

Online Lunar Phases Workshop

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Abstract. This work presents the process of production, development, and presentation of an online didactic activity with the theme of the Moon phases. This workshop was developed over the years of 2020 and 2021, by the outreach program Itinerant Educational Observatory (Observatório Educativo Itinerante/OEI), from the Federal University of Rio Grande do Sul (UFRGS). The activity was created as a strategy to maintain our activities during the period of suspension of on-site activities at the university.

Resumo. Este trabalho apresenta o processo de produção, desenvolvimento e apresentação de uma atividade didática online com o tema das fases da Lua. Essa oficina foi desenvolvida ao longo dos anos de 2020 e 2021, pelo programa de extensão Observatório Educativo Itinerante (Observatório Educativo Itinerante / OEI), da Universidade Federal do Rio Grande do Sul (UFRGS). A atividade foi criada como estratégia para manter as nossas atividades durante o período de suspensão das atividades presenciais na universidade.

Keywords. Teaching of Astronomy — Moon

1. Introduction

Since 1999, the outreach program Itinerant Educational Observatory (Observatório Educativo Itinerante/OEI), of the Institute of Physics at UFRGS, promotes activities of scientific divulgation and qualification in teaching of science and astronomy for teachers, students, and science enthusiasts. In 2020 the measures of social distancing adopted due to the Covid-19 pandemic resulted in many challenges. Among them, the capacity of remotely carrying out activities capable of engaging and delighting participants in the same way as their in-person counterparts. Based on this proposal, we sought to adapt a face-to-face activity carried out with children, whose objectives were to introduce participants to the mechanisms that allow the observation of phases of the Moon; and, then guide them in making a simulator of lunar phases using simple materials.

The adaptation of this workshop to the virtual environment was guided and enriched by the dialogue with teachers from institutions linked to the project MCTI/CNPq Southern Stars: Journey through the Sciences (Estrelas do Sul: Viagem pelas Ciências), which contributed to our keeping a close eye on the objectives of educators, and the realities of students.

2. The virtual workshop

The theme of the lunar phases had already been the focus of activities carried out by the OEI with children, at the Planetarium Professor José Baptista Pereira, from UFRGS: in this activity, the participants were introduced, through an expository class, to the different movements of the Moon, and the mechanisms that allow the observation of its phases. Then, they were guided in the making of a simulator of the lunar phases, made with a sheet of paperboard and a styrofoam ball. The work by Saraiva et al. (2007), which introduces the simulator built in the workshop, was used as a starting point for the development of the virtual workshop, as well as for the study of the phenomenon of lunar phases.

The dynamics of the online activity was also inspired by Saraiva, Silveira & Steffani (2011), which discusses the conceptions of university students about the phases of the Moon. We used this work as a guide to elaborate a series of questions

made to the participants during the workshop. Our purpose was to promote reflection on their prior knowledge, as well as creating opportunities to present the theme from a scientific standpoint. Furthermore, the interactive lunar phases simulators developed by the University of Nebraska-Lincoln¹, together with the complementary materials available for download², provided another source of study and concrete visualization of the lunar phases.

Finally, based on constant dialogue with teachers from three institutions linked to the project Southern Stars: Journey through the Sciences (Estrelas do Sul: Viagem pelas Ciências) (IF/UFRGS), we developed a synchronous online activity, with moments of reflection, dialogue and interaction of the participants with the worked concepts. The virtual platform Nearpod was used to create an interactive slideshow, mixing moments of expository explanations with games, educational videos, exercises for reflection and fixation of concepts, and access to virtual simulators of the sky, in order to explore the lunar phases with a variety of approaches and frameworks, and to give ample opportunities to visualize the concepts covered.

The virtual workshop was presented synchronously in two online events, both free of charge and open to the public. The first presentation, carried out in December 2020 at an event in celebration of the National Day of Astronomy, had a diverse class of teachers and students, ranging from elementary school to undergraduate, in addition to students from two classes of 4^o grade of elementary school. In the second event, held on the International Day of Women and Girls in Science, we had a group of teachers and girls from the final stages of middle school. On both occasions, an anonymous evaluation questionnaire was made available, in which participants could leave their opinions and considerations about the activity. The interactivity with the audience and the variety of activities present in the workshop were appreciated by both educators and students who participated and contributed to their engagement throughout the duration of the activity.

¹ <https://astro.unl.edu/smartphone/asset2/>
<https://astro.unl.edu/smartphone/asset3/>

² <https://astro.unl.edu/nativeapps/>

3. Conclusions

During the elaboration, presentation and evaluation of this workshop, we were able to observe the importance and impact of approaching the same topic under different frameworks, and also contemplating playful aspects and different ways of learning. At the present time, we are adapting the activity so that students have more opportunities for reflection and protagonism in the construction of knowledge. In addition, we are finalizing the development of an auxiliary material for teachers, including a guide for the activity, study materials on concepts to be worked on during the workshop, and online tools that may enrich the lesson, so that the experiences of the activity can be propagated by more educators.

References

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