

# Informal astronomy education in Bulgaria at the beginning of the XXI century: organization, continuum, results

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**Abstract.** The report shows the current opportunities for obtaining astronomical knowledge in school and outside it, through the use of non-formal education. These are school and extracurricular activities, schools, astronomical competitions and Olympiads, observation expeditions. For 25 years Bulgaria has been participating in the International Olympiads in Astronomy and Astronomy and Astrophysics with National Teams. The role and place of the system of Public Astronomical Observatories and Planetaria in the system of non-formal education in astronomy are discussed (In Bulgaria there are 7 Public astronomical observatories with a planetarium). Specialized activities in their school forms allow the formation of sustainable astronomical knowledge and observational habits.

**Keywords.** Sociology of Astronomy, History and philosophy of astronomy

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**Introduction:** Informal education (IE) can be defined as an organized and systematic learning activity, outside the system of formal education (FE), oriented to the specific needs and interests of learners, regardless of their age, gender and level of education. Informal education has features such as flexibility, subjectivity and additionality in relation to FE, which can complement and develop in detail the educational activities in the school as a whole (<http://omsu.ru/page.php?id=501>). The [International Standard Classification of Education](#) defines the informal education as "any organized and continuing educational event that can take place both inside and outside educational institutions and covers people of all ages. Informal education programs do not have to be structured in stages and can have different durations (Rogers 2005).

**Current state of astronomical education in Bulgaria (level of secondary education and informal educational institutions):** Astronomy is one of the most ancient and socially significant sciences. The only place where the science of astronomy could be studied in its entirety – theoretically, practically and observationally, remained the astronomical observatories, planetariums, astronomical circles and local clubs. Their main resources and additional projects have made it possible to create and develop non-formal astronomy education, both in one-off events and in continuous multi-year courses and schools. In the context of developing science education, such centers allow the formation of a quality staff among young people who continue their education at the university. In the period 1961 – 1999 eleven Public Astronomical Observatories and Planetaria were established in Bulgaria – in the cities of Belogradchik, Varna, Gabrovo, Dimitrovgrad, Kardzhali, Silistra, Sliven, Smolyan, Sofia, Stara Zagora and Yambol, and in Haskovo and Troyan – astronomical centers. Some of them underwent various organizational and administrative transformations over time, and later an Astronomical

Association was established on the basis of the two Public Astronomical Observatories in Sofia. These astronomical complexes included observatories, some with planetarium, as well as sites for visual and telescopic observations of celestial objects and phenomena. Since 1997, a National Olympiad in astronomy has been held within the Ministry of Education and Science. To date, the Olympiads are held at three national and one international stage. For 25 years Bulgaria has been participating in the International Olympiads in Astronomy and Astronomy and Astrophysics with National Teams. During this period, 56 gold, 86 silver and 106 bronze medals were won at the Olympics in Brazil, Bulgaria, Greece, Russia, India, Indonesia, Italy, Kazakhstan, China, Poland, Romania, Taiwan, Sweden, etc. Modern information and communication technologies (ICT) also play an extremely important role in non-formal astronomical education in Bulgaria. Available global, European and national Internet resources in astronomy, space physics and astronautics, as well as social networks, allow students to receive up-to-date scientific information in real time. Significant role in drawing attention to astronomical knowledge is played by popular science literature. The books on astronomy and astronautics for children make a pleasant impression, with their well-illustrated pages and accessible language for the little ones. The main forms in the implementation of informal education in astronomy are courses, schools, seminars, project development, observation expeditions (Stoev & Stoeva 2008).

**Perspectives:** Non-formal education in astronomy in Bulgaria has been developing for more than 55 years. During this period, the individual forms, methods and programs for it were in the process of continuous improvement and modification: textbooks, presentations, manuals for teachers, astronomy tasks, amateur research observations etc.

Today, the development of informal education in astronomy as an additional opportunity to obtain astronomical knowledge is becoming extremely relevant. This is a pledge for the formation of well-prepared future students and doctoral students in physics, chemistry, mathematics, computer science at universities and research institutes.

**Conclusion:** The creation and implementation of adequate non-formal education in astronomy at the present stage allows to solve the following important tasks: – creating conditions for a comprehensive study of the kinematics and dynamics of celestial objects and phenomena, as well as physical processes in the near Earth cosmos, the Solar system, the Milky Way Galaxy; – creating preconditions for research activity during the whole training in astronomy; – formation of conceptual scientific notions about the recognizability of the Universe and space processes there; – acquisition of fundamental knowledge both in the field of astronomy and space physics, as well as in other sciences of the natural science educational cycle. Solving these tasks from the basic forms of non-formal education in astronomy makes them a connecting element between formal and non-formal education in other scientific disciplines, which include the acquisition of astronomical knowledge. In view of the above, the following conclusions can be drawn: First, astronomy as a subject of non-formal education contributes to the solution of general education and development tasks in secondary education in Bulgaria; Second, practical classes and research training in astronomy can play a central role in the training and development of students and out-of-school pedagogical institutions in astronomy, astronomical clubs and schools. The participation of students in various national and international astronomical projects and work with large databases has exceptional opportunities for this.

## References

- International Standard Classification of Education, URL: <http://omsu.ru/page.php?id=501>  
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