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The Astrophotography as Aid for Astronomy Education

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Review Article

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ABSTRACT

From the earliest times a astronomy has aroused to man a deep curiosity about the origin of the universe, as well as their training. This work aims to show the importance of astrophotography in astronomy education as a form of aid to Meaningful Learning, shown a brief introduction to Meaningful Learning Theory of Ausubel. Is done a reflection on astrophotography as pedagogical practice in high school and how this practice can help students to meaningful learning in astronomy.

INTRODUCTION

Astronomy transmits great interest from the students, being a very interdisciplinary science, and thus, considered the oldest of the sciences, however, is still rather "unknown" by schools and the public in general. Matters relating to astronomy flame the attention of people of any age group. Second Filho and Saraiva [1]:

"The study of astronomy has fascinated people since ancient times. The reason for this becomes evident to anyone who contemplates the sky on a clear, dark night. After the sun - our source of life - goes down, the beauty of the night sky appear in all its splendor".

Through astronomy education, with the help of astrophotography, students can you understand the beauty around them, creating critical and solutions after learning. In this way, can they develop demonstrations of experiments in the classroom, with images obtained by equipment handling, among other learning through the proposed methodology.

Not here to say that this is one of astronomy teaching solution to improve education, but however, this reflection can serve to excite students to have a little more interest in the subject matter, and thus influence their meaningful learning. The following will be presented to Meaningful Learning Theory of Ausubel, followed by some thoughts on astrophotography as pedagogical practice in high school and how this practice can help students to meaningful learning in astronomy.

THEORY OF MEANINGFUL LEARNING

This theory is known as "Theory of Meaningful Learning" and was created by David Paul Ausubel in the mid-60s of the twentieth century. The main concept of this theory is of significant learning, Moreira [2]:

A process through which new information is related, in a substantive way (non-literal) and non-arbitrary, a material aspect of the cognitive structure of the individual. In this process the new information interacts with a specific knowledge structure, which Ausubel calls "subsumer concept" or simply "subsumer" existing in the cognitive structure of the learner.

Meaningful learning occur when the learner can assign meaning to what is being learned, but these meanings are almost always related to personal attributes. Thus, a learning where there is an assignment of personal meanings nor a relationship

with prior knowledge of the student is not considered a significant learning but mechanical. So, the new information stored in an arbitrary shape and literal. So that meaningful learning will happen, Ausubel proposes that the programming content to be taught in the classroom basically obey two basic principles: the progressive differentiation and integrative reconciliation.

For the occurrence of the significant learning, according to Novak [3], requires three fundamental requirements, namely:

i) Relevant prior knowledge: that is, the student must know some information that relate to the new, to be seized for non-trivial way.

ii) Material [potential] significant: that is, the knowledge to be learned should be relevant to other knowledge and should contain significant concepts and propositions.

iii) The learner must choose to learn significantly. That is, the student must choose, knowingly and intentionally, to relate new knowledge with others who already know of no trivial way.

The occurrence of significant learning is directly related to the above conditions. The first requirement basically says that there have to be relevant subsumers in cognitive structure of the learner, so you can be a relationship between the foreground and he. The second requirement says that the learning material to be potentially significant. According to the theory of Ausubel, a potentially significant material, it is every one that is "likely to relate to the relevant ideas anchored in the cognitive structure of the learner." Ausubel [4]. It can see that the material containing these characteristics can influence the willingness of students to learn, and consequently, facilitating their meaningful learning.

The third requirement states that the learner must express willingness (willingness) to learn significantly. That is, the student is not a mere recipient of knowledge, but a guy who decides to want to learn or not. It turns out that, "no one learn significantly if we do not want to learn. It takes a predisposition to learn, an intentionality "Moreira [2]. Such theoretical assumptions allowed the elaboration of didactic proposal described below, in which it took into account the design of the astronomical images (astrophotography) is a matter stimulating the natural curiosity of students and astronomy education, which they already hold various information on the topic in their cognitive structures.

Thus, it is apparent that it is possible to obtain a significant learning through cognition experienced by the student, when the educational activity is performed in a room with the aid of astrophotography, or you can learn significantly through astronomy education.

REFLECTIONS ON ASTROPHOTOGRAPHY AS A LEARNING AID

Bet on a didactic teaching means not only attract students to a novelty experimental activity, having seen to provide a better education,, but to use this device to build a closer knowledge of their reality. In addition, experimental processes can be facilitators for the further knowledge when related to students' prior knowledge, thus approaching this reality with scientific knowledge.

The experimental activities allow students to contact with the concrete object, removing them from the balance area and placing them in the conflict zone, building more knowledge and then returning to equilibrium zone [5].

Yet in order to search for improvements in the teaching-learning, is that researchers, teachers and students must be engaged and committed to education as the a whole, looking for ways to promote meaningful learning. The concepts discussed it will be assimilated by the students, if they are presented in a language that also makes sense to the learner, says Nogueira et al. [6]. According to Araújo and Abib [7]:

Encourage the active participation of students, awakening their curiosity and interest, favoring an effective engagement with their learning and also provides the construction of a motivating environment, pleasant, stimulating and rich in new and challenging situations, when properly employed, increase the likelihood that knowledge and skills are developed are developed, attitudes and skills related to making and understanding science.

The above authors also state that the use of experimentation in teaching science, specifically physics has been pointed out by teachers and students as one of the most fruitful ways to minimize the difficulties in learn and teach significantly Physics, Araújo and Abib [7].

Delizoicov et al. [8] to write about the challenges to the teaching of science, defined three questions that might guide teachers in developing their plans, which are: What to teach? Why and for what teach science? For those who teach science? So why not invest in a new science teaching methodology, for example, astronomy, and so provide the student a broader view and clarify the universe, even if on a small scale, but still lead the way for his curiosity.

The astronomy education through the astrophotography of the stars can be a great teaching methodology for teachers and high school students, so that this experimental practice can provide better interaction between school, teacher and student.

The use of laboratory and multimedia resources is of great importance in the teaching learning in science, as in primary and secondary education as it provides an incentive to more students and teachers, able to illustrate physical and astronomical phenomena. The proposed of the astrophotography as interdisciplinary approach can provide a set of practical and enjoyable

activities for students making use of telescope, telescope, computer and simple digital camera in order to capture and analyze images of astronomical objects. Already said Neves and Pereira [9]:

Working with Astrophotography can approach people's interest in a sky already so impoverished by the education system and the lights and pollution of cities. Investing therefore a simple Astrophotography, means to touch people's imagination, bringing a "piece of paper" a piece of heaven as never before observed. In addition, the astronomical photography can be an enriching teaching tool for learning concepts of Astronomy and Physics of learning, especially involving the interdisciplinarity between that science and optics concepts.

Through this experimental activity will be possible to approach concepts related not only to astronomy but with different disciplines, such as physics, chemistry, geography, mathematics, history, philosophy, computer science among others, depending of the multidisciplinary as astronomy. This proposal is primarily educational motivating to the students, as the use of a scientific methodology that has an observational, like the one launched by Galileo Galilei, leading students to make reflections in a critical and constructive manner on natural physical phenomena.

In order to the provide meaningful learning, the experiments should not be performed anyway. So Carrascosa [10] in his work in 2006 suggests that the experimental activities must have an investigative approach. The author also states that students must atively participate in all trial proceedings, doing what was prescribed by the teacher, having an interaction between them. Thus it is expected that the acquired learning serves not only to school life the student, but for your life as a whole. With the proposal, you can obtain the astrophotography through simple cameras, used in everyday life, or if possible with an even better camera, where you can get astrophotography with a higher quality. Thus, teachers will encourage the students to an interdisciplinary activity and also the interaction between teacher-student and student-student will be of great importance for teaching learning.

Through this activity, you can work with students the concepts and knowledge in various areas, in this way the intention of this interdisciplinary proposal ensures that students gain an understanding based on a scientific methodology of observational, making them reflect so critical and constructive with respect to natural phenomena of the astronomy.

FINAL CONSIDERATIONS

Knowing the difficulties encountered in the teaching science, especially to astronomy, we must still discuss what better way to teach science, what is the best method, and this so facilitates the understanding of the concepts discussed. It is argued here that this learning is meaningful, and that is related to the teacher-student interaction, which is of great importance to the student at school, environment but also after high school. As a means to aid meaningful learning in teaching astronomy, we found in astrophotography a strong tool for such purpose because this displays an interdisciplinarity, linking the student a to the teacher and other students, without forgetting the a motivation for scientific knowledge of phenomena natural related to astronomy.

We hope that through this reflection, the practice of astrophotography can awaken students an interest in correlating the p'ratico teaching the theory, in a practical and educational way, exposing their ideas, thoughts and criticisms, and thus participate more in class and make the closest didactic experiments of their reality and everyday life, implementing resources and technological tools in experimental practice, thus promoting their meaningful learning. Finally, we hope that this work may have contributed to clarify how relevant is the astronomy education for students, where it is necessary to think of new methods for teaching the same, in view of the progress of thought of students in relation to the phenomena found in their lives.

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