

# IMPACT OF PARTICIPATION IN THE EDUCATIONAL ROBOTICS COMPETITION FROM THE PARENT'S VIEWPOINT: A MIXED METHOD

Wenhao Yu<sup>a</sup>, Yiyang You<sup>b</sup>, Feng-Kuang Chiang<sup>a,c</sup>

Contact Author: Feng-Kuang Chiang (fkchiang@shnu.edu.cn)

<sup>a</sup>Department of Educational Technology, School of Education, Shanghai Normal University, 200234, China

<sup>b</sup>Institute of Higher Education, Fudan University, 200433, China

<sup>c</sup>Center for Future Education, School of Education, Shanghai Jiao Tong University, 200240, China

## THEME

STEM education in diverse contexts

## BACKGROUND AND AIMS

Educational robots have been regarded as an effective learning tool in STEM education. Educational robotics competitions have gained great popularity because they make kids learn by doing and give kids a chance to improve STEM knowledge and competencies by designing and teamwork. Parental involvement in STEM education has been confirmed to positively influence the kid's studies (Grolnick & Slowiaczek, 1994). This study investigates the impact of participation in the educational robotics competition (World Robot Olympiad, WRO) from the parent's viewpoint, mainly focusing on four questions as follows:

Q1: *what is the biggest challenge encountered by kids and how do they overcome it?*

Q2: *what is the greatest gain from participating in the WRO?*

Q3: *what is the impact of the WRO on kids' school learning?*

Q4: *what is the effect of the WRO on children's career choices?*

## METHODOLOGY

This study used mixed-method research to explore parents' perspectives on students after participating in the WRO through questionnaire surveys—online and offline—and interviews. 128 questionnaires and 30 interviews of parents from different countries were collected and analyzed. For quantitative data, we conducted descriptive and correlation analysis based on the seven dimensions of *Emotional Engagement, Career Choice, Engineer Thinking, Team Collaboration, Problem Solving, Learning Skills and Global Consciousness* which contained in the questionnaire. For qualitative data, we used grounded theory to generate code and category from the parent's perspectives.

## RESULTS AND CONCLUSIONS

The results of quantitative research showed that the parents agreed that participation in WRO can actively influence their kid's abilities in all the seven dimensions with *emotional engagement* ranking highest. The qualitative results suggest the impact of parent's perceptions to kid's improvements not only on specific STEM knowledge, but also on school learning and career choice. Based on quantitative and qualitative findings and combined with expectancy theory, we proposed a model about the impact of participation in robotics competitions from the parent's viewpoint. When the kid makes efforts to achieve the goal,

parents' satisfaction with the kid's growth will transform into their motivation to support kids who will make more efforts.

## REFERENCES

Grolnick, W. S., & Slowiaczek, M. L. (1994). Parents' involvement in children's schooling: A multidimensional conceptualization and motivational model. *Child development*, 65(1), 237-252.

Zhang, Y., Lu, Y., Bao, X., & Chiang, F. K. (2022). Impact of participation in the World Robot Olympiad on K-12 robotics education from the coach's perspective. *STEM Education*, 2(1), 37.