

STEMulating School Principals: Brokering Social Capital Opportunities for Student Success

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Abstract

This article discusses the need for school principals to increase STEM opportunities in their schools to foster school achievement among students in their schools by strengthening their backgrounds in science, technology, engineering, and math. The article also discusses how principals can increase STEM opportunities by building and leveraging their social capital to increase STEM opportunities in their building. Social capital theory and its essential components are explored as a means for developing strategies for principals to use in creating their own social capital. The article will discuss specific strategies that school principals can employ to develop and leverage their social capital to create positive outcomes for students in their building.

Keywords: Social Capital, Social Networks, Bonding and Bridging Social Capital

1. Introduction

If it is said that teachers spend more time teaching the subject matter that they are most familiar with, can the same axiom be true for principals. That is, do principals spend more time leading in the areas in which they are most familiar? For example, do principals who have a strong disciplinary background spend more time with disciplinary issues than say, curriculum and instruction? In applying this same concept to STEM, do principals who have a strong STEM background focus more on providing STEM opportunities for students in their schools versus those whose backgrounds are not math, science, technology, and engineering? This is an important construct to unpack, because more and more evidence suggests that students in U.S. public schools are consistently being outpaced and outsmarted in the areas of science, math, and technology as compared to their counterparts. Particularly, when you factor in underrepresented student performance in these areas, the gap is even wider. Moreover, if the focus of STEM is not germane to most schools, but those deemed specifically as STEM schools, how are principals of non-designated STEM schools and principals who are leaders of STEM schools who do not have a background in STEM preparing students for STEM fields? And yet, much of the literature that supports the evidence for this gap in performance does not address the role of the principal, but focuses more on teachers' roles in terms of how they should address this issue in their classrooms. However, if the principal is responsible for all that occurs under their leadership in their building, should they not also be responsible for the limited STEM opportunities in their buildings as well? Yet, there is limited research in the area of principals' preparedness for leading successful STEM initiatives in schools.

Kids Count Data (2014) reports that only 34% of eighth-grade students in the nation is at or above proficiency in Math. The science scores for eighth-grade students, according to Kids Count Data, do not fare much better. Moreover, when the data are stratified in terms of the underrepresented groups (minorities and women), the outcomes are even more dismal. Recently, Weise (2014) reported that many tech firms are comprised of white males. Carrigan, as cited in Weise (2014), explains, "Women and underrepresented minorities have been denied access to resources and opportunities that would allow them to enter and succeed in computer science" (para. 8).

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In short, as the author posits, women and minorities have not had the same opportunities to access technological programs that would most likely lend themselves to advance in the areas of science, math, engineering, and technology. Recent data from Facebook also supported this phenomenon. Goel (2014) reported that

Facebook's management is more white and male than its workforce at large. Globally, 77 percent of senior level employees are men. And in the United States, 74 percent of the company's managers are white, 19 percent Asian, 4 percent Hispanic, 2 percent black, and 1 percent of another ethnicity or two or more races. (para 4).

However, what is very interesting about these data is that according to the My College Options and STEMconnector report, "Nearly 28% of high school freshmen declare interest in a STEM-related field—around 1,000,000 students each year. Of these students, over 57% will lose interest in STEM by the time they graduate from high school" (para 2). Furthermore, as highlighted in this report,

it requires fewer resources to support and maintain interest than to create new interest where it is not present. Therefore, it is crucial to encourage the development of and

investment in programs designed to maintain the existing interest of students throughout high school . . . (para. 3)

Is this data a reflection of principal preparedness in STEM areas? Or, does this data reflect what most principals believe about their strength in leadership? In other words, as asserted previously, do principals spend more time leading in the areas in which they are most familiar?

To address this issue, school principals must be STEMulated in two essential ways. First, school districts must provide intense professional development to principals, particular those who do not have STEM backgrounds. School districts can do this by:

- Partnering with local college and university professors in the STEM areas for professional development.
- Consider supporting district principals for advanced licensure in STEM areas.
- Include the number STEM opportunities provided for students in schools as a metrics for rewarding principals.
- Encourage principals to partner with local colleges and universities for grant writing opportunities in STEM areas for their schools.
- Partner with community stakeholders to provide apprenticeship opportunities for principals in STEM areas.
- Partner with college and university students in STEM areas to develop STEM activities and clubs for students in their school.

As previously reported, the sole issue is not that students are not interested in STEM fields, but there is a lack of opportunity to develop, explore, and cultivate their interest in these areas. In order to address the lack of representation of underrepresented groups in STEM fields,

principals (once adequately prepared in STEM areas) need to use their social capital to create opportunities for these students. Social capital is defined as social networks have value and that benefits accrue because of the networks and connections that one may have to other people. The two most noted constructs of social capital is bonding and bridging social capital. Bonding social capital is defined as those intimate relationships that one would have with immediate family members, a spouse, and close friends. Typically, persons within their own social purview, bonding circle, have similar social ties, and thus their reach is limited and does not often provide access to additional opportunities. Bridging social capital can be described as informal relationships. These relationships tend to be inclusive and include persons who would be considered more of an acquaintance than a close friend. These relationships offer more opportunities for building and tapping into divergent networks. In other words, bridging relationships offer access to networks

that are beyond one's own bonding network, because they extend beyond one's intimate circle. In other words, as Putnam (2000) states, "bonding social capital is good for getting by, but bridging social capital is crucial for 'getting ahead'" (p. 23). Thus, bridging social capital provides one with a link to untapped social networks.

Taliaferro and Flood (2014) explained that unfortunately, for underrepresented groups, tapping into bridging relationships tends to be more difficult. The authors contend that typically students from underrepresented groups have strong bonding social capital. That is, these students often have very close knit relationships with parents, grandparents, and other kinship relationships with members of their social group. These relationships are valuable, and provide a strong support network and system for its group members. However, these relationships are also insulated and provide limited to almost nonexistent opportunities for its members to join bridging circles that would provide them access to more social capital.

As cited by Taliaferro and Flood (2014), school leaders can close that gap by working as a connector for these students between these two constructs to provide them with more access to opportunities that would develop their social capital. Burt's Structural Hole Theory (1998) explains "leaders with more social capital get higher returns to their human capital because they are positioned to identify and develop more rewarding opportunities" (p. 11, as cited in Taliaferro & Flood, 2014, p. 216). According to Burt's Structural Hole Theory, "the manager that creates a bridge between otherwise disconnected groups, has a say in whose interest is served by that bridge" (p. 10). Taliaferro and Flood expound on this theory by connecting it to school leadership. The authors contend that leaders act as brokers of opportunities for students as well as bridges for them. According to Taliaferro and Flood, the principal serves as the bridge between untapped and tapped opportunities and social networks for students their school community (p. 215). In this capacity, the school principal leverages their social capital to create opportunities for students that might otherwise be unattainable. These opportunities, as Gladwell (2008) posits, become advantages in that over time they accumulate, providing one with an edge over one who has not had access to the same opportunities. Gladwell explains,

Success is the result of what sociologists like to call "accumulative advantage" . . . that little difference leads to an opportunity that makes that difference a bit bigger, and that edge in turn leads to another opportunity, which makes the initially small difference bigger still. (pp. 30–31)

Creating these opportunities for students, particularly underrepresented students, is the key to developing students' proficiency and continued interest in STEM fields. As we know from the data, students are interested in STEM areas. These students just need opportunities to cultivate their interest. They need access to programs to develop their interest, as well as access

to people (networks) who can serve as mentors and provide additional opportunities for growth. However, just as important to providing opportunities for students, is to STEMulate principals in STEM areas to promote STEM opportunities in their schools. Sometimes change does not always occur from the inside out, sometimes it occurs from top to bottom. To stimulate students' interest and to maintain their interest in science, technology, engineering, and math, the change should start from the top—the principal.

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