

University of Groningen

Science education reform

Avraamidou, Lucy; Bryan, Lynn

Published in:
13 Questions

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2017

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Avraamidou, L., & Bryan, L. (2017). Science education reform: Reflecting on the past and raising questions for the future. In L. A. Bryan, & K. G. Tobin (Eds.), *13 Questions: Reframing Education's Conversation: Science* (pp. 401-418). Peter Lang.

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

13 Questions

Reframing Education's Conversation:
Science

Edited by
Lynn A. Bryan and Kenneth Tobin



PETER LANG
New York • Bern • Frankfurt • Berlin
Brussels • Vienna • Oxford • Warsaw

Library of Congress Cataloging-in-Publication Data

Names: Bryan, Lynn A. (Lynn Ann), editor. | Tobin, Kenneth George, editor.
Title: 13 questions: reframing education's conversation: science /
edited by Lynn A. Bryan, Kenneth Tobin.
Other titles: Thirteen questions
Description: New York: Peter Lang, 2018.
Series: Counterpoints. Studies in criticality; vol. 442 | ISSN 1058-1634
Includes bibliographical references and index.
Identifiers: LCCN 2016045990 | ISBN 978-1-4331-2780-9 (hardcover: alk. paper)
ISBN 978-1-4331-2779-3 (paperback: alk. paper) | ISBN 978-1-4331-4574-2 (ebook pdf)
ISBN 978-1-4331-4575-9 (epub) | ISBN 978-1-4331-4576-6 (mobi)
Subjects: LCSH: Science—Study and teaching.
Classification: LCC Q181 .T46 2017 | DDC 507.1—dc23
LC record available at <https://lccn.loc.gov/2016045990>
DOI 10.3726/b11305

Bibliographic information published by **Die Deutsche Nationalbibliothek**.
Die Deutsche Nationalbibliothek lists this publication in the “Deutsche
Nationalbibliografie”; detailed bibliographic data are available
on the Internet at <http://dnb.d-nb.de/>.

The paper in this book meets the guidelines for permanence and durability
of the Committee on Production Guidelines for Book Longevity
of the Council of Library Resources.



© 2018 Peter Lang Publishing, Inc., New York
29 Broadway, 18th floor, New York, NY 10006
www.peterlang.com

All rights reserved.

Reprint or reproduction, even partially, in all forms such as microfilm,
xerography, microfiche, microcard, and offset strictly prohibited.

Printed in the United States of America



Table of Contents

List of Figures.....	xi
Foreword: We Must Kill Our Darlings	xiii
Shirley R. Steinberg	
Chapter One: Of Eggs, Chickens, and Deep-Seated Ideologies.....	1
Lynn A. Bryan and Kenneth Tobin	
Section One: The Science Curriculum: What Are the Basics and Are We Teaching Them?	5
Chapter Two: The Science Curriculum at the Elementary Level: What Are the Basics and Are We Teaching Them?	7
Christina Siry	
Chapter Three: The Science Curriculum: What Are the Basics and Are We Teaching Them?	17
Femi S. Otulaja and Meshach B. Ogunniyi	
Chapter Four: Science Education and Transformative Activist Stance: Activism as a Quest for Becoming via Authentic-Authorial Contribution to Communal Practices	33
Anna Stetsenko	

Section Two: Power and Science Education: Who Decides the Forms Science Education Has Taken and Who Should Decide? 49

- Chapter Five: What Can Teachers Do to Restructure Power Dynamics in Science Classrooms? Exploring the Personal and Social Transformative Power of Science Learning through a Funds of Knowledge Approach. 51
Sara Tolbert, Angela Calabrese Barton, and Luis C. Moll
- Chapter Six: STEM Education as “Trojan Horse”: Deconstructed and Reinvented for All 69
Larry Bencze, Michael J. Reiss, Ajay Sharma, and Matthew Weinstein

Section Three: Science Teachers Under Suspicion: Is It True That Science Teachers Aren’t as Good as They Used to Be? 89

- Chapter Seven: Obsessed with Accountability? Science Teachers Under the Microscope 91
Shakhnoza Kayumova and Deborah J. Tippins
- Chapter Eight: En Route to Becoming a “Good” Teacher: An Attempted Hijack of Pedagogical Autonomy? 103
Giuliano Reis

Section Four: Science Students Under Suspicion: Is It True That Students Are Less Interested in Science Than They Used to Be and Perform More Poorly in Science Than They Used to? 115

- Chapter Nine: Problematizing “Problematic” Students in Lower Track Classes 117
Tang Wee Teo
- Chapter Ten: Confronting Prevailing Narratives of Student Engagement and Participation in Science Classrooms. 125
Sonya N. Martin

Section Five: Science Teacher Education: What Is Good Science Teaching and How Do We Teach People to Be Good Science Teachers? 149

- Chapter Eleven: Professional Duties and Challenges of Novice Teachers: Level of Consciousness in Facing the Pedagogical Risk 151
Maurício Pietrocola
- Chapter Twelve: Science Teacher Professional Development: The Blind Men and the Elephant. 161
Aik-Ling Tan

Section Six: (In)Equity and Science Education: In What Ways**Does (In)equity Affect the Process of Science Education? 169**

- Chapter Thirteen: Science Education and Social Inequality:
 Reproduction or Confrontation? 171
 Flavia Rezende and Fernanda Ostermann
- Chapter Fourteen: Dialectical Relationships and How They Shape
 (In)Equitable Science Learning Spaces and Places. 183
 Maria Varelas
- Chapter Fifteen: Race and Poverty in Science Education: Questions and
 Tensions for the Field. 193
 Maxine McKinney de Royston and Abiola A. Farinde
- Chapter Sixteen: Dismantling Racism as a Strategy for Academic Success. 215
 Ana M. Becerra
- Chapter Seventeen: In What Ways Does Race Affect the Educational
 Process? Challenging the Homogenization of Academia. 231
 Carolina Castano Rodriguez and Laura Barraza
- Chapter Eighteen: “Where Is the . . .?”: Using Intersectionality to Problematize
 Power and Hierarchy in Science Teaching and Learning. 243
 Kathryn Scantlebury

Section Seven: Language and Science Education: In What Ways**Does Language Affect the Process of Science Education? 251**

- Chapter Nineteen: Reconstructing Science Education within the
 Language | Science Relationship: Reflections from Multilingual Contexts. . 253
 Sara E. D. Wilmes, Christina Siry, Roberto Gómez Fernández, and
 Anna Maria Gorges
- Chapter Twenty: The Tension of Maintaining Language Diversity
 versus Extinction: Mother Tongue as a Filipino Response. 267
 Purita P. Bilbao, Deborah J. Tippins, and Sophia (Sun Kyung) Jeong
- Chapter Twenty-One: How Perspectives from Linguistically Diverse Classrooms
 Can Help All Students Unlock the Language of Science. 273
 Cory Buxton, Lourdes Cardozo-Gaibisso, Yu Xia, and Jiong Li

Section Eight: Religion and Science Education: In What Ways**Does Religion Affect the Process of Science Education? 293**

- Chapter Twenty-Two: Why a Chapter on Religion in a Book on
 Science Education? 295
 Michael J. Reiss

Chapter Twenty-Three: Religion in Science Classes: Heresy or Constructive Pedagogy?..... 313
 Nidhal Guessoum

Section Nine: Families and Science Education: What Is the Role of Families in the Process of Science Education? 327

Chapter Twenty-Four: Exploring Families’ Roles in Science Learning: From El Bosque in Veracruz, México to the Southeastern U.S..... 329
 Martha Allexsaht-Snider

Chapter Twenty-Five: From Opening Portals to Creating New Pathways 339
 Leanne M. Avery

Section Ten: Culture of Science and Science Education: In What Way Does the Culture of Science and Images of Science Affect the Process of Science Education? 359

Chapter Twenty-Six: Forming Bonds—Breaking Bonds 361
 Anita Hussénus

Chapter Twenty-Seven: On the Need to Engage in Constructive, Productive, Scientific Discourses on Highly Controversial and Emotionally Charged Topics 375
 Cassie F. Quigley and S. Megan Che

Section Eleven: Science Education Reform: What Have Been the Goals and the Effects of the Attempts to Improve Science Education Over the Last Decade? 389

Chapter Twenty-Eight: Science Education Reform: Can Students Learn Science While Navigating Oppressive Schools within an Oppressive Society?..... 391
 Rowhea Elmesky

Chapter Twenty-Nine: Science Education Reform: Reflecting on the Past and Raising Questions for the Future 401
 Lucy Avraamidou and Lynn A. Bryan

Section Twelve: Science Education as a Political Issue: What’s Missing in the Public Conversation About Science Education?..... 419

Chapter Thirty: Rethinking Science Education in Light of Motivated Reasoning..... 421
 David E. Long

Chapter Thirty-One: Sociopolitical Activism and Transformative Learning: Expanding the Discourse About What Counts in Science Education.	437
Lyn Carter, Carolina Castano Rodriguez, and Mellita Jones	
Section Thirteen: Science Education Visions: What Is School Science for and What Should We Be Doing in the Name of Science Education?	453
Chapter Thirty-Two: Breaking Down Enlightenment Silos: From STEM to ST ² EAM Education, and Beyond.	455
Elisabeth (Lily) Taylor and Peter Charles Taylor	
Chapter Thirty-Three: Science Education in the Key of Gentle Empiricism.	473
Lee Beavington and Heesoon Bai	
Chapter Thirty-Four: When Holism Meets Democratization: Re-centering Science Classrooms to Support Students' Feelings of Agency and Connectedness.	485
Isabel Martínez-Cuenca, Autumn Joy Florêncio-Wain, and Alandem W. Oliveira	
Contributor Biographies	503
Subject Index.	517
Names Index	533