



Conceptual design of a didactic resistivity meter for support in educational learning at the Geosciences Museum at Federal Brasilia University (UnB)

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Abstract

Non-formal learning spaces such as museums or science fairs have the potential to develop pedagogical activities like theoretical-practical workshops with unique characteristics such as mediation, interactive environment, and customization based on the type of audience type and age range. When observing non-formal education in Geosciences, the potential for knowledge transmission in environmental themes and water resource management between educators and the public can be enhanced with the aid of geophysics. This work aims to develop a conceptual design for a benchtop resistivity meter for pedagogical classes on water resource management targeting elementary and high school students at the Geosciences Museum/UnB. It also encourages educators to replicate the project in science fairs or practical classes. In subsequent stages, an executive project, a prototype, the first version, and finally, the assembly of a pedagogical workshop will be developed. The methodology used is structured by a development flow of new equipment and product, where the first step includes elaborating the conceptual project based on equipment available on the market and owned by the Institute of Geosciences at Federal Brasília University. The second step involves the data survey of the necessary parts and components for the equipment's development. The third step focuses on elaborating a graphical model of the equipment, leading to the construction of a prototype. The fourth step encompasses the development of the executive project for the new equipment. For the assembly of the workshop, basic models of a porous and unconfined aquifer will be built, allowing students to understand the difference between the vadose zone and the saturated zone, as well as the application of physical principles for the identification of saturated and unsaturated zones, salt wedges, and regions contaminated by urban solid waste. The primary expected outcomes are to disseminate the importance of geophysics as a scientific discipline for societal development and highlight geophysical professionals' role in environmental and water resource management.