

Interdisciplinary collaboration between engineering, mathematics and science

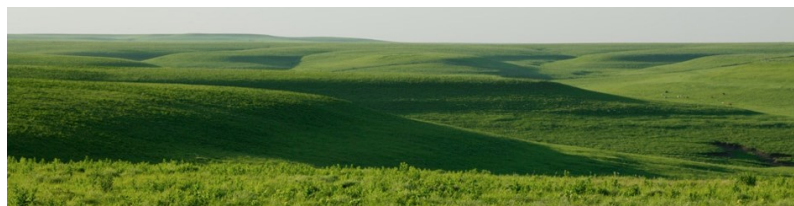
SEMS Research Highlights



Product Design: an Interdisciplinary Activity

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This newsletter presents the research conducted within the School of Engineering, Mathematics and Science (SEMS) at Robert Morris University (RMU). It covers various relevant topics including: interdisciplinary efforts, successful research grants, student research, posters and papers, journal publications, presentations at national and international conferences, contribution to professional societies, STEM educational research, industrial consulting collaborations and applied research.

The design process has been widely recognized as adding value to the STEM concept, evolving it into STEAM where *A* represents “art.” The word *design* is used loosely across multiple disciplines, and, the creative approach to design (a.k.a. “design thinking”) is becoming more valued in disciplines not typically classified within the traditional spectrum of art / design. It has been suggested that the design process occurs in four steps (Pentak and Lauer, in *Design Basics*): **thinking, looking, doing and critiquing**, especially in the early stages of market penetration.

Thinking starts with the parameters associated with the project. What is the purpose? Who is the audience? When is it needed? Thinking is also influenced by one’s own environment and personal experiences.

Looking is constructed of two parts: determining what has already been done and seeking inspiration for what might be done. The former is a process comparable to a literature review while the latter is an exploratory process that investigates history, nature and culture in visual, audible or written forms.

Doing synthesizes the thinking and looking processes into visual output. This may start with sketches, diagrams, or prototypes in variations and may experiment with different arrangements, configurations or materials. Doing concludes with a finalized concept or tangible object.

Critique is important in assessing the success of the final concept or object and in identifying potential areas of



The landscape at the top (an example of **looking**) is from national park service while the Flint Hills Teapot above (an example of **doing**): in copper, sterling silver, acrylic and silver plating,

improvement. The critique helps the designer, and sometimes the peer group to add a new level of knowledge and understanding to the core skill-set that may be employed in future design projects.

This is a publication of SEMS - Research and Outreach Center (ROC) which was established in 2010 by the SEMS Dean Dr. Maria Kalevitch. SEMS-ROC connects SEMS faculty and students with the region, the nation and the globe, demonstrates diversity and interdisciplinary interests of all three departments in the school. For more information on research at RMU – SEMS please contact:

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