

RobotTreeHouses: STE(A)M Education and Digital Fabrication

Robert Corser
University of Washington

RobotTreehouses is a studio-based, action research project focused on exploring new paradigms for design and technology that bridge K-12 and University level education.

Among today's most pressing educational agendas is engaging students in Science, Technology Engineering and Math (STEM) subject matter. The arts, including architecture, have an emerging role to play in energizing this agenda, and transforming STEM into STE(A)M. The RobotTreehouse project is aimed at situating (A)rchitecture in the center of this agenda.

A collaboration between a university architecture program, an acclaimed design practice and a prestigious engineering firm, RobotTreehouses explores the possibilities of playfully integrating STEAM education with advanced digital design and fabrication. "Robot" and "Treehouse" are words loaded with meaning for children and adults alike. Prompted to describe a Robot Treehouse, younger children (ages 8 to 10) were given a room full of drawing and modeling supplies to communicate their ideas and vision. The results and processes were documented and they formed the seed for eight undergraduate and graduate architecture students to design and prototype a full-scale Robot Treehouse in only seven weeks. The result is a classroom in the landscape—a social space and an outlook on the environment—a place for science and play.

The ultimate goal for this full-scale prototype is to engage young people in the observation of their environment, and to spark their imaginations about architecture, engineering and fabrication. The RobotTreehouse is designed for adaptive deployment in a forest or a park, at a suburban playground, or on a telephone pole downtown. The final prototype was realized through sophisticated computer modeling and digital fabrication. Students were exposed to advanced analytical and fabrication tools and processes, and they saw first hand how the digital world that computer games are based in can generate a physical space in which to play, observe, and engage with the world.

According to one of the students: "the Robot Treehouse's poetic form is inspired by the dialogue between the organic shape and the geometric order of a lily pad... The magic of the Treehouse's tensile structure lays in how it responds to human movement. As one leans on the curving backrests and changes the balance of the whole structure, one feels the gentle concentric sway of the platforms. Thus, the Robot Treehouse allows for a personal and intensified connection to the tree and a unique experience of gravity."

The poetics of technology are evident in this gentle responsive movement. It is this gentle swaying that fulfills the childlike dream of an autonomous expressive space, free from the ground and up in a tree. While there is no "robot" physically present in the final built form of this first prototype, digital design and robotic tools were crucial to creating the formal and experiential qualities of the treehouse. This RobotTreehouse is the first in a series of adaptive and responsive architectural parasites that will engage youth and adults alike in STEAM education, bringing architectural pedagogy and fabrication research together with K-12 education in an ongoing multi-disciplinary collaboration.

ROBOTREEHOUSES

STE(A)M EDUCATION & DIGITAL FABRICATION

STUDIO-BASED RESEARCH



Among today's most pressing educational agendas is engaging students in Science, Technology Engineering and Math (STEM) subject matter. The arts, including architecture, have an emerging role to play in energizing this agenda, and transforming STEM into STE(A)M. The RobotTreehouse project is aimed at situating (A)rchitecture in the center of this agenda.

A collaboration between a university architecture program, an acclaimed architecture practice and a prestigious engineering firm, RobotTreehouses explores the possibilities of playfully integrating STEAM education with advanced digital design and fabrication. "Robot" and "Treehouse" are words loaded with meaning for children and adults alike. Prompted to describe a Robot Treehouse, younger children (ages 8 to 10) were given a room full of drawing and modeling supplies to communicate their ideas and vision. The results and processes were documented and they formed the seed for eight undergraduate and graduate architecture students to design and prototype a full-scale Robot Treehouse in only seven weeks. The result is a classroom in the landscape—a social space and an outlook on the environment—a place for science and play.

The ultimate goal for this full-scale prototype is to engage young people in the observation of their environment, and to spark their imaginations about architecture, engineering and fabrication. The RobotTreehouse is designed for adaptive deployment in a forest or a park, at a suburban playground, or on a telephone pole downtown. The final prototype was realized through sophisticated computer modeling and digital fabrication. Students were exposed to advanced analytical and fabrication tools and processes, and they saw first hand how the digital world that computer games are based in can generate a physical space in which to play, observe, and engage with the world. According to one of the students: "the Robot Treehouse's poetic form is inspired by the dialogue between the organic shape and the geometric order of a lily pad... The magic of the Treehouse's lense structure lays in how it responds to human movement. As one leans on the curving backrests and changes the balance of the whole structure, one feels the gentle concentric sway of the platforms. Thus, the Robot Treehouse allows for a personal and intensified connection to the tree and a unique experience of gravity."

The poetics of technology are evident in this gentle responsive movement. It is this gentle swaying that fulfills the childlike dream of an autonomous expressive space, free from the ground and up in a tree. While there is no "robot" in the final built form of this first prototype, digital design and robotic tools were crucial to creating the formal and experiential qualities of the treehouse. This RobotTreehouse is the first in a series of adaptive and responsive architectural parasites that will engage youth and adults alike in STEAM education, bringing architectural pedagogy and fabrication research together with K-12 education in an ongoing multi-disciplinary collaboration.

