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Editors

Children and Sustainable Development

Ecological Education in a Globalized World



 Springer

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Canticle of the Creatures

Most high, all powerful, all good Lord! all praise is yours, all glory, all honor, and all blessing. To you, alone, Most High, do they belong. no mortal lips are worthy to pronounce your name.

Be praised, my Lord, through all your creatures, especially through my lord Brother sun, who brings the day; and you give light through him. and he is beautiful and radiant in all his splendor! of you, Most High, he bears the likeness.

Be praised, my Lord, through sister Moon and the stars; in the heavens you have made them, precious and beautiful.

Be praised, my Lord, through Brothers Wind and air, and clouds and storms, and all the weather, through which you give your creatures sustenance.

Be praised, My Lord, through sister Water; she is very useful, and humble, and precious, and pure.

*Be praised, my Lord, through Brother Fire,
through whom you brighten the night.
He is beautiful and cheerful, and powerful
and strong.*

*Be praised, my Lord, through our sister
Mother Earth, who feeds us and rules us, and
produces various fruits with colored flowers
and herbs.*

*Be praised, my Lord, through those who
forgive for love of you; through those who
endure sickness and trial. Happy those who
endure in peace, for by you, Most
High, they will be crowned.*

*Be praised, my Lord, through our sister
Bodily Death, from whose embrace no
living person can escape. Woe to those who
die in mortal sin! Happy those she
finds doing your most holy will. The second
death can do no harm to them.*

*Praise and bless my Lord, and give thanks,
and serve him with great humility.*

Francis of Assisi

Preface

The present book, “Children and Sustainable Development. Ecological Education in a Globalized World,” represents the fruit of a series of presentations and discussions drawn from the Pontifical Academy of Sciences’ workshop “Children and Sustainable Development: A Challenge for Education,” held at the Vatican in November 2015. This conference was directly inspired by the previous workshop, “Sustainable Humanity, Sustainable Nature: Our Responsibility,” at which leading scientists gathered at the Pontifical Academy in April 2014 to reflect on the projected impact on society posed by climate change and social justice.

This latest volume testifies to the long-standing interest of the Pontifical Academy in areas pertaining to education, especially in topics involving science, as expressed in the previous notable workshops “The Challenges for Science: Education in the 21st Century” (2001); “Globalisation and Education” (2005); and “Bread and Brain: Education and Poverty” (2013).

“Children and Sustainable Development” was attended by participants from many different nations, covering a great variety of disciplines—drawn from across the natural as well as the social sciences—boasting rich expertise in educational research.

The workshop included a number of testimonies, dealing with bottom-up practical activities in both developing and developed countries, many of which were directly related to science education, climate change, and the environment.

The theme and the timing of this workshop were motivated by the conjunction, in 2015, of three exceptional events, namely:

- the United Nation’s proclamation of the Sustainable Development Goals (SDGs), especially SDG#4 on universal education and SDG#10 on reduced inequalities (September 2015);
- the Conference of Parties on Climate Change (COP21 December 2015), concluded by the signing of the Paris Agreement;
- most significantly, Pope Francis’s Encyclical Letter “*Laudato Si’* On care for our common home,” which makes a plea for an “ecological education and spirituality” (May 2015).

The workshop underlined that having an adequate education for the next generation would be a decisive factor in the success of these three sources of inspiration given to humanity. To explore these themes in more detail, a broad spectrum of perspectives was presented, covering topics extending from scientific analysis of global warming and its environmental impact, to experimental research on cognitive learning and child development, teaching practices, pilot projects, and large-scale innovative implementation in education.

Participants considered the most diverse cultural, social, and economical environments, paying special attention to the poor and to child empowerment—a relatively new idea indeed! In this respect, a key relevant contribution was the testimony of young students themselves, drawn from several countries, who gave vivid accounts of their own life experiences in different educational environments (Part IV).

This present tome is organized over five parts and thirty-two chapters, containing contributions written by the speakers on the basis of their presentations at the workshop:

Part I—Environment, Climate and Education

Part II—How Could Education Evolve in a Diversity of Contexts?

Part III—Children, Students and Teachers

Part IV—The Voice of Children and Teenagers on Sustainability and Climate Change

Part V—Values and Perspectives.

The recommendations adopted by the participants and presented in Chap. 31 result from the extensive roundtable discussions held at the end of the workshop. We sincerely hope that the ideas presented—and the network of actors who met during the workshop—will contribute, at the global as well as local levels, to motivate educators, scientists, and policy makers to innovate and to act.

We are most grateful to His Holiness Pope Francis for his encouragements to hold this workshop hosted by the Pontifical Academy of Sciences, and to His Eminence Cardinal Peter Appiah Turkson, President of the Pontifical Council for Justice and Peace, who closed the workshop with an inspiring plea for action and solidarity for the sake of the common good of our endangered planet.

We acknowledge the generous support of Mrs. Courtney Sale Ross, Honorary President of the workshop. We would like to close in thanking all of the authors for their contributions, and to everyone at Springer for their dedication and support in publishing this book.

Buenos Aires, Argentina
 Paris, France
 Vatican City, Holy See (Vatican City State)
 Bonn, Germany

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Word of Opening

As President of the Pontifical Academy of Sciences, I am pleased to present this book, which contains the contributions of the participants to our Workshop on *Children and Sustainable Development*.

I simply summarize here the major mission and activities of our academy. We follow the current developments of available scientific knowledge and of the applications by technologies principally aimed at the benefit of mankind and its environment. This allows us to address the recommendations to the Church and generally to the political leadership. We defend the view that established scientific knowledge has cultural values. Updated knowledge on the laws of nature enriches our orientational knowledge that exerts its impacts on decisions to be taken in the course of our lives. A part of such decisions concerns the use of practical, technological applications of scientific knowledge for innovations contributing to the shaping of the future. Cultural values can in fact also be seen in technological developments that contribute to facilitate our living conditions without harmful impacts on the long-term sustainable development. In this context, it is essential that all members of humankind obtain a qualified education. Our deliberations, presented in the present book, will hopefully contribute positively to an important goal: providing an appropriate education to all human beings as a basis for the shaping of our sustainable development.

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Presentation of the Workshop¹

In May 2014, the Pontifical Academies jointly held an excellent Workshop on Sustainable Humanity, Sustainable Nature: Our Responsibility. A remarkable series of contributions produced a clear picture of the issues and stressed the urgency to act. It also raised the need for spiritual and moral leadership. But the workshop stopped short of elucidating the role of education in the changes to come and making proposals for action in this direction. These essential questions form the basis of the present book.

The goal is to build, through education, an inclusive society in which all people can have the resources to develop a life project in harmony with their culture and beliefs, transcultural universal values, and respect for the environment. Children must develop an approach open to the other as oneself so that the world, without losing the richness of diversity, can become ever-more integrated. To prepare their active participation in the common good, promoting a cooperation between students in their relationships with civic awareness, and valuing cooperation and solidarity above all forms of competitive selfishness are essential. Cognitive and health sciences provide today a better understanding of the way children grow, from birth onward, and develop their cognitive abilities not only to read and write but also to reason, as well as their emotional senses and empathy.

In many countries, one may already observe that “education for sustainable development” is becoming part of the agenda of education leaders and authorities. As science plays an essential part in the acceptance and understanding of the issues, it appears that science education of children and youngsters (and their parents) is at the heart of the action; hence, this new workshop is convened by the Pontifical Academy of Sciences. Progress in general education is slow and the United Nations Millennium Goals for the period 2000–2015 have not been achieved, although some progress has been noticeable in various parts of the world, including Africa

¹This Argument was prepared in a collective manner to focus the Workshop, then finalized by the present author. Translations of this introductory text in French, Italian, and Spanish may be found at casinapioiv.va/content/dam/accademia/booklet/booklet_children.pdf.

and Asia. Progress in science education is much slower, despite the efforts of science academies, Unesco, and some private institutions. The number of poorly educated children is increasing, affected by population migrations, urban uprooting and poverty, wars, forced labor, refugees conditions, and other changes of migrant work force. In many countries, especially developed ones, anti-science movements arise questioning the ability of scientists to arrive at some truth about natural phenomena, showing a poor understanding of the nature of scientific reasoning and a lack of confidence in the scientific institutions which disseminate the results of research. In other countries, parents and sometimes official agencies, basing themselves on religious principles, oppose scientific evidence to the detriment of children. In both cases, the lack of understanding, by the general public, of the nature of science is evident: It has not been transmitted by a proper education pattern.

Today's children will be the adults of tomorrow, confronted with the consequences of today's actions or inactions. More important even, they will be the ones to act, and to act properly if properly prepared. Education has to convey to them hope, not despair or grim perspectives, giving them self-confidence in their intelligence. Hope and trust in human capabilities need to be first embedded in a solid knowledge and then deeply rooted in a message of spiritual nature, since so many factors could lead these children, students in today's schools, to despair. Children are of special concern in the Gospel (Mat 19, 13–15), and education, not only religious, has always been treated as an essential gift to humanity by the Church. The Church itself having millions of students in catholic schools, and these can therefore play a significant role. Indeed, in Chap. 6, the Encyclical Letter *Laudato Si'* makes a plea for "education and ecological spirituality."

Schools in today's world are confronted with massive urban migrations, the digital revolution, the lack of qualified teachers and their low income, the explosion of scientific knowledge, and the deep changes in jobs requiring new skills. It is in this context that schools will have to absorb the Sustainable Development Goals, proclaimed by United Nations in the fall of 2015, and to reconsider their science education in order to deal with interdisciplinary complex issues which demand a new vision. There lies a formidable task in connecting education with the urgency of the issues of climate, development and sustainability, caring for poverty, inequalities, and social conditions.

At the end of the workshop, a global discussion will lead to the establishment of guidelines for action.

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