

Galileo Teacher Training Programme

Brief description:

The International Year of Astronomy provides an excellent opportunity to engage the formal education community in the excitement of astronomical discovery as a vehicle for improving the teaching of science in classrooms around the world. An incredibly rich store of useful astronomy resources is available for such an effort, much of it in digital form and freely available on the Internet. However, experienced educators and outreach specialists identify a critical impediment: many teachers lack the training to understand these resources or use them effectively in their curricula. To address this problem and to sustain the legacy of the International Year of Astronomy 2009, the IAU – in collaboration the National Nodes and leaders in the field such as the Global Hands-On Universe project, the US National Optical Astronomy Observatory and the Astronomical Society of the Pacific – is embarking on a unique global effort to empower teachers by developing the Galileo Teacher Training Programme (GTTP). The Galileo Teacher Training Programme goal is to create by 2012 a worldwide network of certified “Galileo Ambassadors” who will train “Galileo Master Teachers” in the effective use and adaptation of astronomy education tools and resources into classroom science curricula. These Galileo Teachers will be equipped to train other teachers in these methodologies, leveraging the work begun during the IYA in classrooms everywhere. Through workshops, online training tools and basic education kits, the products and techniques developed by this programme will be adaptable to reach locations with few resources of their own as well as computer connected areas that can take advantage of access to robotic optical and radio telescopes, web cams, astronomy exercises, cross-disciplinary resources, image processing, and digital universes (web and desktop planetariums).

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Main goals:

Educational engagement, teacher professional development. Focus on making teachers proficient with the resources of astronomy/science teaching, which can be adapted to the teaching of content that varies somewhat from one country to the next--and one school district to the next.

Resources:

There are a lot of training protocols and materials for beginner activities in astronomy that have been developed at the Astronomical Society of the Pacific, Global Hands-on-Universe and others, online technologies (e.g., distance learning, robotic telescope access) of which to take advantage, as well as a variety of basic materials being adapted by various working groups for IYA. All of these are potentially valuable tools and materials for use in countries and projects that want to approach teachers and students who are not already science oriented. The IYA2009 Galileo Teaching Resources can be adapted in one global training package, adaptable for locale and circumstances.

Approach:

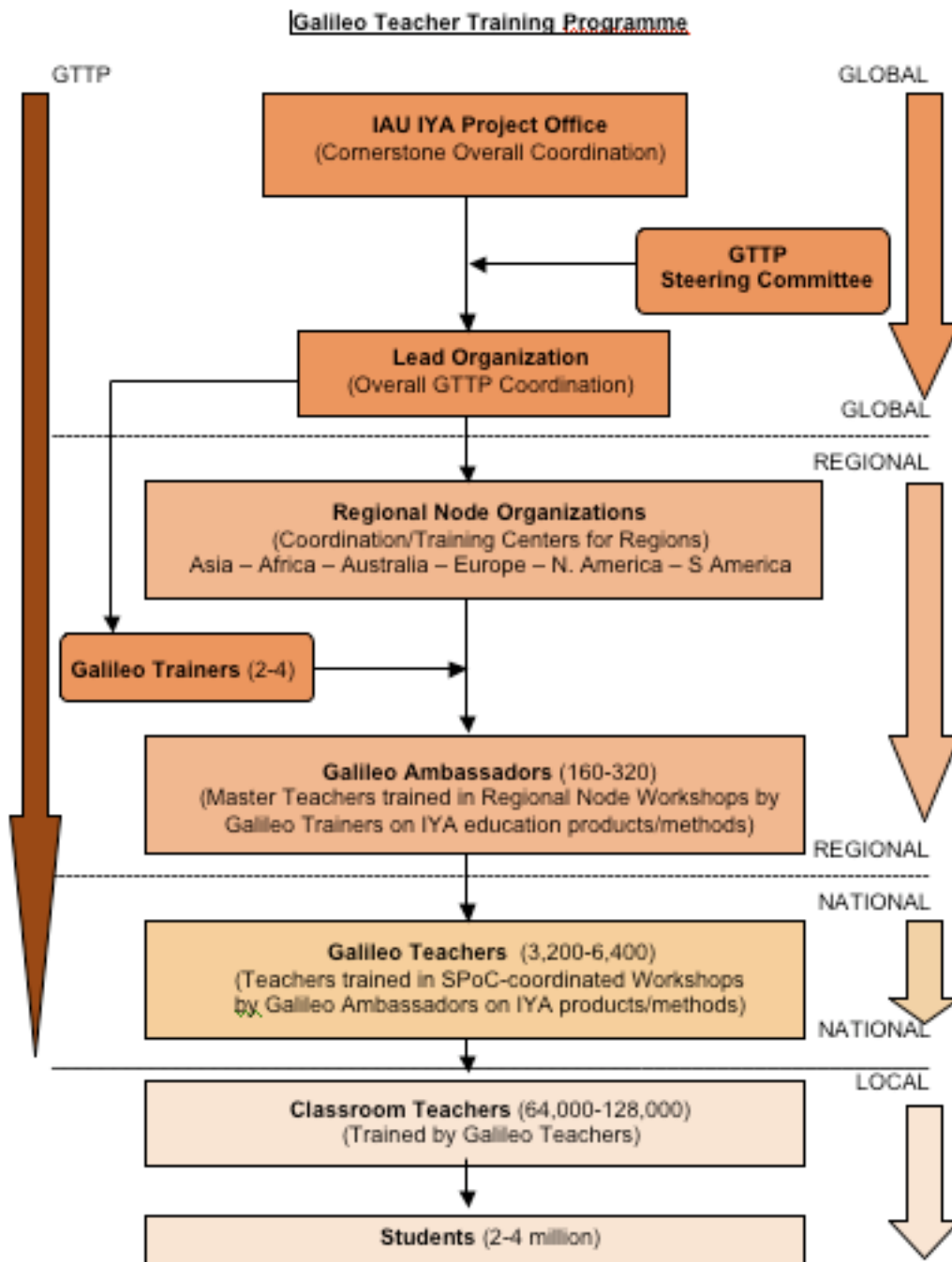
The Project Office recruits and designates a lead organization to serve as the global coordinator, with input from the GTTP Steering Committee (presently, the task group). The Office, Lead Organization and the Committee recruit and designate six regional node organizations to create the global coordination network, and two to four Galileo Trainers to conduct Ambassador workshops. The Office, Lead, Committee, network of nodes, and Trainers work together to develop the educational kit and Ambassador workshop model.

The Galileo Trainers travel to network regions and conduct Ambassador workshops in coordination with the regional node organizations—the products of which are a cadre of Master Teachers called Galileo Ambassadors capable of training teachers in their countries on adapting and using the resources available.

These Galileo Ambassadors, in turn, work with their nations' IYA SpOCs to coordinate and conduct teacher workshops in their countries on the same model—the products of which are a cadre of teachers called Galileo Teachers capable of training more teachers in their districts and school on the methods of the GTTP. (The GTTP Program effort ends at the creation of the Galileo Teachers.)

Early in the effort, a Web site is developed as a repository of materials, information and online lessons. Throughout the effort, front-end, formative, and summative evaluation will be conducted and materials and workshops refined accordingly. At the conclusion of the initial two-year effort, a plan will be developed for sustaining and expanding the network and population of teachers served.

The effort is depicted graphically below, with initial rough numbers included.



As mentioned, a Web site, whose location is to be determined, will be the main repository for teacher educational resources and will undergo review before placement there. These

Web-based resources in turn provide material for training teachers, who can then continue to use the Web site to improve and enhance their efforts.



The effort must be able to adapt to a variety of languages, cultures, and educational circumstances, so the materials and methods will need to be adaptable. Matching teachers with volunteer amateur or professional astronomers in their localities, or even astronomy college students, can be a useful follow-up and help to sustain the effort.

Deliverables:

- 1) Global network of global coordinator and six regional nodes for coordinating teacher professional development using astronomy education tools.
- 2) IYA-related astronomy resource kit, with both physical and online elements, for adaptation as necessary around the world and for use in teacher workshops and classrooms.
- 3) Web-based repository of project resources, both educational and network-related.
- 4) Professional development teacher workshop created with Galileo Trainers and executed by same and coordinated through the network. Result: 160-320 Galileo Ambassadors trained to give subsequent workshops in their regions.
- 5) Professional development teacher workshops conducted by Galileo Ambassadors in coordination with SpoCs. Result: 3,200-6,400 Galileo Master Teachers trained to give subsequent workshops in their countries.

Timeline:

Definition of tasks/network/process/objectives	Jan-Mar 08
SpoC engagement process	Mar-May 08
Network development/Node establishment	Mar – Jul 08
Education package identification/development	Mar-Sep 08
Evaluation criteria/method development	Mar-Sep 08, Jun-Jul 09, Jan-Mar 10
Website development	Mar-Oct 08
Galileo Trainer recruitment/selection/prep	Apr-Sep 08
SpoC Galileo Ambassador recruitment/selection	May-Sep 08
Workshop development	Jun-Sep 08
Initial Ambassador Training Workshops begin	Sep 08-Jun 09
Initial Galileo Teacher training workshops begin	Jan-Dec 09
Evaluation (front-end)	May-Aug 08
Evaluation (formative)	Sep 08-Oct 09
Evaluation (summative)	Nov 09-Feb 10
Program refinements	Aug-Sep08, May-Jun09, Jan-Mar10
Sustainability plan development	Jan-Mar 10

Needed Resources:

Funding, first and foremost, to get the effort moving. Other resources needed include:

- Coordination and coordinators.
- Trainers.
- Web site.
- Resources Adaptation.
- E-learning material preparation.
- Galileo Education Package.
- Public relations/communication.
- Training sites and training expenses.

Evaluation:

One aspect of evaluation metrics will include numbers served/exposed. Additional metrics should be developed, including how many teachers are using Galileo materials or methods in the classrooms, what if any measurable changes in teaching, learning, or attitudes toward science can be observed, etc.

Collected Thoughts:

Below is a summary of thoughts and suggestions provided during the GTTP meeting at the CAP meeting in Athens in October, 2007, to guide collective thinking:

- It's important to communicate that we are creating professional development

opportunities.

- The main objective is to train teachers with a focus on tools that can be applied to varying situations.
- We don't need new resources but to use well the good ones already in existence.
- We must identify networks, resources and key people, and invite them to collaborate.
- We should help to give participants recognition by their local governments.
- We should link this effort to other cornerstone programs.
- Can we develop an IAU accreditation scheme for teachers?
- We must establish evaluation mechanisms (pre- and post effort) to gauge outcomes.
- We should introduce an education component in other cornerstone projects
- Focus on teaching tools and techniques that can be adapted according to varied curricula.
- Target teachers through training.
- Build in flexibility (astronomy is not in all curricula, and requirements vary).
- Create a database of resources – classified and rated.
- Use simple procedures, basic unifying concepts that can serve as a “common denominator” on which more advanced efforts can be built as regions have the resources.
- Use astronomy as a means to teach other things—look for connections with other sciences, for example.
- There will be a need for a global coordination office regional coordinator.
- Focus on skills development in using math and science and new technologies.
- Develop an inexpensive “astronomy box” of basic activities that can be accomplished anywhere, including in underdeveloped countries with limited resources.
- Use astronomy as a tool to engage teachers and students in science and math.
- build a common umbrella and regional leaders on the ground
- Include “e-learning” opportunities and networks.
- Define learning strategies and be able to accommodate different styles.
- Produce a guideline on how to include astronomy in the curriculum.
- Base the program on a simple unifying principle (for example, “look up and seek a better understanding of the universe and your place in it.”)
- Develop a cross-curricular approach of the Universe.
- Consider solutions for language issues.
- Keep the needs of the teachers themselves in mind.
- Use the excitement and appeal of astronomy as a tool to engage teachers and students in science concepts and other topics.
- How can we use this program to get educational networks working together for the longer term?
- Develop an “umbrella” structure to coordinate and support the effort.
- Point out that you don't have to be an astronomer to do astronomy.

