United Nations Educational, Scientific and Cultural Organization

International Bureau of Education

IBE SPECIAL ALERT
STEM EDUCATION

IBE May 2016

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The steady decline of enrollment of young people in science and the shortage of engineers is cause for concern. More young people need to choose engineering or science as a career and making that choice depends on access to the necessary science, mathematics, technology, and engineering (STEM) curriculum.

(UNESCO Natural Sciences)

The IBE has compiled this list of resources on STEM education to assist curriculum developers, researchers and practitioners. The first section focuses on K-STEM curriculum. Other sections include case studies, guides and tools, policy papers, reports related to STEM education.

The *Links* section provides the URLs for programmes such as: *The Connectory, IBE In-Progress Reflections No. 3, STEM education coalition etc.* where their numerous papers and reports may be consulted.

Most of the publications and documents are freely accessible online. Direct access to the materials is indicated by the symbol: @

View all IBE Alerts and Digests

K-12 STEM curriculum

@ Advancing the "E" in K-12 STEM Education
R. Rockland et al. Journal of Technology Studies, 2010

@ A Framework for K-12 Science Education. Practices, Crosscutting Concepts, and Core Ideas
The National Academies Press, 2012

@ The Future of STEM Curriculum and Instructional Design: A Research and Development Agenda for Learning Designers
Center for the Study of Mathematics Curriculum, 2010

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Hanover Research, 2011

@ National STEM school education strategy 2016 – 2026
Education Council, December 2015

@ NYC STEM Education Framework
NYC Department of Education, (2015)

@ Prepare And Inspire: K-12 Education In Science, Technology, Engineering, And Math (Stem) For America's Future
Executive Office of the President, President's Council of Advisors on Science and Technology, 2010

@ Science in the New Zealand Curriculum e-in-science
Cathy Buntting, Ministry of Education, 2012

@ Science in the New Zealand Curriculum e-in-science. Milestone 2: Scoping the possibilities
Cathy Buntting, Ministry of Education, 2012

@ Science in The New Zealand Curriculum: Years 5 to 8
Education Review Office, 2012

@ Shaking up Pre-Calculus: Incorporating Engineering into K-12 Curricula
C. Sabo et al. Advances in Engineering Education, 2014

@ STEM integration in K-12 education: status, prospects, and an agenda for research
M. Honey et al. National Academies Press, 2014

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Lyn D. English, English International Journal of STEM Education, 2016 (ProQuest)

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Capraro, M. M., & Nite, S. B.
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@ Strengthening Mathematics Education in Sri Lanka
Aturupane, Harsha et al. Discussion PaperSeries, World Bank, July 2011

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Aturupane, Harsha et al. Discussion PaperSeries, World Bank, August 2011

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National Research Council, 2011

@ Teaching STEM by Design
K. Billiar et al. Advances in Engineering Education, 2014

@ Voices from the Past: Messages for a STEM Future
Kelley, Todd R. Journal of Technology Studies, 2012

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@ Innovate: A Blueprint for STEM Education in California Public Education
Californians Dedicated to Education Foundation, 2014

@ Sparking Innovation in STEM Education with Technology and Collaboration. A Case Study of the HP Catalyst Initiative
Kiira Kärkkäinen, Stéphan Vincent-Lancrin, OECD Education Working Paper No. 91, 2013

@Supporting Scotland's STEM Education and Culture
Science and Engineering Education Advisory Group (SEEAG), 2012

@Teachers' Perceptions of Rural STEM Teaching: Implications for Rural Teacher Retention
K.P.S. Goodpaster et al. Rural Educator, 2012

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@ Fact Sheet: Women in science
UNESCO Institute for Statistics, 2015
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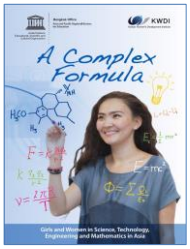
@ Gender Differences in Interest, Perceived Personal Capacity, and Participation in STEM-Related Activities
Katherine Weber, Journal of Technology Education, v24 (1), 2012

@ Gender indicators in science, engineering and technology
Sophia Huyer & Gunnar Westholm, UNESCO, 2007



@ Girls and Women in Science, Technology, Engineering and Mathematics in Asia
UNESCO Office Bangkok; Seoul, KWDI, 2015

@ Guidance Booklet for Teaching and Professional Staff in HE and FE
UKRC, 2012

Inside the Double Bind: A Synthesis of Empirical Research on Undergraduate and Graduate Women of Color in Science, Technology, Engineering, and Mathematics
Maria Ong et al. Harvard Educational Review Vol. 81 No. 2, 2011

@ Psycho-Social Determinants of Gender Prejudice in Science, Technology, Engineering and Mathematics
Nnachi, N. O.; Okpube, M. N., Journal of Education and Practice, v.6(17) 2015

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Soo Boon Ng, Ministry of Education Malaysia, UNESCO IBE, 2016
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The American Association of University Women (AAUW), 2013

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@ Why So Few? Women in Science, Technology, Engineering, and Mathematics
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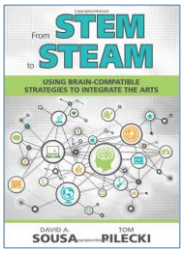
Guidelines, Manuals, Tools, etc.



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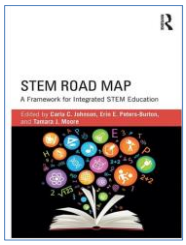

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Brigid Freeman et al. Routledge, 2015
ISBN: 978–1–138–78595–3

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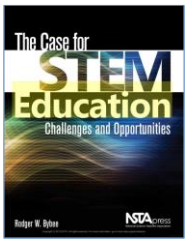

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@ Beyond the Pipeline: STEM Pathways for Youth Development
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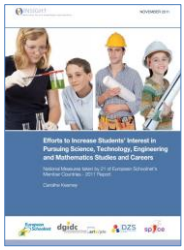

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Mohammad Ehsanul Karim et al., EPFL, 2015

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Anna Smolentseva, Higher School of Economics, ACOLA, 2013

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Michael Kahn, Stellenbosch University ACOLA, 2013

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Subotnik, R. F. et al. Roeper Review 32, 2010

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Blackley, Susan; Howell, Jennifer . Australian Journal of Teacher Education, 2015

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Jae-Eun Jon and Hae-In Chung, ACOLA, 2013

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@ Answering the Call to Improve STEM Education: A STEM Teacher Preparation Program
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Stohlmann, Micah et al. Journal of Pre-College Engineering Education Research (J-PEER). V. 2(1), Article 4, 2012

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Akaygun, Sevil and Aslan-Tutak, Fatma, International Journal of Education in Mathematics, Science and Technology, v.4 (1), 2016

@ Teacher Education That Works: Preparing Secondary-Level Math and Science Teachers for Success with English Language Learners through Content-Based Instruction
M. DelliCarpini, O.B.Alonso,Global Education Review, 2014

@ Where Is the "E" in STEM for Young Children? Engineering Design Education in an Elementary Teacher Preparation Program
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AFRICA

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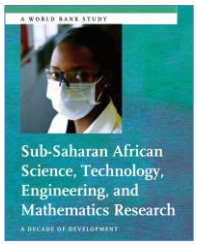

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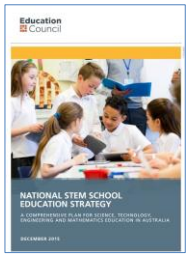

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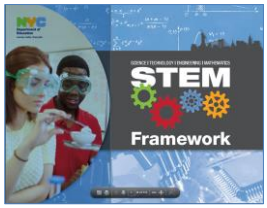

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Hugo Horta, ACOLA, 2013

Dominican Republic

@ Llevando las Ciencias, la Ingeniería, la Tecnología y la Matemática a la Escuela: Pequeños Científicos
Izaskun Uzcanga et al. LACCEI, January 2015

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UNESCO

@ UNESCO Science Report: towards 2030
UNESCO, 2015

@ UNESCO Report Engineering: Issues Challenges and Opportunities for Development
UNESCO, 2010

Links

ACOLA
Australian Council of Learned Academies

The Connectory
Offers a comprehensive collection of STEM opportunities and programs

Global Stem Alliance

STEM education center London

STEM Education Coalition

2016 STEAM/STEM Education Conference

Sciences à l'Ecole

The STEAM Journal

STEM to STEAM

Science, Technology, Engineering and Math: Education for Global Leadership
US Department of Education

FORUM: Girls in Stem

The third issue of the IBE In-Progress Reflections series on Current and Critical issues in the Curriculum and Learning, entitled 'Sharing Malaysian Experience in participation of Girls in STEM Education,' seeks to further promote policy and technical dialogue around STEM education focused on girls. Join the conversation!

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BUREAU OF EDUCATION

www.ibe.unesco.org
Tel +41.22.917.78.00 – Fax +41.22.917.78.01

Postal address
P.O. BOX 199, 1211 Geneva 20, Switzerland

Street address
15 Route des Morillons, 1218 Le Grand-Saconnex,
Geneva, Switzerland

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