, after the International Fulldome Festival in Brno, Czech Republic, during the week before IPS 2016.

Tomáš reached out to planetariums, mostly planetarium-observatory institutions in both the Czech republic and Slovakia, to learn what they are doing and how they interpret educational and popularization roles. I find it interesting that sometimes a term “tuition” (which in most English-speaking countries means the funds charged by a school for its student program) is used in these countries to denote formal education. Trying to communicate the usual meaning, I have changed “tuition” to “formal education” in the discussions by Czech Republic and Slovakia planetarians.

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Formal and informal astronomy education in the Czech Republic and Slovakia

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Pre-university Level
In the Czech Republic, at the pre-university level, astronomy is not taught as a separate school subject. The elementary and high school education content is declared in a so-called General Education Program (GEP), which can be expanded by individual schools. The minimum level of knowledge is given by the GEP, but the actual content, including astronomy material, differs from school to school. The number of lessons dedicated to astronomy in subjects such as physics and geography differs at each school due to their curriculum choices and interest and knowledge of individual teachers.

In elementary schools, astronomy is included in subjects of geography, physics, and chemistry. In high schools, the amount and type of astronomy depends a lot on the type and focus of the particular school. Some schools do not provide courses in mathematics, physics, or chemistry.

Universities
At Charles University in Prague it is possible to study astronomy up to the Ph.D. degree. (See astro.mff.cuni.cz/index_en.html). Equivalent programs are offered by Masaryk University in Brno. (astro.physics.muni.cz/en/). In Silesian University in Opava, students can choose to study astrophysics, focusing on relativistic astrophysics. (See http://www.physics.cs.czu/index.pho7lang=en). Scientific Institutions
Apart from universities, which also conduct astronomical and other scientific research, there are two other important institutions: the Astronomical Institute of the Czech Academy of Sciences (www.astro.cas.cz/about-about-the-institute) and the Czech Space office (www.czechspace.cz/en). Further, the Czech Republic is a member state of the European Southern Observatory (ESO).

Also, there are a number of institutions which focus on extracurricular astronomy education and popularization. The following professional institutions have planetariums: Prague Observatory and Planetarium, Brno Observatory and Planetarium, Planetarium Ostrava, Observatory and Planetarium in Hradec Králové, Planetarium Teplice, Planetarium Most, Planetarium Cheb, Observatory and Planetarium České Budějovice, Interactive Science Museum “Pavnoz poznání” (Fort of Knowledge) Olomouc, Science Centre IQ Landia Liberec, and Techmania Pilsen.

Regional, municipal, and private observatories also exist in the Czech Republic, and they are operated by professors or amateur astronomers. These observatories are supported by the Czech Astronomical Society, which next year celebrates its 100th anniversary. Approximately 600 professional and amateur astronomers are members of this organization (See astro.cz).

Education and Popularization
Details and opinions at Czech Republic and Slovakia planetariums and observatories:
For the growing number of planetarium shows, there is concern about how to classify a particular planetarium program. Should a particular program be considered a form of teaching and educational or should it be only a form of “popularization?” The terms popularization and education in relation to planetarium shows are interpreted in specific ways by the staff at each planetarium. The following are descriptions of activities and interpretations of the education/popularization dichotomy from staff at Czech and Slovakia Planetariums and Observatories, which I solicited in a written survey.

Planetarium Teplice—Petr Dusek
If a show is related to the curriculum and extends it, then it is educational. As for the kindergarten, it usually represents the first contact with the sky at night. A popularization show should explain some particular topic to the general public in a popular manner. That means that it should use comparisons and parables rather than sober facts. The boundary between an educational show and a popularization show is often very narrow and I would say sometimes indefinite. Children need things to be explained in a popular form.

Techmania Pilsen—Tomáš Meiser, head of the Planetarium Department
If we talk about purely educational activities, which I consider to be seminars for teachers, astronomical courses, or supervision of talented students, then we do not provide any of these.

Observatory and Planetarium in Hradec Králové—Jan Vesely
Our shows for schools are educational and based on the GEP of the Czech Ministry of Education, in the category of “Youth and Sports.” We have 13 shows for elementary and high schools. We offer a children’s astronomy club, an astronomy course with focus on children attending primary schools, and an astronomy course intended for teachers of primary school.

Visitors to our facility sometimes do not distinguish between the informal and formal activities. I perceive education as a voluntary activity, motivated primarily by a person’s interest. Therefore, people can educate themselves on their own. Popularization is informal education. On the other hand, formal education is a process that usually takes place in schools. People do not always participate.
voluntarily in formal education.

Our public planetarium and observatory programs primarily are perceived as popularization or informal education. Since many view us as mainly as a scientific institution, our activities for the public are seen as popularization of our scientific work.

Elementary and High School Groups: My experience has shown that about three-fourths of teachers bring their students to the planetarium and observatory to integrate it with their teaching goals. A small number of these teachers even require their children to complete worksheets. These teachers choose the topic of a planetarium show so that it relates to classroom work. Our show offerings follow the GEP of the Ministry of Education’s Youth and Sports. In letters to schools, we note the relationship of our shows to the GEP.

The other one-fourth of attending teachers do not appear to care very much about planetarium show content. They are happy with any topic, especially if children enjoy it. The children always seem to view the visits to the planetarium and observatory as entertainment. Although I view our activities as formal, I believe there is a very narrow boundary between this and popularization.

Classes from universities, including teacher training: Everyone (students, instructors, myself) seem to consider programs for groups from universities as education, perhaps formal as well as informal, since attendance is obligatory and the students receive credit.

Observatory and Planetarium Prague—Jakub Rozehnal, Head of the Observatory

Our facility currently offers two regular astronomy courses and one ongoing astronomy course for employees and colleges.

Our astronomy club (called our “Academy of Space Travelers”) is intended for students ages 12-15. The club involves a series of lessons based on a former two-year course organized in the 1980’s at the Observatory and Planetarium. At the beginning of each year, students are selected, and they attend lessons with older colleagues.

The lessons seem to be useful to the older students, even though they are repeating them. The repeated lesson format involves the older students teaching the younger ones. There is a 90 minute weekly lesson, and a total of 30 weekly lessons from October-June.

Students in the Club take trips to the Astronomical Institute of the Czech Academy of Sciences in Ondrejov and other planetariums and observatories. For all who attend regularly, we organize a week-long summer astronomy camp at Observatory Rokycany, which we call “Holidays Under the Stars.”

Since our last academic year, 2015-2016, we also offer two more student club opportunities. For children in grades 1 and 2, we present a 90 minute lesson every two weeks. We alternate astronomy and other science topics, providing children with basics useful in later years.

For children in grades 3-5, we offer a lesson format similar to that of the astronomy club for older students. But a main difference is and clubs, knowledge is tested.

I am personally involved in both. I present lectures during all of the first year and about one-quarter of the second year in the two-year course. I examine the theory part of final exams. I am aware of the difference in presenting for a class/club and the public. For the public, I present with the goal that people want to come again. For the public I try to simplify things and make them illustrative. In the astronomy courses, my total goal is student education. This means that some students quit. Usually half of the original number of students attend the second year of the course. Acceptance for the second year is not conditional on passing the final exam for the first year.

Observatory and Planetarium Brno—Pavel Gabzdyl, Deputy Director

Our school planetarium shows have a different structure than our shows for the public. Topics for school shows are selected to match material they wish to cover. We count the number of requests we get for a topic as feedback (for example, the solar system is very popular), and plan our offerings accordingly.

The school shows contain live parts and quizzes, which help children to remember material and test their learning. We make worksheets available for most of our planetarium shows, but they are for use by the students when they return to their schools.

We do not use a special classification of the shows we have for the public. We would like to have a different type of show for schools than for the public. However, the separation is financially more demanding for us.

Slovakia, Observatory and Planetarium Žiari nad Hranom—Tomas Dobrovodsky, Head of the Department

Our activities seem to be on the boundary of education and popularization. However, we try to offer programs and activities that specifically educational.

Most of our visitors are students from schools. Their visits constitute a part of their curriculum planetarium show visualization

For the public I try to simplify things and make them illustrative. In the astronomy courses, my total goal is student education.

Observatory and Planetarium Prague—Jakub Rozehnal

Our activities seem to be on the boundary of education and popularization. However, we try to offer programs and activities that specifically educational.

Most of our visitors are students from schools. Their visits constitute a part of their curriculum planetarium show visualization
Other regular educational activities are:
- Preparation of attendees of our astronomy courses for the competition, “What do you know about stars?” (includes sky orientation and astronomical coordinates);
- Regular summer training for participants of the International Astronomy Olympiad in the planetarium;
- For university courses, specific programs demonstrating sun paths for different seasons at different latitudes and motions of other sky objects.
Other irregular educational activities are:
- Course on planetary geography for university students;
- Seminars for teachers and organizers of astronomy courses;
- Special demands of visitors to our planetarium.

Observatory and Planetarium Hrbúnovo—Marian Vidovenec, Director

Popularization in the planetarium is an activity that does not have to be solely about astronomy. In our situation, the purpose of popularization is to attract people to the planetarium. Popularization can be a planetarium concert, planetarium musical theater, reading of literature, or question-and-answer sessions. In these situations, astronomy topics can be presented as complementary features. This popularization is a method of attracting new planetarium visitors.

Another level of popularization is in our everyday work, as we present explanations for lay people, who are interested in astronomy. This is where the boundary between popularization and education lies.

My idea is that formal education is a purely school activity or one which we can provide within a course. In either case formal education has a given curriculum which has specific expectations of student learning.

One of our educational offerings is a post-high-school astronomy study. Intended for working people, it is designated as a two-year high school program. At the end of the two years, there is an exam, which forms the specialized part of the “maturita,” the school-leaving exam.

Other educational activities are internships for university students and organization of special lectures for physics and geography students. We have a contract with the university in Nitra to organize an astronomy lecture series for physicists. Some of these lectures take place in our planetarium and our observatory.

One could also classify our astronomy camps for students as an educational activity, particularly our “Meeting of Young Slovak Astronomers” for students older than 15. The level of the lectures and the practical activities in this camp is quite high. Our competition, “What do you know about stars,” in which can demonstrate their knowledge of astronomy, is another educational offering.

In our planetarium, we present mostly astronomy, and most of our visitors come with school groups. I consider this an educational activity, but I realize that is here where the question of a boundary between education and popularization arises.

Programs that take place in our lecture theater are purely educational, while the functions of planetarium shows are ambiguous.

Conclusions

Planetariums play a very important, positive role in the popularization of astronomy. Based on responses from my survey of Czech Republic and Slovakia planetariums and observatories, I conclude that staff at these institutions realize that there is a difference between education (general and formal) and popularization. Some planetariums categorize their shows according to recognition of criteria for education and popularization, and this is a positive measure. However, the realization of the difference often is not applied.

I think this situation in planetariums is similar to that found currently in many countries, so it is a world-wide challenge for every planetarium to acknowledge the different functions of planetarium shows and pursue greater development of the planetarium’s strong educational potential.

I define these categories of planetarium use:
- Astronomy popularization in the planetarium: Astronomy learning in which emphasis is placed on maximum experience and positive emotional response by the visitor.
- Astronomy education in the planetarium: Visitors are actively involved in the show and should receive some complementary materials, which allow them to revisit the topic/topics outside the planetarium.
- Astronomy “tuition” (formal education) in the planetarium: There must be a feedback (testing of knowledge). It is not possible for the visitor (student) to take part in activities without mental effort.

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