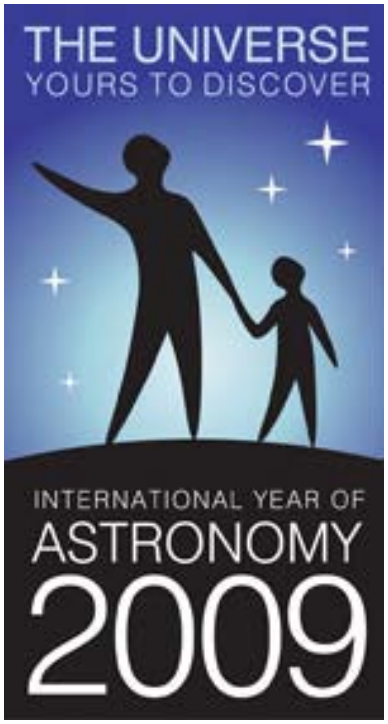
International Year of Astronomy 2009
Evaluation Hands-on Guide



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Evaluation Guide for IYA2009 projects

Introduction

The International Year of Astronomy 2009 presents itself as an excellent opportunity to promote events designed to increase public understanding and awareness of astronomy and space sciences.

All over the world, professionals and amateurs are working hard to bring the public all sorts of activities, exhibitions, shows, contests, websites, observations and other ways of promoting science in general and astronomy in particular.

But how well will they do in achieving their objectives? What will they really accomplish with all their time and effort? What lessons will they learn? What was done well and what could have been done better?

If you are involved in preparing these activities, this guide will hopefully help you answer some of these questions and prepare an easy and thorough evaluation of your events.

What is evaluation?

Evaluation is the analysis of ongoing or completed activities and an effective way of learning how to do things better. It's a way of collecting information that helps all those managing projects to understand and justify the results and impacts, as well as build best practices.

Why evaluate?

Many organisations, particularly in the public and voluntary sectors, are turning to evaluation as a source of learning, as well as to justify their use of funds. Through evaluation, you can:

- Determine if the objectives of your project were reached;
- Obtain information on the outcomes of an event, along with suggestions for improvement;
- Identify the changes resulting from the implementation of your project;
- Identify ways in which the project could have been more effective and efficient;
- Identify unexpected results;
- Crystallise ideas about the event and what it is intending to achieve;
- Find out who has attended your event, along with suggestions for improvement;
- Provide encouragement by demonstrating that your efforts have been worthwhile.

To summarise, although evaluation is many times seen as test and a threat, it should instead be faced as an opportunity to **prove** what was achieved and to **improve** what was not, for the sake of future projects.

Evaluation of projects is very important but also quite difficult to do and therefore rarely done. That is why you should plan it as an integral part of the project itself.

What to Evaluate?

You should begin by defining what the event or project intends to achieve:

Audiences. Which is your audience? Children and their parents? School groups? Members of the public currently uninterested in astronomy? Journalists? A mix of several different audiences?

Numbers. How large do you expect your audiences to be?

Experiences. What will be their experience at the event? Just fun? Improving teamwork efforts? Problem-solving?

Education. What will they learn about astronomy at the event? Understanding of principles? Specific facts? Contribution of science to wellbeing?

Attitudes. Do you expect your audience's attitudes to astronomy to be changed by the event? Are you aiming at stronger support for astronomy or better-informed decision making?

Follow-up. What do you expect your audiences to do after the event? Join a scientific society? Do projects in the classroom or at home?

Your evaluation should address each of these questions, but concentrate on those which are of most importance to you. You may also have formal objectives for the event, like raising the public's awareness of your institution and work.

Summarising, you must evaluate the **quality** of content, the **implementation** process, and the **impact** on your audience. The evaluation must be undertaken **before**, **during** and **after** your project.

Apart from evaluation of your activities, you should also pay attention to some more general indicators that might help you contextualise your evaluation results:

- average number per year of astronomy related news articles(general interest press and scientific publications);
- time of astronomy related news aired on TV and radio;
- members in amateur astronomy associations;
- number of “astronomy clubs" and their members in schools;
- poll to students on “general knowledge about astronomy”;
- rate of astronomy school projects supported by your government;
- number of astronomy sites in your language (and their hits, downloads, etc);
- number of students in astronomy and physics university courses.

How to Evaluate?

There are several methods you can use to evaluate your project, according to your needs, audiences, type of event, objectives, man power, time availability and, of course, your budget.

But first, please note the difference between **monitoring** and **evaluation:** while monitoring is the mere counting of numbers (number of attendees, number of sales, number of downloads) evaluation goes further and deals with the impact of the event on your audience (1000

people bought you book, but how many actually read it and learnt from it?) A thorough and truthful evaluation will generally require the gathering of both quantitative and qualitative data.

When choosing methods of data collection and evaluation, you must carefully weigh the advantages and disadvantages of your choice, as well as the suitability to your own situation and evaluation objectives.

The next table gives an overview of the several evaluation methods.

Table 1 – Evaluation methods

Method	Advantages	Disadvantages
Observation	Suitable for collecting data related to behaviour Works well when subjects are involved in an activity and unable to provide detailed/objective opinions (for example young children)	Subjects may change their behaviour if they are aware they are being observed Potential for observer bias or difference in interpretation between observers Difficult to simultaneously observe and record
Interview	Appropriate for complex situations Allows collection of in-depth information Responses can be asked to explain their responses Questions can be clarified	Potential for interviewer bias Requires skill on the part of the interviewer to elicit honest responses Time-consuming and therefore expensive
Focus group	Very ‘rich’ source of data Allows group interactions to be observed as well as opinions gathered Group situation allows opinions to be challenged and clarified	Time-consuming and expensive Requires skill on the part of the interviewer as group dynamic is crucial to collecting useful data
Questionnaire	Inexpensive Can be completely anonymous Large sample sizes possible Can be distributed in a number of ways	Appropriate questionnaire design is crucial to success Inappropriate for young children, adults with poor reading/writing skills etc Potentially low response rate Self-selecting sample bias Clarification of questions not possible
Secondary sources	Include documents such as reports or previous studies Generally inexpensive Convenient	Validity and reliability problems Data format may not match format required by evaluator

The next table will help you think about the type of information you want depending on the delivery method you are using (events, products and projects), and how you might obtain information to see whether or not you've met your objectives.

Table 2 – Types of information

	Discussion/ Meeting/ Talk	**Website**	**Products e.g. Poster/ CDROM/ Video**	**Exhibition/ Open Day**	**Show/ Play**	**Competition**
Monitoring Data						
Number of people **Types of people**	Count people on entry. Categorise people at registration or by observation or Questionnaire.	Count hits. Pop-up questionnaires on the site or registration procedures.	Number distributed. Use of order/ request forms and Questionnaires.	Count people on entry. Categorise people on entry by registration or Questionnaire.	Count audience. Use ticket sales or booking mechanisms to gather information.	Count entries. Use entries to gather data on types of entrants.
Evaluation Data						
Benchmark	To measure change you need to have a baseline from before the audience engaged with your project and another set of data taken after they took part in your project. You will need to ask the same questions before and after.					
Change views/attitudes **Change behaviour** **Increase interest** **Increase knowledge**	Ask people for baseline views on a paper questionnaire while they wait for the event to start or when they register to come.	Registration questionnaire on the site to gather information.	Distribution methods will affect the ability to collect initial data. Using an ordering mechanism allows data to be gathered.	Ask for baseline views on a paper or e-mail questionnaire when people register to come or buy tickets.	Ask for baseline views on a paper or e-mail questionnaire when people book or buy tickets.	Building in an initial data gathering exercise to the competition process will allow baseline data to be gathered.
Quality/fit for purpose						
Strengths **Weaknesses**	Observe the event. Use exit questionnaires and/or follow-up focus groups or questionnaires.	Include questions on this in a questionnaire hosted on the site Record dwell time per page and page requests.	Follow-up questionnaires and focus groups.	Exit or follow-up questionnaires. Short face-to-face interviews during the event. Observation.	Follow-up questionnaires. Group discussions.	Use entry mechanism to gather feedback.
Interaction with project	Observation of dynamics will help you plan better events in the future.	Record the order in which pages are accessed and dwell time per page.	Observation of users and questionnaires.	Observation. In-depth interviews or focus groups and questionnaires. Feedback from staff/colleagues.	Observation. Questionnaires.	Implicit in taking part, use entry numbers as a measure.
Dialogue						
Obtain views on issue	Listening to the conversations, record key points.	An interactive email facility will allow this.	Not a good medium for getting people's views. Can use these as a stimulus and then use group discussions and questionnaires.	Comment books and exit questionnaires. Build in opportunities for staff/colleagues to engage with visitors.	Not usually designed for giving feedback. Can use debate after the performance.	Can build this in to entry process, but not a normal mechanism for getting people's views.

Reporting

After you collect and analyse the data for your evaluation, it is time to write down your findings and build a report. The report can be aimed at sponsors or your administrators. But you should also write it for yourself and for the team that worked with you on your project, as a way of self assessment. As with the methods of data collection and level of evaluation, you must also choose the most adequate format for your report, in length, detail, language, etc.

Whatever the format you choose, there are some points that you should always address in your report:

Grant details: if your event or project received any kind of funding, you should reference the amount, including partnership funding and in-kind support.

Project details: project details including its aims and a summary of proposed objectives.

Project delivery: comments on successes and challenges with the project delivery.

Key outcomes – quantify: restate the key outcomes for delivery and audience sizes and provide figures for actual deliverables and comments.

Key outcomes – impacts: give evidence of the impact of your project, for the key outcomes and any other impacts recorded.

Additional information: additional evaluation or project report that gives greater detail.

Media coverage: list items of media coverage generated by the project.

Dissemination: describe how the project was disseminated.

Further work: describe your project’s legacy, if there is one.

Questionnaires

Questionnaires are a good way to collect information from the public that attended an event. Although they can be a little time consuming, if you get a good sample, you can actually get very interesting and useful information about the impact of your event on your audience and use that information not only to evaluate your initiatives, but also to learn lessons for future ones.

At the end of this document, you can find two examples of questionnaires that you can use as a base to build your own. Please see Appendix 1 and 2.

In late 2009, the IYA2009 Secretariat will begin collecting evaluation information from all the National Nodes so that it can be included in the final IYA2009 Final Report. It is therefore important that information reach us in a standardised format, as much as possible.

We are counting on your help to make the IYA2009 Final Report as complete as possible, with information from all the participating

countries and institutions. Please do your best to collect as much relevant information as possible, throughout the Year.

Work plan

To finish, on the following figure you can find a work plan for implementing and evaluation your project, which you can adapt to your own needs and objectives:

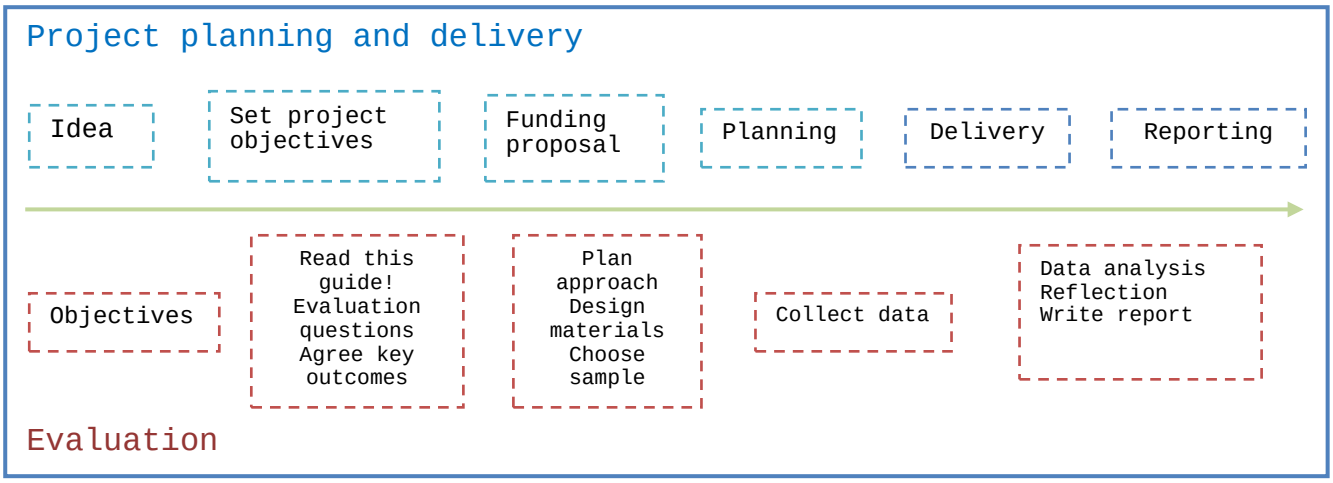


Figure 1. The work plan for implementing and evaluation timeline.

References and further reading:

Sykes, Cathy, 2005, *Evaluation: practical guidelines,* The Research Councils UK and The Office of Science and Technology.

Boddington, Andy; Coe, Trudy, 1995, *So did it work?*, COPUS.

Paterson, Lesley, *Ingenious evaluation guide,* The Royal Academy of Engineering.

Evaluation Guide for IYA2009 in the newspapers

This next section deals with a more specific, yet very important part of the evaluation of IYA2009: the presence of IYA2009-related news in the newspapers.

Introduction

This Guide aims to provide basic information to the IYA2009 network on how to evaluate, understand, and contextualise IYA2009, astronomy and space science in the media during 2009.

To do so we will use newspapers as a source of information. According to the academic literature about science and technology in the media, newspapers are an interesting research field, considering that they are representative of the whole media in science and technology topics (Hansen and Dickinson, 1992).

This basic evaluation methodology will allow a standard analysis of newspaper articles concerning IYA2009, astronomy and space science topics, between 1 December 2008 and 31 January 2010.

Objectives: Why evaluate?

Many organisations, particularly in the public and voluntary sectors, are turning to evaluation as a source of learning, as well as to justify their use of funds. Through evaluation, you can:

- Determine if the objectives of your project were reached;
- Obtain information on the outcomes of an event, along with suggestions for improvements;
- Identify changes resulting from the implementation of your project;
- Identify ways in which the project could have been more effective and efficient;
- Identify unexpected results;
- Crystallise ideas about the event and what it is intending to achieve;
- Find out who has attended your event, along with suggestions for improvement;
- Provide encouragement by demonstrating that your efforts have been worthwhile.

Methodology: How to evaluate?

The collection of an exhaustive number of global newspaper articles concerning IYA2009, astronomy, and space science would allow a powerful analysis of the global IYA2009 impact in the media. However, this task is too big to be carried out by the IYA2009 Secretariat and stakeholders. As such, we describe here a more basic, standardised and simple methodology to be used in the different countries.

This gathering of newspaper articles should be done at least in the most important, daily newspapers sold nationally[1]. In order to obtain a good sample it is important to have one "quality" and one "popular" newspaper[2], which form the accepted definition of "*dominant media*". These newspapers will be the ones that set the social and political agenda and whose news selection criteria and style are followed by the other media, who reproduce their opinions, style and contents, in the search for larger audiences.

With the help of standard software (Excel, SPSS, etc.) samples should be selected during all week-days, between 1.12.2008 and 31.01.2010. You can also ask the newspaper companies to provide you with back issues. But where this is not possible, please note down your starting date. Using the same software, five publishing days per week should be randomly selected to be used for this analysis.

The entire publication must be checked, since IYA2009, astronomy, and space science articles do not always appear in a specific newspaper section.

What kind of information is important for us?

The analysis of a newspaper article can provide us with a very rich and complex data set. Nevertheless, for this task we just need to analyse a few features.

It is very important that the coder, the person that will update the database, only considers the content of the analysis unit. By **analysis unit** we understand the texts, illustrations or texts and illustrations, that by themselves form a unit feasible to be clearly limited and that constitute an object of study itself.

The coder should not use his/her general knowledge about the subject to presuppose informative elements not explicitly stated in the article.

For the analysis, the coder should select all newspaper articles concerning IYA2009, astronomy, and space science topics in the publication.

The coding frame is divided in seven different features:

- **characterisation**
- **scientific content**
- **actors**
- **scientific/IYA2009 events**
- **location**
- **source**
- **news play.**

[1] This option is connected with the need to have a good sample of the most influent newspapers. The importance of selecting the newspapers sold in the country is connected with the public's will to acquire a newspaper, an active relationship with the newspaper.

[2] According to the literature, "popular" newspapers are those whose contents are soft, less profound and mainly sensationalist, targeting less educated and less demanding publics". The "quality" newspapers are those whose contents are more profound and sober, mainly about politics and economics, targeting higher educated publics and cultural and power elites.

The goal of the characterisation feature is to formally characterise the newspaper and the article at stake. It includes the following items:

- **Type**: the newspapers should be classified as "Popular" or "Quality";
- **Day**: the day when the newspaper was published (e.g. 27);
- **Month**: the month when the newspaper was published (e.g. February);
- **Year**: the year when the newspaper was published (e.g. 2009);
- **Newspaper title**: the name of the newspaper (e.g. Deutsche Zeitungen);
- **Article title**: the title of the article. This is almost always at the beginning of the text, and uses larger letters;
- **Location**: if the article is on the upper half or in the lower half of the page. If the article is mainly in the lower half of the page but the top of the article is in the upper half, we should consider it as an article in the upper half of the page;
- **Main illustration content**: illustration content can be classified as: people, planets, stars, galaxies, nebulae, spaceships, satellites, telescopes, landscapes, buildings, symbols or other illustration contents. If there are several different contents in the illustration, only the bigger one should be considered;
- **First page highlight**: if the article has a highlight on the newspaper first page (yes/no);
- **Prominent page**: if the article is on a prominent page: first, second, third or last page. The page should be identified (first, second, third or last page);

Given that IYA2009, astronomy, and space science are science and technology topics, the **scientific content** feature is very important in this analysis. The coder should be able to identify the following list of expected scientific writing features:

- **Scientist(s)/ expert(s) quotations**: if there is any scientist/expert quotation (yes/no);
- **Theory mention**: if the article makes any mention of the theory (yes/no);
- **Methodology mention**: if the article makes any mention of the scientific methodology (yes/no);
- **Technical language/ jargon**: if the article uses any technical language/ jargon (yes/no);
- **Bibliography**: if the article makes any reference to bibliography (yes/no);
- **Data/results presentation**: if the article shows any research data or results (yes/no);
- **Scientist(s)/ expert(s) name(s)**: if the article expresses the name of any scientist/expert (yes/no);
- **Scientific Index**: Index built to evaluate "how scientific" an article is. This Index is determined by the expected features in a scientific article (scientist quotations, theory, method, technical language/ jargon, bibliographic references, data and results, names of scientists).

  The coder should give one point to each of the features that appear in the article. The total score will determine the value of the article's Scientific Index, the overall level of scientific content:

- From 0 to 2 points, the coder should consider the article as an article with a low scientific content;
- From 3 to 4 points, the coder should consider the article as an article with a medium scientific content;
- From 5 to 7 points, the coder should consider the article as an article with a high scientific content.

Actors is a rather important feature in newspaper articles. The coder should code the *main actor type*. If the article has more than one actor, only the most important should be considered. Actors can be classified as: man on the street, scientist/ expert, authority, worker, celebrity, consumer, national (military), European Union, IYA2009 National Coordination, IAU, other astronomy societies, other scientific institutions, government, or other actors.

Scientific/IYA2009 Event feature provides us with the information about what kind of event the article is about. It has two variables: main scientific event and scientific area. To code the main scientific event, the predominant scientific event mentioned in the article should be chosen. Events can be classified as: astronomy in general, IYA2009 Local or National project, IYA2009 International project or others. To code the scientific areas, the predominant scientific area of the scientific event should be chosen. Areas can be classified like: astronomy in general, astronomy communication, astronomy education, solar system exploration, stellar astrophysics, galactic anthroponomy, extragalactic astronomy, X-ray astronomy, infrared astronomy, radio astronomy, instrumentation.

The **location** feature allows us to place the event geographically. It has two variables: Region and Country. In the *location (Region),* the coder must choose one of the locations where the scientific event happened or the location of the institution involved in the event. The Regions are: European Union, other European countries, North America, Central and South America, Asia, Africa, Australia, Antarctic, Arctic. In the *location (country)* the coder should write the name of the country where the scientific event happened or the country of the institution involved in the event.

Source of the information is another analysis feature. This will allow us to know where the information came from. Different information sources can be chosen. They can be: national news wire service, foreign news wire service, other national newspapers, foreign newspapers, national scientific magazines, foreign scientific magazines, NGO, scientific institutions, scientists, public enterprises, private enterprises, scientific/technical reports, books, national IYA2009 coordination, global IYA2009 coordination, IAU, the publication itself, without information or others.

The ***news play*** feature is based on the Budd score (Budd, 1964). This is a score that gives a *news play* measure, allowing the understanding of the highlight of the article within the newspaper context. The higher the Budd score, the higher the *news play*. The Budd score is composed by the combination of a few features: highlight on first page, location on prominent page, location on page upper half, illustrations, title size above average (each one of these features counts one point). The *news play* can be classified as: very low *news play* (1 point), low *news play* (2 points), average *news play* (3 points), high *news play* (4 points) and very high *news play* (5 points).

Potential results

Once this data is collected there are a few results that we can extract, namely: number of news stories related with IYA2009 vs number of astronomical news stories; correlation between some global/national events, press releases and the number of IYA2009 news pieces; trend of the number of news articles related with astronomy throughout the year. If you have access to previous data you can also compare the 2009 results with previous years or other sciences. Once again, these studies will provide important information about the real impact of our communication strategy during IYA2009.

Conclusion

We understand that this is a big task, but it can give us very interesting results and useful data for a proper evaluation of IYA2009. A piece of advice: establish a partnership(s) with one or more universities in order to set up a centralised data coordination and analysis centre[3]. To ease your task we have prepared an EXCEL file to gather all this information. We hope these guidelines help you tackle the evaluation of IYA2009 in the media. Here at the IYA2009 Secretariat, we will continue to work on ways to assist you in your difficult, but rewarding, task of making the International Year of Astronomy 2009 a huge success in your country.

References and further reading

- Bauer, Martin, Asdis Ragnarsdottir, Annadis Rudolfsdottir, John Durant (1995), "Science and technology in the British press, 1946 - 1990", Vols. 1,2,3,4, London (research report).
- Budd, R. (1964), "Attention score: a device for measuring news 'play'", *Journalism Quarterly*, 41, pp. 259-262.
- Fonseca, Rui Brito (2008), «Science and technology in Portuguese newspapers: Portrait of a methodology (The Portuguese media monitor project)", communication to the conference "Mapping the Societal Conversation of Science: Methodological Issues and Avenues", Central Military Club, Sofia.
- Hansen, A. e R. Dickinson (1992), "Science coverage in the British mass media: media output and source input", *Communication*, 17, pp. 365-377.

[3] List of Science Communication Research Groups/Departments: http://www.communicatingastronomy.org/training/index.html

Appendix 1: Questionnaire for the public

Please take a moment to complete this short questionnaire, as it will help us to evaluate International Year of Astronomy 2009 events.

1. Name of event: _____

2. Are you:

❑ Male ❑ Female

3. Which age group do you belong to?

❑Under 20 ❑20s ❑30s ❑40s ❑50s ❑60s ❑70s and over

4. How did you find out about this event?

❑I was told about it ❑It was mentioned on the radio or television

❑ I saw it mentioned on a website ❑Other (please specify) _____

❑ I saw a poster or leaflet _____

5. Why did you want to attend this event?

_____

_____

_____

6. *Before* attending this event, how much do you think you knew about astronomy?

❑Not much at all ❑A little bit ❑A reasonable amount ❑Quite a lot ❑Lots

7. *After* attending this event, how much do you think you know about astronomy?

❑Not much at all ❑A little bit ❑A reasonable amount ❑Quite a lot ❑Lots

Please turn the sheet over.

8. Can you write down three astronomy facts or interesting things about astronomy that you did not know before attending this event?

i)_____

_____

ii)_____

_____

iii)_____

_____

9. Would you like to attend more astronomy events?

❑Definitely not ❑Probably not ❑Maybe ❑Probably ❑Definitely

10. Are there any other comments you would like to add?

_____

_____

_____

_____

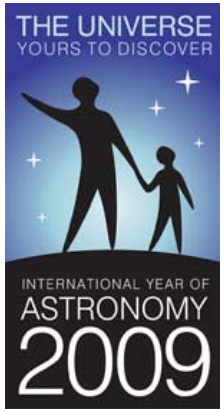
_____

_____

Thank you for completing this questionnaire. Please return it to the event organiser!

For more information about the International Year of Astronomy, log onto www.astronomy2009.org.

Appendix 2: IYA2009 Event Organiser Questionnaire



Name of event: _____

Date event was held: _____

Location: _____

Short description (e.g. star party, public talk): _____

Estimated number of attendees: _____

To what extent do you think that your event has:

	Not at all	A little bit	A reasonable amount	Quite a lot	Lots
Increased scientific awareness	❑	❑	❑	❑	❑
Promoted widespread access to new knowledge and observing experiences	❑	❑	❑	❑	❑
Empowered astronomical communities in developing countries	❑	❑	❑	❑	❑
Supported and improved formal and informal science education	❑	❑	❑	❑	❑
Provided a modern image of science and scientists	❑	❑	❑	❑	❑
Facilitated new networks and strengthened existing ones	❑	❑	❑	❑	❑
Improved the gender-balanced representation of scientists at all levels and promoted greater involvement by underrepresented minorities in scientific and engineering careers	❑	❑	❑	❑	❑
Facilitated the preservation and protection of the world's cultural and natural heritage of dark skies in places such as urban oases, national parks and astronomical sites	❑	❑	❑	❑	❑

Do you have any additional comments?

Once completed, please return this questionnaire to:
IAU IYA2009 Secretariat
ESO education and Public Outreach Department
Karl-Schwarzschild-Strasse 2
D-85748 Garching bei München
Germany