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Enriching science and math through engineering.

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Summary: This case study reviewed the collaborative efforts of university engineers, teacher educators, and middle school teachers to advance sixth- and seventh-grade students' learning through a series of project-based engineering activities. This two-year project enriched regular school curricula by introducing real-world applications of science and mathematics concepts that expanded opportunities for creativity and problem-solving, introduced problem-based learning, and provided after-school programming (for girls only) led by engineering students from the local university. This engineering education initiative showed significant impact on students' (1) confidence in science and mathematics; (2) effort toward science and mathematics; (3) awareness of engineering; and (4) interest in engineering as a potential career. With regard to gender, there were no significant differences between boys' and girls' responses. The girls' confidence in their own skills and potential, however, was significantly more positive than the boys' confidence in the girls. These results gave rise to new questions regarding mentor/mentee relationships and the overall effect of "girls only" mentoring.

Classification: C73 M13
Keywords: engineering education; mentors; problem based learning; teaching methods; engineering technology; case studies; grade 6; grade 7; partnerships in education; achievement; STEM education; curriculum enrichment; enrichment activities; student attitudes; gender differences; college school cooperation; teacher collaboration; program effectiveness; interviews; after school programs
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