

A PLACE TO DISCOVER:
TEACHING SCIENCE AND TECHNOLOGY
WITH MUSEUMS

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FOREWORD

The publication of this volume is part of the education activities that distinguish the Museum of Science and Technology of Milan since its foundation. The presentation of the educational programmes of a range of European museums in the book contributes, in fact, to the understanding of both these institutions and the educational system in the respective countries. School teachers in all those countries would be the first to benefit from the use of such material as an important working tool. In addition, the book can also be of value to young people interested, today, in travelling and exploring other countries. Knowledge of schooling and the life of their peers in different places as well as knowledge of other institutions – especially museums – aimed at the dissemination of scientific and technological culture can certainly constitute the stimulus for further interest and learning.

The publication of the volume coincides with the 50th anniversary of the Museum of Science and Technology ‘Leonardo da Vinci’ of Milan, and with the 100th anniversary of the Deutsches Museum of Munich. Both institutions are preparing a number of initiatives in order to celebrate those aspects that have distinguished them in the course of these years. Among those, the commitment in education will be certainly emphasised as one of the fundamental aspects of these two, as well as other, museums.

My wish is that the European collaboration project ‘School-Museum cooperation for improving the teaching and learning of sciences’ will constitute the basis on which to develop a stronger and long-lasting collaboration between school and museum within all member-countries of the European Union, starting from the countries partners in this project.

Fiorenzo Galli
General Director

*Fondazione Museo Nazionale della Scienza e della Tecnologia
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PREFACE

Salvatore Sutura

Project director

Fondazione Museo Nazionale della Scienza e della Tecnologia 'Leonardo da Vinci'

Milano, Italy

It is with great pleasure that the Museum of Science and Technology 'Leonardo da Vinci' initiated and coordinates the project "*School-Museum cooperation for improving the teaching and learning of sciences*", of which this book is part. The project offers the opportunity for collaboration with important partners, such as the Deutsches Museum of Munich, the National Museum of Natural History of Budapest, the National Museum of Natural Sciences of Madrid, the Museum of Playing Cards in Turnhout, the Catholic College of the Kempen Region, the University Institute for Teacher Training of Lorraine, and the Regional Institute of Educational Research of Lombardia. It is financed by the European Union (Socrates programme), which I would like to thank also on behalf of all partner institutions.

The Museum of Science and Technology strongly wanted this project as a way for widening and enriching its already long experience with educational programmes for schools. The project sets the ground for exchange of expertise, not only between Italian institutions working in the field, but, more than that, between institutions at European level, aiming to identify the basis for joint work between schools and museums that would contribute to the dissemination of knowledge in science. Moreover, the SMEC project¹ represents a tool through which to contribute to reinforcing the importance of museums as educational resources for pupil learning and teachers' professional development; and, in consequence, to emphasise the role of education departments of museums as important sectors of museum institutions.

The SMEC project within the transformation of MNST

The establishment of a *Foundation* for the Museum of Science and Technology of Milano (MNST) sees a double educational aim brought forth: on the one hand, the Museum's historical identity is strengthened through emphasis on the collections; and on the other, an innovative approach to education is proposed, based on interactive activities such as those of a science centre.

Within the current institutional and organisational transformation taking place in MNST, the Education Department also goes through a period of change. Between 2002-2004 (at the same time as the SMEC project), the work of the Education Department will be devoted to the consolidation of the present education programmes, to the development of new services, but more than that, to the identification of the strategies necessary for making the Foundation a place with strong interactive educational approach and a setting for informal learning. Concurrently with the institutional transformation

¹ SMEC stands for 'School-Museum European Cooperation'.

proceeds a rethinking of the exhibition approach of the permanent collections, which will be improved through the organisation of specific sections and thematic areas.

In the context of a more general reform in the field of science museology, going on in both science museums and centres for the dissemination of science, the hypothesis on which MNST is working generates an interesting situation, taking especially into account the difficulties that several 'traditional' museums and science centres are facing in their role in education of the public. On the one hand, a single historical dimension hardly finds consensus within the museum audiences anymore, the young ones in particular. On the other, science centres, lacking that historical dimension that would make them part of the museum world, have been facing several problems. The latter seem though quite overcome today, since the science centres come out progressively able to make up a certain historical aspect. In this context, the choice of MNST matches tradition and innovation, a challenge the results of which will be more evident in the years to come.

Such a choice takes into account several practical issues as well: firstly, funding (public or private), which is still quite limited in Italy, in contrast with other European or American countries. Such a problem becomes more evident if we consider the fact that the MNST dimension is close to that of other big European museums, but its budget is much smaller (1/10 on average).

Secondly, science centres, like museums, are not born 'out of the blue'. Together with the need for a scientific and financial-managerial project, there is the need for a period of preparation, in which personnel, working on both organisation and realisation of activities, have to learn ways to work different from those of a traditional museum. In this context, thanks also to funding from the ministry of Education, University and Research, instead of closing MNST for that period of preparation, the choice made was to keep it open to the public during the renovation of its spaces, and to work towards the development of a structure that can offer educational services that several European museums are already able to offer: *in fact, 19 new interactive areas are operational.*

Thirdly, one important factor for evaluating the functionality of the museum project is the public that the museum is able to involve. Among the objectives is increasing the number of visitors and encouraging access to the Museum.²

The SMEC project within the educational mission of MNST

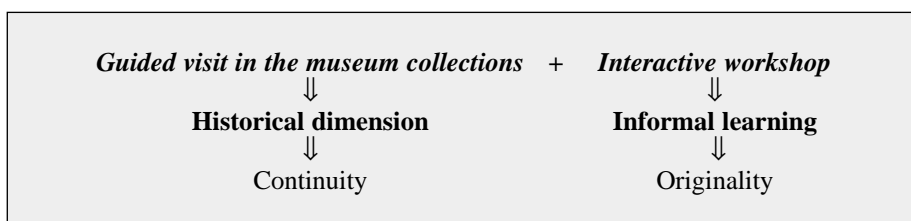
In the context of the development of supply of educational programs, MNST works also towards the development of activities for schools, activities for which the Museum has been distinguished from its beginnings. Those are built on two approaches: traditional guided visits to the Museum collections, and interactive activities focusing on the dissemination of scientific knowledge (especially physics, and then chemistry and biology). The dissemination of knowledge in technology was initially based (and partly still is) on the display of some big machines, some of them still functioning. The public, especially the school groups, are encouraged to engage manually and mentally, while knowledge transmission is built not on theoretical exercises, but on interactive experiments (Enrico Miotto, in this volume, offers more details on the educational methodology of the activities).

² Today the Museum receives 200.000 pupils and 20.000 teachers per year.

Schools are regarded as a particularly important museum public, for many reasons:

- they are strongly motivated, convinced of the immediate usefulness of the museum as extra-curricular resource which helps facilitating learning;
- the teacher sees education in museums as an important tool for enriching teaching projects;
- the museum visit can offer solutions related to understanding of concepts, to discovery learning, or problems of setting (i.e. some experiments cannot easily take place in class);
- the scientific and technological culture, especially strong among the young (through videogames, music, hi-tech products), is often generated not only within school but within other contexts as well.

An efficient methodology, as far as knowledge transmission is concerned, should be based on both historical dimension and interactive learning:



Such methodology should be guaranteed through a continuity of educational offer and of specialised personnel. In this line, the objectives of the MNST for the period 2003-2005 can be summarised as follows:

- reinforce the quality of the existing interactive workshops;
- devise and realise new interactive workshops (two per year);
- increase and strengthen collaboration with schools;
- become specialised as centre for training, especially for teachers;
- devise a project for the creation of a Science Centre within the foundation, which takes into account the long experience of the Museum in education;
- disseminate, at local, national and European level, the museum educational experience and projects;
- use the web as distance learning and dissemination tool.

Among the objectives of the educational activities of MNST is the increase of the number of school children (from 200.000 to 300.000). Quantitative increase has, though, to correspond with quality improvement, possible through the evolution of the educational policy along lines already successfully experimented in the last years.

The contribution of the SMEC project to the relationship between school and museum

The increasing use of museums by schools emphasises the need for developing a close relationship between the two institutions and for considering the museum as one among the fundamental resources for teaching and learning. Collaboration between schools and

museums means on the one hand respect of identities and needs of the two institutions, and on the other, rethinking of the stereotype – unfortunately still valid – of the visit as a mere annual outing, and of the museum as an old place that has little to offer to young people. For this reason, the development of a regular and long-term relationship offers the opportunity to teachers to ‘live’ the museum, to engage in its choices and activities and to contribute to the research for improvement, helping the museum become able to play an active role in society, especially for young people.

On the other hand, the museum can help improve the use of its resources by schools by encouraging contact between teachers and museum educators. Opportunities for meetings with staff offer the information and support necessary for the organisation and creative use of the visit. For example, a sequence of more than one visit results particularly effective for pupils’ learning, whereas the enjoyment aspect of the pedagogical methodology adopted by museums stimulates interest to know more. Independently of the museum type, work with schools should be studied, devised and carried out on the basis of the following principles:

- work with schools should be developed on the basis of themes of common interest, using resources available in both institutions (including new technologies);
- the development of school networks (both local or/and more extended ones) working on a common topic helps exchange of experience and expertise and the development of contacts with more than one museum (in each locality), and enhances participation and knowledge transmission;
- dissemination of the work carried out by schools with museums is important in order not only to make such work more known to the territory, but also in order to offer its results for use by other realities.

For all this it is important that both educational methodologies and competences of those professionals involved in joint school-museum projects are compared and developed. In this sense the SMEC project is particularly important, because it offers the ground for exchange of experiences in the field, and of knowledge and competences necessary for the development of tools for use by teachers and museum educators that contribute to learning, understanding, and dissemination of science in society.