# The "Wicked" Challenge of Improving Education Outcomes

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There are certain types of challenges that are so complex, so heavily influenced by social forces and so enduring that scholars have labeled them "wicked" (Head, 2019; Ritchey, 2013). Examples of wicked challenges include addressing homelessness, reducing poverty, or mitigating climate change. It is difficult to make progress on these challenges because of the ever-changing influences they are subject to along with the differing views humans may have about their causes and about the nature of both the challenge and what a solution might look like. Such problems stand in contrast to "tame" problems where the conditions are known (and stable), where solutions to similar problems can serve as models, and where most (if not all) people would agree on criteria for knowing when a solution has been found. Most mathematics problems are "tame;" most mathematics education ones are "wicked."

Improvement of education outcomes often makes its way onto lists of wicked problems, owing to the complex, intertwined influences on teaching and learning, as well as the diverse views and priorities possessed by the large set of stakeholders involved. Members of the RUME community have generated findings that give powerful insights into how students think about and learn many ideas in the undergraduate curriculum. Findings have also revealed what instructors do when creating rich, equitable learning opportunities for students, as well as what instructors need to know and be able to do to create those opportunities. Despite these many contributions to theory and to practice, a challenge we continue to face is achieving wide-spread utilization of findings from RUME in how learning opportunities are designed and implemented. If our challenges were "tame," the history of RUME's role in mathematics education might look quite different, with clear recipes for how research directly shapes practice.

Our challenge fits the definition of a "wicked problem." Often roots or histories of wicked problems are complex and tangled (Camillus, 2008). Such problems are described differently by various stakeholders (Ritchey, 2013). As progress is made, what remains to be worked on shifts, and the wicked problem "changes with every attempt to address it" (Camillus, 2008). "Solutions are temporary, as issues keep morphing into new problems." (Manville, 2016, p. 4). And of immense importance: wicked problems are never completely solved. The very best one can hope for is continual improvement in addressing the issue (Schmida, 2020).

In the 50 years since the term "wicked" was first used to characterize problems and challenges (Rittel & Webber, 1973) a great deal of theory-focused and practice-focused work has occurred. These developments in areas such as public policy and business have helped others learn to make progress. I contend that viewing some challenges in RUME as "wicked" could enhance our capacity to both understand and to make progress on those challenges.

This poster presentation offers a tour of characteristics of wicked problems as seen in scholarship from variety of fields. These characteristics are mapped to features of challenges from the RUME community to provide insights into the nature of those challenges and to leverage what others have learned. This analysis is used to support the claim that there may be significant benefits to our community if we learn how to see some of our challenges as wicked and design our approaches to them with that view in mind.

## References


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