

## Executive Summary

The information presented here makes accessible to a broader readership the philosophy, strategies, models, processes, program content, tools, research, and evaluation outcomes of “*Strategic Alliance to Advance Technological Education through Enhanced Mathematics, Science, Technology, and English Education at the Secondary Level*,” a major project funded by the National Science Foundation. The report’s direct, yet reflective, approach provides evidence and analysis about a formal learning community and its effect on the teaching and learning of mathematics, science, technology, and English at the secondary level. The information spirals in depth, beginning with a general introduction, moving to a presentation of definitions, philosophies and models, then concluding with broad program content. Most of the program leaders present chapters in their individual voices with references and appendixes, making it possible for those interested in the intellectual merit or replication to clearly understand what concepts and principles were presented, what processes were used, and what tools were developed, as well as to build upon our work and reduce the learning curve or eliminate problems and issues that might occur. The processes and tools evolved over time, through several initiatives and by working with a variety of partners, including those mentioned herein; thus many have contributed to what is reported and found here. Access to all results, outcomes, and products is possible through a website, [www.strategicalliance.niu.edu](http://www.strategicalliance.niu.edu), which presents complete research data and information about related projects. The project contributes to the bodies of knowledge on building learning communities, staff development, teaching and learning, partnership building, evaluation, and research with the primary purpose of improving mathematics and science education at the secondary level to prepare students for higher education and technical careers.

“*Strategic Alliance to Advance Technological Education through Enhanced Mathematics, Science, Technology, and English Education at the Secondary Level*” was a collaborative partnership involving the Rockford Public Schools (RPS), Rock Valley College (RVC), and Northern Illinois University (NIU), in Illinois, that sought to motivate and prepare high school students for technical careers requiring a solid foundation in mathematics, science, technology, and English (MSTE). The primary goal was to improve secondary MSTE, ultimately student achievement, especially for nonmajority students and young women. The project began as an alliance between the Rockford Public School District, NIU, and 300 local business, industry, and community organizations.

The following objectives provided the operational framework for accomplishing the goals.

1. Provide in-service education, training, and technical assistance to secondary teachers.
2. Provide in-service education to district school administrators and counselors on change, reform leadership, and strategic planning, as well as exposure to the teacher-development program.
3. Partner with local business, industry, and community organizations to provide teachers (and ultimately students) with exposure to the real world of MSTE problems

- and applications, authentic contexts, careers requiring MSTE foundations, and information about the higher-education pathways and MSTE requirements to realize access to career clusters.
4. Evaluate all project activities, monitor progress, and determine the merit and broader impact of the initiative.
  5. Produce a systemic reform model for improving MSTE education at the secondary level through business, industry, educational, and community partnerships.
  6. Develop teacher knowledge and skills in the use of computer technology for teaching and learning.
  7. Develop teacher and counselor knowledge and skills in strategies to assist students to develop postsecondary educational and career plans.
  8. Develop a plan for long-term sustainability and continuous improvement.

The project achieved most of its goals. Rockford's approximately 32,000 K-12 public school students are representative of the national profile, consisting of inner-city, urban, suburban, and rural students with approximately 42% nonmajority (approximately 29% African American, 10% Hispanic, and 3% Asian).

This report has three main sections that present the project's basic principles and aims, its methods for addressing the aims, and reflections on research methods and evaluation.

*Part I. Overview.* After an introductory chapter that describes the nature and aims of the project and provides background and context, Chapter 2, *Learning – What Does It Mean?*, defines our goals and strategies. Chapter 3, *Partners in Change*, establishes the leadership foundation for our work with the schools; the next chapter, *Organizational Learnings*, offers reflections from the perspective of leadership strategies, techniques, processes, and outcomes. Chapter 5, *Operating Philosophy and Project Strategies*, along with the succeeding chapters, *Operational Models* and *Program Scope, Content, and Sequence*, completes the foundational discussion and establishes the framework and belief system for the project. Finally, Chapter 8, *Challenges and Lessons Learned*, describes the major difficulties and offers lessons learned for the benefit of those who may want to replicate all or part of what was accomplished.

*Part II. Program.* The first six chapters describe core elements of the program, such as articulation (Chapter 9), interdisciplinary teaming (Chapter 10), interdisciplinary curriculum (Chapter 11), and student performance assessment (Chapter 12), teaching models (Chapter 13), and instructional technology (Chapter 14). Chapters 15-30, written mainly by program leaders, focus on discipline-specific program elements, covering content, strategies, outcomes, opinions about experiences, and in some cases recommendations for replication. Several chapters focus on elements of the program that were multi- and interdisciplinary in nature and represent a fusion of content and delivery. Chapter 31 discusses the role and importance of school counselors.

*Part III. Research Data and Evaluation.* These chapters review the basis for the classroom pilots, present the methodology, and discuss the research limitations.

The full report, including research data and evaluations, is accessible at <http://www.strategicalliance.niu.edu>.