Teaching Science - Contributions of Research for Planning, Practice and Professional Development

J. Bernardino Lopes, José Paulo Cravino, Eliane de Sousa Cruz & António Barbot


From the Prologue
This book is written with two main audiences in mind: science education researchers and science teachers (or other educational professionals in technology and engineering). We think that this format is also ideal to disseminate more widely among professionals in science and technology education the research contributions and guidelines most relevant for their practice.

This book is the result of a collective work of research in science and technology education developed by our team, composed of 13 researchers from three different countries (Portugal, Brazil and Angola), over nearly 20 years. The research, developed in a scholarly context, has focused on science teaching practices, including inside the classroom, and on how to become more effective in promoting students’ learning quality. We looked at science teaching practices in different contexts: general education (from K-12 to higher education), initial teacher training and teacher professional development.

The book has 21 chapters and is organized in four parts:
Part I – Contributions of research to planning science teaching;
Part II – Contributions of research to science teaching practices;
Part III – Contributions of long-term research to improving science teaching practices;
Part IV – Contributions of research to professional development.

From the Preface by Christian Buty
The book you are beginning to read is a rare one. Very few are the research works in Science Education, which take into account the time factor on a long scale; fewer are those, which can document changes in teaching practices and professional development on a range of several years. [...] That is why the work, presented in this book, is important. It is the product and the consequence of a progressive construction, lasting almost twenty years. First the construction of a research team, former doctoral students becoming researchers. Second, the construction of a methodology, common to everybody, used to describe the classroom events in a sharable way. Third, the construction of a large panel of cases, observed during several years, in different countries, in different educational settings. And finally the emergence of a core-research question: the complex relationship between teachers’ professional development and the improvement of students’ learning.

In conclusion, I wish to emphasize the relevant model of the relationship between students’ learning and professional development, proposed figure 1.4 in the first chapter. In fact it is rather a model of
research about this relationship! This model implies the constitution of, and the involvement of a given teacher inside, two communities: a community of peers (teachers), and a community of teachers-researchers.

The community of research in science education can be grateful for this huge work to the editors and contributors of this book!

From the Preface by Jaume Ametller
This book is exceptional both in its scope and in several aspects of the research it reports. It presents a holistic proposal for improving science teaching covering from its planning and design to classroom practice, with a focus on professional development both in dedicated chapters and as one of the transversal themes. In presenting professional development on relation to the elements of professional practice, the book does not only touch upon current research in this area but also puts forward a view of professional development that is feasible for different educational systems.

Another notable aspect of the book is the longitudinal research it presents. This methodological aspect is too often absent from research in science education but, nonetheless, essential for obtaining reliable results on several aspects of science education research, particularly on relation to professional development which is known to depend on changes which require longer periods of time than the ones covered by most research in this area. The longitudinal studies presented in the book make a fundamental contribution on strengthening the overall results.

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