# Women in Project-Based Learning Playbook

A playbook for enrolling, supporting and graduating women in STEM fields

## Resources for a sustainable world class model in STEM Higher Education

Since 2015 the BUILD-IT Alliance, through strategic collaborative dialogue with industry and the Vietnamese Government (MOET), has focused on creating a world class model for innovative technology and engineering higher education. The BUILD-IT public-private ecosystem is designed to produce graduates who can solve problems and engineer solutions and value for Vietnam's social and economic development. BUILD-IT leverages the vast capabilities of the implementing partner, Arizona State University, America's largest and #1-ranked university for innovation, along with diverse government, industry, and academic partners linking T&E higher education to the needs and capabilities of industry partners, building strategic leadership skills to advance university autonomy, program and instructional quality, and formal lasting partnerships. BUILD-IT supports female empowerment and has provided leadership forums, academic initiatives, and scholarships, and has laid groundwork strengthening the universities' capacity for building technical English and 21st century professional skills.

The BUILD-IT Playbook series has been developed with collaboration and input from BUILD-IT partners and is designed to provide a quick start guide and compilation of best practices that have been effectively implemented in Vietnam by our partner institutions. By leveraging these lessons learned and resources for implementation of tested and effective models, you will have resources that will help you develop a sustainable world class model in STEM Higher Education.

### Playbooks in our series include:



**The Maker Innovation Space Playbook**

Multifunctional spaces with workshops and tools to prototype innovations, Makerspaces provide critical learning spaces to the generation of problem solvers.
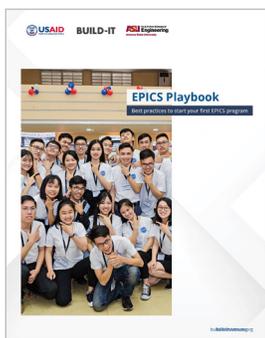


**EPICS**

EPICS is an internationally recognized engineering-based service learning and social innovation applied project program. Helping students build both hard and soft skills for success.
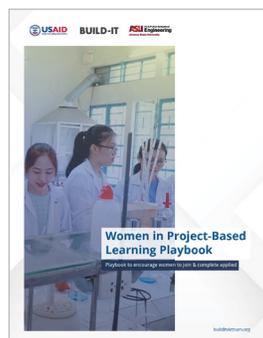


**Women in Project-Based Learning**

This playbook presents detailed instructions for creating gender-responsive programs that encourage and support women in engineering.



**Certified Facilitator and Master Teacher Training**

This playbook provides step-by-step strategies for creating a high yield of trained faculty in a short duration of time who can better drive students towards university success.



**A Playbook for University Leaders Seeking AUN-IQA**

This playbook presents recommended processes, best practices and key points of emphasis to facilitate the successful completion of AUN-IQA certification.



**Digital Pedagogy in Higher Eduction**

Through the digital pedagogy playbook, BUILD-IT university partners have access to proven best practices, methodologies, and approached for teaching and learning in a digital environment.



**The Accreditation Playbook**

This playbook serves as a quick start guide for leaders and officials of universities who are considering or have begun a journey to external international accreditation for programs.



**The Industry Advisory Board Playbook**

This quick start guide provides a foundation for setting up your IAB. Learn the basics of forming your board, finding participants, and setting expectations.

# Engaging Women in Applied Projects

This playbook is a manual for educators to assure that women benefit from applied projects. It is a starting point to inspire gender-responsive programming, mitigate gender barriers, and promote equitable learning outcomes during applied projects.

Applied projects are hands-on learning experiences where men and women leverage the principles of design innovation, entrepreneurship, and research to prototype engineering-based solutions for industry and society. Through applied projects, men and women learn technical skills and the 21st -century skills they will need to succeed in work and life. Aspects of team-based engineering, such as team dynamics, lack of role models, and even unfamiliarity with tools, impact men and women differently. Unsupported by their community and afflicted by gender stereotypes, young women may be hesitant to step into applied project teams or step up to lead their teams.

As pedagogies evolve in Vietnam, leaders, faculty, and students need to respond to gender differences to ensure that men and women achieve equal learning outcomes.

## Our contributors



**Dr. Ly Thien Trang**
Pioneered applied projects and contributed her program management insights



**Dr. Nguyen Thi Anh Thu**
Pioneered Makerspaces and contributed her makerspace insights



**Dr. Phan Thi Mai Ha**
Pioneered applied projects and contributed her program management insights



**Dr. Vo Thanh Hang**
Pioneered applied projects and contributed her program management insights



**Ms. Nguyen Thuong**
Thuong started a women's STEM Club and co-authored "Make her community"

# Plan for her

## How gender-responsive programming encourages women

**Design for her needs**

Often innovations are designed and tested without considering women's needs. Many advances in technology underserve women. Counteract this by challenging students to design solutions that fit all users better. Include a gender impact summary as a key project deliverable. Helmets designed for long hair demonstrates the impact of conscientious design.

**Innovate for her interests**

Often engineering programs are unintentionally centered on men's interests. A smart camera competition might focus on security & surveillance. Women might be more interested in joining if the competition included innovating camera filters and coding motion games. You must design and advertise applied projects that appeal to men and women's interests.

**Build equitable teams**

Often the unconscious power/gender dynamics affect women's participation in teams. Use deliberate teaming techniques to assure roles and workloads are distributed and teammates act on consensus. Create team dynamics that do not replicate social inequalities. Encourage students to include equitable teaming policies in their project charters.

**Partner with women**

Service-learning projects give young women a chance to be mentored by professional women. By partnering with a community of women, all students can design products and solutions tailored for women's needs and interests. This gives all students female role models and an understanding of gender's impact on design.

**Introduce her**

Projects that require meeting with unfamiliar adult mentors could be uncomfortable for women. Assure that meetings are on campus and monitored. Host mentor matching events to assure that their first meetings are comfortable. Check-in with students regularly and privately to learn about their encounters with their mentors.

**Pilot gender-responsive programs**

Embed gender-responsive practices into your pilot programs. If your formative pilot emphasizes women, the complete program will be gender-responsive from the get-go. BUILD-IT piloted Women in EPICS, to embed multi-disciplinary teams, inclusive teaming practices, and human-centered design into the upcoming EPICS program.



*Helmets designed for long hair benefit women*



*Even all female teams should follow equitable teaming practices*



*Team interviewing woman community partner*



*Faculty accompany students to first mentor site visit*

# Make her space

## Makerspaces encourage women

**Showcase women in the makerspace**
The first impression of your markerspace is critical! Online and off, young men and women need to see images of women using tools, in safety signs, and working in the space. Makerspaces should position this imagery on website banners, public-facing signs, and near the tools to normalize women building prototypes.

**Hire women technicians**
The most powerful signal to a young woman that she belongs in the makerspace is seeing a female technician working with equal duties with her male colleagues. An active female technician supporting tool training is critical to helping women overcome hesitation around using unfamiliar tools. A female technician will combat stereotypes and inspire women to use all the space's resources.

**Tool training for women**
Since women may be unfamiliar with tools, men may discourage women from building the prototype. Host tool training events for and by women. Host these sessions regularly and offer them to women from all majors. Link them to new student orientations and high school visits. Include women in any tool training videos that you develop.

**Make it her space**
Introduce the space to women by connecting with women's clubs and hosting women-focused events. Start with children's classes, soft skills programs, and career seminars. As a multi-disciplinary platform, the makerspace is ideal for hosting a women's STEM club. Incentivize women to use the space with membership discounts & reserved lockers.

**Respect her space**
Location, lighting, hygiene, and the presence of strangers are critical to women's engagement. Build your space in a highly visible part of campus, near private restrooms, with trusted adults present. Students should never be alone, especially with public members, mentors, or maintenance workers. The space is not one clique or department's clubhouse. Students must put tools back and take their belongings. Allow students to share anonymous feedback with space managers.


*Poster of woman building on display*


*Female technician normalizes women's role in the space*


*Women-focused tool training familiarizes the tools*


*Women's STEM club meets in the Makerspace*

# Make her community

## How to start a women's STEM club

**Find your mission & co-founders**
Give your club a valuable mission so that members will care about the club even after they graduate. A mission that focuses on women's needs, interests and community will draw students to your club. You can start your club with just two members, write down your mission and find women who share your cause.

**Find female mentors**
You may need faculty or upperclassmen to help you plan your meetings, reserve a space, and keep track of your members. Make a plan to have your club recognized by your university. During recruitment, assure that female faculty are actively supporting you. Leaders should make time to check in with each member and encourage them to attend events.

**Spread your message**
Find faculty, student clubs, departments, and friends to help you share your event information on social media. Share your content across pages, clubs, and departments. Encourage your friends, especially upperclassmen, to share your posts. Host your first event early in the semester, when students are excited to meet new people. Invite university leaders to encourage women to enroll in your club. Make sure leaders know about your initiative to inspire young women.

**Build an inclusive community**
Ensure that everyone feels welcome at your events, introduce each other, give everyone a chance to speak, make group work activities. The most important outcome of the club is building an open and energetic community - not grades or events.

**Run exciting activities and recruit new women**
Focus on at least one big event or competition per semester for an exciting goal. Invite members to mentor each other, invite faculty and experts to inspire your members, run fundraisers, invite boys to join activities, and team up for projects and competitions.

**Stay serious about STEM**
Your club will have a long-term impact if you stay focused on your mission. If your club helps women prepare for meaningful careers, they will support it after university. You will make lifelong friends, and the club will become an essential part of your university.


*The founders of a Women's STEM Club*


*Women mentors are important inspirations*


*Women work together on work/life balance*


*Clubs are way to practice STEM presentations*

# Celebrate her

## For women in STEM, seeing is believing

**Represent her**

A young woman's first impression of your program is critical! Women need to see other women engineering in recruitment materials to realize that they are welcome in your program. Use deliberate and persistent messaging of women in technical roles to normalize women's involvement in applied projects. Leverage social media, university websites, posters, and brochures to feature women actively involved in their projects. At events, arrange for women to be interviewed, photographed, and quoted by the press. Send communication guidelines to the media and your university's marketing department ahead of time.

**Showcase her impact**

During project showcases, conscientiously place women's project displays in prominent locations. Invite women in STEM fields to judge the projects. Ask judges to direct their first questions to women. Invite university leaders to encourage women during recruitment and showcases. Invite underclassmen and high school women to attend project showcases. Showcases are powerful chances to inspire the next generation of women to join applied projects.

**Leaders speak the loudest**

Fighting inequality in applied projects requires an entire organization to consider gender impact in all its strategic plans. Leaders must support gender-responsive programming and empower faculty to make the changes needed. Inform your leaders about your work. Urge them to support your initiatives publicly. Their influence is crucial to steer an entire program, department, or organization to become gender responsive.

**Start young – Start now!**

Changing attitudes about women and girls in STEM should start before boys and girls have absorbed pre-conceived notions about gender and ability. Inspiring an attitude shift means starting today with students at all levels in their STEM pathways. Focus on shifting both parents' and students' attitudes about women's role in applied projects.



*Social media posts focus on women in STEM*



*Television interviews broadcast women's voices*



*Leaders must stand with women in STEM*

## Share your advice with us

Please email USAID BUILD-IT (Tran.Thao@asu.edu) to discuss how you can contribute your own advice for encouraging women through applied projects.