Astronomy Education in Latvia - problems and development

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1. Primary school

School education in Latvia, as in many other countries, is divided into two stages: primary and secondary education. Primary education is compulsory. Every year 30 000 new school children start attending primary school. This is a potential audience that can study astronomy fundamentals. During first grade studies school children learn the basics of natural science which include some elements of astronomy. These lessons are given once a week. At this stage children's interest in the Universe is great; therefore the most active teachers use some out of curriculum activities to give the schoolchildren an idea about the stars, planets and other celestial bodies. The science curriculum itself contains very few elements of astronomy (Karule, 1995). Even more many teachers have problems teaching science at the elementary school, because they are afraid that it is too sophisticated. This situation should be corrected, but at the moment no teacher training in science is planned.

In higher grades of primary school some astronomy elements are taught in different disciplines. In geography there are some topics about the Earth, Seasons and Tides (Klavins, 1992). In physics there are some topics about Eclipses of the Sun and the Moon (Kokare, 1992). And that is all. It leads to the situation that a young person, graduated from primary school, has heard nothing about constellations, Moon phases, comets and many other astronomy questions.

The expected positive changes are the following: new textbooks of the basics of natural science, where more attention is paid to astronomy, are being developed. The textbook for 1st grade has already been published (Vaivode et al., 1995), the others will follow. During this year the education programs of primary school will be revised. Just now teachers have a good opportunity to prepare proposals on how to introduce more science in the curriculum for primary schools.

2. Secondary school

The situation with astronomy education in secondary school is better. Latvia is one of the few countries where astronomy is taught as a separate discipline. Astronomy is a 70 hours course by choice. The main aim of this course is to give the students the notion about the basic structures of Universe and to explain the most important astronomy facts and laws (Ros, 1995). Special attention should be paid to the spatial configuration and the evolution of celestial bodies. For better understanding, the description of astronomical objects is connected with their visibility in the sky (Vilks, 1995).

Two new documents: *Curriculum of Astronomy* (Vilks, 1993) and *Standard of Knowledge* (Vilks, 1995) have been prepared. These documents define the aims and the content of the astronomy course and the level of knowledge which should be achieved. A new astronomy textbook for Latvian schools (Vilks, 1996) has been published this year. It has replaced the old astronomy textbook (Vorontsov- Velyaminov, 1987) that was used for 50 years.

More teaching materials are to come soon. The first book is *Sky Guide* (Vilks, 1996)

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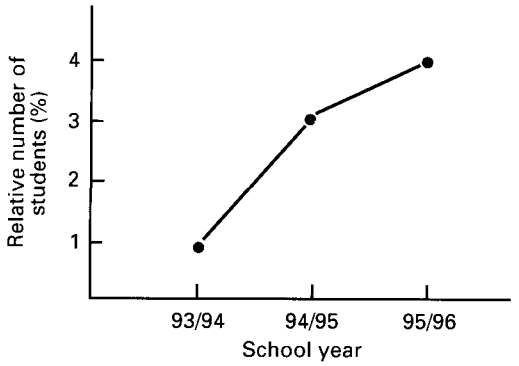

FIGURE 1. Relative number of students, studying astronomy at secondary school during last three school years.

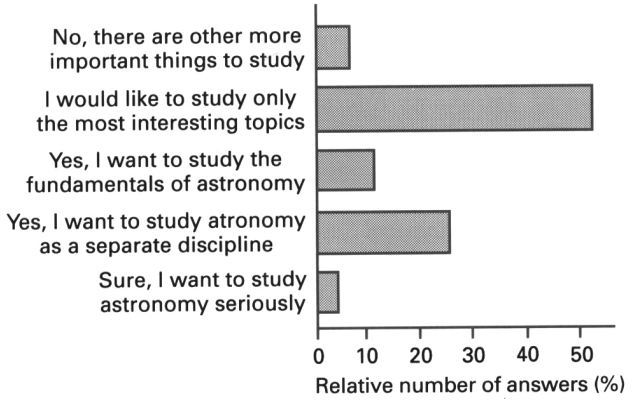

FIGURE 2. Distribution of 400 students answers to the question "Do you want to study astronomy at the secondary school?"

which will help the students to find the constellations and make the observations of different celestial bodies. For teachers *Didactic Materials in Astronomy* (Vilks et al., 1996) will be issued, too. The latter will contain some exercises and lesson planning patterns. The most advanced teachers can also use the materials from *Project STAR* (Project STAR, 1991), *The Universe at Your Fingertips* (Fraknoi et al., 1995), and others. But in most schools a lot of necessary teaching aids are still missing. They are star charts, sky globes, slides, videos, astronomical software and other things. Of course, a lot of astronomical information can be found on *Internet*, but at the moment only few schools in Latvia are connected to this computer network.

During the last three school years the number of students studying astronomy has gradually increased, but nevertheless, it is very low: only 4% of students are choosing astronomy to study (Fig. 1). At the same time, judging by the results of the questionnaire which has been made this year by *The Association of Astronomy Teachers* and covered approximately 400 students, more than half of them would like to learn the most important astronomy topics at the secondary school (Fig. 2). This means that more astronomy fundamentals should be introduced in other disciplines.

The possible solution is to teach some astronomy problems (18 hours) in the basics of natural science. This is a new discipline for Latvian secondary schools, supposed to be introduced in the secondary school curriculum starting from the next school year. A text-

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book for this new discipline is under development now. More astronomy fundamentals (35 hours) could be introduced in physics during the next few years.

3. Teachers' activities

Last year *Latvian Association of Astronomy Teachers* was organized. The purpose of this organization is to promote astronomy education in all levels — school, university, public education, correspondance education and mass media. The Association includes not only teachers, but also other persons interested in teaching astronomy. During a one year period several teachers' meetings concerning educational methods have been held, and some new ideas have been generated. The most active teachers have already started preparing some new teaching aids: exercise books, overhead materials and others. Teachers help organize *The Open Olympiad (Competition) of Astronomy* which is held every year in Riga, the capital of the state. The most gifted astronomy students from all over the country take part in this Olympiad. The Association has established some contacts and the information exchange with Lithuanian and Russian colleagues. Now astronomy teachers from Latvia are looking for mutual cooperation contacts with *The European Association of Astronomy Education*.

4. Public education

Since 1947 *The Latvian Astronomical Society* has been functioning. This Society unites professional and amateur astronomers, astronomy teachers and the people interested in astronomy. Regular meetings concerning actual astronomy and space exploration questions are held and expeditions to eclipse sites are organized.

In Riga *The Museum of Space Exploration* was opened in 1987. It is located in the building, where Fridrich Tsander, one of the rocket constructing pioneers lived at the beginning of the XXth century. The exposition of the museum is devoted to the history and some recent achievements in space exploration.

Unfortunately there is no planetarium in Latvia. In the former Soviet Union a *Zeiss planetarium* existed but it was situated in an old orthodox church. Some years ago this building was given back to the church and planetarium was closed. Now the authorities of the Riga School Management Board are looking for the possibility to buy a new planetarium in Sweden.

In the *Astronomical Tower* of the University of Latvia sky observations with a 22 cm reflecting telescope are available for students of schools and universities and for the general public. The Moon, planets, double stars, galaxies, star clusters and nebulae are being demonstrated. During the *Hyakutake* comet visibility period the Tower was visited by more than 1 000 people.

Every year in August during the *Perseids* meteor stream maximum the *Star Party "Aquila"* is held in the country area where the darkness of the sky is appropriate. During the Star Party students and amateur astronomers observe the sky with some home-made telescopes, and they establish some new contacts and share their experience.

Two astronomical periodicals are issued in Latvian. They are – the popular science magazine "*The Starry Sky*" and the *Astronomical Calendar*. "The Starry Sky" is **the only** popular science magazine now published in Latvia.

This year the home page of **Astronomical Observatory of University of Latvia** has been created by the University students. It contains the most comprehensive information about astronomy activities in Latvia. The texts are given in English and Latvian. The home page address is: http://www.lanet.lv/members/LU/astro/.

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