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Remakers: Project-Based Learning for Sustainability and Resource Conservation

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Abstract

With the real world moving actively to embrace the principles of the circular economy to conserve Earth's limited resources, educational practice needs to support this paradigm shift. Educators teaching different aspects of sustainable development are finding new ways to encourage students to reinvent used-up products, to stretch existing resources, to minimize waste, and to challenge the cradle-to-grave system of production and consumption still dominating industry and manufacturing. Worcester Polytechnic Institute, a pioneer of project-based learning and an institution known for bold experiments in engineering education, has been offering its first-year students an opportunity to participate in resource conservation efforts through project-based multi-disciplinary seminars within the Great Problems Seminars Program. Team-taught "Recover, Reuse, Recycle" seminar has been experimenting with new ways of teaching resource conservation and sustainability since 2007. Students in this seminar, who often call themselves Remakers, work in project teams to develop and apply strategies that deliver more sustainable use of finite materials, prevent their loss in landfills and ensure continuous recapture and return of their value back into the system. Six strategies emerged from those efforts over the years: Contain, Extend, Substitute, Simulate, Transform and Transcend. These strategies are part of the emergent toolkit and Remaker mindset that need to be discussed and fostered in new generations of makers. Each strategy has its own goals, sequence of steps and learning outcomes. Application of these strategies will help both students and educators address urgent societal problems and manage Earth's material flows on new foundations of planetary stewardship.

Keywords: Circular Economy; Engineering Education; Paradigm Shift; Recover-Reuse-Recycle; Teamwork Strategies