KIBO Research Basis

KIBO™ is based on over 20 years of research conducted by KinderLab co-founder **Dr. Marina Bers**. At her DevTech Research Group at Tufts University, Bers and her team developed both the theoretical foundation and the robotic prototypes that, with the support of the National Science Foundation, became KIBO. Her research shows specific, powerful and positive learning outcomes for young learners (ages 4–7) when working with KIBO. Find more at **www.kinderlabrobotics.com/research-articles**.

Improved Sequencing Ability in Early Childhood

PreK-Gr2 students' performance on standard assessments of sequencing ability improved from 20-35% after an 8-week robotics and coding curriculum with KIBO.

- Kazakoff, E.R. & Bers, M.U. (2014). Put your robot in, Put your robot out: Sequencing through programming robots in early childhood. Journal of Educational Computing Research, 50(4).
- Kazakoff, E., Sullivan, A., & Bers, M.U. (2013). The effect of a classroom-based intensive robotics and programming workshop on sequencing ability in early childhood. Early Childhood Education Journal, 41(4), 245-255. doi:10.1007/s10643-012-0554-5.
- Kazakoff, E.R. & Bers, M.U. (2014). Put your robot in, Put your robot out: Sequencing through programming robots in early childhood. Journal of Educational Computing Research, 50(4).

Improved Computational Thinking with Concrete Tools

Children using KIBO performed 27% better on computational thinking than children using screen-based tools.

- Pugnali, A., Sullivan, A., & Bers, M.U. (2017) The Impact of User Interface on Young Children's Computational Thinking. Journal of Information Technology Education: Innovations in Practice, 16, 172-193.

Counteracting Harmful Gender-Based STEM Stereotypes

After a KIBO curriculum, 2/3 of girls expressed an interest in engineering careers – a rate *equal* to boys. Girls who completed a 6-week KIBO curriculum were equally capable as boys at building and programming.

- Sullivan (2016). Breaking the STEM Stereotype: Investigating the Use of Robotics to Change Young Children's Gender Stereotypes About Technology and Engineering (PhD dissertation).
- Sullivan, A. & Bers, M. U. (2016). Girls, boys, and bots: Gender differences in young children's performance on robotics and programming tasks. Journal of Information Technology Education: Innovations in Practice, 15, 145-165.
- Sullivan, A. & Bers, M.U. (2018). The Impact of Teacher Gender on Girls' Performance on Programming Tasks in Early Elementary School. Journal of Information Technology Education: Innovations in Practice, 17, 153-162

Positive Impact on Underrepresented Groups in STEM Fields

Studies also demonstrate successful mastery of programming and computational thinking skills by disadvantaged students in underperforming schools.

- Elkin, M., Sullivan, A., & Bers, M.U. (2016). Programming with the KIBO Robotics Kit in Preschool Classrooms. Computers in the Schools, 33:3, 169-186.
- Kazakoff, E., Sullivan, A., & Bers, M.U. (2013). The effect of a classroom-based intensive robotics and programming workshop on sequencing ability in early childhood. Early Childhood Education Journal, 41(4), 245-255. doi:10.1007/ s10643-012-0554-5.
- Sullivan, A., & Bers, M.U. (2015). Robotics in the early childhood classroom: Learning outcomes from an 8-week robotics curriculum in pre-kindergarten through second grade. International Journal of Technology and Design Education. Online First.