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LIFE IN THE COSMIC CONTEXT. AN ASTROBIOLOGY COURSE AS AN EXPERIMENT IN TRANSDISCIPLINARITY

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"Life in the Cosmic Context" (AGA0316) is the astrobiology course offered by University of São Paulo to undergraduate students of science and humanities majors. The variety of background of the population attending AGA0316 and the broad scope of the addresssed issues makes this course a laboratory of transdisciplinarity.

Astrobiology is a new field of research concerned with the study of the origin, distribution, and destiny of life in the universe. It is rapidly gaining the attention of scientists and the public, partially due to the fundamental questions it poses: what is life? are we alone in the universe? what will be the future of life on Earth and elsewhere? In 2003, University of São Paulo (USP) created the course of astrobiology "Life in the Cosmic Context", addressing these questions, taking into account several disciplines – astrophysics, biology, chemistry, geology, meteorology, environmental sciences.

The course is provided by IAG (Instituto de Astronomia, Geofísica e Ciências Atmosféricas) to undergraduate students of science and humanities majors. In general, AGA0316 is offered each semester. During the period of 2003-2013, a total of 1513 students have enrolled in the course, distributed over 32 majors.

The fact that a large number of majors is represented in the course illustrates the capability of astrobiology in integrating several fields of knowledge. Considering the definition of astrobiology as "the study of the living universe" (Chyba & Hand, 2005), their two objects – universe and life – are so encompassing that astrobiology could be characterized as being transdisciplinary in addition to being interdisciplinary.

Transdisciplinarity is an approach to knowledge that goes beyond objects to consider the environment in which the objects are embedded. The transdisciplinary research not only focuses on the environment of the object under study, but also creates the environment. In contrast to the interdisciplinary research, which surrounds its object from several points of view, in the transdisciplinary approach, the object expands into an enveloping space. In that *transdisciplinary space*, there is the integration of diverse forms of research, derived from specific problem-solving strategies for building knowledge (Jaeger & Scheringer, 1998). The transdisciplinary approach has been used in complex problem solving context, for instance, in shaping university curricula (Ernst, 2008) and in preventive medicine (Kessel & Rosenfield, 2008).

In the classes of AGA 0316, the central underlying questions of astrobiology are explored in by a wide variety of activities designed to build a transdisciplinary frame. For example, philosophical insights are combined with the design of strategies for the recognition of life elsewhere, and the biological fieldwork on extremophiles with astronomical observations of exoplanets and of the molecular content of the universe.

At the same time that the course focuses on issues related to the idea of extraterrestrial life, the reflections and activities of the students lead them to broaden their conceptions about life and to bridge disciplinary barriers. The explicit project of defragmentation of knowledge of transdisciplinarity (Max-Neef, 2005) is mirrored by the very ambition of astrobiology of reuniting the present-day fragmented scientific body, and both are experienced in the classes of AGA0316. Finally, one important impact of the "Life in the Cosmic Context" is that several students who have attended the course have become actively involved in science teaching and outreach, thus having an important role in promoting the scientific literacy.

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