STEM for All Showcase Report

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Cover Page Footnote

This article and the associated STEM for all showcase submission video (https://www.youtube.com/watch?v=Clps427rdDc) was presented at the NSF 2021 STEM FOR ALL COVID, Equity & Social Justice Conference, May 11-18.

This article provides a description of the development of the STEM in your Home project in the STEM for Success initiative.

The STEM for Success initiative grew out of the National Science Foundation funded Leadership and iSTEAM for Females in Elementary Schools (LiFE) project (NSF grant #1744490).

The LiFE Project, was an NSF INCLUDES Design and Development Launch Pilot, which involved a collaborative effort to counter the stereotypical expectation that boys are "naturally" better at science and math which becomes a self-fulfilling prophecy, silently shaping the girls' own perceptions of their ability. LiFE collaborators worked to address this problem at its source: the early learning experiences of elementary school girls. The elementary-middle school period is critical because by 8th grade, many girls have left the STEM pathway forever. LiFE worked with its partner schools in Hillside, Long Branch, Morris Plains, Newark and Weehawken, New Jersey to co-design effective ways to showcase STEM as a collaborative, people-rich space in which girls can participate together, be themselves, and engage in exploration. LiFE supported participants in STEAM clubs for girls through professional development for teachers, role model visits to schools, inclusive events and relevant supplies. The project used "iSTEAM" learning strategies that encourage students to apply the tools of various disciplines to investigate and solve real-world problems in an open environment of innovation, collaboration, and communication. LiFE also worked to build auxiliary skills such as technology, teamwork, communication and leadership including through partnerships with Apple Corporation and the US Army. The project's efforts worked to include strategies that research indicates should be especially effective in engaging girls.

For two years, from April 2018 through March 2020 LiFE worked with STEAM clubs for students in grades 2 through 6. LiFE encouraged iSTEAM exploration through the use of Problem/Project-Based Learning strategies, promoting participation in longer-term projects and presenting at events bringing together the participating schools. Our partner teachers felt it would be a good idea for the clubs to present their work in their own communities and so we planned to have seven events (one at each participating school) in March 2020, New Jersey STEM Month. Two of these events took place before the world shut down due to the COVID-19 pandemic.

When the pandemic shut down plans for in-person meetings and STEM month events, LiFE pivoted and revised the roles of its New Jersey Institute of Technology (NJIT) undergraduate STEM role models. These undergraduate STEM majors previously had made visits to the clubs. Now, our role models created videos and accompanying activity plans that participants could take part in from home. The role models demonstrated the activities through videos that were streamed online at our 'STEM in Your Home' events. The demonstrations usually used materials commonly found at home so viewers were able to work along with us or perform the work at a convenient time including with their families while being able to review the videos. Thus, students were provided with hands-on learning experiences to continue to foster participation in STEM. In addition to the STEM demonstrations, we also hosted virtual tours. During the livestreams, students were able to ask questions of our team and learn about

why they are pursuing STEM degrees. The videos and activities allow for engagement in hands-on, minds-on Science, Technology, Engineering and Mathematics discovery and fun.

The 'STEM in Your Home' project is showcased in our STEM for ALL video which provides a glimpse into the project activities. Among the activities presented in the STEM for All video are a tandem jump by one of our undergraduate role models with the US ARMY Golden Knights (gravity and air resistance) and a Chemistry in the Kitchen experiment concerning Properties of Water. The videos and activity plans are accessible through the NJIT STEM for Success website www.stemforsuccess.org as well as at our digital commons site https://digitalcommons.njit.edu/stemresources/ We acknowledge support for this work from NSF grant #1744490 and from Howmet Aerospace Foundation.

Since March 2020, the Collaborative for Leadership Education and Assessment research (CLEAR) expanded the work of the LiFE project as part of the STEM for Success project under the auspices of NJIT's College of Science and Liberal Arts (CSLA). STEM for Success works to empower children to have freedom and agency to follow their own path and solve problems they may face as they pursue their own passions in life. STEM for Success collaborates with people and organizations that share this outlook. The project aims to broaden participation of children in STEM, and foster collaborative change in STEM by engaging multiple stakeholders around STEM experiences.

STEM for Success has establish a digital repository to house a student showcase, STEM resources, and a collection of STEM journals for and by students. These free repositories allow educators and students to collect, share and showcase STEM accomplishments of students as they develop skills to become productive members of the future workforce, fostering a growth mindset, critical thinking, reflection, problem solving, leadership, communication, collaboration and other essential skills.

The project is eager to work with those who have the desire to broaden participation in STEM for all. You can get involved through the www.stemforsuccess.org website or by contacting CLEAR@njit.edu