

# Learning by Stealth – Reducing Gender Stereotypes in STEM through Motivation- Driven Making

Best Practices for Educators  
and Youth Workers



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Check more at: [4equality.erasmus.site](https://4equality.erasmus.site)

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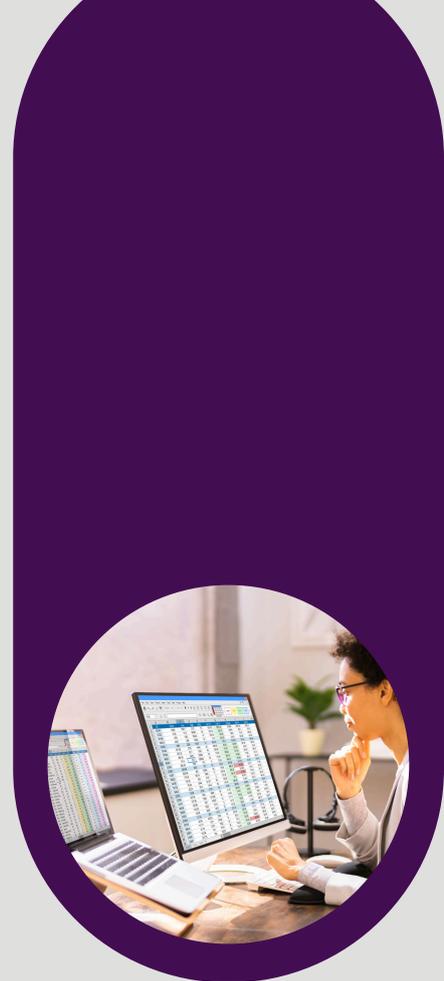
# What Is Learning by Stealth?

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**Learning by Stealth is an inclusive educational approach that introduces coding, circuitry, and problem-solving indirectly, through activities that align with young women’s existing interests (creativity, design, social recognition, self-expression).**

**The practice was implemented within a wearable technology programme supported by Central Queensland University, with pedagogical input from Wendy Fasso.**

**Rather than announcing “this is a programming class,” facilitators invite girls to create something meaningful to them, and technology becomes a tool rather than the goal.**



## The Core Problem This Practice Addresses

Young people learn complex STEM skills not because they are told to learn them, but because they want to achieve a personally meaningful outcome.

In this approach:

- Motivation comes before technical instruction
- Identity and pride drive engagement
- STEM skills are acquired implicitly and confidently

Many girls aged 14–18 (and often up to 25) associate:

- Coding → “for nerds”
- Programming → “for boys”
- Science → abstract, boring, or intimidating

As a result, interest drops before learning even begins.





# How the Practice Works?

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As a youth worker, you can help young women stand firm in their STEM or business ambitions by equipping them with practical skills to understand themselves, communicate clearly, and advocate for their goals.

## 1. Motivation First, Technology Second

Instead of saying:

“Today we will learn programming.”

Facilitators say:

“Today you will make something amazing that lights up and reacts the way you want.”

Girls become invested in:

- How their artefact looks
- How it performs
- How it will be perceived by others

Programming becomes a means to an end, not a scary subject.

## 2. Coding Without the Fear Label

Girls:

- Build paper circuits with copper tape
- Use LEDs and programmable components
- Experiment with light patterns and timing

Crucially, they are not constantly reminded that they are “coding.”

### **This removes:**

- Performance anxiety
- Fear of failure
- Stereotype threat

### **And replaces it with:**

- ✓ Curiosity
- ✓ Experimentation
- ✓ Autonomy

### 3. Hands-Off Facilitation & Mistake-Friendly Learning

#### Facilitators adopt a guided but non-directive role:

- They do not fix problems immediately
- They avoid saying “this is wrong”
- They ask reflective questions instead

#### Examples:

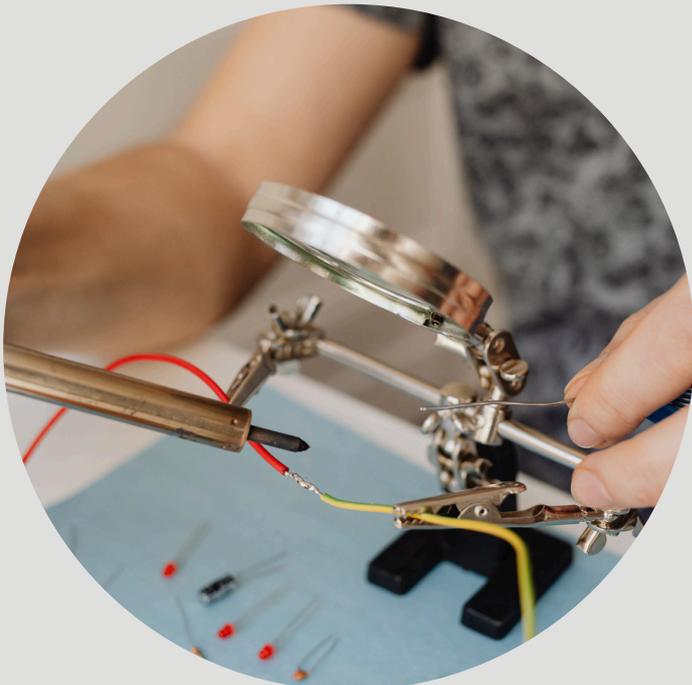
- “What do you think is happening here?”
- “What could you try differently?”

#### Girls are allowed to:

- Make mistakes
- Debug their own circuits
- Recover from errors

#### This builds:

- ✓ Confidence
- ✓ Problem-solving ability
- ✓ Ownership of learning



### 4. Confidence Through Recovery, Not Perfection

A critical insight from this practice: Confidence grows not from getting things right, but from fixing things yourself.

When girls:

- Identify the problem
- Test solutions
- See their design finally work

They experience:

- Pride
- Increased self-belief
- Willingness to try harder challenges

This directly counters the stereotype that girls must be “perfect” to belong in STEM.

# Step-by-Step Guide for Youth Workers

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## Phase 1: Hook the Interest

- ✓ Start with creative making (fashion, art, design, gifts)
- ✓ Avoid technical jargon at first
- ✓ Emphasise personal expression and fun

## Phase 2: Introduce Technology as a Tool

- ✓ Add LEDs, circuits, or digital elements gradually
- ✓ Let curiosity lead the learning
- ✓ Encourage experimentation over instruction

## Phase 3: Allow Safe Failure

- ✓ Let participants struggle within safe limits
- ✓ Intervene only if mistakes become irreversible
- ✓ Celebrate problem-solving, not speed

**Important:** Avoid fixing problems for participants—ask guiding questions instead.

## Phase 4: Reflection & Reframing

At the end, help girls name what they learned:

- “You programmed a sequence.”
- “You debugged a system.”
- “You managed a project.”
- This reframing helps them recognize themselves as capable STEM learners.



## How those practices will help?

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### This practice actively dismantles:

- “Girls don’t like coding”
- “STEM is only for a certain type of person”
- “Mistakes mean you’re not good enough”

### Instead, it promotes:

- ✓ Inclusive learning cultures
- ✓ Growth mindset
- ✓ Gender-responsive pedagogy