

# Learning Engineering Virtual Institute Proposal

## 1. Executive Summary

### A. In a few sentences only, please summarize your proposal for LEVI.

ALTER-Math aims to double math learning progress for middle school students in all socioeconomic groups, especially those in low-income families, by developing an effective, scalable, and reusable AI-augmented learning environment using large language models (LLMs) and state-of-the-art AI technologies. Specifically, we theoretically ground ALTER-Math within a learning by teaching (LT) framework and will orchestrate multiple learning sciences strategies evidenced with strong effect size (e.g., conceptual change and social psychological interventions, [see Section 2.D. for details](#)) to spark, guide, and facilitate students' math learning by reshaping their role as a passive learner into a proactive teacher. To broaden its impacts and maximize implementation success, we will integrate ALTER-Math within Math Nation ([see Appendix B](#)), a core curriculum (Florida B.E.S.T. standards-aligned) used by over one million students annually, to capitalize on its extensive resources including millions of naturalistic math learning conversations and the infrastructure from Betty's Brain ([see Appendix J](#)), an edtech pioneer in LT conceptualization, to empower students' math learning with proposed teachable agents.