Specialized Science High Schools: Exploring Contributions of the Model to Adolescent Talent Development

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As the field of gifted education shifts much of its focus to domain-specific talent development, specialized science high schools are taking their place on the stage. Back in 1981, Bloom and Sosniak argued persuasively that talent development cannot take place exclusively in schools. They stressed that schools were not prepared to offer the required levels of expert teaching, time, and effort. Yet, specialized science high schools, by design, are staffed with teachers with advanced degrees, offer relatively flexible schedules, interested peers, reasonable access to appropriate technology, and connections with research institutions to provide apprenticeships for the most motivated and interested students.

Of course, specialized high schools, whether for the sciences or the arts, are not for everyone. Most academically talented teenagers are still exploring what they're interested in and do not want to attend a school that appears to have a narrower focus than what can be found at a good comprehensive secondary school. Ironically, however, many talented students (the percentage needs to be determined empirically), choose to attend specialized science high schools not because of their interest in science but because the schools have a reputation for being rigorous and for attracting a motivated and academically focused student body. In fact, the specialized schools pride themselves on the outstanding offerings they provide in humanities, the arts, and social sciences. This leads us to ask, what is the best instructional environment for gifted students in the sciences? What variables make a difference?

Several of the articles in this special issue address the fact that specialized science high schools come in different forms—there are state residential schools, schools within schools, self-contained schools, and part-time sites. Some schools are on college campuses and are organized under the state's higher education system. Others are administered under a regional or local school system. What we don't yet know is which of these is most effective and for whom.

Collectively, the articles in this special issue yield a comprehensive look at the nature and history of special Science, Technology, Engineering, and Mathematics (STEM) schools. Rena F. Subotnik, Robert H. Tai, Rochelle Rickoff, and John Almarode review research about the psychological, environmental, educational, cultural, and sociological variables that affect the development of STEM talent. They note that although specialized STEM schools are regarded as the "crown jewels" of their school districts and states, and have increased in number, insufficient research exists to inform educators, researchers, and policy makers about how they contribute to the development of STEM talent.

Jerald Thomas and Corinne Williams remind us that Stuyvesant, the first specialized STEM school, was founded in 1904—over 100 years ago! Currently, the National Consortium of Specialized Secondary Schools of Mathematics, Science, and Technology (NCSSSMST) has 106 members representing 36 states. Thomas and Williams discuss the impetus for forming such schools, which usually have been in response to national concerns about America's economic competitiveness and states' concerns about "brain drain."

Steven I. Pfeiffer, Marguerite Overstreet, and Andrew Park provide comparative descriptive analyses of 16 state-supported, residential STEM high schools. Though these schools vary widely in structural features such as location, size, and funding, most offer unique and important opportunities to

work with practicing scientists and conduct authentic research in outside labs and facilities. Interestingly, as Pfeiffer points out, fewer than half offer traditional advanced placement (AP) courses.

Tracy L. Cross and Andrea Dawn Frazier utilize psychological theories to provide context for students' participation in attending year-long residential STEM academies. The authors harness the words of the students to illustrate why bright young people attend the schools, what they must give up in order to do so, and what they expect to gain by the time they graduate.

Julia Link Roberts offers 11 successful strategies to advocate for the establishment of state-supported, residential STEM high schools. Robert's strategies emphasize the importance of laying the groundwork for a specialized school within a state by crafting key messages that appeal to various stakeholders and garnering the support of diverse stakeholder groups including legislators, politicians, educators, and the taxpayer.

Stephanie Pace Marshall helped found the Illinois Mathematics and Science Academy and served as its first president. Pace- Marshall proposes that future STEM education create conditions and foster instruction that will result in students being prepared to participate in global networks of collaboration, becoming leaders of change and innovation, becoming social entrepreneurs, and engaging in design-oriented and systems-based thinking.

Paula Olszewski-Kubilius ends this special issue with a focus on other options for students interested and talented in STEM areas. Piecing together various programs is a viable option for students whose families have the financial and personal resources to orchestrate a "symphony" of options into a whole that is more than just the sum of its parts. According to Olszewski-Kubilius, specialized STEM schools play an outsize role for students from rural areas with fewer program opportunities or from economically disadvantaged backgrounds because they offer environments with a comprehensive array of supports.

We celebrate specialized science high schools as a model to be explored further in the panoply of offerings for gifted adolescents. We hope that this special issue will spur a flurry of research, visits, convention sessions, and collaboration with the faculties of specialized schools, along with staff from out-of-school programs, traditional school programs, and other educational professionals and researchers.

REFERENCE

Bloom, B. S., & Sosniak, L. A. (1981). Talent development vs. schooling. *Educational Leadership*, *39*, 86–95.

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