

Expanding the School Counselor Repertoire Through STEM-Focused Career Development

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The call to generate increased student interest in math and science careers continues to receive tremendous amounts of national attention, most recently in President Barack Obama's (2011) State of the Union address when he referred to the current climate as "our generation's Sputnik moment." Responses to this call focus predominantly on teacher training and standards-based instruction. However, considering the explosive momentum within science, technology, engineering, and mathematics (STEM) education initiatives and the pivotal role school counselors can and should play in academic and career planning, school counselors would benefit from taking the necessary steps toward adopting and integrating elements of these STEM initiatives into their work.

Keywords: STEM, school counselor, career development

Educators and employment experts currently use the word *crisis* to describe America's present status with regard to generating a productive and relevant 21st-century workforce. The World Economic Forum (2010) ranks the United States 48th in the quality of mathematics and science education. The 2010 ACT College Readiness report indicated that 76% of high school graduates did not meet high school benchmarks for readiness in one or more freshman-level courses (American College Testing, 2010). To effectively respond to this emerging crisis and thrive within an evolving technological society, "all students need to develop their capabilities in science, technology, engineering, and mathematics (STEM) to levels much beyond what was considered acceptable in the past" (National Academy of Sciences, 2007, p. 1). Today's public schools are now placing greater focus on improving instruction and facilitating connections between student achievement and career interests in mathematics and science. Many federal and state agencies now fund K–12 STEM education programs and research. Overall federal funding for STEM has increased significantly. These efforts are the result of research findings indicating that the position of the United States as a global leader in the areas of innovation and competitiveness has been or will be lost if significant steps are not taken to rectify this reality (National Academy of Sciences, 2007). According to *Rising Above the Gathering Storm* (National Academy of Sciences, 2007) and the follow-up report,

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Beyond the Gathering Storm (National Academy of Sciences, 2010), U.S. public schools showed few signs of improvement, particularly in mathematics and science. The report by the National Academy of Sciences (2010), the United States' advisor on science and technology, indicated that the country ranked 27th out of 29 wealthy countries with regard to the number of college students obtaining degrees in science or engineering. The literature (Feller, 2009) has shown that these fields remain crucial for almost all endeavors of life, and all young Americans should leave school "STEM-capable."

Responses to the perceived national crisis include an increased focus on improving student ability through instruction, as well as ongoing concerns over generating greater student interest and engagement in STEM careers. Recent initiatives through the National Science Foundation, federal and state departments of education, as well as the Department of Defense address the current STEM issues by bridging the gap between enhanced instruction in mathematics and science and increasing student engagement in these career paths.

Focus groups with students, teachers, and career counselors conducted by a Department of Defense-funded initiative indicate that students need more than just exposure to STEM activities (Virginia Demonstration Project [VDP], 2010). The 6-year project suggests that additional training needs to be provided to school personnel in order to create a more explicit connection between the abstract concept of a career and the day-to-day learning experiences in the classroom. These implications go beyond career awareness and suggest that career discussions can have an impact on student academic accomplishments. Perry, Liu, and Pabian (2010) asserted that increasing student engagement through career planning in the classroom leads to higher levels of academic achievement and improved graduation rates. As Feller (2009) indicated, "intentional learning experiences [are essential] for developing a gatekeeper's ability to communicate about STEM courses, programs, and career options" (p. 25).

Classroom efforts have received support and shown effectiveness; however, personal and emotional realms have received limited attention, and there continues to be a call in the literature (Feller, 2009, 2010; Morganson, Jones, & Major, 2010) for enhancing school counselor involvement in STEM-related career decision making. The momentum toward STEM career planning provides ideal opportunities for school counselors to address student career trajectories, specifically, course advisement and selection, promotion of academic rigor, strategic emphasis on achievement and goal orientation, commitment to parental inclusion, and attention to underrepresented populations. In this article, we address the opportunities presented to school counselors for involvement in the STEM movement and provide practical tools for integrating a STEM focus into their career development programming.

Background

Some authors (Gibbons & Borders, 2010; National Office for School Counselor Advocacy [NOSCA], 2010) have maintained that school counselors serve as gatekeepers of student potential. They function on the front lines of career awareness and help the current generation explore the world of work. As research (Dahir, 2001) has shown, school counselors in particular

can encourage students to pursue STEM-related careers that fit their unique qualities, education, and training. Increases in career and technology education, as well as formal and informal educational programs such as Project Lead the Way, have led to a resurgence of counselor participation in STEM career development. In some states, counselors engage in online career initiatives such as Career View and Wizard, as well as statewide “career coach” projects that are offered at community colleges.

Because of the transdisciplinary nature of the school counselors’ roles and the extent of their potential impact on the future lives of students, it has become increasingly apparent that school counselors need to increase their awareness of 21st-century career opportunities, particularly STEM-relevant information. It is important that school counselors do not overlook their professional obligation to provide rigorous, well-rounded, exploratory, and relevant opportunities for students’ career development trajectories (American School Counselor Association [ASCA], 2006). Although recent literature (Feller, 2009, 2010) has emphasized this need, obstacles remain and deliberate responses need further development.

In identifying the need for school counselor involvement in STEM outreach through focus group studies conducted in 2006 and 2010 (VDP, 2010), researchers worked with three groups of 12–15 school counselors from various schools who responded to inquiries concerning the integration of STEM into their practice and their school. Leaders facilitated, documented, and recorded discussions for further analysis. Central themes were identified, namely that school counselors from participating schools tended to have little time to review career options with students and focused less on mathematics and science career opportunities than those of other subject areas. This self-reported partiality toward more socially oriented career trajectories is understandable, given the school counselor’s educational background and professional experiences, and, in the literature (Feller, 2009), has been referred to as the school counselor’s “unconscious incompetence” regarding STEM, its relevance, and the school counselor’s role within the initiative. In reality, school counselors have a multitude of duties; without intentional consideration, they may not be aware of their potential bias and lack of awareness of current career trends. Likewise, given their varied professional responsibilities, counselors may miss the significance of their role in establishing one of the earliest anticipatory expectations with regard to how a student views his or her ability in specific academic areas.

Regardless of whether a student has the potential to excel in mathematics or science, or, for that matter, whether a student is college-bound, the current school climate and the high administrative demands placed on the school counselor may restrict the time the school counselor has to fully evaluate course options and engage in career-related discussions, which enhance and develop a student’s personal, academic, and career development (ASCA, 2005). Despite these challenges, the role of the school counselor requires the individual to take proactive steps toward rigorous and relevant student career development (ASCA, 2010); in doing so, school counselors maintain an awareness of their career-related preferences, gain information on career trajectories about which they lack current knowledge, and engage their skill set toward playing an influential role in achieving national education and career goals for the youth of the country. School counselors need a pragmatic guide

for using STEM-specific interventions with particular age groups. The aforementioned information addresses the type and kind of involvement that can be provided through their professional roles and responsibilities.

Key Impact Areas of School Counselors' STEM Repertoire

Bleeker and Jacobs (2004) noted that students' work habits, sense of self-efficacy, and thoughts of career exploration generally begin during the middle school period. STEM initiatives identify this time as the "make or break" period for students. Authors (Turner & Lapan, 2005) have maintained that between sixth and eighth grade, students develop the skills that will have an impact on their STEM-related course selections in high school and their engagement in STEM-focused programs of study. Studies (Bleeker & Jacobs, 2004; Post-Kammer & Smith, 1986) have shown that the opinions held by significant adults (parents, counselors, and teachers) regarding mathematics significantly influence a child's perception of his or her skill level and decision to enroll in more challenging mathematics courses. Hence, during this time of student transition, well-informed school counselors can play a key role in explaining to students the relationship between academic decision making and long-term career goals. The following sections identify two key areas of counselor impact in the STEM career movement: (a) academic and career counseling and (b) leadership and advocacy.

Academic and Career Counseling

School counselors facilitate student course planning; however, the importance of this activity recently has received considerable attention. Middle school students often do not receive the amount of advising on mathematics course selection that one might expect. Frome and Dunham (2002) reported that teachers advised only one third of their students and counselors advised only one fourth. Trusty, Robinson, Plata, and Ng (2000) maintained that encouraging middle school students to take more challenging mathematics and science classes had an important impact on students' general academic success. Given that females are under-represented within STEM careers, it is not surprising that adolescent girls steadily experience declining confidence in their mathematics and science skills, resulting in a decrease in their enrollment in mathematics and science classes, and ultimately limiting their career choices (Kerr & Robinson Kurpius, 2004; Shapka & Keating, 2003; Stake & Nickens, 2005), making such advisement particularly important.

The ASCA National Model (ASCA, 2005) and STEM initiatives both focus on ensuring student access to challenging and appropriate courses in order to help positively intervene in the achievement gap that currently exists. This becomes increasingly important when considering research (Trusty & Niles, 2004) indicating that intensive mathematics course completion in high school has the strongest impact on bachelor degree completion. Furthermore, some researchers (e.g., Trusty & Niles, 2004) have asserted that an increase of one credit in intensive mathematics improves the odds of reaching one's potential by 73%. School counselors orienting themselves within the STEM movement and building on their wealth of knowledge can deliberately assist students in acquiring the

course work necessary to expand their academic knowledge and pursue the repertoire of 21st-century career choices.

The nature of the school counselors' role means that they have insight into students' self-esteem and self-efficacy, thus, they are in a good position to connect a hopeful future with student career planning. Akos, Shoffner, and Ellis (2007) affirmed that the school counselor assists in course placement and has direct opportunities to empower students to take rigorous courses of study. Often, the school counselor is able to help students develop self-confidence and shape realistic attitudes about the future. The school counselor's career counseling influence is crucial given the research (Akos et al., 2007) that student self-efficacy and confidence levels regarding their abilities in mathematics and science predict their interest in STEM career paths.

School counselors can deliberately work to integrate STEM knowledge into student goal setting. Abu-Hilal (2000) suggested that school counselors should focus less on developing positive attitudes and more on helping students identify higher level aspirations "as the higher and clearer goals mediate the influence of attitudes on achievement" (p. 83). In fact, recent Individuals With Disabilities Education Act reauthorizations have prompted a national requirement for all students over the age of 16 years with current individualized education plans (IEPs) to have annually updated postsecondary goals and age-appropriate transition assessments (National Secondary Transition Technical Assistance Center, 2009). Many states have begun including these plans in IEPs for younger students because they recognize the importance of transition services. Additionally, recent legislation enacted in some states mandates that beginning with the 2011–2012 academic year, schools should begin utilizing a personal academic and career plan for every student. If students' goals have an impact on their attitudes toward school, then assisting students in developing a future-oriented set of objectives associated with their goals will likely result in higher achievement. Trusty and Niles (2004) maintained that methodical, long-term, individualized career planning beginning in middle school can help students develop their own learning experiences and the skills driving them toward completing a bachelor's degree. The bedrock of this process is goal setting. School counselors' efforts toward enhancing the goal orientations of students while working toward enhancing the pool of potential students who may succeed in critical need areas, such as mathematics and science careers, will result in not only an increase in student participation in these fields of study but also a stronger base of student achievement overall.

Leadership and Advocacy

School counselors are leaders and advocates who have a significant impact on the academic achievement, aspirations, decisions, and future plans of students (NOSCA, 2010). Although they might work with students individually to deliberately integrate STEM knowledge into student goal setting, they also play multiple roles within the system of the school. Hence, as ASCA (2005) asserted, school counselors must use their leadership and advocacy skills to change school systems to maximize student potential. School counselor leadership begins with gaining awareness of current trends and STEM-related careers. Feller (2009) affirmed that STEM-focused information delivery and assimila-

tion is particularly necessary for school counselors because they may not have experience in these subject areas and/or interest in STEM-related subject matter or careers. Wyrick (2004) maintained that many of today's school counselors have likely not been exposed to a STEM focus in their graduate programs, and their education about career development may have been limited. As school counselors promote their own base of knowledge, they can lead others (counselors, teachers, administrators) by sharing current information and promoting a STEM focus in the school. School counselors should use their increased knowledge to advocate for student access to more intensive career guidance involvement, more challenging mathematics and science courses, and more exposure to STEM-related programming.

The literature (Jacobs, Chhin, & Bleeker, 2006) states that parents set the stage for a child's career ambitions and instill the precursors of career exploration, thus making parents essential to science education reform (National Research Council, 1996). Nonetheless, research (Moreno, Tharp, & Denk, 1999) indicates that families often do not participate in science-related or other activities within the school. Because they are likely to have direct contact with parents, school counselors can share relevant knowledge regarding career options and related scholarship and internship opportunities. Considering the strong impact of parental support on a student's decision to pursue a STEM career, school counselors can use their skills and visibility to share information with and be advocates for parents regarding the most effective way to provide such support.

School counselors must also advocate for increasing the number of underrepresented populations in STEM careers. School counselors advocate for the needs of all students, and some authors (e.g., Cox & Lee 2007; Holcomb-McCoy, 2007) have suggested that they are instrumental in reducing educational inequalities on the basis of gender, socioeconomic status, race, and other variables; therefore, research has shown (Auwarter & Aruguete, 2008) that they are critical participants in increasing the number of historically underrepresented females and minorities in STEM fields. According to the Association for Multicultural Counseling and Development's (AMCD) Multicultural Counseling Competencies (Arredondo et al., 1996) and ASCA's (2010) Ethical Standards for School Counselors, in addressing cultural bias, school counselors must first address their own potential biases. In a recent study targeting the preparation of minorities for mathematics and science careers, results indicated that "although growth in participation and performance is evident for all subgroups, minority participation improves more slowly than that of other ethnic subgroups, perpetuating a lack of minorities in mathematics and science careers" (Brown & Campbell, 2009, p. 225). The literature (Moffat, Pibum, Sidlik, Baker, & Trammel, 1992) illustrates the considerable role early career development interventions play in encouraging females to pursue additional course work in male-dominated fields.

Avenues to Provide STEM Career Guidance

As gatekeepers to the world of work, school counselors can take steps to increase their awareness of 21st-century career opportunities. Based on focus group findings and the previously covered areas of counselor

engagement, four recommendations are noteworthy: (a) increase knowledge of the school counselor's role in career exploration, (b) increase content knowledge of current and future career opportunities, (c) explore one's individual career preferences, and (d) embrace a leadership role in career decision making.

Strategies for increasing knowledge of one's role in career exploration begin with professional development. This can take two different, but important avenues of study. First, counselors who are interested in broadening their STEM knowledge base might consider reviewing the most effective theoretical perspective utilized for age-appropriate student career development. The use of a particularly relevant framework, the social cognitive career theory (SCCT; Lent, Brown, & Hackett, 1994), can help counselors recognize the complexity of personal and systemic influences on career development and might enhance a school counselor's awareness of relevant factors as she or he develops effective interventions. A social cognitive framework provides school counselors with a validated structure for better organizing interventions. Given the skepticism that is voiced in the literature (Wyrick, 2004) regarding sufficient training in career development within CACREP programs, this model could act as a refresher on the commonly accepted theories while elucidating current research findings. Turner, Steward, and Lapan (2002) provided a helpful and practically oriented review of SCCT, and Fouad et al. (2010) used the framework to conceptualize their research regarding supports and barriers for student STEM involvement. These knowledge sources provide the big picture context that is necessary for school counselors to understand what skills they currently possess as well as those that they can acquire.

Second, when the counselor feels grounded in her or his own professional underpinnings, that individual can explore specific career fields of study. Counselors could begin with a review of influential documents (e.g., *Beyond the Gathering Storm* by National Academy of Sciences, 2010) so that they can more fully comprehend the urgency in the STEM movement. Additional references include *STEM-Centric Career Development: Building Bright Futures From Main Street to Outer Space* (Feller, 2010) and *STEM Centric Career Development: Sputnik II or a Thud?* (Feller, 2009), which is focused on the school counselor's role in STEM career development.

Second, although school counselors possess the skills necessary to provide basic career counseling, they may not have access to current career facts and skill requirements for STEM-focused career planning. The skills element of this repertoire expansion should be a relatively smooth extension of current practice with the addition of some recommended STEM-focused tools. For instance, state-mandated education and career planning will provide an annual opportunity for school counselors to help students align course plans with career goals. School counselors will find one website (www.stemcareer.com) particularly useful. Feller (2011) provided a unique link specifically for school counselors to access information such as grant opportunities, listings of bachelor's- and master's-level STEM programs at a variety of postsecondary institutions, games that allow students to explore careers and job opportunities (www.yourstemcareer.com), and other career development resources for counselor use, such as gender-specific career fair ideas.

School counselors can access information and create informative and user-friendly tools for STEM-career focused interactions. Career Cards, produced by Engineering Go For It (American Society for Engineering Education, 2011), describe the basic functions of particular professions and are one helpful resource for use with students. The counselor can easily develop an introductory tool for engaging parents in the conversation as well. For example, the counselor might develop a career handout that outlines specific mechanisms for parents to demonstrate support and encouragement for their child's career exploration. Additionally, the counselor can provide a parent-child career exploration worksheet to help engage students and parents in conversation. A worksheet could include prompts for discussion and sharing as well as occupational projection statistics (U.S. Department of Labor, 2011).

Counselors can readily integrate multiple online resources for assimilation into career-related discussions. Resources provide activities to engage students in career exploration, activities for teacher use, film clips relevant to STEM career choices and opportunities, STEM projects for student involvement, easy-to-use career interest inventories, and multiple websites for student/parent (and school counselor) exploration. These resources assist school counselors in adding a new knowledge domain to their current skill set.

Third, counselors may feel challenged when scrutinizing their potential career-related preferences; however, they should devote some time toward self-evaluating their potential level of partiality toward socially oriented career fields because certain inclinations could have an impact on the guidance they provide to students. As with other awareness activities, counselors can accomplish this individually or with professional peer groups. One suggested activity uses a career-awareness survey that is designed for school counselors who are seeking to determine their level of preference for socially oriented occupations. The intentions inherent in such an exploration are by no means accusatory; rather, they are meant to encourage counselors to access and use the resources that will allow them to fill the gaps in their base of knowledge and experience. An important aspect of appropriate and effective inclusion of STEM initiatives involves school counselors gaining this kind of awareness.

Fourth, counselors who embrace their leadership role will assist in defining the scope of their influence and create opportunities for improved counselor services within the school environment. Demonstrating awareness of national career development trends will position counselors as leaders who can align school initiatives with long-term career planning. Although their confidence to offer STEM-related career activities will increase as their knowledge grows, as leaders, counselors will need to locate supportive structures and activities: STEM professional development, improving connections with career and technical education counselors, attending STEM-relevant sessions at conferences, connecting with STEM-involved counselors, and making the case to their administrators.

Because of proximity and emphasis on collaborative learning, authors (e.g., Akos et al., 2007) have recommended that school counselors use multiple approaches when assisting teachers in student career exploration. For example, they can help teachers examine their interactions with students concerning subjects of interest, support teacher infusion of exploratory activities in STEM-related subjects, work with teachers to identify biases, and develop a support system for inquiries. Furthermore, school counselors should understand their role in responding to poignant

statements from government and industry leaders, which emphasize the importance of the STEM movement. As the needs of our society and the world at large evolve, so too must career counseling.

STEM education initiatives are currently experiencing explosive momentum and potential scholarship opportunities offer a viable pathway to employment. Given the spiraling cost of higher education and the concerns regarding unemployment, rethinking the role of the school counselor in career guidance is timely. The very existence of counselors in schools can spark discussion. The role of a school counselor can and should be tied to relevance. Counselors have a place in educating students and in making the connection between course content and potential career opportunities. One could argue that the school counselor has the most important role in this job. Therefore, professional discussions concerning the importance of STEM content preparedness and career awareness must continue. The integration of a STEM career component serves to illustrate a school counselor's relevance and can lend itself to consideration of counselor/student ratios within the school.

Summary

The role of the school counselor is complex. The interrelated components of the ASCA Model (2005) illuminate the multiple responsibilities of school counselors, and research (Scarborough & Culbreth, 2008) continues to show that these counselors seek more intricate involvement in guidance-related interventions. Involvement in STEM-related initiatives provides multiple opportunities for school counselors to feel the direct impact of their work with students and with the adults involved in students' lives. During educational development, student career planning plays a vital role, and school counselors possess the skills, knowledge, and aptitudes necessary to facilitate positive youth development in this domain.

Results of recent STEM initiatives offer both promising programmatic considerations and insight into future research possibilities. With an increased knowledge base gained through school counselor-focused STEM professional development, school counselors have the opportunity to bring together teachers and administrators to create an opportunity for career awareness for school personnel, students, and their families. In addition, school counselors can continue to build on the development of a pathway for a course of study and promote student potential through career-linking opportunities. Finally, school administrators and personnel can support grant initiatives to solidify both teacher and school counselor roles in career exploration and enhance data-based decisions for increasing mathematics and science interest.

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