Research Academy for University Learning at Montclair State University

Resources

Ethnic and Gender Issues in Science, Technology, Engineering, and Math Courses: An Annotated Bibliography

American Council on Education (2002). 2001-2002: Nineteenth annual status report on minorities in higher education excerpts from the executive summary.

Examines high school completion rates, college enrollment and graduation rates, and advanced degree attainment and employment.

Bell, A. E., & Spencer, S. J. (2002). The effect of stereotype threat on women's performance on the fundamentals of engineering exam. Proceedings of the 2002 American Society for Engineering Education Annual Conference & Exposition. Retrieved December 18, 2002 from http://www.ecpe.vt.edu/fac_support/DSPCL/docs/ASEE02.pdf

Found that stereotype threat impeded women's performance when completing difficult questions on the fundamentals of engineering exam and recommends that educators create learning climates where stereotype threat is diminished so that more women may succeed

Beller, M. and Gafni, N. (2000, January). Can Item Format (Multiple Choice vs. Open-Ended) Account for Gender Differences in Mathematics Achievement? *Sex Roles, 42* (1/2), 1-21, January 2000.

http://extra.shu.ac.uk/iowme/documents/newsletter%2020%201.doc

Investigated whether item format accounted for gender differences in mathematics performance and found results that suggest item difficulty, not format, may be the underlying cause

Born, W.K., Revelle, W., & Pinto, L.H. (2002). Improving biology performance with workshop groups. ***Journal of Science Education and Technology, 11*****(4), 347-365.**

Found that successful interventions for improving student performance included weekly workshop groups that were academically rigorous (non-remedial), cooperative (not competitive), facilitated by trained student peers who had successfully completed course and who provided encouragement and guidance without giving answers, and expressed strong trust in the ability of students to do challenging work.

Breslow, L. (2001). Transforming novice problem solvers into experts.

Offers several strategies for teaching problem-solving skills including modeling strategies, solution-planning, and problem analysis

Cohoon, J.M. (2001). What causes women to discontinue pursuing the undergraduate computer science major at higher rates than men: Toward improving female retention in the computer science major. ***Communications of the ACM, 44*****(5), 108-114. Retrieved December 10, 2002 from http://doi.acm.org/10.1145/374308.374367**

Identified departmental and institutional factors that contributed to the successful retention of female students in computer science

Duffy, J., Warren, K., & Walsh, M. (2001). Classroom interactions: Gender of teacher, gender of student, and classroom subject. ***Sex Roles, 45*****(9/10), 579-593.**

Examined the effects of gender on teacher-student interactions and found generally that males interact more with teachers and that interactions differed according to the subject and gender of the teacher

Fraser-Abder, P. (2001). Preparing science teachers for culturally diverse classrooms. ***Journal of Science Teacher Education, 12*****(2), 123-131.**

Suggests three areas for teacher preparation for culturally diverse classrooms including knowing students life experiences, researching literature on gender and cultural issues in science and math education, and developing strategies for dealing with student problems

Gainor, K.A. (1998). Social cognitive expectations and racial identity attitudes in predicting the math choice intentions of Black college students. *Journal of Counseling Psychology, 45*(4), 403-413.

Suggests that increasing students' perceptions of self-efficacy and outcome expectations positively impact math-related career choices

Inzlincht, M. & Ben-Zeev, T. (2002). A threatening intellectual environment: Why females are susceptible to experiencing problem-solving deficits in the presence of males. *Psychological Science, 11*(5), 365-371. Retrieved December 18, 2002 from http://chiron.valdosta.edu/mawhatley/7670/readings/self3.pdf

Found that women's test performance decreased relative to the number of males introduced in the testing environment and suggests that women may benefit from study in single-sex math environments

Keller, J. (2002, August). Blatant stereotype threat and women's math performance: Self-handicapping as a strategic means to cope with obtrusive negative performance expectations. *Sex Roles, 47(*3/4), 193-198.

Found that increasing the applicability of negative stereotypes resulted in decreased performance by female high school students on difficult math exam

Marx, D.M., Brown, J.L., & Steele, C.M. (1999). Allport's legacy and the situational press of stereotypes. *Journal of Social Issues, 55*(3), 491-502.

Investigated stereotype threat inducing conditions(e.g., difficult math exam) and found women test takers "underperformed" , but performed well when threat was removed (e.g., difficult literature exam, easy math exam, and/or difficult math exam presented as gender fair)

Montgomery, S. & Barrett, M.C. (2002). Undergraduate women in science and engineering: Providing academic support.

Studied factors that contribute to underperformance of women in science and engineering including male participation and interruption patterns, women's distorted attributions for personal success, and negative peer interactions

Nauta, M.M., Epperson, D.L., & Kahn, J.H. (1998). A multiple-groups analysis of predictors of higher level career aspirations among women in mathematics, science, and engineering majors. *Journal of Counseling Psychology, 45(*4), 483-496.

Found that interventions designed to boost students' self-efficacy and to increase women's access to role models who successfully negotiate motherhood and careers related to higher level career achievement aspirations

Pearl, A., Pollack, M.E., Riskin, E., Thomas, B., Wolf, E. & Wu, A. (1990). Becoming a computer scientist: A report by the ACM committee on the status of women in computing science. *Communications of the ACM, 33*(11), 47-57. Retrieved December 18, 2002 from http://doi.acm.org/10.1145/92755.92757

Identifies obstacles for women pursuing careers in computer science including issues of self-esteem, access to role models and mentors, discrimination, and role conflict

Shih, M., Pittinsky, T.L., & Ambady, N. *Stereotype susceptibility: Shifts in quantitative performance from socio-cultural identification*. Retrieved December 3, 2002 from http://www.si.umich.edu/ICOS/shihpaper.html

Investigated the dual identities of Asian American women and found that activating the positive stereotype (e.g., Asians excel in mathematics) countered the stereotype threat of women as underperformers in mathematics

Smith, J.L., & White, P.H. (2002). An examination of implicitly activated, explicitly activated, and nullified stereotypes on mathematical performance: It's not just a woman's issue. *Sex Roles, 47*(3/4), 179-191.

Found that stereotype threat can only be diminished when threat is directly attacked within a specific context (e.g., students told that a specific task is a fair and unbiased assessment of their abilities)

Steele, C.M. (1999). Thin ice: Stereotype threat and Black college students. *The Atlantic Online*. Retrieved November 11, 2002 from http://www.theatlantic.com/issues/99aug/9908stereotype.htm

Found that among the highest achieving students (or those who had a stronger academic identity and skills), the fear of being associated with a negative stereotype impaired intellectual functioning and disrupted test performance regardless of preparation, ability, self-confidence, or motivation

Verity, P.G., Gilligan, M.R., Frischer, M.E., Booth, M.G., Richardson, J.P., & Franklin, C. (2002). Improving undergraduate research experiences: Lessons from a historically black university's unusual collaboration. AAHE Bulletin, 3-6.

Describes a collaborative partnership between Savannah State University (a Historically Black College) and Skidaway Institute of Oceanography to promote research experiences among African-American undergraduates in marine science and identifies key characteristics for the success of similar projects.

Walsh, M., Hickey, C., and Duffy, J. (1999). Influence of Item Content and Stereotype Situation on Gender Differences in Mathematical Problem Solving. *Sex Roles, 41* (3/4), 219-240, August 1999.

Found that the gender labeling of characters in the mathematical word problem was not the cause for performance differences between men and women on mathematical standardized tests, but that instead stereotype threat played a role.

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