

E.M.N.E.M. Checkers Bot  
(Technical Report)

Historical Narratives in University Engineering Courses as a  
Means of Promoting Sociotechnical Education  
(STS Research Paper)

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by

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How can STEM education better prepare engineers who are expert sociotechnical innovators? Because engineering by definition serves people, we cannot call any technical innovation a success if its social costs exceed its social benefits. Hence successful engineering is never exclusively technical; it is inherently sociotechnical in character. Successful STEM education therefore integrates the social and the technical.

The technical project team designed a robot that can play checkers with a human opponent on a physical checkers set. Project success demonstrated team members' technical proficiency and problem-solving skills. The system's modular design accommodates adaptation to diverse audiences. For instance, high school programming students could write evaluation functions to assess a given board state for the AI player. These functions could then compete against each other, creating a fun project that fosters interest in engineering and programming.

Two related deficits in STEM education can be mitigated together. First, STEM programs still tend to teach students to segregate the social from the technical, though such segregation has had hazardous social implications. Second, though human cognition excels at narrative, which can efficiently sustain engagement, learning, and critical thinking, nevertheless, narrative is seldom formally applied in STEM education. Narrative educational methods that reintegrate the social and the technical can redress both deficiencies. An example lesson demonstrates how such narrative sociotechnical integration can be applied to foster STEM students' sociotechnical competence. Through this investigation, the paper aims to contribute to the broader conversation about fostering sociotechnical competence in STEM education.