HER TECH

Gender-Sensitive **Engagement Framework**

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Table of **Content**

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Welcome Message

Every girl deserves the opportunity to discover, explore and shape the digital world.

Yet across Europe, too many girls still face barriers that limit their participation in ICT and computing education. These barriers are rarely about ability. More often, they are linked to confidence, belonging, visibility and access to meaningful opportunities.

The HER TECH Gender-Sensitive Engagement Framework was developed to support educators in creating learning environments where girls can thrive. Drawing on research, interviews and inspiring practices from across Europe, the framework brings together evidence-based strategies that help make technology education more inclusive, engaging and empowering.

This is not a set of rules or a one-size-fits-all solution. Rather, it is an invitation to reflect, experiment and build learning experiences that allow every student to see technology as a space where they belong.

Because engagement is not created in a single lesson or workshop. It is built over time, through everyday interactions, encouragement and opportunities that help girls recognise their potential and imagine themselves as future creators, innovators and leaders.

We hope this framework inspires new ideas, meaningful conversations and lasting change in classrooms across Europe.

The HER TECH Consortium

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Introduction

Most girls do not wake up one morning and decide that technology is not for them. Instead, that feeling is often built gradually through hundreds of small experiences: a classroom where someone else always takes the keyboard, a role model they never meet, a stereotype left unchallenged, or a moment of self-doubt that goes unnoticed. The good news is that the opposite is also true.

A single encouraging teacher. A project that connects technology to creativity. A chance to succeed, be recognised and feel part of a community. These experiences can shape how girls see themselves and what futures they imagine for themselves.

This framework is built on a simple idea: engagement does not happen by accident.

It is created through the environments we design, the opportunities we offer and the messages we send every day in our classrooms, schools and communities.

The HER TECH Engagement Framework brings together lessons from research, educational practice and successful initiatives across Europe to help educators better understand what supports girls' engagement in ICT and computing.

Rather than focusing on what girls lack, the framework focuses on the conditions that help them thrive.

Because when girls have access, feel that they belong, receive recognition and can see pathways forward, technology stops being something that belongs to others.

It becomes something they can shape themselves.

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How to Use This Framework

This framework is written for teachers and educators working at primary and secondary school level. It can be read in full as a professional development resource or used section by section as a guide to specific challenges — for example, designing a lesson with a lower entry barrier (Belonging), or thinking through how to structure group work fairly (Recognition).

Each pillar section follows the same structure: a brief account of why the pillar matters, grounded in the research evidence; practical strategies organised by dimension (Curriculum and Content, Pedagogy and Practices, Tools and Resources); and a Case Spotlight drawing on a documented example from the HER TECH case studies.

The framework is intentionally practical rather than prescriptive. The evidence is clear on principles; the precise application will always depend on your specific school, curriculum, and students. Use this document as a lens for examining your current practice and as a source of ideas for strengthening it — not as a fixed recipe.

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The HER TECH **Engagement Framework**

The framework is built around four pillars — Access, Belonging, Recognition, and Progression — that emerged as the most consistent enabling factors across the literature, the interviews, and the case studies, and that draw on the research of Ulrika Sultan on girls' interest and participation in technology and STEM (Sultan, 2025)[1].

[1] Sultan, U. (2025). Så får vi fler att välja STEM. Näringslivets skolforum, Stockholm.

They are interdependent: access without belonging produces disengagement; belonging without recognition produces invisibility; recognition without progression produces lost potential. Together, they describe the conditions for a school environment in which girls can learn ICT, feel engaged, and be genuinely recognised. The relationship also runs backwards: a strategy placed in one pillar will often reinforce or activate another.

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A peer mentoring pipeline (Progression) deepens a girl's sense of belonging; a well-designed showcase opportunity (Recognition) can open pathways she had not previously considered. Readers are encouraged to move across sections freely rather than treating the pillars as separate compartments.

ACCESS
Every girl in the room

BELONGING
A culture where girls thrive

RECOGNITION
Competence made visible

PROGRESSION
Sustaining and opening pathways

Within each pillar, the framework is organised across three practical dimensions for teachers:

- **Curriculum and Content** — the 'what': how you frame, sequence, and connect the subject matter to make it accessible and meaningful.
- **Pedagogy and Practices** — the 'how': the teaching methods, classroom structures, and interaction patterns you use.
- **Tools and Resources** — the 'with what': the physical, digital, and organisational instruments that enable or reinforce the strategies above.

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Pillar 1

ACCESS: Every Girl in the Room

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Why
Access matters

When ICT is optional, girls disproportionately do not choose it. Across all seven partner countries, the research consistently shows that the gender gap in computing is in large part a structural gap: it widens or narrows depending on whether participation is mandatory or elective, whether exposure begins early or late, and whether schools actively remove financial, geographic, and social barriers to entry. Access is the prerequisite for everything else.

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What the Evidence **Tells Us**

The 'interest dip' in girls' STEM engagement most commonly occurs between ages 12 and 14 — and it almost always coincides with the introduction of elective subject choices. In Croatia, for example, informatics transitions from compulsory to optional at precisely this age, and the result is a predictable drop in female participation. In Finland and Belgium, educators report that girls who might have remained engaged under a mandatory model opt instead for subjects that feel more socially comfortable, more aligned with their friend group, or less associated with a 'nerd' identity they do not wish to claim.

Timetabling is a structural barrier that is rarely discussed but consistently impactful. When ICT options clash with arts, music, or languages in the same block, girls — whose subject choices are often shaped by peer group alignment and social belonging — disproportionately walk away from technology. Educators in Finland, Belgium, and Germany all described this timetabling conflict as a significant but under addressed driver of the gender gap.

The research also confirms that the window for effective intervention is earlier than most school systems currently assume. Evidence from Belgium, Finland, and Sweden consistently points to pre-primary and early primary school as the most powerful window: reaching children before gender stereotypes about who 'belongs' in technical fields have had time to solidify. A single well-designed workshop at age 14 cannot undo years of cumulative messaging that computing is 'not for girls'; but sustained exposure starting at age 5 or 6 can prevent that message from becoming entrenched.

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Strategies for schools

Curriculum and Content

1

Embed computing in mandatory, cross-curricular teaching rather than positioning it as a standalone elective. Integrate coding into science, mathematics, arts, and language lessons so that girls who would not self-select a 'tech' course still encounter it.

2

Plan a 'red thread' — a scaffolded sequence of computing experiences across school years, not isolated one-off activities. Students who meet technology five or six times across their compulsory education develop a very different relationship with it than those who encounter it once.

3

Start early. Pre-primary and lower primary school are the most powerful entry points. Use age-appropriate, screen-light, and playful activities (see Tools section) to build familiarity and positive associations before stereotypes solidify. In practice, 'starting early' means ages 4–7 for first exposure, and it does not require specialist equipment or a computing teacher. Sorting games, sequencing stories, directional play with floor robots, and 'unplugged' logic puzzles all build foundational computational thinking within the skills and time of a generalist early years educator. What matters is that girls encounter these activities as normal, enjoyable, and socially neutral.

4

Actively advocate at your school for timetabling solutions that prevent ICT from competing head-to-head with arts, music, or languages. Where possible, position computing inside those subjects rather than against them.

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Pedagogy and Practices

Design participation as the default, not the exception. Wherever possible, ensure all students — including those who show no initial interest — are included in computing activities. Do not rely on student self-selection to fill tech workshops or clubs.

Use community and after-school settings to extend access beyond the school day, particularly for students whose home environments do not provide technology exposure. Partner with local libraries, science centres, or NGOs where possible. In practical terms, this can mean: a monthly computing session at a local library open to all students regardless of school ICT provision; a referral to a national club network (CoderDojo, Kodcentrum, LUMA) with a specific date and link; or a short loan of a micro:bit or similar device for a weekend project. The specific form matters less than the habit of making the connection explicit and removing the steps a student would need to take alone.

Remove cost barriers actively. When field trips, competitions, or special programmes involve fees, seek funding or alternatives so that socioeconomic background does not become a proxy for access to computing opportunities.

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Tools and Resources

Prioritise tools with zero or very low cost and no prerequisite hardware: Scratch, Code.org, micro:bit, and unplugged coding activities require minimal infrastructure and can be delivered on school computers or tablets.

Explore lending networks and school partnerships to access specialised equipment (robotics kits, 3D printers, VR headsets) without requiring full purchase. National and regional STEM networks (e.g., LUMA in Finland, Kodcentrum in Sweden, IRIM in Croatia) exist in many countries for exactly this purpose.

For the youngest learners, use physical, unplugged, and off-screen activities: directional robot toys, paper-based sequencing games, and movement-based logic activities build computational thinking before any screen is involved.

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Case Spotlight: SWEDEN

TechLab Linköping – Mandatory STEM Centre

TechLab serves 22 municipal primary schools and reaches ~6,000 students each year through mandatory participation in grades 3, 5, 6 and 8. Every student attends at least five times. By making attendance compulsory, the programme prevents the self-selection bias that typically means tech clubs are attended predominantly by tech-interested boys.

One-third of applicants for the new grade 7 elective 'profile classes' are girls – an early indicator that the mandatory foundation is generating genuine, self-motivated interest in ICT beyond the compulsory programme.

Key lesson: Mandatory participation is the most reliable structural tool for ensuring every girl is in the room. It is not sufficient on its own, but without it, all other strategies operate on a self-selected minority.

Photos: www.tech-labs.se

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Pillar 2

BELONGING: A Culture Where Girls Thrive

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Why
Belonging matters

Getting girls into the room is necessary but not sufficient. Once there, girls face a set of cultural and environmental pressures — stereotypes, performance anxiety, gaming culture gaps, and male-dominated classroom dynamics — that can make computing feel like a space that was not designed for them. Belonging is about actively redesigning that space: through the content you choose, the creative framing you apply, the tools you select, and the interaction structures you set up

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What the Evidence **Tells Us**

A recurring observation across all 45 interviews is that girls often approach unfamiliar technology with a deliberate 'observer phase' — a period of watchful waiting, sometimes lasting weeks, before they are ready to try a new tool themselves. Educators who recognise this pattern as a rational strategy for managing the fear of public failure respond by designing lesson structures that make observation safe and that create a low-pressure path from watching to doing. Educators who do not recognise it often interpret it as disengagement — and lose the student in the process.

The 'start-up distance' that girls experience is real and has a clear cause: boys arrive in computing classrooms with years of accumulated comfort with digital environments, built through gaming on computers and consoles, construction play, and online activity. Girls' digital leisure is more often centred on social platforms and communication, typically through phones and tablets rather than the desktop and console environments that most closely resemble a computing classroom.

This is not an innate difference — it is the predictable result of divergent exposure. But it is experienced by girls as personal deficit, and it feeds directly into the confidence gap. The picture is further complicated by a perception gap: many girls who do play games regularly do not identify as 'gamers', because the label has become so strongly associated with a male-dominated culture. This means the experiential gap between girls and boys is often smaller than it appears — but girls are less likely to recognise or claim their own digital experience. Asking students what they make, share, and explore online, rather than who 'games', tends to surface a level of familiarity that self-reported non-gamers routinely discount. Addressing the start-up distance requires designing early experiences that quickly close the gap, not leaving girls to conclude that their initial hesitation is evidence of permanent incapacity.

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The research is equally clear about what helps. Programs that frame technology as a tool for creativity, storytelling, design, and social impact consistently attract and retain girls more effectively than those framed around abstract syntax and competitive achievement. The 'digital woodshop' approach — where computing is linked to craft, aesthetics, and tangible making — is one of the most successful reframings documented across the case studies. So is the STEAM approach: integrating computing into art, music, filmmaking, and design projects. A related consideration has become more pressing as AI-generation tools enter classrooms: when computing is integrated with creative subjects, it is worth being deliberate about sequencing.

Letting students generate ideas, sketches, or stories first — before introducing AI tools that produce finished outputs — protects the creative thinking that motivates many girls to engage with technology in the first place. The risk is not that AI makes things easier; it is that students habituate to starting from a generated result rather than from their own imagination. Designing for original thought first, then tool use, preserves the creative agency that the STEAM framing is meant to activate.

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Strategies for schools

Curriculum and Content

1

Frame technology as a medium for creativity, not a technical discipline. Call it 'digital making', 'digital storytelling', or 'the digital woodshop' rather than programming or coding. The framing changes who feels invited.

2

Connect computing to social impact. Projects linked to environmental sustainability, healthcare, community issues, and the arts engage girls significantly more effectively than abstract technical exercises or competition-focused tasks. The question 'who benefits from this?' should be answerable in every major computing project.

3

Offer multiple entry points to the same computational concept. Not every student will engage first through writing code — some will engage through stop-motion animation, some through digital art, some through robotics, some through music. Design activities with varied pathways in.

4

Use unplugged coding activities for younger students and as a warm-up for older ones. Removing the screen removes the performance pressure associated with it and allows computational thinking to feel like problem-solving — which girls are highly motivated to do.

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Pedagogy and Practices

Honour the observer phase. When introducing new technology, allow a period of structured observation before requiring direct participation. The 'round mat' method used by one primary teacher in Sweden — where one student uses a new device in a designated, calm space while the rest of the class works on parallel tasks — is a simple structural adaptation that removes the 'being watched' dynamic that most commonly causes girls to refuse to try.

Design a two-phase lesson structure: a highly guided, low-risk entry phase followed by an open exploration phase. The entry phase builds the foundational comfort that allows girls to then experiment freely. Do not move to open exploration before that baseline is secure.

Frame mistakes as part of the process, not as evidence of incapacity. Explicitly tell students that errors are how programming and making work — not a sign that they cannot do it. Model this by thinking aloud about your own mistakes when demonstrating.

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Pedagogy and Practices

Use collaborative rather than competitive structures. Remove leaderboards, speed competitions, and comparative scoring. Girls are more motivated by problem-solving, collaboration, and real-world impact than by competition and speed.

Be attentive to the aesthetics of your computing environment. The colour and design of robots and tools matters more than you might expect: bright, friendly, and visually inclusive equipment sends a different social signal than grey, industrial, or aggressively 'technical' hardware.

Organise activities in simultaneous stations: while one group uses digital tools, another creates a physical or artistic representation of the same subject, and a third produces a written text (for example) — ensuring that digital engagement is always embedded within a broader, multi-modal learning experience rather than isolated as a separate technical task.

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Tools and Resources

Choose visual, block-based programming environments first: Scratch, Snap!, MIT App Inventor, and similar tools remove syntax anxiety and allow students to focus on computational thinking. Move to text-based languages only when block-based tools feel comfortable.

Include analog and off-screen tools alongside digital ones, not only as warm-ups for younger students but as valued methods in their own right. Card-sorting activities, physical prototyping, sketchnoting, and collaborative paper-based design challenges give students a way to engage with computational thinking under no performance pressure and create reference experiences of capability that transfer to digital work. Analog tools are particularly valuable when learning from failure is the goal: the absence of a screen removes the social stakes attached to a visible coding error.

Integrate tools for creative output: stop-motion apps, digital art platforms, storytelling tools, music coding (e.g., Sonic Pi), and physical making environments (e.g., Arduino, Lego Spike, Ozobots). These blur the boundary between technology and art.

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Tools and Resources

Where possible, choose equipment that has been designed with aesthetic inclusivity in mind: colourful Lego Spike robots, friendly digital sprites, and visually appealing interfaces send a signal about who the tool is for.

Use 'parallel station' lesson structures: set up multiple simultaneous activities (one digital, one physical/artistic, one written/reflective) so that students who are in the observer phase with a new digital tool are never idle or exposed.

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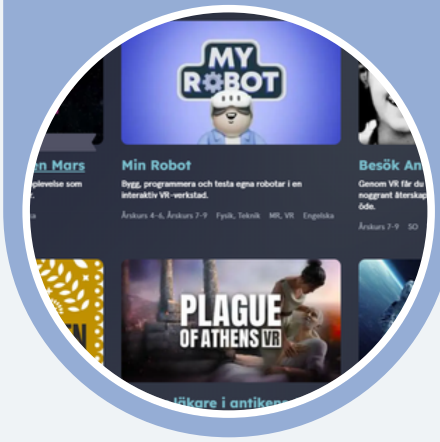
Case Spotlight: SWEDEN

Modda Sörmland — The Round Mat VR Method

A Swedish primary teacher embeds computing into art, history, science and language lessons across a 3+ year longitudinal relationship with the same cohort. VR is introduced through a 'round mat' method: one student at a time uses the headset in a calm, designated space while the rest of the class works on parallel offline activities. The student on the mat is never the centre of attention.



One girl who watched VR use for two to three months before attempting it has become a peer teacher for younger students. The question 'no, this is not for me' is no longer heard in the class.

Key lesson: The observer phase is not failure — it is preparation. Designing a lesson structure that makes observation safe and the transition to participation low-pressure is one of the most powerful belonging interventions available to a classroom teacher.

Photos: https://moddasormland.se

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Pillar 3

RECOGNITION: Making Girls' Competence Visible

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Why
Recognition matters

Girls who have access to computing and who feel they belong in the classroom will still disengage if their technical contributions are systematically undervalued, overlooked, or steered toward peripheral roles. Recognition is about making girls' competence explicitly visible — to themselves, to their peers, to their families, and to the broader school community. It is also about countering the pervasive message that technical authority belongs to boys.

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What the Evidence **Tells Us**

Perhaps the most striking finding across the interviews is the persistent disconnect between girls' actual ability and their belief in it. Across every partner country, educators described the same behavioural pattern: girls who are precise, methodical, and often more technically accomplished than their peers, yet who approach new technology with caution, hesitate to ask for help in public, and interpret a coding error as a sign of personal failure. Boys, by contrast, dive in without hesitation, project confidence regardless of their skill level, and treat setbacks as trivial.

In mixed-gender group work, this plays out in a predictable role division: boys take the keyboard, the code, and the hardware; girls take the documentation, coordination, and 'management'. This is not always the result of explicit pressure — often girls voluntarily move toward the organisational role, partly because the social expectation is there and partly because the bar for entry into the technical role feels higher than for their male peers. The result is self-reinforcing: girls who never take the keyboard never build the confidence that comes from taking the keyboard.

Recognition matters for a third reason: the absence of female role models in computing environments sends a quiet but powerful message. When girls look to the front of a mathematics or computing class and consistently see a man, they absorb the pattern. When they encounter female engineers, ethical hackers, or university students, educators consistently describe the encounter as transformative — not because a single conversation changes everything, but because it makes a previously unimaginable path suddenly plausible.

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Strategies for schools

Curriculum and Content

1

Include female scientists, engineers, and computing pioneers explicitly in your curriculum examples. When you reference historical or contemporary figures in computing, ensure that women are represented — Ada Lovelace, Grace Hopper, Radia Perlman — alongside their male counterparts.

2

Design projects with visible, tangible outputs that students can share publicly: games, websites, animations, robots, physical products. Visible technical achievement is one of the most direct forms of recognition.

3

Incorporate career exploration as part of the curriculum: what does an ICT professional actually do? Include diverse examples of women in computing careers, including non-linear paths and less stereotypical roles (UX design, cybersecurity, AI ethics, biomedical computing).

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Pedagogy and Practices

Explicitly rotate technical roles in every group project. Use a structured rotation (programmer, assembler, tester, presenter) and ensure every student — regardless of gender — occupies the technical roles. Do not allow self-selection to produce the same division in every lesson.

Provide proactive, individual positive reinforcement to girls. Waiting for students to ask for feedback means quiet, capable girls will not receive it. Go to them. Say specifically what they did well. Research from Germany consistently shows that girls' performance visibly improves after direct individual encouragement — the effect is strong and immediate.

When a girl develops confidence and technical skill, position her as a peer teacher or demonstrator for younger students or less confident classmates. Making female technical competence publicly visible within the school community is one of the most powerful belonging and recognition strategies available.

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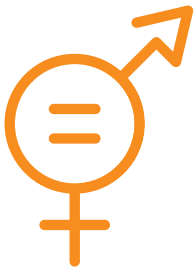
Pedagogy and Practices

Challenge stereotype language actively. When a student says 'that's a boy thing' or 'I'm not technical', name it and counter it — not dismissively, but with evidence: 'Actually, I've seen you solve more complex problems than this in science. Let's try.'



Consider developing a classroom or school-wide Gender Equality Charter with students — a collaborative agreement about fair role distribution, inclusive language, and equal access to technical tasks. The process of developing it is as valuable as the document itself.

Invite female engineers, ethical hackers, scientists, or university students to your class as guest speakers. Brief them to share real, non-linear career stories — including failures, doubts, and unexpected paths. Idealised success stories are less powerful than honest accounts. Even more effective are speakers who are young or at an early career stage, as girls are more likely to see themselves in someone closer to their own age and experience. Personal connections work particularly well — an older sister, a family friend, or a recent alumna of the same school can be especially powerful role models, as the proximity makes the possibility feel more real and attainable.

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Tools and Resources

Create portfolio and showcase opportunities: end-of-term exhibitions, school presentations, online showcases, or participation in national STEM festivals where students present their own work to external audiences. IC Laives in Italy positions girls as 'experts' who present scientific research to public audiences — with transformative effects on confidence and self-perception.

Establish or participate in all-girls computing challenges. Events like CyberTrials in Italy (cybersecurity challenges for girls only) report that girls 'have so much fun being together and tackling informatics topics as a team'. Same-gender spaces at specific moments can catalyse confidence in ways that mixed-gender environments — however well-designed — cannot always match. That said, gender separation is not the only route to engagement: designing challenges around themes that girls find genuinely compelling — sustainability, health, social equity, creative technology — can be equally effective at drawing participation and may reach girls who would not self-select a 'girls only' event. The two approaches are not mutually exclusive; the best choice will depend on the school context and, most importantly, on what the girls themselves say they want.

Connect students to mentoring ecosystems: programmes like STEM Supergirls and Mentoring Byte in Croatia, or I Wish in Ireland, link girls with female professionals who share honest accounts of their careers. These connections do not require the school to run the mentoring itself — they require a teacher to make the introduction.

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Case Spotlight: ITALY

IC Laives — Role Rotation and Public Recognition

IC Laives is a comprehensive school serving ~1,000 students, 23% with a migrant background and 17% with special educational needs. Since 2022, the school has embedded robotics and ICT across the curriculum. Girls are explicitly rotated into Team Leader roles during robotics competitions — a structural decision, not an invitation.

'Science in Depth' projects position girls as experts who present their own scientific research to external audiences at national festivals (Didacta, Innovation Festival). Girls report feeling 'empowered' to pursue technical upper secondary schools.

The school has developed a Gender Equality Charter in collaboration with Oxfam and INDIRE, covering inclusive language and non-stereotypical teaching materials.

Key lesson: Recognition is not passive. It requires deliberate structural choices — who leads, who presents, who is positioned as expert. These choices must be made by the teacher, not left to emerge naturally from group dynamics.

Photos: https://www.iclaives.edu.it

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Pillar 4

PROGRESSION: Sustaining Interest and Opening Pathways

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Why
Progression matters

Building confidence in a single lesson or project is necessary, but it is not sufficient to change girls' longer-term relationship with computing. The evidence is unambiguous: one-off interventions cannot compete with years of cumulative messaging about who technology is for. Progression means designing ICT education as a sustained journey, with a scaffolded increase in challenge, explicit connections to future pathways, and engagement structures that extend beyond the school gate.

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What the Evidence **Tells Us**

The 'Coding Girls' programme in Italy offers a sobering finding: girls who gained significantly in programming confidence and skill awareness through the programme did not automatically translate that gain into stronger intentions to choose STEM at university. Boys, by contrast, showed stronger changes in STEM intentions. The researchers' conclusion is that building confidence is necessary but not sufficient — if wider stereotypes, guidance structures, and opportunity signals remain unchanged, individual skill-building does not produce systemic change.

The Sweden case studies show the alternative: longitudinal, sustained engagement across years changes not just individual skills but identity. Students who encounter TechLab at five mandatory touchpoints across their primary education, and who have a teacher who has known and supported them across three or four school years, develop a stable sense of themselves as technically capable. The question 'is this for me?' is asked — and answered affirmatively — not in a single moment of inspiration, but through accumulated, positive experience over time.

Progression also means connecting what happens in the classroom to what comes next — in the next school year, in secondary education, in higher education, and in professional life. Girls need to be able to see themselves in those futures. When they cannot — when all the visible computer scientists they can imagine are male, socially isolated, and interested only in abstract code — the distance between 'me now' and 'a person who does computing' feels impossible to cross. Visible, diverse, and honest career stories are not a luxury add-on; they are a structural requirement of effective ICT education.

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Strategies for schools

Curriculum and Content

1

Plan progression across school years, not just within lessons. Map how computing skills build from year to year: from unplugged sequencing and block-based programming in lower primary, through micro:bit and Scratch projects in upper primary, to web design, data analysis, or text-based programming in secondary. Every student should be able to see the path ahead.

2

Make career connections explicit and diverse. Regularly invite students to explore the range of professions where computing plays a role: healthcare, environmental science, journalism, film, architecture, fashion, agriculture, and social work all involve data, algorithms, and digital tools. The narrative that computing leads only to a tech company coding job is both false and counterproductive.

3

Sequence from guided to open-ended. The most effective progression design begins with highly scaffolded, low-risk tasks and gradually increases student autonomy — moving toward student-defined projects, open challenges, and independent making. This mirrors the shift from 'observer phase' to confident practitioner described across the evidence.

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Pedagogy and Practices

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Track individual students over time. Know which students are growing in confidence, which are levelling off, and which have reverted to the observer position after a setback. The teacher in the Modda Sörmland case explicitly tracks each student's readiness and uses that knowledge to time the next challenge — neither rushing them nor leaving them stagnant.

Create peer mentoring pipelines: students who have developed confidence become role models and peer teachers for younger students. This serves two functions — it makes female technical competence visible to younger students, and it deepens the confident student's own sense of technical identity.

Host Family Nights where students demonstrate their technical projects to parents and siblings. When a daughter is the expert in the room — explaining how she built a weather station or programmed a robot — the family narrative about who is 'technical' begins, quietly but concretely, to shift. Multiple educators across the partner countries describe this as a surprisingly powerful intervention.

Connect students to external opportunities: national STEM competitions, open days at technical universities, coding challenges, and community events. These connections extend the sense of a possible future in computing beyond the walls of the school.

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Tools and Resources

Maintain a library of loan equipment that students can borrow to continue their computing projects at home. When the bridge between school and home is built — when computing is not something that only happens in school — the accumulated exposure that boys have traditionally enjoyed through gaming and digital play begins to equalise.

Connect with and signpost national and European mentoring and career programmes: LUMA Centre Finland, STEM Supergirls Croatia, and I Wish Ireland are all examples of nationally scaled programmes that teachers can refer and introduce their students to.

Use digital portfolios where students document their computing journey across years — not just final products, but process, decisions, and reflection. Portfolios serve both as a tool for recognition (making the journey visible) and as evidence for future applications to competitive programmes or pathways.

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Case Spotlight: FINLAND

LUMA Centre — A National Pipeline for Girls in STEM

LUMA Centre Finland is a network of 13 regional centres at every Finnish university of science and technology, with a national mandate from the Ministry of Education. It offers free study visits, clubs, camps, and teacher professional development — creating a coherent pipeline from primary school through to teacher training and university.

The ZAU project (Zonta Antaa Uskallusta, 2018–2021) specifically targeted girls aged 10–12 and their families, connecting programming content to everyday phenomena — food, environment, arts, space — and involving parents in the experience.

Teacher professional development is a core component: teachers who complete LUMA training report increased confidence delivering STEM content, directly improving lesson quality for all students, including girls.

Key lesson: Progression requires institutional infrastructure. Individual teacher passion matters, but it cannot substitute for structural support — national networks, sustained funding, teacher development, and explicit pathways from primary school to higher education and career.

Photos: https://www.luma.fi/en

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Transversal Themes

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Transversal Themes

1 The Teacher as Role Model and Confidence Builder

2 Supporting the Observer Phase

3 The Confidence-Competence Gap

4 Engaging Families

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HER TECH

The Teacher

as Role Model and Confidence Builder

Teacher confidence is as important as technical knowledge. A teacher who is visibly at ease with computing — who treats errors as normal, who models problem-solving out loud, and who communicates that 'this is something you can do' — creates a fundamentally different classroom climate than one who is anxious, defensive, or dismissive.

Female teachers in computing have a disproportionate impact. When girls look to the front of a computing class and see a woman who is confident, technically skilled, and at ease in that environment, it disrupts the quiet equation that many have begun to draw: that technical authority belongs to men. If you are a female teacher delivering any kind of digital or computing content — even as a generalist — you are a role model whether or not you feel like one. This point is illustrated clearly in Ireland, where the coexistence of all-girls and all-boys schools makes the dynamic visible: when the teachers of computing and technical subjects in an all-girls school remain predominantly male, girls absorb the same role model deficit as their peers in mixed schools. Single-sex settings can also have fewer specialist facilities than all-boys equivalents. An all-girls school is neither a sufficient condition nor an obstacle — its effect depends, as in any school, on who is teaching, what is being modelled, and what resources are in the room.

For all teachers, proactive encouragement is not optional for girls — it is essential. Research from Germany and Croatia consistently shows that girls who receive direct, specific, individual positive feedback significantly improve their performance and persistence. Go to the quiet students. Acknowledge what they did well, not just in general terms but specifically: 'That logic you used to solve that problem was really effective. Did you notice how it worked?'

Seeking professional development in both technical skills and gender-sensitive pedagogy matters. LUMA Centre Finland, Italy's STAAR Network, and Belgium's NGO networks all describe teacher training as a multiplier: a better-prepared teacher improves the experience of every student in every lesson, every year.

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Supporting
the Observer Phase

The 'observer phase' — a period of watchful, careful observation before a student feels ready to engage with a new tool or task — is one of the most consistently documented phenomena in the interviews. It is almost exclusively observed in girls, and it is frequently misread as disengagement, reluctance, or lack of interest.

It is none of these things. It is a rational, often highly intelligent strategy for managing the fear of public failure in a domain where girls have absorbed the message — from family, peers, media, and classroom dynamics — that they are more likely than their male peers to look incompetent. The student who watched VR for two to three months before trying it, and who has since become a peer teacher for younger students, is not an exception. She is a pattern.

Supporting the observer phase means three things. First, design lesson structures that make observation safe — parallel stations, round mat methods, small group settings where one student is not spotlighted. Second, do not force or hurry the transition from watching to doing. Trust the student's readiness and gently create opportunities rather than issuing commands. Third, notice when the transition happens and immediately affirm it: that moment is enormously fragile, and the response it receives will determine whether it is repeated.

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The Confidence-Competence Gap

Across all seven partner countries, the picture is consistent: girls who are technically precise, methodical, and often more accomplished than their male peers describe themselves as 'not technical', 'not good at this', or 'just trying'. Boys with markedly lower performance describe themselves as skilled and experienced. This gap between actual competence and perceived competence — the confidence-competence gap — is not a personality trait. It is a learnable response to years of explicit and implicit messaging.

The practical implications for teachers are significant. First, do not take girls' self-assessments at face value. A girl who says she 'doesn't really know' a concept may be being tactically humble. Look at what she actually does, not just what she says. Second, design tasks so that early success is almost guaranteed: start very simple, build quickly, and let students experience competence before they encounter difficulty. This builds the reference experience that makes 'I can do this' feel credible.

Third, explicitly reframe errors as part of the process. The IC Laives 'Abilitarte' project in Italy works with students on the emotional dimensions of technology — specifically on perceiving a compilation error as a logical opportunity rather than a personal failure. This is not work tangential to computing: it is a direct intervention in the mechanism that produces the confidence-competence gap. Teaching girls to relate to difficulty differently is as important as teaching them to code.

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Engaging Families

The most consequential shaping of girls' relationship with technology often happens at home, before she encounters a formal computing lesson. The 'family curriculum' — the informal but powerful set of expectations, models, and messages that parents communicate — is a major driver of the gender gap in ICT. Parents who say 'I was never good at maths either' in front of a daughter (a phrase reported with striking consistency across Germany, Finland, and Italy) are transmitting a permission structure: a quiet signal that technical incompetence is acceptable, even normal, for women.

Schools cannot do this work alone. But they can create structured opportunities for families to encounter their daughters as technically capable and confident. Family Nights — where students bring parents, grandparents, and siblings to see and interact with their computing projects — are consistently described across the case studies as one of the most powerful interventions available. The moment when a daughter becomes the expert in the room, demonstrating how she built something digital or mechanical, can shift a family's narrative in ways that years of teacher encouragement cannot.

Consider also communicating with parents directly about the gender gap in ICT — not as a problem with their daughters, but as a structural issue that families can help to address. Suggest that they actively encourage their daughters to experiment with technology at home, treat computing as a normal part of household life, and resist passing on their own mathematical anxieties. Small, concrete, family-facing actions can reinforce the belonging and recognition work that teachers do in class.

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HER TECH

Implementation:

A Teacher's Self-Assessment

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ACCESS

Dimension	Teacher Action	Self-check Question
Curriculum	Embed computing in mandatory cross-curricular lessons	Do all my students encounter computing regardless of their interests?
Curriculum	Plan a multi-year 'red thread' of scaffolded computing experiences	Can students see a clear progression from this year to next?
Pedagogy	Ensure all students participate; do not rely on self-selection	Are there girls who opt out of computing activities? Why?
Resources	Remove cost and equipment barriers; explore lending networks	Do any students lack access to the tools or devices needed?
Family	Host Family Nights where students demonstrate their projects	When did families last see what their daughter built in ICT?

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BELONGING

Dimension	Teacher Action	Self-check Question
Curriculum	Frame computing as creativity, storytelling, and social impact	Would a student who 'doesn't like tech' still find this interesting?
Curriculum	Provide multiple entry points; unplugged activities for beginners	Can a student with no prior experience succeed in this lesson?
Pedagogy	Allow the observer phase; do not force immediate participation	Do I give students time and safety to watch before doing?
Pedagogy	Use parallel stations so no student is spotlighted with new tech	Is any student ever the centre of attention when trying something new?
Pedagogy	Frame errors as learning steps; model this with your own mistakes	When something goes wrong in class, what do I communicate?
Resources	Choose visual, block-based tools; aesthetically inclusive equipment	Does my choice of tools signal that computing is for everyone?

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RECOGNITION

Dimension	Teacher Action	Self-check Question
Pedagogy	Rotate technical roles explicitly in every group project	Does every student take the keyboard, not just the documentation?
Pedagogy	Provide proactive, specific individual encouragement to girls	Do I actively go to quiet students and name what they do well?
Pedagogy	Position confident girls as peer teachers and demonstrators	Have I created visible female technical expertise in my class?
Pedagogy	Invite female computing professionals as guest speakers	When did my students last see a woman working in technology?
Curriculum	Include female computing pioneers in curriculum examples	Are women represented in the historical and current examples I use?
Resources	Create public showcases for student work (exhibitions, competitions)	Do my students have opportunities to share their work publicly?

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PROGRESSION

Dimension	Teacher Action	Self-check Question
Curriculum	Map skill progression across school years; make pathways visible	Do students know what comes next after this lesson/project/year?
Curriculum	Connect computing to diverse career pathways, not only tech roles	Do students understand how computing connects to fields they care about?
Pedagogy	Track individual students' confidence over time; adjust pace	Do I know which students have plateaued and which are ready to stretch?
Pedagogy	Create peer mentoring pipelines within the school	Are older or more confident students mentoring younger ones?
Resources	Signpost external mentoring, events, and career programmes	Do I know what national or regional programmes I can refer students to?
Family	Brief families on how to support computing at home	Have I communicated with parents about their role in girls' ICT engagement?

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LEGAL NOTICE

Almost There AB

June, 2026

Suggested citation:
Her Tech, Her Terms. Engagement as the key (2026). *Gender-sensitive engagement framework*. HER TECH Consortium.

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