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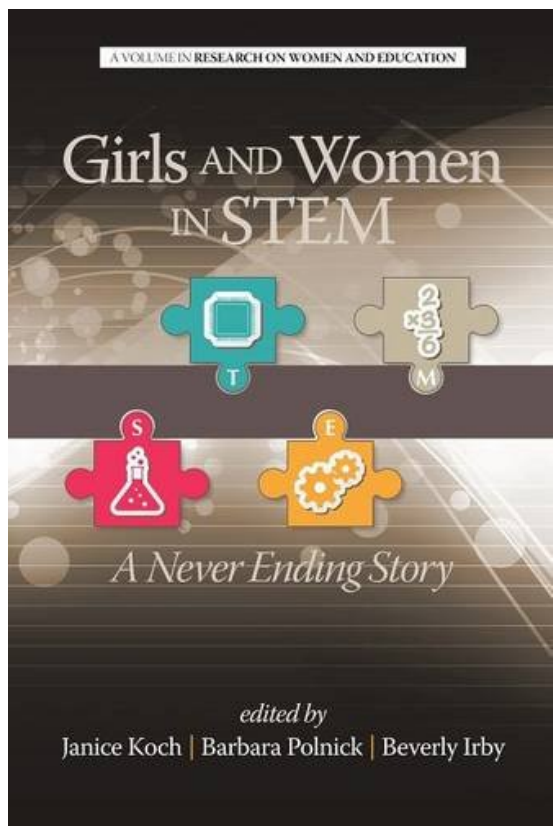
Reviewed by Brooke Midkiff
University of North Carolina
United States



The editors of *Girls and Women in STEM: A Never Ending Story* have brought together a collection of research projects that provide information about the current state of girls and women in STEM as well as possible interventions to address gender disparities in STEM fields. The book provides an overall view of the experiences of girls and women in STEM, and as all books in the Research on Women in Education series, strives to offer readers a perspective of girls and women in many different contexts. The book provides this perspective in two parts. The first half of the book consists of case studies that provide insights into the experiences of girls and women in STEM fields. Part 2, on the other hand, offers various research projects that examine interventions to reduce or close gender gaps in STEM fields.

Part 1 – the case studies – is centered around narrating stories of women and girls in STEM fields, focusing on their experiences and what we might learn from these experiences moving forward to reduce the gender gap in STEM fields. The case studies include a range of experiences and cultural identities, providing a broad, if not deep, picture of what is means to be a

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girl in a STEM class or college major, or a woman in a STEM field at a university. Catherine Martin-Dunlop and Whitney Johnson provide a discussion of the "successes and struggles" (p. 3) of African-American women who pursued and obtained undergraduate degrees in science and engineering. Martin-Dunlop & Johnson use the qualitative method of portraiture to bring to life the experiences of 3 such women. Ezella McPherson's chapter also addresses the experiences of African-American women in STEM. McPherson, however, focuses on the K-16 experiences of African-American women who majored in a "hard science" in college. McPherson uses multiple-case research as her methodology with 8 women. McPherson's use of Black Feminist Thought (Collins, 1990) and the tenets of intersectionality (Crenshaw, 1991) gives her case study richness and complexity. In addition to providing case studies about the experiences of African-American girls and women in STEM, Part 1 also includes one study about Latina experiences (Chapter 3 by Carolyn Parker).

Lyon's chapter on maternal roles in promoting girls interesting in computer science as a college major uses ethnographic interviewing. Lyon concludes with a poignant suggestion that "Educators can perhaps fill this gap, particularly in computer science, by introducing the field earlier in the pipeline and in a more interesting manner" (p. 68). It is nice to see this suggestion derived from qualitative inquiry; however, the author does not speak to the already substantial body of literature that addresses various concepts of the gender gap in STEM fields. For example, Xie and Shauman's (2003) research directly refutes the common perception of the "leaky pipeline" for girls and women in STEM. In contrast to the belief that girls begin in STEM fields and then do not persist (as compared to boys), Xie and Shauman (2003) demonstrate that STEM degrees are mostly likely completed by one of two pathways: persistence in STEM from high school to college or entry into a STEM field after entering college. Their research finds that nearly half of the gender gap in STEM degrees is a result of the higher likelihood that males will declare at STEM major for college in the first 2 years of high school. That is, when girls declare an interest in STEM in high school, they are just a likely to complete a degree in a STEM field as boys. Additionally, Legewie and DiPrete (2012) also find that the "leaky pipeline" only accounts for under 2 percent of the overall gender gap in STEM majors. This would seem to support Lyon's suggestion; however, although we know much about the role of persistence in closing the gender gap in STEM fields, there is little empirical evidence regarding the timing at which interventions might be most effective at closing the STEM gender gap. In their apt synthesis of the research on gender gaps in education, DiPrete and Buchmann (2013) conclude that "...we do not know when during childhood STEM orientations typically stabilize and produce long-term implications for academic degrees and occupational choices" (p. 194). Lyon's conclusion that STEM must be introduced earlier in the pipeline and in a more interesting manner, in light of the empirical evidence, is likely correct but as yet unsubstantiated.

Part 2 of *Girls and Women in STEM: A Never Ending Story* begins to move beyond sharing the experiences of girls and women in STEM to articulating possible interventions to reduce the gender gap in STEM fields. The six chapters of Part 2 provide six different interventions and descriptions of their use. Nicole N. Wallace and Annemarie Hattingh's chapter explores the use of alternative assessments in improving girls' attitudes about STEM fields. Wallace & Hattingh report a mixed method design, using both a qualitative and quantitative questionnaire to measure student-reported attitudes towards science prior to the intervention, during the intervention, and after the intervention. Wallace & Hattingh describe their research design as quasi-experimental, using equivalent time-samples (p. 110); however, this is an inaccurate portrayal of the research design used, as it is reported in the chapter. There were a sufficient number of participants, but all received the intervention, so there is no control group with which to compare questionnaire results. This does not mean, though, that their findings are not valid, but rather that this study provides exploratory information that alternative assessments *may* be associated with improved attitudes about STEM fields among female students, rather than providing information about whether or not alternative assessments *caused* a change in female students' attitudes about STEM fields. Additionally, the authors acknowledge that a limitation of the study is that it "represents a small microcosm of South African society, and therefore extrapolation to the larger South African population of high school students is very limited" (p. 133).

The two chapters following Wallace and Hattingh's take up the topic of out-of-school interventions to improve girls' and women's participation in STEM. Merle Froschl and Barbara Sprung describe two grant-funded afterschool programs that were designed with the intention of improving girls' interest in STEM fields. Froschl & Sprung make the argument that afterschool programs are ideal for supporting girls in STEM because they can promote engagement, capacity, and continuity – three factors believed to be critical to support girls in STEM. Because afterschool programs are not subject to the same time constraints and testing regimes as public schools during regular school hours, afterschool programs provide a better forum for allowing exploration and engagement. One of the programs Froschl & Sprung describe is *Great Science for Girls* (GSG) – an afterschool program implemented in 150 centers between 2006-2011. Supported through funding provided by the National Science Foundation Program for Gender in Science and Engineering, GSG developed 7 evidence-based curricula for use in afterschool programs. GSG reached both male and female students, but its curriculum is designed to promote girls' interest in STEM fields in particular. Additionally, GSG was successful in building the capacity of afterschool centers in successfully promoting STEM fields. Froschl & Sprung report that GSG, upon external review, demonstrated an increase in science by over 90% of students who participated. Additionally, GSG developed free tools for educators to extend the sustainability of the project beyond the grant funding, which may be downloaded at www.greatscienceforgirls.org.

Crystal T. Chukwurah and Stacy S. Klein-Gardner continue the discussion of out-of-school learning as a way to improve girls' interest in STEM fields. They report on a summer institute for girls interested in STEM that was made available to rising 9th and 10th graders in Davidson County, Tennessee. This is in line with previous research that suggests that girls' declaration of a interest in a STEM field within the first 2 years of high school is critical to their completion of a STEM degree (Xie & Shauman, 2003). The Edward E. Ford Educational Leadership Grant as well as other donors provided funding for this intervention, and the summer institute was found to have positive results in increasing girls' self-efficacy with regards to STEM subjects. However, the summer institute only served 16 students, calling into question the sustainability of this model and the ability of the education community to bring this to scale.

Cecilia D. Craig offers insight into another out-of-school learning opportunity that may work to increase girls' interest in STEM fields – robotics classes and competitions. Craig describes the use of LEGO MINDSTORMS and the elementary-age competition FIRST LEGO League (FLL) to stimulate interest in STEM fields. Craig reports, though, that capacity is an issue when incorporating these types of interventions, and that teacher training and comfort with the subject and tools are critical to the success of a robotics program – both in how well it goes and in whether or not it influences students positively or negatively.

Other interventions described in Part 2 include efforts to improve mathematics instruction and programs to support college students into graduate school and then the professoriate in STEM fields.

In conclusion, *Girls and Women in STEM: A Never Ending Story* provides a broad base of information about the current gender gap in STEM fields. It will be useful as a starting point for instructors who wish to examine their own practices with regards to gender equality in STEM fields. It will also be useful as an introductory text to the subject in university classes either in Education or Women's and Gender Studies. This book does not provide deep analysis of the issue or substantial empirical research on the causes of, or solutions to, the gender gap in STEM fields. However, it is accessible to readers and can serve as a basis for beginning the discussion among students, teachers, and scholars.

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About the Reviewer

Brooke Midkiff
University of Norta Carolina
United States

Brooke Midkiff is a doctoral candidate at the University of North Carolina. She is pursuing a degree in Policy, Leadership, and School Improvement along with a graduate minor in Women's and Gender Studies. Brooke specializes in quasi-experimental methods, with a focus on aggregate, state-level data. Her research interests are in gender issues in education including women and the politics of education, feminist critical policy analysis, and sex education policy. She lives in Chapel Hill, North Carolina with her daughter Sophia.

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