

Importance of Science and Technology Center for learning of physical issues

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This work was carried out with ninth graders, high school and pre-university private and public schools in the city of Itabaiana / SE. Ten visits were conducted with different groups of students, the CCTECA (House of Science and Technology City Aracaju), in order to provide students with a closer contact with experiments and physical phenomena that are present in everyday life. These students were divided into groups for better learning and interaction with the monitors, where they had the opportunity to handle the experiments. During the visit students were accompanied by the coordinators and teachers of the College of Physics and Writing. Students was charged: an essay on the videos viewed in the planetarium, which could explain a dissertation on the importance of the visit to this space for learning, and to do a little explanation of the theory covered in the experiments that most caught his attention. With the information contained in the texts produced by students was evident that there was a great contribution to learning of these students, as well as them having contact with physics experiments, put forward their opinions and relate the physical classroom with the experiments and their daily lives.

Keywords: Science Centers; motivation; learning

Este trabalho foi realizado com alunos do nono ano, ensino médio e pré-escolas universitárias públicas e privadas na cidade de Itabaiana / SE. Dez visitas foram realizadas com diferentes grupos de estudantes, a CCTECA (Casa da Ciência e Tecnologia da Cidade de Aracaju), a fim de proporcionar aos alunos um contato mais próximo com os experimentos e fenômenos físicos que estão presentes na vida cotidiana. Esses alunos foram divididos em grupos para uma melhor aprendizagem e interação com os monitores, onde tiveram a oportunidade de lidar com os experimentos. Durante a visita os alunos foram acompanhados pelos coordenadores e professores da Faculdade de Física e Redação. Os estudantes foi acusado: um ensaio sobre os vídeos assistidos no planetário, o que poderia explicar uma dissertação sobre a importância da visita a este espaço de aprendizagem, e para fazer uma pequena explicação da teoria coberta nos experimentos que mais chamou sua atenção. Com as informações contidas nos textos produzidos pelos alunos era evidente que havia uma grande contribuição para a aprendizagem desses alunos, bem como lhes ter contato com experiências de física, apresentar as suas opiniões e relacionar a sala de aula física com os experimentos e as suas vidas diárias .

Palavras-chave: Centros de Ciência; motivação; aprendizagem

1. INTRODUÇÃO

The non-formal education is one that provides the learning of concepts of formal schooling in popular areas such as science centers, museums, historical centers, or any other activities that are developed with a definite object. These spaces, in most cases, partially supply the lack of schools, lack of laboratories, equipment, when planning activities that would be developed in these areas, correlating with the school curriculum.

Teaching science is more than promote the establishment of scientific terms and repetition of what we find in textbooks; focus is learning situations that allow the student to the formation of cognitive baggage. The construction of these situations is a very difficult task for teachers concerned with teaching. The spaces outside the school environment are considered complements to the educational needs of the school, because most of them do not have a laboratory, making the possibility of the student view, play and learn by doing. Motivated by

this concern about science education, numerous studies on different forms of education, which aim to make learning more enjoyable, increase students' interest.

Several projects and partnerships with schools emerged within universities and research centers in different states of our country. Proposals for improving education through non-formal education with extracurricular activities, took the students to visit other places, among them, science centers and universities themselves. As an example we can cite the Planetary Observatories and offering the possibility of developing a contextualized teaching of astronomy, allowing the realization of educational activities that provide access to a more authentic school science.

The research methodology consisted of a qualitative approach through the production of texts. This was made possible by the union of physics teachers and a better context for writing and learning in an interdisciplinary way. The activities were designed with main aim to interest the student of science, but also highlight the need for interdisciplinary and integrative approaches of physics with other areas of scientific knowledge. This can occur when the school's pedagogical project is built collectively, involving houses of science, teachers, school students and trying to reconcile a proposed science education to consider the context out of school and at the same time has to do with what the student is studying in the classroom.

With that, we describe how creativity can be important for the teaching-learning process through the production of texts. As an alternative that emphasizes the student's development of reasoning and critical thinking the same.

2. THEORETICAL

2.1 Non-formal spaces

According to the concepts found in the book *Research in Physics Teaching*, which was organized by Roberto Nardi: Some authors classify the species into three educational systems: formal, non-formal and informal. According to DIB (1987), formal education is linked to the school, "is a systematic and organized method of teaching, structured according to certain laws and regulations, with a relatively rigid curriculum in terms of objectives, content and methodologies." The non-formal education is characterized by educational processes with flexible curricula and methodologies, student-centered, focused on an individualized teaching, self-instructive. Informal education curriculum does not follow, does not offer degrees or diplomas, not mandatory of any kind and not just for students but the general public.

2.2 CCTECA

The deployment of the House of Science in Sergipe is a very important milestone for the company and represents a great gain for the population and the student audience, because the teacher can associate learning with classroom experiments facilitating the process of knowledge.

The CCTECA - House Science and Technology City Aracaju is a federal government pilot project aimed at installing centers stimuli and promoting science and technology throughout the country. In Sergipe the project was financed through the - Ministry of Science and Technology in partnership with the Municipality of Aracaju and the Federal University of Sergipe (UFS). The House is divided into three basic sections: the planetarium, the administrative sector and Experimentoteca, the main sector containing a large hall where we can find different didactic and interactive experiments specially designed for teaching physics, mathematics, chemistry, computer science, astronomy and science general. The visit is permitted by scheduling school on Tuesdays to Fridays from 8:00 am to 12:00 and 14:00 h to 17:00 h. Since every weekend the house is open to the general public.

2.3 Student motivation for learning

Students feel motivated to study subjects related to science. This is caused mainly by traditional teaching methods used. Thus, it is extremely important that there is continual development and improvement of teaching procedures, which are more attractive and therefore more effective than conventional methods.

The learner's behavior is related to internal and external causes. According to Piaget (1987), the interest is related to intrinsic motivation, because it involves the student's choices, which promotes personal growth and the formation of a self-image of competence. Perception is analogous to Vygotsky (1993), which says that interest involving personal choices should not fall on objects that are beyond the possibilities. The interest and should thus situate the object in a region where the guy with a little help can make progress. This helps these external stimuli cause the emergence of new structures. After all, what the student can do today with help, be able to do alone tomorrow.

Both Piaget and Vygotsky, said the issue should be studied student interest, and the student should have an orientation. However, to assist in its development, the counselor must respect the limits of the student.

According to Charlot,

involves the mobilization mobilize ("inside"), while the motivation emphasizes the fact that it is motivated by someone or something ("outside"). It is true that at the end of the analysis, these concepts coincide: it may be said that I was mobilized to achieve a goal that motivates me and I'm motivated by something that can mobilize me. (P.55)

The student is mobilized when it has interest in a particular activity to achieve a goal by investing in it, when you use yourself as a resource when it is set in motion for reasons that relate to a desire, a sense, a value.

3. METHODOLOGY

First visits were scheduled for students, stating the amount of visitors, dates and times. As a minimum, sent letters requesting permission to visit the students.

For a qualitative approach of the activity, students were asked to write a text on videos viewed in the planetarium, speaks about the importance of visiting this space for learning and expounding on the theories discussed in the experiments they are most aroused attention relating to the contents studied in class. This activity could be performed in groups of up to four components, or individually.

4. DISCUSSION AND ANALYSIS OF THE FINDINGS

For a classification of information from student writing, was analyzed in three stages: the first for videos viewed in the planetarium, the second the ten experiments that attracted the most attention of students and the third lecture on the importance of the House learning of physical discipline.

It was for the writing teacher to observe the agreement, coherence and cohesion of texts, as well as the spelling of the same teacher and physical experiments to verify that attracted the attention of students and the importance of this visit for the same.

Step 1: Video assisted in the planetarium

In the account of the students watched videos on the planet can highlight the writing of some students:

"Knowing the source of life and the possibility of life on another planet at the Planetarium and our fun."

"We visited the planetarium shows which theories of the solar system, the emergence of life on earth and possibilities of the existence of beings on other planets in our galaxy."

"We went to the planetarium where there we saw a video the earth could have formed, how life could have arisen in the land and the assumption of life have existed on other planets (...) The important thing is we have to preserve our planet for he does not become simply a place where people lived one day but a place that preserves and live in a harmonious way. "

"The planet we could see with a better understanding shown by a projector in a privileged position where you learn and understand more about the system and our planet, seeking improvements and how was the situation of our planet for thousands of years. In the computer room access to the means of virtual CCTECA, where he had many interesting links, one showing exactly what time we could observe that the space station passes Sergipe. "

"The planetarium is something a lot of technology, get in there, the first impression was a cozy room and very curious to see how it would work there. A very good experience, everything that happened there was of paramount importance, since the moment I began to see the origin of the earth by the end of representation. I was surprised at the way that it was the illustrations that went with that half moon roof, something a lot of progress. In short, unique experience, like everything there, all very interesting. "

"The planetarium, could never imagine it to be that way, when the teacher said she would watch the ceiling, never came into my head that could be the way it was, in short all very surprising."

"In the planetarium to watch the video that we reported on the Hubble Space Telescope, which is an astronomical satellite, artificial drone that carries a large telescope. The satellite registered many photos, including one that showed when the rings of Saturn turned away, also shown in detail, the craters on the moon (...) that there still saw the life cycle of stars (birth and death). "

According to these reports, we can see that they have identified the importance of knowing the origin of planets and preservation of the earth, were impressed by the display format of the videos and still images are made as events that happen in galaxies.

Step 2: Experiments that most attracted the attention of students

We can see that the analysis of 94 papers, all they cited: the gyrotec, experiment that simulates the absence of gravity, van der Graff generator, which shows the power and electrification of the tips, spherical mirrors, which produce images of different natures.

There was also a great quote from experiments that show content related to electricity and optics, as they are more noticeable to the everyday life of students.

Step3: Importance of CCTECA for learning

In essays on the importance of CCTECA, we highlight some texts that contributed to check the students' learning:

"We know several experiments in which various knowledge acquired as mirrors to transform your real image among others. We know more examples including physics which made it easier for their studies and daily life getting easier to understand in the classroom. "

"The visit has greatly contributed to our learning in both physics and chemistry. While visiting the CCTECA begin to see with physical eyes and saw that others can learn by playing."

"The CCTECA showed various physics experiments. We saw many interesting experiments many of them are part of our daily lives and did not even know. "

"The visit is important to acquire knowledge about various things seen in our day-to-day do not know where they came from and how they work. In addition to learning more about the physical matter that is important for everything, because everything is physical. "

"... was necessary for learning outside the classroom and a better understanding of the theories in practice. I could improve my physical skills among others. "

"The CCTECA helps to show another way that physics is not as bad as people think, it is also quite fun. The experiments are quite interesting with examples from everyday life, such as the human eye, soap bubbles, the hydroelectric power plant and several others. "

"All experiments were surprising and very curious (...) because some people had never seen and do see that everything is part of the physical (...) The CCTECA is approved."

"Acquiring knowledge about the physics, the origin of earth and life, and discover why many of the things experienced in everyday life, through our experiments and the video seen in the planetarium, as well as fun and interaction between teachers and students "

"The visit to CCTECA is of great importance for us visitors, because it shows us the fun side of studying physics in the various experiments as gyrotec, which simulates weightlessness with spinning circles and that is used in the training and NASA Force Air, which makes us acquire more knowledge we will use both at school and in our day-to-day. "

"It was important to learn some subjects, in theory, were flat and hard, but seeing all these very interesting experiments have become easier to be understood. We can see where all those issues apply in practice. In addition to better understand some things about electricity generation and energy

expenditure. It was also good to relax a bit, because being alone in the practice session, the matter becomes boring and an excursion like this, students interested in the subject because it makes learning fun. "

"Well, for us the importance of having known CCTECA, did we realize that physical theories is not only complex and complicated calculations, physics is everywhere, and if we stop to think and look around us and everything that revolves around us is physical, so we can better understand what to study it. "

"We remember things we already knew, we saw new things, we feel it is good to spend a lot more energy and had a goal to inform, educate and learn."

"The CCTECA is a great place of knowledge, several of the experiments we never hear or speak, they are all great, as the experiments is exceptional gyrotec leaves you feeling that in this zero-gravity (...) this short trip though, was remarkable for everyone. "

In papers written by students, was perceived the importance of this visit to learn, because some students who considered a physical discipline boring, the perception changed after this work, considering it useful for their lives, describing the importance in their daily and were able to realize that physics is everywhere.

This work also provided a critical sense of the same with respect to the use of electric power, and perception of information important to your life, when he reports that "the CCTECA is approved."

It was mentioned also the importance of content displayed outside the school environment, making learning more fun and contribute to a greater interaction between teachers and students.

5. FINAL CONSIDERATIONS

The ability to motivate students for learning in physics have been challenges for teachers of physics, we realized that carrying out an activity outside of school helps to arouse the interest of the students for physical knowledge, developing their creativity, especially in arouse the interest of the young science.

Besides being an excellent opportunity to develop an interdisciplinary activity, provided it is previously arranged. Allowing a greater interaction between teachers and students of the school community.

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