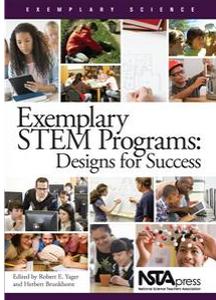


Book Review

JOHN STILES

*Institute for the Promotion of Science and Technology (IPST)
Bangkok 10110, Thailand*



Exemplary STEM Programs: Designs for Success. Yager, R.E. and Brunckhorst, H., eds. Arlington, Virginia USA: NSTA Press, (National Science Teachers Association) 2014. 461 pages

The latest in the NSTA (National Science Teachers Association) series of Exemplary Science publications, *Exemplary STEM Programs: Designs for Success*, is a compilation of twenty exemplary STEM models in the United States, written by classroom teachers, teacher educators and researchers. The editors, Robert Yager and Herbert Brunckhorst, both well-known science educators, together have dedicated a century to teaching and learning. This monograph is a wealth of information about STEM education, presented in detail by outstanding educators. Each chapter presents a model project or initiative in a thorough narrative that describes and explains how the project was developed and field tested, and how positive results were achieved.

The book covers all levels, from designs for early childhood classrooms through elementary, middle and high school, in urban, rural and small town settings, and includes examples of models for inclusion in which every student is engaged in STEM learning. The book also has a chapter that describes a successful program that develops teacher and administrator leadership in STEM education. Although most chapters are about science programs that incorporate STEM connections, there are also descriptions of how the content areas of mathematics, English literacy and technology integrate STEM models.

As Yager explains in the Forward, "The goal of this monograph was to provide 24 chapters...that showed major emphasis concerning success with student learning." In reviewing over 100 submissions for the monograph, Yager and Brunckhorst found that many showed no evidence of successful learning by students. Each of the examples in this book, therefore, includes such evidence, giving statistical support to the innovative designs. The submitted drafts were also required to connect to and reference the *Next Generation Science Standards (NGSS)* and *A Framework for K-12 Science Education*.

Nearly every chapter follows the same outline: 1. Setting (where the author(s) work and the described program is implemented); 2. Overview (specific features of the STEM program); 3. Major features of the instructional program (in light of STEM reform for program success); 4. Evidence of success (how do you know it is effective?); 5. Next steps (what is proposed for use of the data?).

The chapters are well written, with detailed descriptions of the projects, accompanied by statistical evidence of the program's success as measured by student learning. Ample graphics illustrate each chapter. For example, in Chapter 2, *Science in our backyard: How a school is turning its grounds into a living lab*, written by Jyoti Gopal and Ella Pastor of the Riverdale Country School in the Bronx, New York City, the authors describe how an urban school was transformed into one in which pre-kindergarten through grade 5 students daily experience inquiry learning in "the natural world". The chapter includes 22 photos of students engaged in projects, such as nature walks, garden study, organic and inorganic litter study, composting and soil study, dendrology and hydrology. This particular chapter, while rich in describing an exciting elementary STEM program, lacks substantive evidence of its success, describing rather than presenting quantitative information.

Other chapters, however, include in-depth data regarding student learning, such as in Chapter 20, *Like a scientist: Using problem-based learning to connect practice with content in STEM education*, written by Donna Sterling, Mollianne Logerwell and David Long. The authors describe a teacher professional development center at George Mason University in Fairfax, Virginia, in which classroom teachers participated in a summer project in which they designed STEM curricula and lessons, and practiced implementation in a risk-free environment. Participants were assessed using a science content knowledge instrument and a questionnaire about the teachers' views of the Nature of Science. Results are presented in five tables of detailed analyses. A table of growth in science knowledge by students who attended an accompanying summer camp is also included.

The book presents innovative STEM lessons and programs by classroom teachers and university researchers in an easy to read style, with illustrations of student work, charts and photos. As noted earlier, some chapters are weak in assessment, but give extensive descriptions of exemplary STEM projects. Other chapters include detailed data regarding evidence of student and teacher learning. If your school or district is considering implementing a STEM program or adding a component to its instructional program, this book is highly recommended as a resource.



John Stiles is a former science teacher, science consultant and professor of elementary education. He is currently a science curriculum advisor for the Institute for the Promotion of Teaching Science and Technology (IPST) in Bangkok. He is also Editor-in-Chief of K-12 STEM Education.