

Historic Instruments to Foster Authentic Learning of Physics. The Historical Collection of Physics Instruments of the University of Palermo

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Abstract. The study of historic physics instruments may be a powerful didactic tool in physics education, as the understanding of their use also in terms of the social, political, and scientific contexts they were designed and built can help students to see physics also from a cultural viewpoint and to foster authentic, in context learning. In this poster we describe some instruments of the Historical Collection of Physics Instruments displayed at the Department of Physics and Chemistry of the University of Palermo, Italy, and their uses in the historical context they were designed and built.

1 Introduction

All science teachers commonly agree on the fact that empirical inquiry is the hallmark of the natural sciences. So, it is hard to imagine learning science without observing natural phenomena and reproducing them in a controlled environment (i.e. doing "experiments") to isolate and study the quantities typical of the phenomena one considers relevant for their description and/or explanation. Experimentation substantiates and contextualizes scientific knowledge and understanding. Laboratory is a perfect environment to foster student authentic learning [1-3], as it allows them to think about the phenomena they want to study, to discuss them in specific contexts, solving real problems related to data collection and to build models representing the relationships among the quantities experimentally studied. In this way students can develop skills and attitudes, not only knowledge, which is just an intermediary step in the process.

In this view, it may be interesting for the learner to deepen the relationships between the laboratory instruments as artifacts and the natural phenomena they were designed to study, also from an historical point of view. For this reason it is common to find in many university science departments collections of historical instruments, often even specifically designed for didactical use, whose description is offered to the visitor and the student interested in understanding their use also in terms of their social, political, and scientific contexts.

In this poster we describe some instruments of the Historical Collection of Physics Instruments displayed at the Department of Physics and Chemistry of the University of Palermo, Italy [4-6], and their uses in the historical context they were designed and built. The oldest instruments date back to the early 19th century, when experimental Physics began to be taught in the University by using instruments and apparatuses. A remarkable input to the Collection was given when Domenico Scinà held the chair of Experimental Physics in 1811 at the old "Gabinetto di Fisica" of the "Reale Università degli Studi di Palermo". The Collection consists of more than 500 instruments, many of which have constituted part of the apparatuses used for scientific research. The Collection mainly concerns mechanical, acoustic, calorimetric, optical, electromagnetic and modern physics instruments made by manufacturers in France, Germany, England, as well as in Italy. Many of the earliest instruments were made in the physics laboratory of the Department. Although the oldest instruments were only employed for didactic demonstrations, the Collection faithfully reflects the main topics of the scientific research carried out in Palermo since the second half of the 19th century onward.

References

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