

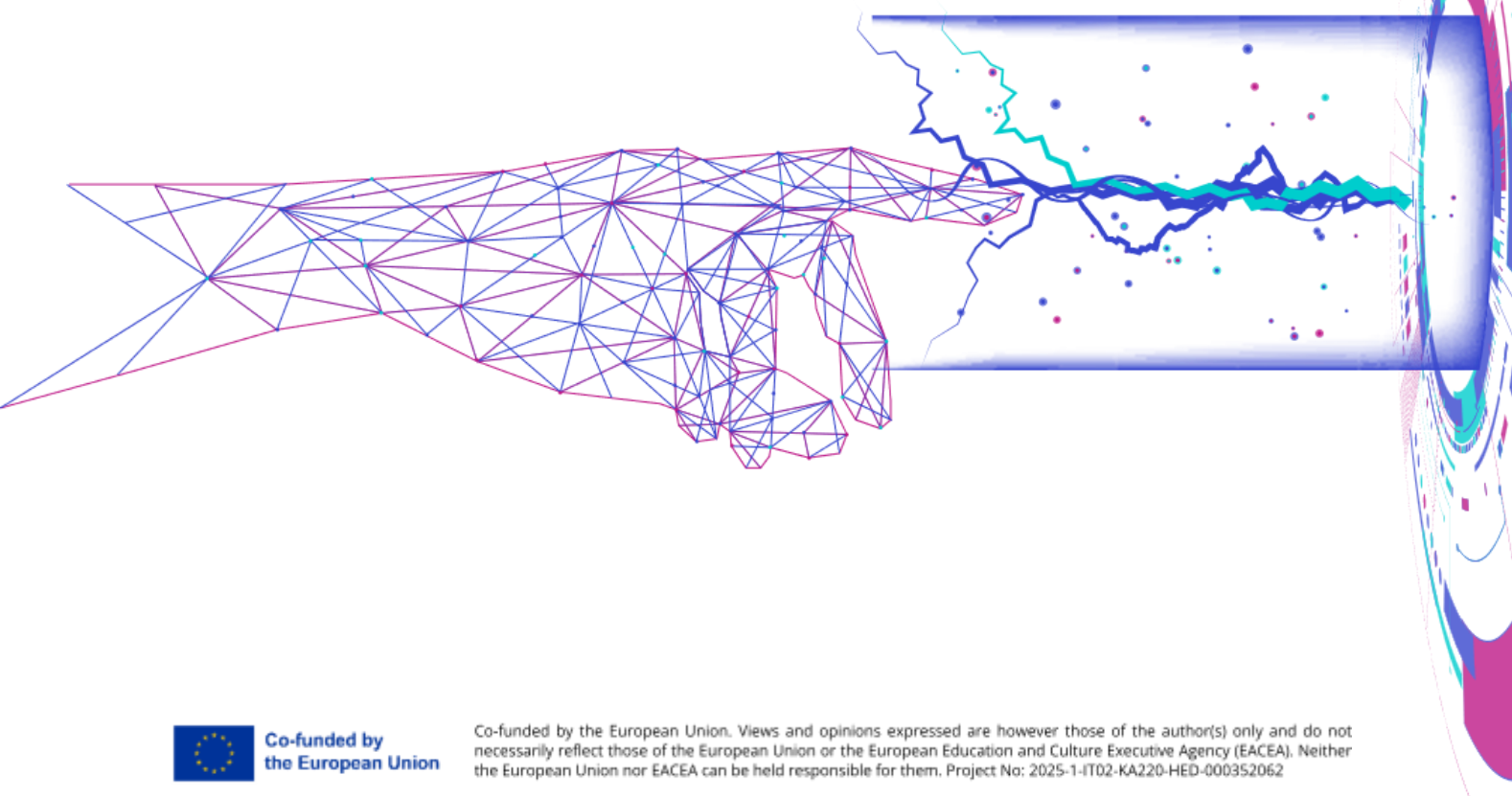


Girls' Empowerment in Digital Skills

# GEMS

## D2.3 Compendium of lesson learnt and best practices

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|                            |                                      |
|----------------------------|--------------------------------------|
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## Summary

Across the six analysed countries — Austria, Cyprus, Estonia, Italy, Slovenia, and Spain — 68 gender-inclusive ICT education practices were identified with interviews. The practices ranged across school (26), non-formal (21), higher education (16), and adult learning (6) contexts. The methodology of mapping individual practices comprised thematic analysis based on interview quotations (see D.2.1), and the search of micro-patterns within the practices. The country specific approach was followed to the comparative across countries approach. We used Generative AI ChatGPT Education for supporting the analysis process in making the comparative tables. The results of the AI supported analysis were validated by humans who participated in the interviewing.

At the **school level**, practices were mainly observed in the form of robotics education, AI and coding activities, STEAM projects, cybersecurity competitions, creative digital learning, and outreach initiatives. The strongest approaches focused on **early exposure**, **hands-on experimentation**, and **low-threshold participation**, helping girls encounter ICT before stereotypes became firmly established. Many countries also emphasized **creative and interdisciplinary framing of ICT**, linking technology with storytelling, sustainability, design, or real-world societal challenges.

Within **hobby and non-formal education**, the practices most frequently involved coding clubs, maker spaces, girls-only programmes, mentoring initiatives, hackathons, STEM outreach, and innovation challenges. These environments were especially important for supporting **confidence-building**, **identity formation**, and **psychological safety** during adolescence. Girls-only spaces, peer communities, and mentoring repeatedly emerged as highly effective approaches for helping girls feel that they belong in ICT.

At the level of **higher education, vocational education, and adult learning**, practices focused on interdisciplinary ICT programmes, human-centered computing, innovation and entrepreneurship pathways, employability support, mentoring networks, and flexible reskilling opportunities. Several countries highlighted the importance of **alternative entry routes** into ICT, especially for women changing careers or entering digital fields later in life. Universities and professional networks frequently supported women through mentoring, applied projects, industry collaboration, and visibility of women professionals and researchers.

The analysis across the six countries shows that some micro-practices are strongly associated with a specific **age/developmental stage**, while others are mainly connected to the **learning environment or study form** (formal, non-formal, higher education, adult learning).

Across all six countries, several recurring approaches appeared consistently.

A major cross-country finding is that successful gender-inclusive ICT education does not rely only on motivating girls individually. Instead, the most effective practices actively transform ICT learning environments to become more inclusive, socially meaningful, collaborative, and psychologically supportive.

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## Preface

This Compendium is a key deliverable of Work Package 2 (WP2) of the GEMS project—Girls' Empowerment in Digital Skills—an Erasmus+ Cooperation Partnership dedicated to promoting gender balance in ICT education across Europe. It documents 68 practices (see Annex 1) for gender inclusion in ICT education across six partner countries: Austria, Cyprus, Estonia, Italy, Slovenia, and Spain. The practices presented here emerged from comprehensive field research involving surveys with more than 300 young women (aged 14-28), interviews with over 200 educators and policymakers, and systematic mapping of programmes spanning primary schools to professional networks. While each practice is context-specific, reflecting the unique educational ecosystems of its country, common success factors emerge across contexts: early hands-on exposure to technology, visible female role models, collaborative rather than competitive learning structures, and meaningful connections between ICT skills and real-world applications. These patterns provide actionable insights for educators, policymakers, and institutions seeking to create more inclusive digital pathways.

**How to use this Compendium:** This document serves multiple purposes within the GEMS project and beyond. It provides the evidence base for WP3, where findings from these practices inform the development of the EquiTeach Training Programme—a comprehensive methodology for gender-inclusive ICT teaching that will equip university faculty and educators with concrete tools to support young women in technology fields. Second, it identifies the key interests and engagement strategies that will shape the TechGems mentoring programme in WP4. Beyond the project consortium, this Compendium can also serve as a source of inspiration for practitioners, policymakers, and institutions across Europe seeking to develop their own gender-inclusive ICT initiatives. Rather than prescriptive solutions, these examples represent promising approaches that require thoughtful adaptation to local contexts, resources, and educational frameworks.

## 1. Overview of the literature in the field

Female participation in ICT is shaped by internal factors such as low self-efficacy, misperceptions about ICT careers, and lack of career clarity, which reduce engagement and confidence in technical tasks [1, 2, 3]. External barriers include stereotypes, teacher bias, weak institutional support, and limited ICT career knowledge in families and networks [3, 4, 5, 6]. Self-efficacy is the central psychological mechanism influencing motivation, persistence, and ICT career choice, with girls reporting lower confidence despite equal performance [7, 8, 9, 10, 11, 31]. In ICT education, self-efficacy predicts enrollment, persistence, and help-seeking more strongly than academic ability, and strongly shapes women's likelihood of pursuing ICT careers [12, 13]. Confidence gaps explain much of the gender disparity in ICT participation, while mastery experiences and hands-on learning increase interest and reduce later attrition [1, 14, 15]. Sociocultural stereotypes portraying ICT as masculine or socially isolating discourage girls' participation and shape perceptions of belonging [6, 16, 17, 18]. These stereotypes reduce interest and aspirations, with girls less likely to pursue tech when they perceive it as gender-typed [17, 19]. The absence of visible female role models further weakens belonging, while relatable professionals and mentoring increase motivation, self-efficacy, and perceived career fit [20, 21, 22, 23]. Effective interventions therefore combine inclusive pedagogy, complex problem-solving curricula, and exposure to female ICT professionals [3, 24, 25]. Inclusive cultures, flexible learning and work arrangements, and supportive institutional environments further strengthen participation and retention of women in ICT pathways [1, 26, 27].

Key useful practices and factors influencing girls' and young women's engagement in ICT and career pathways across school, hobby education, and university contexts combine multiple mechanisms (see Table 1).

Table 1. The theoretical explanations for the practices for girls' ICT engagement

| Theory                                  | Explanation from theory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Self-Determination Theory – Autonomy    | Autonomy supports interest formation by allowing learners to express creativity and personal interests through technical work. Girls often respond positively when ICT is framed as creative expression rather than purely technical mastery. Creative and interdisciplinary ICT entry points increase engagement and reduce stereotype threat [28, 30].<br>Autonomy-supportive environments increase intrinsic motivation [31] and persistence in complex learning tasks. When students can shape their own technological projects, they develop ownership and stronger identification with ICT work. |
| Self-Determination Theory – Competence  | Competence develops through achievable challenges and visible progress. Mastery experiences are one of the strongest drivers of motivation in learning. Mastery experiences strengthen competence and persistence in technical learning [7, 15].                                                                                                                                                                                                                                                                                                                                                       |
| Self-Determination Theory – Relatedness | Belonging strongly predicts persistence in STEM fields [11, 26]. Relatedness increases persistence in fields where women may feel socially isolated. Strong communities counteract stereotype-based exclusion. Safe collaborative spaces strengthen belonging and reduce anxiety about entering male-dominated domains. Counterspaces and supportive communities strengthen science identity and persistence [23].                                                                                                                                                                                     |

|                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Social Cognitive Career Theory – Self-Efficacy        | Mastery experiences strengthen self-efficacy and willingness to participate in challenging tasks. Hands-on problem solving and feedback-rich environments increase computing self-efficacy [12, 15]. Self-efficacy develops through mastery experiences and social persuasion. Self-efficacy strongly predicts ICT career choice and persistence [7, 10, 13]. Recognition helps girls internalize their technical competence.                                                                                           |
| Social Cognitive Career Theory – Outcome Expectations | Career decisions are shaped by expectations about future outcomes. Career knowledge and outcome expectations influence educational choices [2, 3]. Seeing real career pathways increases motivation to pursue ICT studies. Clear outcome expectations strengthen motivation to invest effort in education. Perceived employability is a key motivator for women entering ICT education [2].                                                                                                                             |
| Gender Stereotype Threat                              | Safe environments reduce stereotype threat and performance anxiety. Stereotype threat reduces participation and belonging in STEM [17, 18]. Counter-stereotypical cues increase belonging and reduce perception that ICT is a male domain. Role model visibility increases perceived “fit” with STEM careers [21]. Structural adjustments reduce stereotype-driven participation gaps. Teacher practices and participation structures influence gender participation [4].                                               |
| Identity Formation Theory                             | Seeing relatable role models helps students imagine themselves in similar roles. Role models strengthen STEM identity and career aspirations [22, 23]. Identity develops through participation in communities of practice and professional roles. Professional identity forms through authentic participation in technical communities [20]. Public participation reinforces identity as a legitimate contributor to the technical field. Recognition and visibility strengthen professional identity development [11]. |

## 2. Cross-country analytical insight: main micro-practices supporting gender inclusion in ICT education

### 2.1. Comparative synthesis across Austria, Cyprus, Estonia, Italy, Slovenia, and Spain

The comparative analysis of gender related ICT teaching practices across the six countries was done seeking within each practice micro-practices that could be related with some theoretical constructs. The comparative analysis revealed that gender-inclusive ICT learning is consistently supported not through single interventions, but through recurring micro-practices embedded within participation structures, learning design, mentoring relationships, and educational transitions.

Although the national contexts differed, the same core mechanisms repeatedly emerged across educational levels. These practices collectively helped to reduce barriers, strengthen belonging, and reshape how girls and women experienced ICT.

One key finding was that the nature of these micropractices changed by educational level:

- **School level** focused primarily on *access, normalization, and stereotype disruption*

- **Hobby/non-formal education** focused on *identity-building, confidence, and sustained engagement*
- **Higher/adult education** focused on *retention, diversification, transition, and professional belonging*

Table 2. Cross-Country Main Micro-Practices by Educational Level

| Educational Level                   | Main Micro-Practices                            | Inclusion Function                                             | Countries Where Strongly Visible          |
|-------------------------------------|-------------------------------------------------|----------------------------------------------------------------|-------------------------------------------|
| <b>SCHOOLS</b>                      | Early exposure to ICT                           | Prevents early self-exclusion and stereotype formation         | Estonia, Austria, Slovenia, Spain, Cyprus |
|                                     | Hands-on experimentation and practical learning | Reduces fear of failure and abstract intimidation              | Estonia, Austria, Italy, Slovenia, Spain  |
|                                     | Low-threshold entry activities                  | Encourages participation without prior expertise               | Estonia, Austria, Cyprus, Spain           |
|                                     | Whole-class or normalized participation         | Removes self-selection bias and normalizes girls' presence     | Estonia, Austria                          |
|                                     | Creative and interdisciplinary ICT framing      | Broadens image of ICT beyond masculine stereotypes             | Italy, Slovenia, Spain, Estonia           |
|                                     | Collaborative project-based learning            | Reduces competitive pressure and supports participation        | Slovenia, Spain, Italy, Estonia           |
|                                     | Teacher encouragement and mediation             | Teachers actively support girls' participation and persistence | Estonia, Cyprus, Slovenia                 |
|                                     | Female role-model visibility                    | Increases identification with ICT pathways                     | Austria, Cyprus, Spain, Slovenia          |
|                                     | Real-world and societal relevance               | Makes ICT meaningful and socially connected                    | Italy, Slovenia, Spain                    |
|                                     | Career visibility and workplace exposure        | Connects ICT learning with future opportunities                | Austria, Italy, Cyprus                    |
| <b>HOBBY / NON-FORMAL EDUCATION</b> | Girls-only learning spaces                      | Creates psychological safety and reduces stereotype pressure   | Estonia, Spain, Cyprus                    |
|                                     | Peer support and community-building             | Strengthens belonging and sustained engagement                 | Estonia, Slovenia, Spain                  |
|                                     | Voluntary and interest-driven participation     | Supports autonomy and intrinsic motivation                     | Estonia, Austria, Slovenia                |

| <b>Educational Level</b>                  | <b>Main Micro-Practices</b>                     | <b>Inclusion Function</b>                                      | <b>Countries Where Strongly Visible</b> |
|-------------------------------------------|-------------------------------------------------|----------------------------------------------------------------|-----------------------------------------|
|                                           | Hands-on and maker-oriented experimentation     | Builds competence through exploration and creativity           | Slovenia, Spain, Italy, Austria         |
|                                           | Mentoring and informal guidance                 | Strengthens confidence and future orientation                  | Austria, Cyprus, Spain                  |
|                                           | Role-model visibility                           | Supports ICT identity formation                                | Austria, Cyprus, Spain, Estonia         |
|                                           | Flexible progression pathways                   | Allows learners to develop at their own pace                   | Estonia, Austria, Slovenia              |
|                                           | Hackathons, challenges, and competitions        | Encourages leadership, collaboration, and innovation           | Spain, Slovenia, Estonia                |
|                                           | Community-based outreach                        | Expands participation to underrepresented groups               | Estonia, Italy, Spain                   |
|                                           | Creative self-expression through technology     | Connects ICT with identity and personal relevance              | Spain, Slovenia, Italy                  |
| <b>HIGHER EDUCATION / ADULT EDUCATION</b> | Interdisciplinary framing of ICT                | Broadens participation beyond traditional technical identities | Estonia, Italy, Slovenia, Spain         |
|                                           | Human-centered and socially meaningful ICT      | Attracts diverse learner profiles and increases relevance      | Estonia, Italy, Spain                   |
|                                           | Applied real-world project work                 | Reinforces competence and career relevance                     | Estonia, Slovenia, Spain, Italy         |
|                                           | Flexible and alternative entry pathways         | Supports career changers and non-traditional learners          | Estonia, Austria, Spain                 |
|                                           | Mentoring and professional networking           | Reduces professional isolation and supports retention          | Austria, Italy, Spain, Slovenia         |
|                                           | Industry partnerships and employability support | Strengthens transition into ICT careers                        | Austria, Spain, Italy                   |
|                                           | Collaborative and inclusive learning culture    | Reduces exclusion and supports persistence                     | Estonia, Slovenia, Italy                |
|                                           | Innovation and entrepreneurship pathways        | Encourages leadership and professional visibility              | Spain, Slovenia, Italy                  |

| Educational Level | Main Micro-Practices                   | Inclusion Function                                | Countries Where Strongly Visible |
|-------------------|----------------------------------------|---------------------------------------------------|----------------------------------|
|                   | Recognition and scholarship mechanisms | Signals institutional valuing of women in ICT     | Italy, Cyprus                    |
|                   | Professional identity-building         | Supports long-term retention and belonging in ICT | Austria, Slovenia, Spain, Italy  |

### 3. Cross-Level analytical insight

#### 3.1. School level → Inclusion through normalization and accessibility

Across countries, school-level girls and young women's inclusion to ICT learning and careers depended heavily on reducing the perception that ICT is a specialized or masculine domain. The strongest micro-practices consistently introduced ICT early, reduced intimidation, normalized girls' participation, and connected ICT with creativity and real-world relevance. The successful approaches avoided positioning ICT as elite or competitive from the outset. Instead, they created accessible and collaborative learning experiences where girls could participate without already identifying as “technical.” A particularly important mechanism across countries was hands-on experimentation where girls would be supported.

##### 3.1.1. Hands-on experimentation combined with low-threshold participation

This combination repeatedly appeared as the strongest early inclusion mechanism.

#### 3.2. Hobby and non-formal education → Inclusion through identity and belonging

In all countries, non-formal learning environments played a crucial role in sustaining girls' engagement during adolescence — the stage where gender gaps often widen.

The strongest recurring micro-practices focused on psychological safety, peer belonging, mentoring, experimentation, and identity formation. A particularly strong pattern across the countries was the importance of community based participation, mentoring and professional exposure and interdisciplinary framing.

##### Community-based participation structures

Girls persisted longer when ICT learning became social, collaborative, and identity-supportive rather than performance-oriented. Girls-only spaces were especially important at this level because they temporarily reduced stereotype pressure and created confidence-building environments.

#### 3.3. Higher and adult education → Inclusion through diversification and professional belonging

At higher and adult education levels, the strongest inclusion mechanisms shifted away from initial motivation and toward retention, professional identity, employability, and flexible transition pathways. Across countries, one of the most important recurring practices was interdisciplinarity in ICT tasks, mentoring and professional visibility.

##### Interdisciplinary reframing of ICT

ICT became more inclusive when connected with design, humanities, sustainability, innovation, entrepreneurship, and societal impact. Another highly visible cross-country pattern was mentoring and professional embeddedness.

### **Mentoring + networking + professional visibility**

Women remained in ICT pathways more successfully when they gained access to professional communities, role models, and industry networks. Flexible pathways for career changers and adult learners also emerged as major inclusion mechanisms, especially in Estonia, Austria, and Spain.

## **4. Overall comparative conclusion**

The findings from Austria, Cyprus, Estonia, Italy, Slovenia, and Spain strongly supported existing theoretical literature (see Table 1) about girls' motivation and participation in ICT. Across all partner countries, the observed practices repeatedly aligned with key theories explaining motivation, persistence, belonging, self-efficacy, stereotype reduction, and identity formation in STEM and ICT education.

The cases showed that girls' participation is not primarily limited by ability, but by confidence gaps, stereotype threat, lack of belonging, unclear pathways, and absence of visible identity models.

The educational practices identified across countries (see Annexes 1-7) operationalized theoretical concepts through concrete participation structures and pedagogical micro-practices.

*Table 3: How Cross-Country Cases Support Existing Theory About Girls' ICT Motivation*

| <b>Theoretical Perspective</b>                | <b>Main Theoretical Claim</b>                                                   | <b>Supporting Findings Across Countries</b>                                                                                                          | <b>Example Countries / Cases</b>                                                                                                                           |
|-----------------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Self-Determination Theory – Autonomy</b>   | Motivation increases when learners experience choice, creativity, and ownership | Girls engage more strongly when ICT is connected to creative projects, interdisciplinary learning, personal interests, and self-directed exploration | Italy (creative coding, interdisciplinary projects), Slovenia (digital creativity), Spain (creative STEAM), Estonia (AI electives, project-based learning) |
| <b>Self-Determination Theory – Competence</b> | Motivation depends on experiencing mastery and achievable success               | Hands-on experimentation, scaffolded progression, beginner-friendly tasks, and practical projects repeatedly increased confidence and persistence    | Estonia (CyberNut progression), Austria (hands-on STEM workshops), Spain (maker activities), Slovenia (robotics learning)                                  |

|                                                              |                                                                                |                                                                                                                                             |                                                                                                                                         |
|--------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Self-Determination Theory – Relatedness</b>               | Belonging and supportive social environments sustain participation             | Peer communities, collaborative teamwork, girls-only spaces, and mentoring strongly supported sustained engagement                          | Estonia (Unicorn Squad), Austria (#thenewITgirls), Spain (girls’ coding communities), Cyprus (girls-only workshops)                     |
| <b>Social Cognitive Career Theory – Self-Efficacy</b>        | Confidence and perceived competence predict persistence and career choice      | Girls often showed confidence gaps rather than competence gaps; repeated mastery experiences and positive feedback increased participation  | Estonia (competition pathways), Italy (hands-on camps), Austria (safe experimentation), Slovenia (maker projects)                       |
| <b>Social Cognitive Career Theory – Outcome Expectations</b> | Learners engage when they can imagine meaningful future careers                | Workplace exposure, internships, career mentoring, and visible ICT pathways increased motivation and persistence                            | Austria (Töchtertag), Italy (VR career orientation), Spain (industry partnerships), Cyprus (career-oriented ICT programmes)             |
| <b>Gender Stereotype Threat Theory</b>                       | Girls disengage when ICT is framed as masculine or socially exclusive          | Girls-only environments, interdisciplinary ICT framing, and visible female participation reduced stereotype pressure                        | Estonia (girls-only STEM clubs), Cyprus (parent and teacher awareness), Italy (interdisciplinary ICT), Spain (women-in-tech campaigns)  |
| <b>Identity Formation Theory</b>                             | Participation increases when learners can imagine themselves as “ICT people”   | Role models, mentoring, leadership opportunities, and public recognition strengthened ICT identity and belonging                            | Austria (women-in-ICT mentoring), Estonia (public technical recognition), Slovenia (innovation communities), Spain (mentoring networks) |
| <b>Belonging and Counterspace Theory</b>                     | Safe communities and counterspaces reduce exclusion and strengthen persistence | Girls-only clubs, peer communities, mentoring networks, and supportive participation cultures were among the strongest recurring mechanisms | Estonia (Unicorn Squad), Austria (safe-space STEM learning), Spain (coding communities), Cyprus (girls’ ICT camps)                      |

|                                                        |                                                                                       |                                                                                                                                      |                                                                                                                                         |
|--------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Project-Based and Experiential Learning Theory</b>  | Applied and meaningful tasks increase engagement and retention                        | Real-world projects, collaborative problem-solving, maker culture, and experimentation increased motivation across all levels        | Slovenia (STEAM problem-solving), Spain (innovation challenges), Italy (mobile labs), Estonia (robotics integration)                    |
| <b>Interdisciplinary and Human-Centered ICT Theory</b> | Broadening ICT beyond purely technical identities attracts more diverse participation | Human-centered, creative, and socially meaningful ICT pathways consistently attracted girls and women                                | Estonia (HCI and Digital Humanities), Italy (Digital Humanities), Spain (innovation-oriented ICT), Slovenia (creative digital projects) |
| <b>Pathway and Ecosystem Theory</b>                    | Participation depends on continuity across educational transitions                    | Countries with visible progression pathways, mentoring continuity, and ecosystem support showed stronger long-term engagement models | Estonia (school → hobby → higher education pathways), Austria (career transition support), Italy (university-industry ecosystems)       |

Across all six countries, the analysis showed that successful gender inclusion in ICT depended on transforming the learning environment rather than “fixing” girls’ motivation.

The discovered micro-practices (see Table 2) may be best understood as: context-sensitive inclusion mechanisms. Some are primarily developmental (linked to age and identity formation), while others are primarily structural (linked to educational format and participation design). However, the most successful gender-inclusive ICT practices combined both dimensions, responding to girls’ developmental needs, but also adapting the learning environment itself. Together, these micropractices created inclusive ICT ecosystems where girls and women are more likely to enter, persist, identify with, and succeed in digital learning and careers. The most consistent cross-country micro-practices were the following (see Table 4):

Table 4: Mapping of micro-practices within practices

| <b>Micro-practice category</b>     | <b>Related practices (Annex 1)</b>                                                                                                                                                                                                                         |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hands-on practical experimentation | 2. ALMAH Tech Days, 6. Robotics Integration at Gustav Adolf Grammar School, 8. CyberNut → CyberPuur Competitions, 9. Robotica Project, 14. Kodice and STEM mojstrice within Zavod 404, 15. Coding4Girls, 25. Il Cielo Itinerante, 27. Cybersecurity Summer |

|                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                               | Schools, 35. Il Cielo Itinerante, 41. Digital Skills Camps, 42. ČIPke and Rampa Lab, 52. Vocational & Adult ICT Retraining                                                                                                                                                                                                                                                                                                                                                                                                      |
| Low-threshold participation structures        | 2. ALMAH Tech Days, 7. AI and Programming Electives, 25. Il Cielo Itinerante, 39. ALMAH Learning Support, 40. Girls-Only ICT Workshops, 48. Applied ICT Entrepreneurship and Fast Prototyping, 51. Get Started, 52. Vocational & Adult ICT Retraining, 56. Digital Humanities Minor, 57. LM-43 Digital Humanities                                                                                                                                                                                                               |
| Collaborative and non-competitive learning    | 1. TechnikOlympiade, 13. GirlsDoCode, 14. Kodice and STEM mojstrice within Zavod 404, 16. Girls Go Circular, 20. EDUGENIA (ACTFEM Toolkit), 29. PINKAMP — Le Ragazze Contano!, 31. Open Coding & Robotics Clubs, 43. Girls-only summer and winter programming schools (CodeWeek), 47. PINKAMP                                                                                                                                                                                                                                   |
| Role-model visibility and mentoring           | 12. Inženirke in inženirji bomo! / Inženirka leta, 17. Girls4STEM, 18. InspiraSTEAM, 19. STEM4Girls UC3M, 21. HorigeSTEM, 22. Töchters tag (Daughters' Day), 23. W.O.W. Women Orientation Workshops, 28. Emakumeak Zientzia, 34. W.O.W., 37. STEM Talent Girl, 38. #thenewITgirls, 43. Girls-only summer and winter programming schools (CodeWeek), 49. University ICT Mentoring, 53. She Goes Digital, 59. Women for cyber / Women4Cyber, 60. Ona Ve (She Knows), 62. VÖSI Women in ICT, 67. EUGAIN, 68. Women in ICT Networks |
| Creative and interdisciplinary framing of ICT | 3. STEAM and Digital Game-Based Learning, 13. GirlsDoCode, 15. Coding4Girls, 16. Girls Go Circular, 20. EDUGENIA (ACTFEM Toolkit), 42. ČIPke and Rampa Lab, 44. Dekleta in digitalni svet (Girls and the Digital World), 55. HCI / Interaction Design Master's, 56. Digital Humanities Minor, 57. LM-43 Digital Humanities, 61. Interdisciplinary Digital Innovation                                                                                                                                                            |
| Community-building and peer support           | 30. Unicorn Squad, 31. Open Coding & Robotics Clubs, 33. NGO & Community STEM Outreach, 36. Yes We Tech, 38. #thenewITgirls, 42. ČIPke and Rampa Lab, 43. Girls-only summer and winter programming schools (CodeWeek), 46. NoésFeinadeDones, 49. University ICT Mentoring, 59. Women for cyber / Women4Cyber, 62.                                                                                                                                                                                                               |

|                                              |                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                              | VÖSI Women in ICT, 65. ACM WomENCourage, 67. EUGAIN, 68. Women in ICT Networks                                                                                                                                                                                                                                                                                                                                 |
| Flexible progression and transition pathways | 8. CyberNut → CyberPuur Competitions, 32. Cybersecurity Hobby Pathways, 37. STEM Talent Girl, 46. NoésFeinadeDones, 49. University ICT Mentoring, 50. FIT – Fem* in Tech, 51. Get Started, 52. Vocational & Adult ICT Retraining, 58. LM-32 Computer Engineering, 66. ICT Employability Support                                                                                                                |
| Real-world relevance and career visibility   | 1. TechnikOlympiade, 12. Inženirke in inženirji bomo! / Inženirka leta, 17. Girls4STEM, 19. STEM4Girls UC3M, 22. Töchters' Day, 23. W.O.W. Women Orientation Workshops, 26. OUI — Ovunque da Qui, 27. Cybersecurity Summer Schools, 34. W.O.W., 37. STEM Talent Girl, 50. FIT – Fem* in Tech, 53. She Goes Digital, 62. VÖSI Women in ICT, 63. University–Industry Partnerships, 66. ICT Employability Support |

## 5. Micro-practices linked mainly to age and developmental level

The analysis shows that different motivational mechanisms become important at different developmental stages.

### Early age (primary/lower secondary)

At younger ages, girls are motivated mainly by curiosity, playfulness, experimentation, and normalization. At this stage stereotypes are still weaker, identity is more flexible, and participation is strongly influenced by exposure opportunities. Therefore, successful practices focus on hands-on learning, robotics, games, creativity, low-threshold experimentation.

### Adolescence

During adolescence, motivation becomes much more identity-sensitive. Girls begin asking implicitly: “Is ICT for people like me?”, “Will I belong here?”, “Will I be judged?”. At this stage, the strongest motivators become peer belonging, girls-only spaces, role models, mentoring, supportive communities, and psychologically safe participation. This pattern appeared extremely consistently across all countries.

### Higher education / adulthood

Later stages shift motivation toward professional identity, career meaning, employability, flexibility, and recognition. Women are motivated when ICT becomes socially relevant, interdisciplinary, creative, professionally meaningful, and compatible with broader life goals. Thus, it may be asserted that

motivation changes developmentally. But age alone does not explain participation. These practices appear because girls and women face different barriers at different stages of life.

Table 5: Micropractices related with age/developmental levels

| <b>Educational Stage</b>                  | <b>Typical Inclusion Need</b>             | <b>Typical Micro-Practices</b>                                                          |
|-------------------------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------|
| <b>Primary / early secondary school</b>   | Reducing stereotypes before they solidify | Early exposure, hands-on experimentation, playful coding, robotics, low-threshold entry |
| <b>Adolescence / teen years</b>           | Confidence and identity-building          | Girls-only spaces, peer communities, mentoring, role-model visibility                   |
| <b>Higher education / young adulthood</b> | Retention and professional belonging      | Networking, interdisciplinary ICT framing, applied projects, mentoring                  |
| <b>Adult learners / career changers</b>   | Flexible access and transition support    | Modular learning, vocational retraining, employability support, flexible pathways       |

Early exposure is most critical at primary and lower secondary levels. Girls-only learning spaces are especially important during adolescence, when stereotype pressure increases. Professional networking becomes more important at university and career-transition stages. So some micro-practices clearly emerge because of developmental and social needs related to age.

## 6. Micro-practices linked mainly to study form

Is girls' motivation to study ICT learning form specific? The comparative analysis of cases shows that the form of learning fundamentally shapes motivation. Micro-practices are strongly shaped by whether learning takes place in formal education, non-formal education, hobby education, higher education, or adult learning. Schools are strongest at: "making ICT unavoidable and legitimate." Whole-class participation is specific to formal school systems because schools can structurally require participation. This is critical because girls often self-select out early if participation is optional from the start. Non-formal learning is strongest at: "making ICT personally meaningful." Voluntary interest-driven participation is typical of hobby education. This was one of the strongest findings across countries. Higher education is strongest at: "making ICT professionally imaginable." Flexible modular learning is mainly characteristic of adult education.

### Formal school education motivates through:

- normalization,
- accessibility,
- structural participation,
- and exposure.

Key mechanisms are whole-class participation, curriculum integration, teacher mediation, low-threshold entry.

### Non-formal / hobby learning motivates through:

- identity,

- autonomy,
- social belonging,
- and emotional safety.

Key mechanisms are clubs, mentoring, maker spaces, girls-only environments, peer communities.

### Higher education motivates through:

- professional identity,
- interdisciplinarity,
- networking,
- and future orientation.

Key mechanisms are applied projects, mentoring networks, innovation ecosystems, industry collaboration, and human-centered ICT.

Table 6. Micro-practices related with study forms

| Study Form                          | Typical Characteristics                            | Typical Micro-Practices                                                |
|-------------------------------------|----------------------------------------------------|------------------------------------------------------------------------|
| <b>Formal school education</b>      | Structured curriculum and compulsory participation | Whole-class participation, curriculum integration, teacher mediation   |
| <b>Hobby / non-formal education</b> | Voluntary participation and identity exploration   | Peer communities, maker culture, flexible progression, experimentation |
| <b>Higher education</b>             | Specialization and professional preparation        | Interdisciplinary framing, applied projects, mentoring networks        |
| <b>Adult education</b>              | Career transition and reskilling                   | Flexible schedules, practical orientation, employability support       |

## 7. Culture-specific aspects

We explored if girls' ICT learning practices are culture specific in the partner countries (Austria, Estonia, Italy, Cyprus, Spain, Slovenia). There are cultural differences between countries, but the recurring girls' ICT teaching micro-patterns to motivate them were found to be remarkably similar across all six countries. This is one of the strongest findings of the analysis. Across very different national contexts, girls respond positively to the same core mechanisms: belonging, safety, creativity, collaboration, visible role models, meaningful projects, practical success, and flexible participation. What differs culturally is mainly how practices are organized, who delivers them, and how strongly they are institutionalized. But the underlying motivational mechanisms remained highly similar. Culturally specific practice examples:

- Estonia emphasized structured progression and curriculum integration,
- Austria emphasized mentoring and career orientation,
- Italy emphasized proximity-based outreach and interdisciplinary identity,

- Spain and Slovenia emphasized creativity and innovation,
- Cyprus emphasized stereotype disruption and social mediation.

## 8. Implications and limitations of the cross-country analysis

The comparative analysis across Austria, Cyprus, Estonia, Italy, Slovenia, and Spain highlighted several important implications for gender-inclusive ICT education policy and practice. Girls engaged and persisted in ICT when participation environments reduced identity threat and increased meaningful belonging through socially supported, competence-building experiences. Girls were most motivated toward ICT when they experienced:

1. ICT as accessible
2. ICT as socially meaningful
3. ICT as compatible with their identity
4. ICT as a space where they belong
5. ICT as a pathway where success feels attainable

The qualitative practices' analysis strongly suggests that motivation is primarily shaped by social participation environments rather than by innate interest or technical ability. A major implication is that successful inclusion in ICT depends less on isolated interventions and more on the accumulation of small, repeated micro-practices across educational pathways. Gender inclusion emerges most effectively when ICT learning environments are intentionally designed to reduce barriers, normalize participation, and support identity formation over time.

The findings suggest that different educational levels might require different inclusion mechanisms:

- **School-level practices** are most effective when they focus on early exposure, low-threshold participation, hands-on learning, and stereotype reduction.
- **Non-formal and hobby education** play a critical role in sustaining girls' engagement through psychological safety, peer support, mentoring, and identity-building.
- **Higher and adult education** are particularly important for retention, diversification of pathways, employability, and professional belonging.

Across all countries, the strongest recurring approaches include:

- practical and project-based learning,
- collaborative rather than competitive participation structures,
- visible female role models and mentoring,
- interdisciplinary and human-centered framing of ICT,
- and flexible progression pathways.

The analysis also implies that gender inclusion should not be understood only as increasing the number of girls entering ICT. Instead, successful approaches actively transform how ICT itself is presented and experienced — making it more socially meaningful, creative, collaborative, and accessible. Another important implication is the strong role of non-formal education. In several countries, hobby clubs, mentoring programmes, outreach initiatives, and maker communities function as essential bridges

between school exposure and long-term participation in ICT pathways. Finally, the analysis suggests that inclusive ICT ecosystems require collaboration between multiple actors: schools, universities, NGOs, industry, community organizations, and professional networks. No single institution alone appears sufficient to sustain gender inclusion across the full educational trajectory. The analysis also contains several limitations that should be acknowledged. First, the number and depth of documented practices varied between countries. Estonia and Italy provided particularly detailed and systematic datasets, while some other countries included fewer documented cases. Therefore, comparisons reflect differences in available documentation as well as differences in practice ecosystems. Second, the cases were selected as examples of good practice rather than as representative national samples. The analysis therefore identifies promising approaches but cannot determine how widespread or institutionally embedded these practices are within each country. Third, most practices were analysed qualitatively through interviews, reports, and case descriptions. As a result, the study focuses more on participation structures and perceived inclusion mechanisms than on measurable long-term outcomes such as ICT degree completion, employment transitions, or sustained career retention. Many practices overlap across educational levels and study forms. For example, cybersecurity competitions may function simultaneously as school, hobby, and talent-development pathways; mentoring may occur in both formal and informal settings; and maker activities may exist inside or outside school structures. Therefore, educational categories should be understood as analytical rather than strictly separated. Another limitation is that the analysis primarily focuses on gender inclusion and gives less attention to intersectional dimensions (socio-economic background, ethnicity, disability, migration background, or regional inequalities).

Because educational systems, labour markets, and cultural contexts differ across countries, the transferability of individual practices may be limited. Practices that work effectively in one national or institutional context may require adaptation before implementation elsewhere. Despite these limitations, the cross-country analysis demonstrates strong consistency in the types of micro-practices that support girls' and women's participation in ICT. The findings suggest that inclusive ICT participation develops through long-term ecosystems of support rather than single interventions. Effective inclusion depends on aligning educational environments with learners' developmental, social, and professional needs across different stages of life and learning.

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## Annex 1. Table of all the good practices

| No. | Practice Level / Form | Practice Name                                                       | Country  | Most Specific Example Quote / Practice Characteristic                                                                                                           |
|-----|-----------------------|---------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | School                | <a href="#">TechnikOlympia.de</a>                                   | Austria  | Team-based technical competitions solving real-world challenges                                                                                                 |
| 2   | School                | <a href="#">ALMAH Tech Days</a>                                     | Austria  | Early exposure; low-threshold experimentation; curiosity-driven participation                                                                                   |
| 3   | School                | <a href="#">STEAM and Digital Game-Based Learning</a>               | Cyprus   | Makes ICT relatable and engaging; reduces stereotypes                                                                                                           |
| 4   | School                | <a href="#">Teacher Support Networks</a>                            | Cyprus   | Teachers become mediators of inclusion and stereotype reduction                                                                                                 |
| 5   | School                | <a href="#">Real School Informatics and Olympiads</a>               | Estonia  | Removes self-selection bias; normalizes girls' participation                                                                                                    |
| 6   | School                | <a href="#">Robotics Integration at Gustav Adolf Grammar School</a> | Estonia  | Hands-on learning reduces stereotypes                                                                                                                           |
| 7   | School                | <a href="#">AI and Programming Electives</a>                        | Estonia  | Low barrier entry; interest-driven participation                                                                                                                |
| 8   | School                | <a href="#">CyberNut → CyberPuur Competitions</a>                   | Estonia  | Builds confidence gradually; early engagement of girls                                                                                                          |
| 9   | School                | <a href="#">Robotica Project</a>                                    | Italy    | Normalizes girls' presence in technical fields through tangible success                                                                                         |
| 10  | School                | <a href="#">SEMUA Scuola</a>                                        | Italy    | Dismantles the myth of ICT as a male domain through direct experience                                                                                           |
| 11  | School                | <a href="#">StudIAmo Insieme</a>                                    | Italy    | AI-based digital tools supporting independent study and personalized learning                                                                                   |
| 12  | School                | <a href="#">Inženirke in inženirji bomo! / Inženirka leta</a>       | Slovenia | Women engineers made visible and relatable through school visits and personal stories, supporting girls' career imagination before key educational transitions. |
| 13  | School                | <a href="#">GirlsDoCode</a>                                         | Slovenia | Girls-only programming combining coding, teamwork, contact with women engineers and a national hackathon.                                                       |
| 14  | School                | <a href="#">Kodice and STEM mojstrice within Zavod 404</a>          | Slovenia | Hands-on, girls-only STEM/maker workshops led by young female mentors; school partnerships broaden access.                                                      |

|    |                                      |                                                    |          |                                                                                                                            |
|----|--------------------------------------|----------------------------------------------------|----------|----------------------------------------------------------------------------------------------------------------------------|
| 15 | School                               | <a href="#">Coding4Girls</a>                       | Slovenia | Game-design-based programming with reusable teaching scenarios connecting coding to creativity and social relevance.       |
| 16 | School                               | <a href="#">Girls Go Circular</a>                  | Slovenia | Project-based learning linking digital skills with circular economy and entrepreneurship, giving girls ownership of ideas. |
| 17 | School / Career Orientation          | <a href="#">Girls4STEM</a>                         | Spain    | Students create video biographies after interviewing women STEM professionals.                                             |
| 18 | School / Mentoring                   | <a href="#">InspiraSTEAM</a>                       | Spain    | Six classroom sessions combine STEM role models, mentoring and gender-stereotype reflection.                               |
| 19 | School / University Outreach         | <a href="#">STEM4Girls UC3M</a>                    | Spain    | Practical STEM workshops and cascade mentoring connect girls with university role models.                                  |
| 20 | School / Non-formal                  | <a href="#">EDUGENIA (ACTFEM Toolkit)</a>          | Spain    | Participatory sessions co-design AI classroom resources with an intersectional gender perspective.                         |
| 21 | School / Higher Education / Research | <a href="#">HORIGESTEM</a>                         | Spain    | Quasi-experimental and qualitative studies test whether female role models improve girls' STEM motivation.                 |
| 22 | School / Career Orientation          | Töchertag (Daughters' Day)                         | Austria  | Girls visit workplaces and observe technical professions                                                                   |
| 23 | School / Career Orientation          | <a href="#">W.O.W. Women Orientation Workshops</a> | Italy    | Immersive VR interviews showcasing the daily work of female ICT professionals                                              |
| 24 | School / Community                   | <a href="#">Parent Awareness Outreach</a>          | Cyprus   | Changes social expectations and support structures                                                                         |
| 25 | School / Community                   | <a href="#">Il Cielo Itinerante</a>                | Italy    | Scientific labs and interactive workshops delivered in fragile educational contexts                                        |
| 26 | School / Higher Education Outreach   | <a href="#">OUI — Ovunque da Qui</a>               | Italy    | Supports informed choice and reduces gender-related bias                                                                   |
| 27 | School / Non-formal                  | <a href="#">Cybersecurity Summer Schools</a>       | Cyprus   | Future-oriented ICT identity-building; practical exploration                                                               |
| 28 | School / Outreach                    | <a href="#">Emakumeak Zientzian</a>                | Spain    | More than 30 research entities organise activities around women in science and technology.                                 |
| 29 | School / University Outreach         | <a href="#">PINKAMP — Le Ragazze Contano!</a>      | Italy    | Small, non-competitive group work supported by university tutors builds autonomy and confidence                            |
| 30 | Hobby                                | Unicorn Squad                                      | Estonia  | Safe environment; builds confidence and identity in ICT                                                                    |

|    |                             |                                                                             |          |                                                                                                                         |
|----|-----------------------------|-----------------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------|
| 31 | Hobby                       | Open Coding & Robotics Clubs                                                | Estonia  | Peer learning; flexible participation                                                                                   |
| 32 | Hobby                       | Cybersecurity Hobby Pathways                                                | Estonia  | Interest-based progression; identity building                                                                           |
| 33 | Hobby                       | NGO & Community STEM Outreach                                               | Estonia  | Active recruitment and inclusion of girls                                                                               |
| 34 | Hobby / Career Orientation  | <a href="#">W.O.W.</a>                                                      | Italy    | Virtual exposure normalizes women's presence in technical roles                                                         |
| 35 | Hobby / Community           | <a href="#">Il Cielo Itinerante</a>                                         | Italy    | Near-peer female STEM trainers and learning-by-doing build early confidence                                             |
| 36 | Hobby / Community           | <a href="#">Yes We Tech</a>                                                 | Spain    | Free feminist tech events create safe spaces with role models and practical workshops.                                  |
| 37 | School / Career Orientation | <a href="#">STEM Talent Girl</a>                                            | Spain    | Sustained mentoring accompanies girls from early STEM inspiration to real work exposure.                                |
| 38 | Hobby / Non-formal          | <a href="#">#thenewITgirls</a>                                              | Austria  | Role-model visibility; peer support; stereotype reduction                                                               |
| 39 | Hobby / Non-formal          | <a href="#">ALMAH Learning Support</a>                                      | Austria  | Psychological safety; low-pressure engagement                                                                           |
| 40 | Hobby / Non-formal          | <a href="#">Girls-Only ICT Workshops</a>                                    | Cyprus   | Safe participation environment; reduced stereotype threat                                                               |
| 41 | Hobby / Non-formal          | <a href="#">Digital Skills Camps</a>                                        | Cyprus   | Builds ICT identity and confidence through practical engagement                                                         |
| 42 | Hobby / Non-formal          | <a href="#">Čipke and Rampa Lab</a>                                         | Slovenia | Girls-focused maker workshops where girls actively create technology rather than only consume it.                       |
| 43 | Hobby / Non-formal          | <a href="#">Girls-only summer and winter programming schools (CodeWeek)</a> | Slovenia | Seasonal girls-only coding schools using hackathon-style work and mentoring; collaboration over competition.            |
| 44 | Hobby / Non-formal          | <a href="#">Dekleta in digitalni svet (Girls and the Digital World)</a>     | Slovenia | Frames digital participation as empowerment — confidence, critical awareness and online agency beyond technical skills. |
| 45 | Adult Education             | <a href="#">FemCoders</a>                                                   | Spain    | Intensive women-only digital training combines technical learning with social and employment support.                   |
| 46 | Non-formal                  | <a href="#">NoésFeinadeDon es</a>                                           | Spain    | Five life-stage pathways support girls and women from STEAM discovery to leadership.                                    |

|    |                               |                                                                   |          |                                                                                                                   |
|----|-------------------------------|-------------------------------------------------------------------|----------|-------------------------------------------------------------------------------------------------------------------|
| 47 | Hobby University Outreach     | / <a href="#">PINKAMP</a>                                         | Italy    | Project-based learning; university-led mentoring                                                                  |
| 48 | Non-formal                    | <a href="#">Applied ICT Entrepreneurship and Fast Prototyping</a> | Cyprus   | Free access; inclusive participation; awareness-building                                                          |
| 49 | Non-formal Transition         | / <a href="#">University ICT Mentoring</a>                        | Cyprus   | Role models and social support increase persistence                                                               |
| 50 | Vocational Orientation        | FIT – Fem* in Tech                                                | Austria  | Continuous support pathway; confidence-building                                                                   |
| 51 | Employment Support            | Get Started                                                       | Austria  | Fear reduction; discovery of hidden abilities                                                                     |
| 52 | Adult Education               | Vocational & Adult ICT Retraining                                 | Estonia  | Supports women re-entering workforce; practical orientation                                                       |
| 53 | Company Professional          | / <a href="#">She Goes Digital</a>                                | Austria  | Workshops and mentoring hosted by companies                                                                       |
| 54 | Higher Education              | <a href="#">Women-Targeted ICT Scholarships</a>                   | Cyprus   | Reduces financial barriers; signals institutional commitment                                                      |
| 55 | Higher Education              | HCI / Interaction Design Master's                                 | Estonia  | High female participation; human-centered framing                                                                 |
| 56 | Higher Education              | Digital Humanities Minor                                          | Estonia  | Lowers entry barrier; attracts non-traditional ICT learners                                                       |
| 57 | Higher Education              | <a href="#">LM-43 Digital Humanities</a>                          | Italy    | Low-threshold entry for women from non-technical backgrounds                                                      |
| 58 | Higher Education              | <a href="#">LM-32 Computer Engineering</a>                        | Italy    | Addresses the leaky pipeline through mentoring and structural support                                             |
| 59 | Higher Education              | <a href="#">Women for cyber / Women4Cyber</a>                     | Slovenia | Networking, mentoring and conferences raising visibility of women in cybersecurity; supports entry and retention. |
| 60 | Higher Education              | <a href="#">Ona Ve (She Knows)</a>                                | Slovenia | Searchable platform making women experts in STEM/ICT publicly visible; challenges stereotypes about expertise.    |
| 61 | Higher Education              | Interdisciplinary Digital Innovation                              | Spain    | Broadens participation and diversifies ICT identity                                                               |
| 62 | Higher Education Professional | / VÖSI Women in ICT                                               | Austria  | Community support; career visibility; mentoring                                                                   |
| 63 | Higher Education Professional | / <a href="#">University-Industry Partnerships</a>                | Cyprus   | Increases relevance, networking, and employability                                                                |

|    |                                 |                                            |       |                                                                                  |
|----|---------------------------------|--------------------------------------------|-------|----------------------------------------------------------------------------------|
| 64 | Higher Education / Professional | <a href="#">Amazon Women in Innovation</a> | Italy | Signals that female excellence in ICT is valued                                  |
| 65 | Higher Education / Professional | <a href="#">ACM WomENCourage</a>           | Italy | Builds professional identity through peer recognition                            |
| 66 | Higher Education / Professional | ICT Employability Support                  | Spain | Industry connections and mentoring support transition into ICT careers           |
| 67 | Higher Education / Research     | <a href="#">EUGAIN</a>                     | Italy | Reduces professional isolation through mentoring and international collaboration |
| 68 | Higher Education / Research     | Women in ICT Networks                      | Spain | Mentoring and networking reduce professional isolation                           |

## Annex 2. Practices in Austria

Across the Austrian cases, gender-inclusive ICT learning is supported through a combination of early exposure, role-model visibility, career orientation, safe learning environments, and flexible transition pathways into ICT professions. Unlike the Estonian cases, which emphasize curriculum integration and structured progression within formal education, Austrian initiatives strongly rely on partnerships between schools, NGOs, companies, universities, and labour-market actors.

Austrian practices frequently frame ICT not only as a technical field but also as a social, creative, and career-oriented opportunity. Many initiatives are designed specifically to reduce psychological barriers and stereotypes that discourage girls and women from entering ICT.

Across the cases, three recurring inclusion mechanisms emerge:

- Exposure and awareness-building → introducing girls to ICT through workshops, visits, and experiential activities
- Confidence and identity-building → creating supportive environments with mentoring and female role models
- Transition and career support → helping girls and women move from interest into education, training, and employment pathways

A key cross-cutting characteristic is that successful Austrian initiatives rarely focus only on technical skill acquisition. Instead, they combine social support, practical experiences, mentoring, and career visibility to make ICT careers feel accessible and realistic.

### SCHOOLS / EARLY EXPOSURE

Across the Austrian dataset, several practices focus on introducing girls to ICT and technical fields through experiential learning, competitions, and school-company partnerships. The strongest approaches emphasize practical experimentation, visibility of technical professions, and reduction of stereotypes at an early age.

The selected cases include:

- TechnikOlympiade
- ALMAH Tech Days
- Töchtertag (Daughters' Day)

*Table 1: ICT Education Provision for Girls at School Level (Austria)*

| Case Name                       | Level               | Description                                                     | Gender-Inclusive ICT Support Characteristics                        | Example Practices                                              |
|---------------------------------|---------------------|-----------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------|
| Hands-on Technical Competitions | School / Non-formal | Team-based technical competitions solving real-world challenges | Practical learning reduces stereotypes; teamwork supports inclusion | TechnikOlympiade; project-based competitions; innovation tasks |
| Early STEM and ICT Exploration  | Primary & Secondary | Hands-on workshops introducing                                  | Early exposure; low-threshold experimentation;                      | ALMAH Tech Days; robotics workshops; digital experimentation   |

|                                  |                           |                                                          |                                                                |                                              |
|----------------------------------|---------------------------|----------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------|
|                                  |                           | robotics, physics, and digital technologies              | curiosity-driven participation                                 |                                              |
| Company-Based Career Exploration | School Career Orientation | Girls visit workplaces and observe technical professions | Real-world exposure increases career visibility and motivation | TöchtersTag; workplace visits; job-shadowing |

## Recurring Small-Level Practices in Schools

The Austrian school-level cases show that gender inclusion is strongly supported through experiential learning and visibility-building. Rather than focusing primarily on abstract ICT learning, the initiatives create motivating first encounters with technology.

*Table 2: Recurrent Micro-Practices Supporting Gender Inclusion at Schools (Austria)*

| Micro-Practice               | Description                                                 | Found In Cases                |
|------------------------------|-------------------------------------------------------------|-------------------------------|
| Hands-on experimentation     | Girls actively build, test, and solve problems              | TechnikOlympiade, ALMAH       |
| Real-world career exposure   | Contact with workplaces and technical professions           | TöchtersTag, TechnikOlympiade |
| Low-threshold participation  | Activities accessible without prior technical knowledge     | ALMAH, TöchtersTag            |
| Team-based learning          | Collaborative participation reduces competition pressure    | TechnikOlympiade              |
| Early exposure to ICT        | Introduction to technical subjects at younger ages          | ALMAH Tech Days               |
| Female role model visibility | Exposure to women in technical professions                  | TöchtersTag, ALMAH            |
| Learning-by-doing            | Practical activities instead of abstract instruction        | TechnikOlympiade, ALMAH       |
| Career relevance             | Direct connection between activities and future professions | TöchtersTag, TechnikOlympiade |

## Key Analytical Insight

A central finding is that Austrian school-level initiatives emphasize visibility and accessibility of ICT careers. The most effective practices:

- Reduce intimidation through hands-on activities
- Create positive first experiences with technology

- Connect ICT learning with real workplaces and careers
- Provide socially supportive participation structures

Instead of expecting girls to independently seek ICT opportunities, these initiatives actively bring technology experiences into familiar and supportive environments.

## HOBBY / NON-FORMAL EDUCATION AUSTRIA

Within the Austrian dataset, several practices focus on informal learning, mentoring, community-building, and low-threshold access to ICT. These initiatives often combine social support with practical digital activities.

The selected cases include:

- #thenewITgirls
- ALMAH Learning Support & Summer Camp
- FIT – Fem\* in Tech
- Get Started

Table 3: ICT Education Provision in Hobby / Non-Formal Education (Austria)

| Case Name                              | Level                             | Description                                       | Gender-Inclusive ICT Support Characteristics              | Example Practices                                      |
|----------------------------------------|-----------------------------------|---------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------|
| Women-Led ICT Mentoring Networks       | Non-formal Community              | Networking and mentoring with women in ICT        | Role-model visibility; peer support; stereotype reduction | #thenewITgirls; networking events; mentoring           |
| Safe-Space STEM Learning Support       | Non-formal                        | Informal learning support and workshops for girls | Psychological safety; low-pressure engagement             | ALMAH learning support; girls' centres; STEM workshops |
| Structured Transition Support into ICT | Non-formal Vocational Orientation | Career orientation and practical ICT exploration  | Continuous support pathway; confidence-building           | FIT – Fem* in Tech; counselling; workshops             |
| Learning-by-Trying Programmes          | Non-formal Employment Support     | Practical experimentation in technical fields     | Fear reduction; discovery of hidden abilities             | Get Started; trial workshops; technical exploration    |

## Recurring Small-Level Practices in Hobby / Informal Education in Austria

Across the Austrian informal-learning cases, participation design and emotional support are central. The initiatives repeatedly create environments where girls and women can experiment without fear of failure.

Table 4: Recurrent Micro-Practices Supporting Gender Inclusion in Informal Education (Austria)

| Micro-Practice | Description | Found In Cases |
|----------------|-------------|----------------|
|----------------|-------------|----------------|

|                                        |                                                          |                       |
|----------------------------------------|----------------------------------------------------------|-----------------------|
| Female role-model visibility           | Women professionals share experiences and career stories | #thenewITgirls, ALMAH |
| Safe and supportive environments       | Learning spaces reduce pressure and stereotypes          | ALMAH, Get Started    |
| Low-threshold entry                    | Participation without prior ICT experience               | Get Started, FIT      |
| Career orientation and counselling     | Guidance connecting interests with ICT careers           | FIT, Get Started      |
| Peer networking and community-building | Social belonging increases sustained participation       | #thenewITgirls        |
| Practical experimentation              | Participants try technologies directly                   | Get Started, ALMAH    |
| Confidence-building through success    | Small achievements reinforce self-efficacy               | Get Started, FIT      |
| Flexible participation pathways        | Learners can engage at different intensity levels        | ALMAH, FIT            |

## Key Analytical Insight

The Austrian non-formal education cases show that sustained engagement depends heavily on psychological and social inclusion.

The most effective approaches:

- Normalize women's participation in ICT through visible role models
- Build confidence through experimentation and mentoring
- Support transitions into ICT through counselling and guidance
- Create social belonging through peer communities and networks

Compared with formal education, these practices focus less on curriculum and more on identity formation, motivation, and long-term career orientation.

## HIGHER EDUCATION, CAREER TRANSITION, AND PROFESSIONAL NETWORKS AUSTRIA

The Austrian dataset also contains several practices supporting women's transition into ICT careers through higher education exposure, industry collaboration, networking, and workplace-oriented digital learning.

The selected cases include:

- She Goes Digital
- VÖSI Women in ICT
- FIT – Fem\* in Tech
- ALMAH Career-Oriented Activities

*Table 5: ICT Education and Career Support for Women in Higher, Professional, and Transition Contexts (Austria)*

| Case Name                             | Level                          | Description                                        | Gender-Inclusive ICT Support Characteristics              | Example Practices                              |
|---------------------------------------|--------------------------------|----------------------------------------------------|-----------------------------------------------------------|------------------------------------------------|
| Company-Based Digital Career Learning | Company Professional           | Workshops and mentoring hosted by companies        | Real-world ICT visibility; practical exposure             | She Goes Digital; company visits; AI workshops |
| Professional Women-in-ICT Networks    | Professional Networking        | Industry-based / networking and knowledge exchange | Community support; career visibility; mentoring           | VÖSI Women in ICT; panels; networking events   |
| Supported ICT Career Transitions      | Vocational Orientation         | Structured pathways into technical professions     | Guidance for non-traditional learners and career changers | FIT – Fem* in Tech                             |
| University-Linked ICT Exposure        | Transition to Higher Education | Exposure to university-level technical learning    | Bridges between schools and higher education              | ALMAH Summer Camps; Tech Days                  |

## Recurring Small-Level Practices in Higher, Professional, and Transition Contexts in Austria

At this level, inclusion is strongly connected to career identity, professional belonging, and flexible access routes into ICT.

*Table 6: Recurrent Micro-Practices Supporting Gender Inclusion (Austria)*

| Micro-Practice                  | Description                                        | Found In Cases          |
|---------------------------------|----------------------------------------------------|-------------------------|
| Industry partnerships           | Companies directly participate in ICT learning     | She Goes Digital, ALMAH |
| Mentoring and networking        | Access to professional women in ICT                | VÖSI, #thenewITgirls    |
| Flexible transition pathways    | Support for career changers and returners          | FIT, She Goes Digital   |
| Real-world ICT applications     | Learning connected to workplace technologies       | She Goes Digital        |
| Career guidance and counselling | Support in navigating ICT pathways                 | FIT                     |
| Visibility of ICT careers       | Demonstrating realistic professional opportunities | VÖSI, She Goes Digital  |

|                                           |                                                |                                |
|-------------------------------------------|------------------------------------------------|--------------------------------|
| Practical workplace exposure              | Job shadowing and company visits               | Töchters Tag, She Goes Digital |
| Confidence-building through participation | Supportive environments reduce fear of failure | FIT, Get Started               |

## Key Analytical Insight

A central finding is that Austrian higher-level and transition-focused practices emphasize access to professional communities and realistic career pathways.

The most effective approaches:

- Connect learning directly with workplaces and industry
- Provide mentoring and networking opportunities
- Support women entering ICT from non-traditional backgrounds
- Reduce barriers through flexible and low-threshold participation

Unlike approaches focused purely on formal ICT education, these practices strengthen inclusion by helping women imagine themselves as future ICT professionals and by providing concrete pathways toward employment and participation in the digital sector.

## #thenewITgirls

**The Country:** Austria

**The Educational level:** Company level

**The age group of girls/women:** From young girls (from 8 years) to adult women

**How does this practice engage girls/young women to learn ICT for ICT careers, describe specific elements in the practice that target girls motivation and interest.**

The *#newitgirls* initiative engages girls and young women mainly through talks, mentoring and networking events with women working in the ICT sector. Female professionals share their career paths and experiences, which helps challenge stereotypes and provides visible role models.

The initiative also builds motivation through community-building and peer exchange, creating a supportive environment where participants can connect with others interested in technology. By discussing current digital trends, innovation and real career pathways in ICT, the programme helps participants understand how digital skills relate to real job opportunities and encourages them to consider careers in the technology sector.

**How can girls/women discover this ICT learning opportunity? (e.g. marketing the opportunity, at meeting places, social suggestions)**

Girls and young women discover *#thenewitgirls* initiative mainly through online promotion, social media campaigns and the programme website, where information about events, mentoring and workshops is shared. The initiative is also promoted through partner companies, universities and technology networks, which help reach students and young women interested in digital careers. In addition, participants often discover the programme through recommendations from peers, professional networks and tech events, which increases its visibility within the ICT community.

**What way the learning modes support girls/women engagement in ICT? (e.g. promoting agency, teamwork, leadership, is it only for girls/women or for mixed gender groups)**

The initiative supports engagement through interactive formats such as workshops, mentoring sessions, talks and networking events. These formats encourage active participation and allow girls and young women to exchange ideas with professionals and peers. Many activities focus on creating a supportive environment specifically for women, which helps reduce stereotypes and encourages participants to explore digital topics confidently while developing teamwork and leadership skills.

**How does facilitation, mentoring, partnership support girls/women to be highly motivated (e.g. modes of guidance, avoiding gender bias and social perceptions, providing learning partners, assigning industry mentors)?**

Motivation is strengthened through mentoring relationships with experienced professionals from the ICT sector, who share career insights and provide guidance. Partnerships with technology companies and industry experts allow participants to learn directly from professionals and gain insight into real digital workplaces. Female role models play an important role in challenging gender stereotypes and showing that successful careers in technology are achievable for women.

**How is girls/women confidence and self-efficacy built towards ICT?**

Confidence is built through exposure to real career stories, mentoring and community support. Participants hear from women who have built careers in technology, which helps them identify with these pathways. Networking and peer exchange create a supportive environment where participants can ask questions, discuss challenges and develop greater confidence in pursuing ICT careers.

**What way engagement to networks extends girls' social motivation to learn ICT (e.g. events, competitions, fairs) ?**

The initiative strongly focuses on community building and networking within the tech ecosystem. Events bring together participants, mentors, companies and organisations from the ICT sector. These networking opportunities allow girls and young women to build professional connections, exchange experiences and feel part of a broader community working in digital innovation.

**How are learning resources and tasks constructed that motivate girls/women problem-solving in ICT (e.g. relevance, complex problems, interdisciplinarity, career-relatedness. practical skill mastery)?**

Learning activities often focus on practical discussions, technology trends and real-world digital challenges presented by industry experts. Participants explore topics such as digital transformation, innovation and emerging technologies. These real-world examples help demonstrate how ICT skills are applied in practice and encourage participants to develop analytical and problem-solving skills.

**What are the elements of ICT career opportunities in the programme (e.g. job shadowing, practice, career guidance, positive career perception)**

The programme emphasises career inspiration and professional exposure. Participants gain insights into different ICT professions through talks with experts, mentoring sessions and industry networking events. These activities provide information about career paths, required skills and opportunities within the technology sector, helping participants develop a clearer understanding of possible professional futures.

**What are the elements of ICT entrepreneurship in the programme (e.g. hackathons, product development, marketing)**

Entrepreneurial aspects appear through interaction with start-ups, innovation leaders and digital entrepreneurs who participate in the programme as speakers or mentors. Participants learn about innovation processes, digital business models and opportunities within the technology ecosystem. This

exposure helps them understand how ICT skills can also lead to entrepreneurial careers in technology and innovation.

**What is the evidence that this practice works, how it is monitored and assessed?**

Evidence of the effectiveness of *#thenewitgirls* initiative is mainly reflected in the growing community of participants, regular events and strong engagement with industry partners and sponsors. The programme documents its activities through event participation, community growth and media visibility. Feedback from participants and mentors, as well as continued involvement of partner companies, provide qualitative evidence that the initiative successfully inspires girls and women to consider careers in ICT. Monitoring is typically conducted through event participation numbers, community engagement, and feedback collected during or after events, which helps organisers assess the relevance and impact of the activities.

**Who are involved in teaching and on which basis (e.g. paid role, voluntary engagement)**

Learning and mentoring activities are facilitated by women working in the ICT sector, technology experts, entrepreneurs and professionals from partner companies. These individuals often participate as speakers, mentors or facilitators during events and workshops. Their involvement can be based on professional collaboration with the initiative, company partnerships or voluntary engagement as role models and mentors who support the goal of increasing female participation in technology fields.

**What assets and resources are required for this practice to be successful (e.g. tuition fee)**

The success of *#thenewitgirls* initiative depends on several key resources, including strong partnerships with technology companies, sponsors and industry networks that support the organisation of events, mentoring programmes and community activities. Financial resources from sponsors help cover organisational costs such as event logistics, communication activities and platform management.

In addition, the initiative relies on expert knowledge and time contributed by ICT professionals, who participate as speakers, mentors or facilitators. Digital communication channels, including the programme website and social media platforms, are important resources for promoting activities and connecting participants. Most activities are designed to be accessible and low-cost or free for participants, which helps remove financial barriers and allows more girls and young women to participate in ICT-related learning opportunities.

**What external support mechanisms are used to enhance participation for those with restricted opportunities (e.g. scholarship, flexibility in study mode or time, travel support, caregivers mobility)**

*#thenewitgirls* initiative supports participation mainly through accessible community-based events and strong industry partnerships, which help reduce barriers for girls and young women interested in ICT. Many events and networking activities are free of charge, making participation possible regardless of financial background. The initiative also uses flexible participation formats, such as short talks, networking sessions and community events, which allow participants to join without long-term commitments or strict schedules. This flexibility can benefit young women who may have limited time due to studies, work or family responsibilities. In addition, partnerships with technology companies, sponsors and professional networks help provide access to professional environments, mentors and industry knowledge that participants might otherwise not have. These networks offer guidance, inspiration and potential career connections, which can be especially valuable for girls and women who lack access to ICT role models or professional support systems.

**What policies are required for this practice to be successful**

The success of *#thenewitgirls* initiative depends on supportive gender equality and digital education policies that encourage the participation of women in STEM and ICT sectors. Policies promoting equal

opportunities in education and employment, as well as strategies aimed at increasing women's representation in technology fields, create the institutional framework that allows such initiatives to grow. In addition, national and regional digitalisation strategies, which prioritise digital skills development and innovation, support programmes that introduce girls and young women to ICT careers. Policies that encourage collaboration between educational institutions, technology companies and civil society organisations are also important, as they facilitate partnerships, mentoring opportunities and industry involvement. Finally, initiatives like *#thenewitgirls* benefit from broader diversity and inclusion policies in the technology sector, which aim to reduce gender stereotypes, promote female role models and improve access for women to professional networks and career opportunities in ICT.

**References:** Link to the practice curriculum etc.

Official programme website:

<https://www.thenewitgirls.com>

Link to Meet-up/ Networking

<https://www.thenewitgirls.com/#events>

## Girls' Empowerment in Digital Skills

(including sub-formats: Tech Days, Summer Camp, Learning Support at PEPPA Girls' Centre, Job Talks, Online Learning Support)

### The Country

Austria

### The Educational level

- Primary education (Tech Days – Volksschule)
- Secondary education (Summer Camp, mentoring, job talks)
- Non-formal education (learning support, workshops, online resources)
- Transition to higher education (FH-based activities and exposure to study programmes)

### The age group of girls/women

- 8–10 years (primary school, Tech Days)
- 14–20 years (Summer Camp, job talks, career orientation)
- Mixed ages (learning support participants at PEPPA Girls' Centre)

### How does this practice engage girls/young women to learn ICT for ICT careers?

The ALMA programme uses a **multi-layered engagement approach**, combining early exposure, sustained support, and career orientation.

### Key engagement strategies:

#### 1. Early exposure through experiential learning (Tech Days)

Girls (and mixed groups at younger ages) participate in **hands-on workshops** in robotics, mechatronics, physics, and digital technologies. These are not passive sessions but structured, activity-based experiences where participants actively build, test, and explore.

→ This reduces the perception of ICT as abstract or inaccessible.

#### 2. Low-threshold entry points (PEPPA learning support)

At the girls' centre, participants receive **free, informal academic support** in STEM subjects. This creates a **safe and familiar environment**, especially for girls who might not yet identify with ICT.

→ Particularly important for inclusion and reaching underrepresented groups.

### 3. Deepening interest through targeted formats (Summer Camp & Job Talks)

For older participants, the programme provides:

- **Thematic workshops**
- **Career-oriented sessions**
- **Direct interaction with professionals**

These formats explicitly connect **learning** → **study** → **career pathways**, addressing a common gap in ICT education.

### 4. Playful experimentation and risk-taking

A distinctive feature is encouraging girls to:

- Try things without fear
- Make mistakes intentionally (e.g. breaking a component to overcome fear)

→ This directly tackles internalised stereotypes (e.g. “I must not fail”) and builds a **growth mindset**.

### How can girls/women discover this ICT learning opportunity?

The programme uses a **multi-channel outreach strategy**:

#### **Structured outreach:**

- Direct contact with schools (emails, visits, posters, flyers)
- Teachers as key multipliers
- Distribution through school networks

#### **Informal and community-based outreach:**

- Parents and personal networks
- Word-of-mouth (very strong impact, leading to waiting lists)

#### **Digital access:**

- Website with registration system
- Online materials and learning resources

#### **Strategic insight:**

The proactive approach (schools outreach) is crucial — participation did not rely only on self-selection but on **active recruitment**, which increases inclusion.

### What way the learning modes support girls/women engagement in ICT?

The programme combines **pedagogical design** + **gender-sensitive didactics**:

#### **Learning formats:**

- Hands-on workshops
- Laboratory work
- Group-based experiments
- Blended learning (online + offline resources)

#### **Gender-sensitive elements:**

- Use of **single-gender groups** where beneficial
- **Mixed groups with structured role rotation**
- Avoidance of stereotypical task allocation (e.g. girls documenting, boys building)

#### **Pedagogical approach:**

- Emphasis on **teamwork and collaboration**
- Learning by doing (experiential learning)
- Reflection on roles and participation

→ This creates a balance between **inclusion, empowerment, and realism of ICT work environments**.

### How does facilitation, mentoring, partnership support girls/women

#### **Role of facilitators:**

- Workshops led largely by **female lecturers and professionals**
- Trainers act as **both instructors and role models**

**Mentoring structures:**

- Informal mentoring during workshops and camps
- Follow-up support in schools (train-the-trainer model)
- Continuous interaction rather than one-off contact

**Partnerships:**

- Universities (FH Technikum Wien)
- Girls' centres (PEPPA)
- LEA (Let's Empower Austria)
- Schools and teachers

**Impact:**

- Reduces gender bias by **making women in ICT visible and relatable**
- Builds trust through **personal interaction and dialogue**
- Supports sustainability via **institutional collaboration**

**How is girls/women confidence and self-efficacy built towards ICT?**

Confidence-building is a **core design principle**:

**Mechanisms:**

- Safe environments for experimentation
- Explicit permission to fail and explore
- Hands-on success experiences
- Peer learning and group support
- Exposure to diverse female role models

**Additional dimension:**

The programme **openly addresses challenges**, such as:

- Being in male-dominated environments
- Work-life balance issues

→ This creates **realistic but empowering narratives**, rather than idealised ones.

**Key insight:**

Confidence is built not only through success, but through:

- Reducing fear
- Normalising uncertainty
- Encouraging persistence

**What way engagement to networks extends girls' social motivation to learn ICT?**

Networking is embedded in all formats:

- Interaction with professionals
- Peer exchange during workshops
- Exposure to university environments
- Connection to future education pathways

**Social motivation effect:**

- Seeing “people like me” in ICT
- Feeling part of a community
- Understanding ICT as socially relevant and collaborative

**How are learning resources and tasks constructed?****Design principles:**

- Concrete, real-world tasks (not abstract theory)
- Problem-based learning
- Interdisciplinary content (STEM integration)

- Collaborative tasks requiring communication

**Gender-sensitive design:**

- Role rotation in teams
- Reflection on participation
- Avoiding passive roles for girls

**Example:**

Instead of abstract exercises, tasks might involve:

- Building circuits
- Testing devices
- Solving practical technical problems

→ This increases **relevance, engagement, and skill transfer**.

**What are the elements of ICT career opportunities in the programme?**

- Job talks with professionals
- Exposure to different ICT roles
- Direct link to study programmes
- Demonstration of real tasks and workplaces

**Key strength:**

Bridging the gap between:

**“What I learn” → “What I can do” → “What I can become”**

This directly addresses a major barrier identified in ICT education: lack of concrete career imagination.

**What are the elements of ICT entrepreneurship in the programme?**

While not a primary focus, entrepreneurship elements include:

- Exposure to innovation processes
- Understanding how technology is applied in organisations
- Creative experimentation in workshops

However:

→ No structured entrepreneurship training (e.g. hackathons)

**What is the evidence that this practice works?****Quantitative indicators:**

- 322 girls supported (learning support)
- 360 learning sessions
- 214 students in Tech Days
- High demand (waiting lists)

**Qualitative indicators:**

- Positive feedback from participants and teachers
- Observed engagement and participation

**Evaluation methods:**

- Surveys and questionnaires
- Visual feedback tools (e.g. coloured balls for children)
- Open qualitative feedback

**Who are involved in teaching and on which basis?**

- University lecturers (mostly female in key roles)
- Project staff
- Educators and teachers
- Trainers in partner organisations

→ Participation is typically part of **professional roles**, not voluntary.

**What assets and resources are required?**

- Public funding (e.g. MA23)
- Institutional infrastructure (labs, classrooms)
- Human resources (trainers, coordinators)
- Learning materials
- Digital platforms

**What external support mechanisms are used?**

- Free participation
- School-based organisation
- Flexible entry points
- Additional support for disadvantaged girls (PEPPA centre)

**What policies are required for this practice to be successful?**

- Gender equality policies in education
- Public funding for STEM inclusion
- Institutional commitment to diversity
- Support for work-life balance and inclusion in ICT careers

**Key structural challenge identified:**

- Gap between policy and real-life implementation (e.g. childcare, career progression)

**References**

- [ALMA Project \(FH Technikum Wien, LEA, PEPPA\)](#)

<https://www.caritas-wien.at/hilfe-angebote/kinder-familie/peppa-zentrum-fuer-maedchen-und-junge-frauen/>

- <https://letsempoweraustria.at/>

**FIT – Fem\* in Tech****Country**

Austria

**Educational Level**

Non-formal education / vocational orientation / transition to VET (company & training level)

**Age Group of Girls/Women**

Young women and girls (approx. 15–25), especially:

- school leavers
- NEETs
- career changers or women re-entering the labour market

**How does this practice engage girls/young women to learn ICT for ICT careers?**

The FiT programme engages young women by **combining career orientation, practical exposure, and structured pathways into technical professions**, including ICT.

Key elements:

- **Individual counselling and orientation** to identify strengths, interests, and suitable technical career paths
- **Workshops and trial trainings** in technical fields (including ICT-related professions)
- **Hands-on experiences in non-traditional occupations**, making technical careers more tangible
- Focus on **breaking gender stereotypes**, especially in male-dominated sectors such as IT, engineering, and digital technologies

Unlike short-term initiatives, FiT provides a **continuous support structure**, helping participants move from interest → exploration → qualification → employment.

### **How can girls/women discover this ICT learning opportunity?**

Girls and young women can access FiT through multiple channels:

- Direct contact with sprungbrett (website, counselling services, outreach)
- Referrals via AMS (Public Employment Service Austria)
- Schools and career guidance services
- Youth work organisations and NGOs
- Social workers and support institutions

The programme is especially visible among:

- young women seeking career orientation
- participants in labour market integration programmes

### **What way the learning modes support girls/women engagement in ICT?**

FiT uses participatory, practice-oriented, and supportive learning modes:

- Workshops and trial training sessions in technical fields
- Internships and practical placements in companies
- Individual coaching and group sessions

These modes:

- promote active learning and agency
- encourage experimentation and hands-on exploration
- support peer exchange among women

Many activities are women-only, creating a safe and encouraging learning environment, especially for beginners in ICT.

### **How does facilitation, mentoring, partnership support girls/women to be highly motivated?**

Motivation is strengthened through a **strong support system**:

- Professional counsellors and trainers guide participants individually
- Partnerships with companies provide real insights into technical professions
- Mentoring-like support through coaching and continuous guidance
- Close cooperation with AMS and training providers ensures structured pathways

Facilitators actively work to:

- challenge gender stereotypes
- support confidence-building
- provide realistic but encouraging career guidance

### **How is girls/women confidence and self-efficacy built towards ICT?**

Confidence is built through:

- Step-by-step exposure to technical tasks
- Positive feedback and encouragement from trainers
- Safe learning environments (women-only groups)
- Successful completion of internships or training modules

Participants gradually develop:

- belief in their own abilities
- willingness to enter male-dominated fields
- a clearer professional identity

### **What way engagement to networks extends girls' social motivation to learn ICT?**

FiT strengthens social motivation through:

- Connections to companies and employers
- Peer networks among participants
- Links to training institutions and labour market actors

These networks:

- create role models and support systems
- show real career opportunities
- increase motivation through belonging and visibility

### **How are learning resources and tasks constructed that motivate girls/women problem-solving in ICT?**

Learning is designed to be:

- Practical and application-oriented
- Linked to real job tasks and workplace requirements
- Focused on problem-solving and experimentation

Participants engage in:

- technical exercises
- real-life work scenarios
- interdisciplinary tasks

This helps them understand:

*“How is ICT used in real jobs?”*

*“What can I actually do with these skills?”*

### **What are the elements of ICT career opportunities in the programme?**

FiT has strong career integration elements:

- Internships in technical and ICT-related fields
- Career counselling and job orientation
- Support in choosing and entering VET or training programmes
- Preparation for employment (applications, interviews, etc.)

The programme directly connects participants to:

- training pathways
- employers
- long-term career opportunities

### **What are the elements of ICT entrepreneurship in the programme?**

Entrepreneurship is not the main focus, but elements include:

- exposure to different company types and work environments
- understanding of technical professions and innovation processes
- development of initiative, independence, and problem-solving skills

### **What is the evidence that this practice works, how it is monitored and assessed?**

The programme’s effectiveness is reflected in:

- Successful transitions into technical training and employment
- Continuous participant counselling and follow-up
- Monitoring through:
  - o participation data
  - o completion of training/internships
  - o employment outcomes

As part of labour market programmes, FiT is also aligned with AMS evaluation frameworks.

### **Who are involved in teaching and on which basis?**

- Professional counsellors and trainers at sprungbrett
- Experts from partner companies (during internships or visits)
- Training providers and VET institutions

Most roles are professionally funded (not voluntary).

#### **What assets and resources are required for this practice to be successful**

- Qualified staff (counsellors, trainers)
- Partnerships with companies and training providers
- Access to workshops and technical equipment
- Coordination with AMS and labour market institutions

Participation is generally free for participants.

#### **What external support mechanisms are used to enhance participation?**

FiT supports accessibility through:

- Free participation
- Individual counselling and flexible pathways
- Support for:
  - o disadvantaged young women
  - o NEETs
  - o women with limited access to education or employment

Close cooperation with AMS and social services ensures inclusion.

#### **What policies are required for this practice to be successful?**

- Gender equality policies in education and labour market
- Public funding for women in STEM/ICT programmes
- Strong cooperation between:
  - o NGOs (like sprungbrett)
  - o public employment services
  - o companies

These frameworks enable sustainable integration of women into technical professions.

#### **References**

- <https://sprungbrett.or.at/>
- <https://sprungbrett.or.at/kontakt>

#### **Get Started**

##### **The Country**

Austria

##### **The Educational level (secondary, hobby education, higher education)**

Company level

##### **The age group of girls/women**

#### **How does this practice engage girls/young women to learn ICT for ICT careers, describe specific elements in the practice that target girls motivation and interest.**

Girls were encouraged to try out technical activities (e.g. IT, programming, workshops) in a safe learning environment.

The programme focused on “learning by trying”, allowing participants to discover whether they enjoy ICT or technical work.

Many girls experienced “aha moments”, realising they had skills and talent they were not aware of before.

The project actively addressed fear and self-doubt, as many girls believed they could not succeed in male-dominated fields.

Exposure to different professions helped overcome the limited awareness of career options beyond stereotypical roles.

**How can girls/women discover this ICT learning opportunity? (e.g. marketing the opportunity, at meeting places, social suggestions)**

Participants were mainly referred by AMS (Public Employment Service Austria).

The programme targeted individuals through employment counselling and job orientation processes.

Awareness depended strongly on institutional guidance rather than open/public promotion.

**What way the learning modes support girls/women engagement in ICT? (e.g. promoting agency, teamwork, leadership, is it only for girls/women or for mixed gender groups)**

- Clearing phase (orientation phase) introducing different professions and possibilities.
- Workshops and practical modules (IT, wood, metal, etc.).
- Hands-on learning in workshops, including tools, machines, and simulations.
- Trial periods (e.g. one week in a workshop) to explore interests.
- Focus on active experimentation instead of theory.

**How does facilitation, mentoring, partnership support girls/women to be highly motivated (e.g. modes of guidance, avoiding gender bias and social perceptions, providing learning partners, assigning industry mentors)?**

- Trainers and professionals (Fachtrainer:innen) guided participants in workshops.
- Trainers provided encouragement and reassurance, especially addressing gender stereotypes.
- Girls received direct feedback and motivation, including being told they can perform equally to men.
- The programme created a supportive environment to reduce fear of failure.
- Cooperation between organisations (e.g. ipcenter, BFI, Jugend am Werk) enabled structured delivery.

**How is girls/women confidence and self-efficacy built towards ICT?**

- Confidence was built through:
  - Trying tasks independently and successfully
  - Experiencing visible results of their work
  - Receiving positive feedback and encouragement
- Many participants realised: *"I can actually do this"*, which increased self-belief.
- However, the transcript highlights that fear of failure and low self-confidence remain major barriers, especially due to socialisation and stereotypes.
- Early encouragement (school/family) is seen as crucial for long-term confidence development.

**What are the elements of ICT career opportunities in the programme?**

- Strong focus on career orientation and exploration:
  - o Overview of professions (e.g. IT, electrical engineering, mechatronics)
  - o Discussion of required skills and qualifications
  - o Identification of individual strengths and weaknesses
- Participants were guided towards:
  - o Apprenticeships (Lehre)
  - o Technical career pathways
- ICT-related fields mentioned:
  - o IT/programming
  - o Electrotechnics
  - o Technical trades

**What are the elements of ICT entrepreneurship in the programme?**

- The programme did not explicitly focus on entrepreneurship.
- However, participants gained:
  - o Insights into technical work environments
  - o Understanding of skills needed in industry
- The focus remained on:
  - o Employment and vocational pathways, not business creation.

### **What is the evidence that this practice works, how it is monitored and assessed**

- Evidence is mainly qualitative:
  - o Participants discovering new skills and career interests
  - o Individual success stories (e.g. choosing a technical career after trying it)
- Observed outcomes:
  - o Increased interest in technical professions
  - o Some participants changing career direction after workshops
- Monitoring included:
  - o Initial interviews (Erstgespräch)
  - o Ongoing observation during modules
- The transcript highlights:
  - o The importance of hands-on experience as a key success factor
- However, no formal large-scale evaluation system is described.

### **Who are involved in teaching and on which basis?**

- Professional trainers (Fachtrainer:innen) in workshops
- Trainers were:
  - o Experts in their field (e.g. automotive, technical, IT)
  - o Responsible for practical instruction and guidance
- Their role was part of their professional employment, not voluntary.
- Multiple organisations collaborated:
  - o ipcenter
  - o Jugend am Werk
  - o BFI

### **What assets and resources are required?**

- Workshop infrastructure (machines, tools, IT equipment)
- Qualified trainers and staff
- Organisational cooperation between institutions
- Physical workshop spaces
- Access to simulators and technical equipment

### **What external support mechanisms are used?**

- AMS referrals ensured access for participants
- Target group included:
  - o Women
  - o People with migration background
- Programme provided:
  - o Structured support and guidance
- However, barriers still existed:
  - o Cultural expectations
  - o Family restrictions
- o **Lack of awareness**

**What policies are required for this practice to be successful?**

- Need for:
  - o Increased funding for education and training programmes
  - o More technical training opportunities for women
- o Support for:
  - § Workshops
  - § Internships (Praktika)
  - § Trial days (Schnuppertage)
- Policies should:
  - o Promote gender equality in technical fields
  - o Address stereotypes and discrimination
- The transcript emphasizes:
  - o Current funding is insufficient and even decreasing, limiting impact

**Reference**

<https://www.ipcenter.at/ueber-uns/abgeschlossene-projekte/get-started/>

**She Goes Digital****Country**

Austria

**Educational Level**

Company level

**Age Group of Girls/Women**

Girls from approx. 14 years up to women 50+ (including career changers and returners)

**How does this practice engage girls/young women to learn ICT for ICT careers?**

The She Goes Digital initiative engages girls and women in ICT by offering low-threshold, highly accessible entry points into digital learning and careers. A key feature is that there are no formal entry requirements, selection processes or prior knowledge needed, making participation inclusive and barrier-free.

The programme is built around company-led activities, where partner organisations (e.g. Microsoft, Coca-Cola, public institutions, start-ups) design and host workshops, job shadowing opportunities, mentoring sessions, or company visits. These activities provide real-life insights into how digitalisation is applied in different sectors, such as supply chains, AI applications, or cloud systems. This helps participants understand that ICT is not abstract but embedded in everyday work environments.

A strong motivational element is the hands-on exposure to real technologies, such as AI tools, cloud computing environments, or digital production systems. Participants can, for example, experiment with digital tools or observe real projects, which reduces fear of technology and increases curiosity.

Additionally, the programme includes a structured learning pathway (introduced later in the programme's development), consisting of:

- a self-assessment of digital skills
- a digital competence certification (based on European frameworks)
- an advanced certification (e.g. Microsoft AI/Cloud certification)

This pathway creates a clear progression from exploration to professionalisation, which strengthens long-term engagement in ICT careers.

**How can girls/women discover this ICT learning opportunity?**

Participants mainly discover the programme through organic and community-based communication channels, including:

- Social media (especially LinkedIn)

- Word-of-mouth recommendations
- Company and partner networks
- Visibility within the ICT and innovation ecosystem

Unlike many programmes, She Goes Digital does not rely heavily on paid marketing, but rather on network effects and partnerships.

Companies participating in the programme promote their activities, while existing participants recommend the programme to peers. This creates a trust-based outreach model.

Additionally:

- Events (kick-offs, closing events, public sessions) increase visibility
- Collaborations with organisations such as Women in ICT extend outreach
- Educational institutions and professional networks help disseminate opportunities

This combination ensures that also women outside traditional ICT pathways (e.g. career changers or returners) become aware of the programme.

### **How do the learning modes support girls/women engagement in ICT?**

The learning modes are highly interactive, flexible, and practice-oriented, which strongly supports engagement:

- Hands-on workshops and real-life demonstrations make digital topics tangible
- Job shadowing and company visits connect learning to real work contexts
- Mentoring and networking formats support personal and professional development

A key feature is the creation of a safe learning environment specifically for women, which reduces fear of asking questions and encourages participation—especially for beginners without a technical background.

At the same time, the programme includes interaction with mixed professional environments (e.g. companies, industry experts), which helps participants transition into broader ICT contexts.

The programme also supports flexible participation, for example:

- Sessions scheduled in the evening (to accommodate working women and caregivers)
- Online formats and recorded sessions
- Voluntary participation in all learning components

These elements make participation feasible for women with diverse life situations.

### **How do facilitation, mentoring, and partnerships support motivation?**

Facilitation and mentoring are central to motivation:

- Activities are led by ICT professionals, trainers, and company experts, providing authentic insights into the field
- Female role models share career paths, challenges, and successes, helping participants identify with them and challenge stereotypes

A particularly strong element is the mentoring programme (e.g. via Women in ICT), where participants can connect directly with experienced professionals and receive guidance.

Partnerships with companies are especially impactful:

- They provide direct exposure to real work environments
- They show career pathways and entry points
- They create opportunities for networking and future employment

This combination of expert guidance + real-world exposure + role models significantly increases motivation and reduces uncertainty about entering ICT careers.

### **How is girls'/women's confidence and self-efficacy built towards ICT?**

Confidence is built through a combination of:

#### **1. Low-threshold access**

Participants can join without prior experience, which reduces fear and creates early success experiences.

## 2. Hands-on learning

Participants actively work with technologies (e.g. creating cloud environments, solving tasks), which helps them realise: *“I can do this.”*

## 3. Safe spaces

Women-only environments reduce pressure and allow participants to:

- ask questions freely
- experiment without fear of judgement

## 4. Role models and empowerment training

Workshops like “I am remarkable” explicitly address confidence-building, helping women:

- recognise their achievements
- overcome self-doubt
- communicate their skills

## 5. Peer support

Learning groups and community exchange foster encouragement and mutual support.

Together, these elements help participants shift from self-doubt to self-efficacy.

## How does engagement with networks extend girls' motivation to learn ICT?

Networking is a core pillar of the programme:

- Participants connect with ICT professionals, companies, and peers
- Events (kick-offs, closing events, workshops) bring together large groups (e.g. ~100 participants)
- Communities such as Women in ICT provide ongoing engagement

These networks:

- create a sense of belonging in the tech community
- provide role models and career inspiration
- open up future opportunities (jobs, mentoring, collaborations)

Social motivation is strengthened because ICT is experienced as a collaborative and supportive field, not an isolated technical domain.

## How are learning resources and tasks constructed?

Learning is designed around real-world relevance and progressive skill-building:

- Tasks are linked to actual ICT applications (e.g. cloud systems, AI tools)
- Participants work in structured modules with practical exercises
- Learning includes guided sessions + independent practice + group work

Examples include:

- Creating virtual machines in cloud environments
- Understanding system architectures (frontend/backend/database)
- Applying AI and digital tools in real contexts

Participants are encouraged to:

- work in learning groups
- solve exercises collaboratively
- apply knowledge to practical scenarios

This design supports problem-solving, analytical thinking, and practical mastery.

## What are the elements of ICT career opportunities in the programme?

The programme offers strong career orientation and exposure:

- Company-led activities show real job roles and work environments
- Job shadowing and mentoring provide direct career insights
- Certification pathways support formal skill recognition

Participants learn about:

- ICT roles (e.g. cloud specialist, IT support, AI-related jobs)
- Required skills and qualifications
- Educational pathways (e.g. further training, university programmes)

There is also evidence of impact, with participants transitioning into ICT roles or education pathways (e.g. cloud careers, IT security studies) .

### **What are the elements of ICT entrepreneurship?**

Entrepreneurship is addressed indirectly through:

- Exposure to start-ups and innovation environments
- Insights into how digital solutions are developed and applied
- Understanding of how technology supports business processes and innovation

Participants learn how ICT can be used to:

- create new products and services
- improve business operations
- drive innovation across sectors

### **What is the evidence that this practice works?**

Evidence includes:

- Over 1000 women reached since 2022
- High participation in events and training programmes
- Positive participant feedback (e.g. “game changer”, increased confidence)
- Documented career transitions into ICT-related roles or education

Monitoring methods include:

- Participation data
- Feedback surveys
- Programme evaluation and reporting

### **Who is involved in teaching?**

Teaching and facilitation are provided by:

- ICT professionals from partner companies
- Certified trainers (e.g. for Microsoft certification)
- Mentors from professional networks
- Programme coordinators and facilitators

Roles are mostly professional or project-based, with some voluntary engagement in coordination and programme development.

### **What resources are required?**

Key resources include:

- Partnerships with companies and networks
- Trainers and mentors
- Digital learning platforms and tools
- Certification programmes
- Project coordination

Participation is free for women, funded through company sponsorships.

### **What external support mechanisms enhance participation?**

The programme ensures accessibility through:

- Free participation (no financial barriers)
- Flexible formats (online, evening sessions, recordings)
- Integration with work and caregiving responsibilities

- Low-threshold access (no entry requirements)

This is particularly important for:

- working women
- mothers
- career changers

### **What policies are required for success?**

The initiative highlights the need for:

- Stronger public funding and policy support for women in ICT
- Gender equality policies in education and labour markets
- Support for public-private partnerships

The interview also indicates that lack of funding remains a challenge, despite strong programme impact .

### **References**

- Website: <https://shego.es.at/digital/highlights-aus-2025/>
- Programme: <https://shego.es.at/digital/sgd-programm/>
- Interview transcript:

## **Technikolympiade**

### **The Country**

Austria

### **The Educational level (secondary, hobby education, higher education)**

secondary education, part of non-formal/hobby education

### **The age group of girls/women**

The programme primarily addresses young people aged approx. 15–20, including girls in technical secondary schools, vocational training or early career orientation phases.

### **How does this practice engage girls/young women to learn ICT for ICT careers, describe specific elements in the practice that target girls motivation and interest.**

The TechnikOlympiade engages girls through hands-on, project-based competitions where participants work in teams to solve real technical challenges. The focus on practical problem-solving, creativity and innovation makes ICT and technical fields more tangible and engaging. Working on real projects increases motivation, while the competition format adds excitement and recognition. The initiative also promotes teamwork, applied skills and exposure to technical careers, which helps girls see the relevance of ICT for future professions.

### **How can girls/women discover this ICT learning opportunity? (e.g. marketing the opportunity, at meeting places, social suggestions)**

Girls mainly discover the TechnikOlympiade through schools, teachers and vocational training institutions, which actively promote participation. Information is also shared via the official website, educational networks and partner organisations. In addition, recommendations from teachers, peers and school projects play an important role in encouraging participation.

What way the learning modes support girls/women engagement in ICT? (e.g. promoting agency, teamwork, leadership, is it only for girls/women or for mixed gender groups)

### **How is girls/women confidence and self-efficacy built towards ICT?**

Confidence is built through hands-on project work and successful problem-solving experiences. By working in teams on real technical challenges and presenting their results, girls gain a sense of achievement and see that they can apply ICT and technical skills effectively. Recognition through the competition further strengthens self-belief.

**What way engagement to networks extends girls' social motivation to learn ICT (e.g. events, competitions, fairs) ?**

The competition brings participants together with peers, schools, companies and industry representatives during project phases and final events. These interactions create a sense of belonging to the technical community and increase motivation through shared experiences, public presentations and exposure to real-world environments.

**How are learning resources and tasks constructed that motivate girls/women problem-solving in ICT (e.g. relevance, complex problems, interdisciplinarity, career-relatedness. practical skill mastery)?**

Tasks are designed as real-world, project-based challenges that require creativity, technical thinking and teamwork. They are often interdisciplinary and practical, connecting ICT with engineering or applied sciences. This relevance to real-life problems encourages engagement and helps participants develop concrete technical skills.

**What are the elements of ICT career opportunities in the programme (e.g. job shadowing, practice, career guidance, positive career perception)**

Participants gain insights into ICT and technical careers through practical project work, interaction with companies and exposure to industry-related challenges. Presentations and final events help create a positive perception of technical professions and show possible career pathways in ICT and related fields.

**What are the elements of ICT entrepreneurship in the programme (e.g. hackathons, product development, marketing)**

While the main objective is career orientation, the programme also introduces girls to innovation and entrepreneurial thinking through exposure to technology companies and digital workplaces. By observing how companies develop digital products and services and by engaging in creative technical activities during workshops, participants gain insights into innovation processes and technology-driven business environments. However, the programme focuses more on career awareness than on formal entrepreneurship training such as hackathons or start-up development.

**What is the evidence that this practice works, how it is monitored and assessed?**

The effectiveness of the TechnikOlympiade is reflected in its continued implementation, participation of multiple schools and recurring competition cycles. Success is monitored through project submissions, jury evaluations and final presentations, where teams are assessed based on innovation, technical quality and problem-solving. Feedback from teachers, students and partners also contributes to evaluating the programme's impact.

**Who are involved in teaching and on which basis (e.g. paid role, voluntary engagement)**

Participants are supported by teachers, trainers and industry experts, who guide teams during the project phase. Teachers are involved as part of their professional role in schools, while industry experts and jury members typically contribute through partnerships or voluntary/professional engagement.

**What assets and resources are required for this practice to be successful (e.g. tuition fee)**

Key resources include school infrastructure, technical equipment, materials for project development and organisational support for the competition. Additional resources come from partner organisations and companies that support the initiative. Participation is generally free of charge, making it accessible to students.

**What external support mechanisms are used to enhance participation for those with restricted opportunities (e.g. scholarship, flexibility in study mode or time, travel support, caregivers mobility)**

Participation is supported through integration into school activities and guidance from teachers, which lowers organisational barriers. Collaboration with schools ensures that students can participate within their learning environment. In some cases, support from partners or organisers (e.g. for events or materials) helps enable participation for a wider group of students.

### **What policies are required for this practice to be successful**

The initiative benefits from education policies that promote STEM and vocational training, as well as innovation and digital skills strategies. Policies encouraging school–industry cooperation and experiential learning are particularly important, as they enable project-based competitions and partnerships with companies.

### **Töchtertag (daughters day)**

#### **The Country**

Austria

#### **The Educational level (secondary, hobby education, higher education)**

Company level

#### **The age group of girls/women**

##### **Lower secondary school girls (approx. 11–14 years)**

Students from the 1st–4th grade of Mittelschule or Gymnasium.

##### **Upper secondary school girls (approx. 15–18 years)**

Female students preparing for the Matura.

### **How does this practice engage girls/young women to learn ICT for ICT careers, describe specific elements in the practice that target girls motivation and interest.**

Within an environment where they are accompanied with family members, they can have a look at their work environments. They visit companies and working places from people they already know which can be inspiring.

### **How can girls/women discover this ICT learning opportunity? (e.g. marketing the opportunity, at meeting places, social suggestions)**

- Parents, since girls can visit the workplace of a parent.
- The official website ([toechtertag.at](http://toechtertag.at)) where students can browse participating companies and register.
- Public promotion by the City of Vienna, including social media campaigns and public communication.
- Participating companies and institutions, which advertise their workshops or job-shadowing opportunities.
- Education authorities and school networks, which distribute information materials.
- schools and teachers, who inform students about the event and encourage participation

### **What way the learning modes support girls/women engagement in ICT? (e.g. promoting agency, teamwork, leadership, is it only for girls/women or for mixed gender groups)**

- Workplace visits
- Hands-on workshops
- Company tours
- Job shadowing

Girls can actively explore technology and digital tools rather than only learning theoretically. Encourage teamwork and collaboration with peers. Provide real-world learning environments where girls can observe professional ICT work.

### **How does facilitation, mentoring, partnership support girls/women to be highly motivated (e.g. modes of guidance, avoiding gender bias and social perceptions, providing learning partners, assigning industry mentors)?**

- Motivation is strengthened through several support mechanisms:

- **Industry professionals** guide girls during company visits and workshops.
- **Participating organisations and companies** act as facilitators and provide insights into their professions.
- Girls interact directly with female professionals and role models working in technical fields.
- Partnerships between schools, companies, and public institutions ensure structured guidance and organisation.

Exposure to professionals helps reduce gender stereotypes and biases by showing that women can successfully work in technical and digital careers.

### **How is girls/women confidence and self-efficacy built towards ICT?**

Vienna Girls' Day creates connections through:

- Networking opportunities with companies and professionals
- Events and workshops organised by companies
- Exposure to STEM-related workplaces and communities
- Connections between schools, educational institutions, and industry

These interactions help girls become aware of wider professional networks and career ecosystems in ICT and STEM fields.

### **What way engagement to networks extends girls' social motivation to learn ICT (e.g. events, competitions, fairs) ?**

Vienna Girls' Day increases girls' motivation to explore ICT by connecting them with companies, universities and professionals during events and workplace visits. Through workshops, company tours and public activities such as the Töchertag Festival, participants meet other students as well as female professionals in technical fields. These interactions create a supportive social environment and expose girls to real professional networks in the technology and digital sectors.

### **How are learning resources and tasks constructed that motivate girls/women problem-solving in ICT (e.g. relevance, complex problems, interdisciplinarity, career-relatedness, practical skill mastery)?**

The learning activities are designed as practical and interactive experiences rather than theoretical lessons. During workshops and company visits, girls work on small technical tasks, experiments or programming exercises that demonstrate how digital technologies function in real life. By connecting ICT topics to real-world applications and interdisciplinary challenges, the programme helps participants develop practical skills and encourages curiosity, experimentation and problem-solving.

### **What are the elements of ICT career opportunities in the programme (e.g. job shadowing, practice, career guidance, positive career perception)**

The programme strongly focuses on career exploration by allowing girls to visit companies, observe professionals at work and participate in hands-on workshops related to ICT and technical professions. Through job shadowing, presentations and conversations with employees, participants learn about different career paths, required qualifications and daily work tasks in the digital and technology sectors. This exposure helps create positive perceptions of ICT careers and broadens girls' understanding of their professional options.

### **What are the elements of ICT entrepreneurship in the programme (e.g. hackathons, product development, marketing)**

While the main objective is career orientation, the programme also introduces girls to innovation and entrepreneurial thinking through exposure to technology companies and digital workplaces. By observing how companies develop digital products and services and by engaging in creative technical activities during workshops, participants gain insights into innovation processes and technology-driven business environments. However, the programme focuses more on career awareness than on formal entrepreneurship training such as hackathons or start-up development.

**What is the evidence that this practice works, how it is monitored and assessed?**

The City's communications and Töchtertag website document a long-running programme with early rapid growth (2002: ~200 girls in 1 company; second year: 500 girls in 17 companies). After pandemic-era virtual formats (e.g., 2020 shifted online, with ~190 companies presenting digitally), the in-person programme rebuilt and then reached new highs by 2024–2025.

The programme uses multiple, clearly observable monitoring channels that together form a basic “count + feedback + process” system.

**Registration and administrative monitoring** are primarily handled through the Töchtertag website. The online registration form collects participant identity and schooling information, contact details, and—crucially for safeguarding and inclusion—parent/guardian consent (for minors) and self-declared special needs (e.g., allergy, medication needs, accessibility). School linkage and attendance verification are built into the process. Post-event participant assessment exists in the form of structured questionnaires.

<https://presse.wien.gv.at/presse/2025/04/24/rekorde-beim-wiener-toechtertag-2025-5-900-maedchen-erkunden-neue-berufswelten-und-brechen-mit-rollenbildern>

<https://presse.wien.gv.at/presse/2024/04/25/wiener-toechtertag-2024-bricht-rekorde-5-000-maedchen-in-rund-290-unternehmen>

<https://presse.wien.gv.at/2023/04/27/wiener-toechtertag-2023-bricht-alle-rekorde-girlpower-in-250-unternehmen>

[https://www.bildung-wien.gv.at/service/Presse/Presseaussendungen/31.03.2022-PA\\_20-Jahre-](https://www.bildung-wien.gv.at/service/Presse/Presseaussendungen/31.03.2022-PA_20-Jahre-)

**Who are involved in teaching and on which basis (e.g. paid role, voluntary engagement)**

The learning activities are mainly facilitated by professionals from participating companies, research institutions and public organisations. These professionals guide workshops, demonstrations and workplace visits. Their involvement is usually part of their professional role within the company or institution rather than voluntary teaching. The programme is organised and coordinated by the Women's Service of the City of Vienna in cooperation with the Vienna Directorate of Education and the Vienna Chamber of Commerce.

**What assets and resources are required for this practice to be successful (e.g. tuition fee)**

Key resources include the organisational infrastructure provided by the City of Vienna, the online platform used for registration and programme information, and the active participation of companies willing to host students. Companies provide facilities, equipment and staff time to organise workshops or workplace visits. Financial barriers are minimized because participation is free of charge for both students and companies, making the programme accessible to a wide range of participants.

**What external support mechanisms are used to enhance participation for those with restricted opportunities (e.g. scholarship, flexibility in study mode or time, travel support, caregivers mobility)**

The programme is designed to be widely accessible. Schools support participation by informing students and helping organise attendance. Because the initiative is free and organised during the school day, financial barriers are reduced. Girls can either attend a company selected through the official website or visit the workplace of a parent, which provides additional flexibility and accessibility for participants from different backgrounds.

**What policies are required for this practice to be successful?**

The initiative is supported by gender equality and education policies at the municipal level that promote equal opportunities in education and employment. Policies encouraging girls' participation in STEM

fields, gender-sensitive career guidance and cooperation between schools and industry are essential for the programme's implementation. Institutional collaboration between the City of Vienna, the education authorities and business organisations ensures the programme's sustainability and integration into the broader strategy of promoting women in technology and science.

References: Link to the practice curriculum etc.

<https://www.toechtertag.at/>

Example programme and workshop descriptions (TU Wien participation):

<https://www.tuwien.at/tu-wien/organisation/zentrale-bereiche/personalentwicklung/vereinbarkeit-tu-kids/veranstaltungen-fuer-kinder/toechtertag>

Example company participation and workshop description:

<https://www.brz.gv.at/wie-wir-arbeiten/Kontakt-aufnehmen/veranstaltungen/20260423-wiener-toechtertag-2026.html>

## **VÖSI Special Interest Group: Women in ICT**

### **The Country**

Austria

### **The Educational level (secondary, hobby education, higher education)**

Network

### **The age group of girls/women**

The initiative mainly targets young adult women and professionals (approx. 18+), including female students in higher education, early-career professionals and women already working in or entering the ICT sector.

### **How does this practice engage girls/young women to learn ICT for ICT careers, describe specific elements in the practice that target girls motivation and interest.**

The *VÖSI Women in ICT* network engages women primarily through professional networking, visibility of role models and knowledge exchange. Events, discussions and panels feature women working in ICT who share their career paths and experiences, which helps challenge stereotypes and increases motivation.

The initiative also fosters engagement by creating a supportive professional community, where participants can connect with peers and experts, exchange experiences and gain insights into ICT careers. By highlighting real career opportunities, industry trends and professional pathways, the network encourages women to explore, enter or advance in ICT careers.

### **How can girls/women discover this ICT learning opportunity? (e.g. marketing the opportunity, at meeting places, social suggestions)**

The network is promoted through the VÖSI website, professional networks, partner organisations and ICT events. Visibility is also increased through industry connections, conferences and word-of-mouth within the tech community.

### **What way the learning modes support girls/women engagement in ICT? (e.g. promoting agency, teamwork, leadership, is it only for girls/women or for mixed gender groups)**

The initiative mainly uses **networking events, discussions, panels and knowledge exchange formats**. These create a supportive environment for women, encourage participation and allow engagement with ICT topics in a **collaborative and peer-based setting**.

### **How does facilitation, mentoring, partnership support girls/women to be highly motivated (e.g. modes of guidance, avoiding gender bias and social perceptions, providing learning partners, assigning industry mentors)?**

The initiative mainly uses networking events, discussions, panels and knowledge exchange formats. These create a supportive environment for women, encourage participation and allow engagement with ICT topics in a collaborative and peer-based setting.

**How is girls/women confidence and self-efficacy built towards ICT?**

The initiative mainly uses **networking events, discussions, panels and knowledge exchange formats**. These create a supportive environment for women, encourage participation and allow engagement with ICT topics in a **collaborative and peer-based setting**.

**What way engagement to networks extends girls' social motivation to learn ICT (e.g. events, competitions, fairs) ?**

The network connects participants with ICT professionals, organisations and events, creating a sense of belonging to the tech community. Networking opportunities increase motivation by providing social support and career inspiration.

**How are learning resources and tasks constructed that motivate girls/women problem-solving in ICT (e.g. relevance, complex problems, interdisciplinarity, career-relatedness. practical skill mastery)?**

The initiative focuses less on structured tasks and more on knowledge exchange, discussions and real-world insights. Learning is based on practical experiences shared by professionals, highlighting real ICT challenges and solutions

**What are the elements of ICT career opportunities in the programme (e.g. job shadowing, practice, career guidance, positive career perception)**

Participants gain exposure to career paths, industry insights and professional opportunities through networking, talks and interaction with ICT professionals. This supports career orientation and positive perception of ICT jobs.

**What are the elements of ICT entrepreneurship in the programme (e.g. hackathons, product development, marketing)**

Entrepreneurial aspects are addressed through exchange with industry experts, innovation discussions and exposure to the ICT ecosystem, although entrepreneurship is not the main focus.

**What is the evidence that this practice works, how it is monitored and assessed?**

Evidence is mainly reflected in ongoing activities, participation in events and continued engagement of members and partners. Monitoring is informal and based on network growth, event participation and feedback from participants.

**Who are involved in teaching and on which basis (e.g. paid role, voluntary engagement)**

Activities are facilitated by ICT professionals, experts and members of the VÖSI network, usually on a professional or voluntary basis, contributing knowledge and experience.

**What assets and resources are required for this practice to be successful (e.g. tuition fee)**

The initiative relies on organisational support from VÖSI, industry partnerships, expert contributions and event infrastructure. Participation is generally free or low-cost, ensuring accessibility.

What external support mechanisms are used to enhance participation for those with restricted opportunities (e.g. scholarship, flexibility in study mode or time, travel support, caregivers mobility)

Accessibility is supported through open events, networking formats and partnerships with organisations, allowing participation without major financial or structural barriers.

**What policies are required for this practice to be successful**

The initiative benefits from gender equality policies, digital skills strategies and support for women in STEM, as well as policies encouraging collaboration between industry, education and professional networks.

References: Link to the practice curriculum etc.

<https://voesi.or.at/voesi-aktiv/special-interest-groups/special-interest-group-womeninict/>

## Annex 3. Practices in Cyprus

Across the Cyprus cases, gender-inclusive ICT learning is not driven by a single intervention or a fully embedded national curriculum approach, but by a coherent set of targeted practices that operate across the education pathway and respond to different barriers encountered by girls and women at various stages of their learning and career development. The examples reflect a system in which universities, NGOs, European projects, schools, parents, teachers, industry partners, and equality bodies contribute through complementary but distinct mechanisms.

At the school level, practices are primarily oriented toward early awareness, stereotype disruption, and mediation through adults who shape girls' expectations. In non-formal settings, the emphasis shifts toward safe participation spaces, hands-on experimentation, role-model visibility, and identity formation. At higher education and early professional levels, inclusion is supported through scholarships, partnerships, mentoring, employability support, and institutional commitments to gender equality.

Across the Cyprus cases, three recurring inclusion mechanisms emerge:

- Awareness and stereotype disruption → challenging assumptions about girls and ICT
- Confidence and identity-building → supporting girls through role models, mentoring, and safe participation spaces
- Transition and career support → helping women move into higher education and ICT careers through partnerships, scholarships, and professional networks

A key cross-cutting characteristic is that successful Cypriot approaches do not focus solely on technical competence, but on transforming the social and cultural conditions that shape participation in ICT.

### SCHOOLS IN CYPRUS

Across the reviewed Cyprus dataset, school-level practices mainly focus on awareness-building, stereotype reduction, teacher support, and engaging girls with ICT through innovative and interactive approaches. Unlike fully curriculum-integrated approaches, many initiatives are project-based or workshop-oriented.

The selected cases include:

- STEAM and Digital Game-Based Learning Initiatives
- Cybersecurity Awareness and Summer School Activities
- Teacher Networks for Gender-Sensitive ICT Education
- Parent Awareness and Gender Equality Outreach

*Table 1: ICT Education Provision for Girls at Schools (Cyprus)*

| Case Name                             | Level               | Description                                                                 | Gender-Inclusive ICT Support Characteristics                 | Example Practices                                  |
|---------------------------------------|---------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------|
| STEAM and Digital Game-Based Learning | School              | ICT and STEAM concepts introduced through creative and interactive learning | Makes ICT relatable and engaging; reduces stereotypes        | Game-based learning; storytelling; STEAM workshops |
| Cybersecurity Awareness Pathways      | School / Non-formal | Interactive cybersecurity learning                                          | Future-oriented ICT identity-building; practical exploration | Cybersecurity modules; summer schools;             |

|                                           |                    |                                                                      |                                                                 |                                                             |
|-------------------------------------------|--------------------|----------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------|
|                                           |                    | experiences and summer schools                                       |                                                                 | challenge-based activities                                  |
| Gender-Sensitive Teacher Support Networks | School             | Teacher development and collaboration focused on gender inclusion    | Teachers become mediators of inclusion and stereotype reduction | Teacher workshops; professional learning networks           |
| Parent Awareness and Equality Outreach    | School / Community | Initiatives supporting parents to encourage girls' ICT participation | Changes social expectations and support structures              | Awareness campaigns; parent workshops; equality discussions |

## Recurring Small-Level Practices in Schools in Cyprus

The Cyprus school-level cases show that gender inclusion is strongly connected to cultural mediation and social encouragement. Rather than focusing only on technical skill teaching, the initiatives repeatedly reshape how girls experience ICT.

*Table 2: Recurrent Micro-Practices Supporting Gender Inclusion at Schools (Cyprus)*

| Micro-Practice                      | Description                                         | Found In Cases                       |
|-------------------------------------|-----------------------------------------------------|--------------------------------------|
| Narrative and story-based learning  | ICT linked to relatable stories and experiences     | STEAM/game-based initiatives         |
| Interactive and playful learning    | Games and practical activities reduce intimidation  | Cybersecurity and STEAM workshops    |
| Early stereotype disruption         | Challenging assumptions about gender and technology | Teacher and parent initiatives       |
| Teacher encouragement and mediation | Teachers actively support girls' participation      | Teacher support networks             |
| Parent awareness-building           | Families encouraged to support girls' ICT interests | Parent outreach programmes           |
| Role-model visibility               | Girls encounter women working in ICT and STEM       | Cybersecurity and awareness projects |
| Hands-on experimentation            | Practical activities build confidence               | STEAM and cybersecurity activities   |
| Future-oriented ICT framing         | ICT connected with future careers and innovation    | Cybersecurity summer schools         |

## Key Analytical Insight

A central finding is that Cyprus school-level initiatives focus less on structural curriculum integration and more on transforming social expectations and participation cultures.

The most effective approaches:

- Challenge stereotypes before they become internalised
- Use interactive and creative learning formats
- Support teachers and parents as mediators of inclusion
- Connect ICT learning with meaningful future opportunities

These practices collectively help girls perceive ICT as socially relevant, achievable, and compatible with their identities and aspirations.

## HOBBY / NON-FORMAL EDUCATION IN CYPRUS

Within the Cyprus dataset, non-formal education contains the strongest concentration of direct engagement strategies for girls and young women in ICT. These initiatives often combine safe learning spaces, role-model visibility, practical experimentation, and mentoring.

The selected cases include:

- Girls-only ICT and STEM Workshops
- Cybersecurity and Digital Skills Summer Schools
- NGO and European Project-Based ICT Activities
- Community-Based ICT Outreach and Mentoring

*Table 3: ICT Education Provision in Hobby / Non-Formal Education (Cyprus)*

| Case Name                              | Level                   | Description                                                | Gender-Inclusive ICT Support Characteristics                    | Example Practices                          |
|----------------------------------------|-------------------------|------------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------|
| Girls-Only ICT Learning Spaces         | Hobby / Non-formal      | Programmes designed specifically for girls and young women | Safe participation environment; reduced stereotype threat       | Girls-only workshops; mentoring activities |
| Cybersecurity and Digital Skills Camps | Hobby / Non-formal      | Intensive experiential ICT learning opportunities          | Builds ICT identity and confidence through practical engagement | Summer schools; challenge-based learning   |
| NGO and European Project Outreach      | Non-formal              | Project-based initiatives increasing girls' access to ICT  | Free access; inclusive participation; awareness-building        | EU-funded projects; outreach workshops     |
| Community and University ICT Mentoring | Non-formal / Transition | Mentoring and exposure to higher education and ICT careers | Role models and social support increase persistence             | University visits; mentoring; networking   |

## Recurring Small-Level Practices in Hobby / Informal Education in Cyprus

Across the Cyprus non-formal education cases, inclusion relies heavily on emotional safety, identity-building, and practical experimentation.

*Table 4: Recurrent Micro-Practices Supporting Gender Inclusion (Cyprus)*

| Micro-Practice                          | Description                                            | Found In Cases                              |
|-----------------------------------------|--------------------------------------------------------|---------------------------------------------|
| Girls-only participation formats        | Dedicated groups reduce fear of judgement              | Girls-only workshops and camps              |
| Hands-on experimentation                | Learning through practical ICT tasks                   | Cybersecurity camps; digital workshops      |
| Role-model visibility                   | Female mentors and professionals support participation | Mentoring programmes                        |
| Flexible and low-cost access            | Free or affordable participation increases inclusion   | NGO and EU-funded projects                  |
| Peer support and community-building     | Social belonging strengthens engagement                | Workshops and mentoring networks            |
| Project-based learning                  | Participants create and solve real tasks               | ICT camps and workshops                     |
| Exposure to real ICT environments       | Visits and activities in universities or companies     | University outreach programmes              |
| Confidence-building through achievement | Success in practical tasks reinforces self-efficacy    | Digital skills and cybersecurity activities |

## Key Analytical Insight

The Cyprus non-formal education cases demonstrate that sustained engagement in ICT depends strongly on psychological safety, social support, and meaningful participation.

The most effective approaches:

- Create environments where girls can experiment without fear of failure
- Use female role models and mentoring to strengthen identity-building
- Provide practical and enjoyable ICT experiences
- Build bridges between informal learning and future education pathways

Non-formal learning therefore acts as a critical transition space where girls begin to imagine themselves as belonging within ICT.

## HIGHER EDUCATION, TRANSITION, AND PROFESSIONAL SUPPORT IN CYPRUS

At higher education and transition levels, Cyprus practices focus strongly on access, retention, scholarships, professional partnerships, and employability.

The selected cases include:

- “To all women and girls: Join the journey in Engineering and Technology”

- University–Industry ICT Partnerships
- Women’s Employability and ICT Transition Support
- Gender Equality and Institutional Inclusion Policies

*Table 5: ICT Education Provision for Women at Higher Education and Transition Levels (Cyprus)*

| Case Name                                       | Level                           | Description                                                      | Gender-Inclusive ICT Support Characteristics                 | Example Practices                                   |
|-------------------------------------------------|---------------------------------|------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------|
| Women-Targeted ICT and Engineering Scholarships | Higher Education                | Financial support encouraging women to enter Engineering and ICT | Reduces financial barriers; signals institutional commitment | Tuition-fee scholarships; performance-based renewal |
| University–Industry ICT Partnerships            | Higher Education / Professional | Collaboration between universities and ICT-sector organisations  | Increases relevance, networking, and employability           | Industry projects; company collaborations           |
| Employability and Career Transition Support     | Higher Education / Early Career | Guidance and preparation for ICT employment pathways             | Supports persistence and professional identity               | Career workshops; mentoring; employability support  |
| Institutional Gender Equality Frameworks        | Higher Education                | University policies promoting women’s participation in ICT       | Structural support for inclusion and belonging               | Equality offices; inclusion initiatives             |

## Recurring Small-Level Practices in Higher Education and Transition Contexts in Cyprus

At this level, gender inclusion focuses on access, persistence, and transition into ICT careers.

*Table 6: Recurrent Micro-Practices Supporting Gender Inclusion (Cyprus)*

| Micro-Practice                            | Description                                       | Found In Cases                  |
|-------------------------------------------|---------------------------------------------------|---------------------------------|
| Financial support mechanisms              | Scholarships reduce barriers to participation     | Women-targeted ICT scholarships |
| Institutional recognition of women in ICT | Explicit equality commitment increases legitimacy | Gender equality frameworks      |
| Industry collaboration                    | Partnerships strengthen career relevance          | University–industry projects    |

|                                         |                                                          |                                      |
|-----------------------------------------|----------------------------------------------------------|--------------------------------------|
| Mentoring and guidance                  | Academic and professional support encourages persistence | Employability initiatives            |
| Professional identity-building          | Women experience themselves as future ICT professionals  | Career and transition programmes     |
| Networking opportunities                | Participation in ICT communities increases belonging     | Industry and university events       |
| Flexible transition pathways            | Support for women entering ICT through different routes  | Career support programmes            |
| Confidence-building through achievement | Recognition and academic success reinforce self-efficacy | Scholarship renewal and project work |

## Key Analytical Insight

A central finding is that Cyprus higher education and transition-level initiatives combine structural support with symbolic recognition.

The most effective approaches:

- Reduce economic and social barriers to ICT participation
- Strengthen women's professional identity in Engineering and ICT
- Connect education with employability and industry relevance
- Build inclusive institutional cultures that support persistence

Unlike purely skills-focused approaches, these practices emphasize that participation in ICT is also shaped by visibility, belonging, recognition, and access to supportive networks.

## To all women and girls: Join the journey in Engineering and Technology

Country: Cyprus

Level of education: Higher education

Age group of girls/women: 18+

### How does this practice engage girls/young women in ICT learning and careers?

This practice engages women through a structural access mechanism combined with symbolic institutional support. The 50% tuition-fee scholarship directly reduces the financial burden associated with entering Engineering studies and therefore lowers one important barrier to ICT-related higher education. Its gender-targeted design is equally important because it makes women visible as intended participants in Engineering and technology fields. The practice does not rely only on individual motivation; it sends an institutional message that women are wanted, supported and expected to succeed in these fields. Renewal of the scholarship based on academic performance adds a persistence mechanism, encouraging responsibility, long-term engagement and continued achievement. The initiative also operates under the auspices of the Commissioner for Gender Equality, which gives it public legitimacy and connects it to wider equality policy.

### How do girls/women learn about this opportunity?

Women can learn about the opportunity through Frederick University's official website, university social media channels, targeted communication campaigns and gender equality outreach activities. These

channels combine broad institutional visibility with direct communication to prospective women students who may not otherwise consider Engineering or ICT-related pathways.

### **Learning formats supporting participation**

The learning takes place within standard undergraduate Engineering programmes, but the entry mechanism is designed specifically for women enrolling for the first time in the School of Engineering. This combination is important. The scholarship creates a supportive women-focused entry point, while the academic experience remains integrated into mainstream university programmes with the same standards and recognition as other students. The women-only access incentive reduces stereotype pressure at the point of entry without creating a separate or lower-status pathway.

### **Instruction, mentoring, partnerships**

Formal mentoring is not specified as a separate component, but facilitation is provided through institutional structures, academic staff guidance and the university's broader gender equality framework. The practice avoids deficit-based narratives by presenting women as capable students who should be supported through access and recognition rather than treated as lacking ability.

### **Confidence and self-efficacy development**

Confidence is built through recognition and academic validation. Receiving a scholarship confirms that the student is seen as a legitimate candidate for Engineering studies. Renewal based on academic performance reinforces self-efficacy because progress is linked to demonstrated competence. Participation in mainstream Engineering programmes further strengthens professional identity and helps women see themselves as future ICT and Engineering professionals.

### **Networks and social motivation**

The initiative supports networking indirectly by integrating women into Engineering student cohorts, university communities and STEM-related events. Although networking is not the central design feature, the scholarship creates access to academic and professional environments that may otherwise remain distant.

### **Learning materials and tasks**

Learning resources and tasks are those of accredited Engineering curricula. Students engage with complex problems, practical and analytical skills, interdisciplinary Engineering and ICT content, and career-relevant tasks. The value of the practice is that it opens access to these resources rather than creating a separate curriculum.

### **ICT career support elements**

The practice supports ICT career opportunities by enabling women to obtain recognised qualifications in Engineering fields that connect to ICT and STEM professions. The scholarship improves access to higher education, strengthens persistence and increases the likelihood of later professional entry.

### **ICT entrepreneurship elements**

Entrepreneurship is not explicitly included in the scholarship itself, but Engineering programmes typically expose students to innovation, design, problem-solving and product-development thinking, which can support entrepreneurial capacities indirectly.

### **Other**

Evidence is monitored through women's enrolment in Engineering, academic performance and scholarship renewal rates. The continuation of the initiative since 2021 indicates sustained institutional commitment. Teaching is delivered by paid academic staff in the School of Engineering. The practice requires financial resources for tuition support, administrative capacity for managing scholarships, communication resources and institutional policies supporting gender equality in higher education. External support is provided through the tuition-fee reduction, renewal conditions and policy-level endorsement.

Key mechanism: financial access combined with institutional legitimacy

## **Frederick University STEM Days & STEM Camps**

Country: Cyprus

Level of education: Hobby / informal education delivered by a higher education institution

Age group of girls/women: STEM Days target girls aged 9-12 and STEM Camps target girls aged 13-16

### **How does this practice engage girls/young women in ICT learning and careers?**

This practice engages girls through early exposure, practical activity and explicit empowerment. It introduces programming, robotics, AI, internet technologies and broader STEM topics through hands-on workshops in university environments. Motivation is supported by learning-by-doing because girls can see the results of their work and experience ICT as practical, creative and achievable. Female role models are central because participants meet women from STEM fields and encounter realistic pathways into studies and careers. The programme also includes empowerment sessions that address gender bias and underrepresentation directly, helping girls recognise stereotypes and build resilience rather than internalising exclusion. The intensive five-day format of STEM Camps allows engagement to deepen beyond a one-off activity.

### **How do girls/women learn about this opportunity?**

Girls and families can discover the opportunity through Frederick University communication channels, school networks, educators, parents, guardians and word-of-mouth. Because the programme targets minors, the role of schools and parents is especially important in enabling participation.

### **Learning formats supporting participation**

The practice uses girls-only participation, collaborative workshops, team-based problem solving, role-playing and interactive exercises. These learning modes support agency and confidence because girls are not passive recipients of information. They participate, experiment and solve problems in groups. The girls-only format creates a safe environment, while the university laboratory setting gives the experience authenticity.

### **Instruction, mentoring, partnerships**

Facilitation is provided by faculty members, university students, alumni and sometimes external experts. Students and alumni function as near-peer role models, making STEM futures feel more relatable. The Cyprus Mechanism for Women's Rights partly supports the practice, which adds legitimacy and connects the activity to wider gender equality aims. Bias and social perceptions are addressed explicitly in empowerment sessions.

### **Confidence and self-efficacy development**

Confidence develops through successful completion of coding, robotics or other STEM tasks, as well as through role-playing and problem-solving exercises. Girls are encouraged to make mistakes, collaborate and try again, which reduces fear of failure. Meeting female role models strengthens the belief that ICT and STEM are suitable fields for girls.

### **Networks and social motivation**

The programme creates temporary but meaningful peer communities among girls interested in STEM. Field trips and contact with faculty, students, alumni and women professionals expand participants' social horizons and aspirations. Repeated yearly activities can create a pathway that links childhood curiosity with later study choices.

### **Learning materials and tasks**

Resources include university laboratories, equipment for robotics, programming, AI and internet technologies, and practical tasks situated in real STEM environments. The activities are multidisciplinary and connect Engineering and computing to real-world relevance. Tasks can move from guided activities to more independent challenges, especially during longer camps.

### **ICT career support elements**

Career opportunity elements include contact with role models, field trips, exposure to university departments and early insight into study routes. The programme supports positive career perception by showing that ICT and STEM careers are diverse, accessible and connected to real people.

### **ICT entrepreneurship elements**

Entrepreneurship is not an explicit module, but problem-solving, AI, robotics and exposure to emerging technologies can support innovation-oriented thinking and future product-development interests.

## **Other**

Effectiveness can be monitored through registrations, demand, repeat participation, participant and parent feedback, workshop observations and longer-term interest in STEM subject choices. Teaching is delivered by paid faculty, supported by students and alumni who may participate voluntarily, and by external experts. Required assets include university labs, staff time, safeguarding arrangements, scheduling, funding for free participation and field trip logistics. Policies required include institutional gender equality commitment, child protection for minors, inclusive participation practices and support from women's rights bodies.

Key mechanism: early exposure, role models and immersive hands-on learning

## **Parents Workshops: Supporting Girls' Pathways to STEM and ICT**

Country: Cyprus

Level of education: Hobby / informal education as a parent-focused outreach initiative led by a higher education institution

Age group of girls/women: Indirect beneficiaries are girls of primary and secondary school age; direct participants are parents and guardians

### **How does this practice engage girls/young women in ICT learning and careers?**

This practice engages girls indirectly by influencing one of the most decisive environments shaping their educational and career choices: the family. The workshops do not teach ICT skills directly to girls. Instead, they target parental attitudes, expectations and forms of encouragement. By addressing stereotypes, unconscious bias and social expectations, the workshops help parents understand how ordinary language and assumptions can discourage girls from ICT and STEM. Providing parents with accurate information about ICT careers also makes them more capable of giving informed guidance. The practice positions parents as active supporters who can validate girls' interests in technology and problem-solving.

### **How do girls/women learn about this opportunity?**

Parents discover the workshops through Frederick University communication channels, school networks, community networks, word-of-mouth and gender equality outreach initiatives. Girls benefit when their parents participate and bring changed expectations and encouragement back into the home environment.

### **Learning formats supporting participation**

The learning mode is dialogue-based, reflective and gender-sensitive. Workshops encourage discussion rather than one-way instruction. This supports agency at the family level, because parents learn how they can actively support girls' choices. The format can be in-person or online and may be combined with parallel activities for children, reducing caregiving barriers.

### **Instruction, mentoring, partnerships**

Facilitation is provided by university or external experts with knowledge of STEM education and gender equality. The university acts as a trusted institutional partner and lends credibility to the messages. Facilitators address gender bias and social perceptions directly, while offering guidance that helps parents reflect without feeling blamed.

### **Confidence and self-efficacy development**

Girls' confidence is built indirectly through increased parental encouragement, reduction of discouraging messages at home and validation of girls' interest in technology. When parents become more aware of ICT opportunities and gender bias, they are better able to support girls' self-efficacy over time.

### **Networks and social motivation**

The network effect is indirect. Parents gain awareness of STEM and ICT pathways, and through school and university outreach they become connected to information sources that can support girls' choices. This improves the social environment around girls' learning.

### **Learning materials and tasks**

Workshop resources focus on real-life relevance, ICT career information and everyday examples of how support or discouragement operates. The tasks are reflective rather than technical, linking ICT to future opportunities and long-term skills.

### **ICT career support elements**

The career element is guidance through parents. Parents receive information about ICT and STEM fields, career prospects and educational pathways. This enables them to promote positive perceptions of ICT careers as stable, meaningful and achievable.

### **ICT entrepreneurship elements**

Entrepreneurship is not explicitly included, but reframing ICT as innovative and future-oriented can support more open attitudes toward entrepreneurial ICT futures.

### **Other**

Monitoring can include parent participation, qualitative feedback, observed changes in parental attitudes and reported increases in parental encouragement. University staff or experts facilitate the workshops as part of institutional outreach. Required assets include trained facilitators, workshop materials, communication resources, university facilities or online platforms and outreach capacity. External support mechanisms include free participation, flexible delivery and parallel activities for children where available. Policies required include institutional gender equality commitment, parental engagement in education and alignment with national and EU gender equality frameworks.

Key mechanism: indirect motivation through parental attitudes and family support

## **Building partnerships with organisations operating in STEM sectors**

Country: Cyprus

Level of education: Higher education

Age group of girls/women: Women aged 18+ in undergraduate Engineering and ICT-related studies

### **How does this practice engage girls/young women in ICT learning and careers?**

This practice engages women by connecting financial support, industry recognition and the real-world relevance of STEM study. Co-funded scholarships reduce financial barriers, but they also validate women's choice to enter Engineering and ICT-related fields. Partnerships with organisations such as Chevron signal that women belong in STEM sectors and that employers actively want to support their participation. The long-term nature of the partnership is important because it shows that support for women is not a one-off campaign but an ongoing commitment. The practice bridges education and industry by linking academic study to professional contexts.

### **How do girls/women learn about this opportunity?**

Women can learn about the opportunity through Frederick University's website, scholarship announcements, communications about partnerships, academic advisors and word-of-mouth among students. Visibility of the collaboration itself functions as marketing by showing that women-focused STEM support exists.

### **Learning formats supporting participation**

Women participate in regular undergraduate ICT and Engineering programmes with mixed-gender groups and equal academic expectations. The scholarship does not separate women from mainstream learning; instead, it supports them within it. This reinforces belonging, agency and professional identity because women are included as full participants in standard degree pathways.

### **Instruction, mentoring, partnerships**

The partnership provides external validation and may open possibilities for future industry engagement or mentoring. Academic staff provide guidance within degree programmes, while industry partners contribute strategically and financially. The company's involvement helps counter gender bias by demonstrating that recognised STEM organisations support women's participation.

### **Confidence and self-efficacy development**

Financial support reduces stress and allows students to focus on learning. Being selected for a scholarship strengthens self-belief and academic identity. Association with respected STEM

organisations reinforces confidence because women see that their pathway is valued by both university and industry.

### **Networks and social motivation**

Partnerships expand students' awareness of professional STEM networks and increase visibility of the wider ICT community. Students can perceive themselves not only as learners but as future professionals connected to real sectors and employers.

### **Learning materials and tasks**

Students follow standard ICT and Engineering curricula, which provide exposure to complex real-world problems, analytical and technical skills, interdisciplinary learning and career-related tasks. Industry involvement reinforces the practical relevance of academic work.

### **ICT career support elements**

The practice supports careers by enabling access to ICT and Engineering education, promoting positive perceptions of ICT professions and highlighting employability pathways through industry involvement.

### **ICT entrepreneurship elements**

Explicit entrepreneurship components are not described. However, exposure to industry partnerships can encourage innovation-oriented thinking, career ambition and awareness of applied STEM contexts.

### **Other**

Evidence includes the number of co-funded scholarships, with five women supported since 2022 and three more planned, continuation and expansion of the partnership, monitoring through academic performance and increased visibility of women-focused STEM initiatives. Teaching is delivered by paid academic staff, while industry partners provide financial and strategic support. Required resources include scholarship funding, strong university-industry relationships, administrative capacity and communication resources. Policies required include institutional gender equality policies, transparent scholarship procedures and ethical inclusive partnership frameworks.

Key mechanism: education-industry partnership and external validation

## **FemSTEAM Mysteries - Role Models and Game-Based Learning**

Country: Cyprus

Level of education: Secondary education with strong links to teacher professional development and higher education research

Age group of girls/women: Primarily girls of upper primary and secondary school age, approximately 12-15; indirect beneficiaries include female teachers and educators

### **How does this practice engage girls/young women in ICT learning and careers?**

FemSTEAM Mysteries engages girls by combining female role models, digital game-based learning and mystery storytelling. The practice uses escape-room style narratives and digital games to make ICT and STEAM learning playful and memorable. Female STEAM role models are embedded in the learning content so that girls encounter women scientists and ICT professionals through stories and games. This directly challenges stereotypes about who belongs in technology. The project uses gender equality framing rather than deficit framing, presenting STEAM as accessible and rewarding for girls and boys while still making women visible.

### **How do girls/women learn about this opportunity?**

Girls encounter the opportunity mainly through school-based implementation, teachers trained through FemSTEAM seminars, European University Cyprus dissemination channels and Erasmus+ project communication through conferences, publications and project events.

### **Learning formats supporting participation**

The learning takes place in mixed-gender classrooms but is designed to support equality and inclusion. Game-based and inquiry-driven activities promote agency, curiosity and collaborative problem-solving. Girls participate on equal footing with boys, while gender bias is addressed through role model visibility and learning design.

### **Instruction, mentoring, partnerships**

Teachers act as facilitators after receiving professional development through the Erasmus+ project. Partnerships between schools, university researchers and higher education institutions support quality and sustainability. The practice avoids gender bias by normalising women in STEAM narratives rather than treating them as exceptions.

### **Confidence and self-efficacy development**

Confidence is built through successful problem-solving within games. Narrative-driven tasks allow students to experience achievement in a lower-pressure format, while seeing women succeed in STEAM roles strengthens self-identification. The mystery format reduces fear of failure because learning is framed as exploration.

### **Networks and social motivation**

Participation connects schools and teachers to a European Erasmus+ initiative. Recognition such as the European Innovative Teaching Award 2023 increases legitimacy and visibility. Teachers become part of a STEAM education network that can extend impact beyond one classroom.

### **Learning materials and tasks**

Learning resources include digital games, role model stories, mystery narratives and teacher training materials. Tasks are challenge-based, interdisciplinary and contextual, requiring logical thinking, digital skills, collaboration and creativity. Problems are meaningful rather than abstract because they are embedded in stories.

### **ICT career support elements**

Career elements focus on positive career perception. Girls are exposed to female ICT and STEAM role models and learn that careers in these areas can be diverse, creative and socially relevant. The practice is age-appropriate and provides early awareness rather than job placement.

### **ICT entrepreneurship elements**

Entrepreneurship is not explicit, although creativity, innovation and problem-solving are strongly promoted through game design and narrative challenges.

### **Other**

Evidence includes the European Innovative Teaching Award 2023, academic publications, teacher feedback from professional development seminars and classroom observations of engagement. School teachers implement the activities as paid professionals, while university researchers contribute through coordination, research and training. Resources include Erasmus+ funding, digital games, teacher seminars and research capacity. Support mechanisms include free access and integration into regular lessons. Policies required include gender equality in education, openness to innovative digital pedagogies and support for Erasmus+ cooperation.

Key mechanism: role models combined with game-based and narrative learning

## **GIRLS2CYBER: Empowering Girls aged 12-15 to Lead the Future of Cybersecurity**

Country: Cyprus

Level of education: Secondary education / hobby informal education through an Erasmus+ project led by a higher education institution

Age group of girls/women: Girls aged 12-15

### **How does this practice engage girls/young women in ICT learning and careers?**

GIRLS2CYBER engages girls at a critical age when interest in ICT can decline. It introduces cybersecurity as a meaningful, socially relevant and future-oriented ICT field. The programme uses empowering language such as cyber heroines to reframe cybersecurity as inclusive, exciting and impactful. It explicitly challenges the stereotype of cybersecurity as a male field. An AI-powered educational platform and fifteen interactive modules are designed to make cybersecurity fun and accessible, while mentoring from female role models helps participants imagine their own futures in the sector. The training programme is tested through a summer school delivered face-to-face in Cyprus and Greece and online at EU level, with more than 200 girls expected to participate.

### **How do girls/women learn about this opportunity?**

Girls can discover the initiative through European University Cyprus and Erasmus+ communication channels, school networks, teacher dissemination, online announcements, outreach campaigns, parents and educators seeking digital-skills opportunities.

### **Learning formats supporting participation**

The programme is girls-only and therefore creates a safe and supportive environment for cybersecurity learning. Activities are hands-on, interactive and experiential. They promote agency, collaboration and leadership while reducing fear of failure and comparison with boys.

### **Instruction, mentoring, partnerships**

Activities are facilitated by experts and educators connected to European University Cyprus and the wider Erasmus+ partnership. Facilitation explicitly avoids gender bias and challenges social stereotypes. The European project framework adds legitimacy and visibility, while girls receive encouragement rather than evaluation-focused instruction.

### **Confidence and self-efficacy development**

Confidence is built through successful completion of practical cybersecurity tasks and through an empowering identity narrative. Girls experience cybersecurity as something they can understand, control and shape, which strengthens self-efficacy.

### **Networks and social motivation**

Participation connects girls to a European Erasmus+ project community and to peers with similar interests. The visibility of the project helps participants feel part of a wider ICT movement, not an isolated local activity.

### **Learning materials and tasks**

Learning resources include cybersecurity activities, interactive modules, digital platform content and scenario-based tasks. Problems are connected to real digital-world challenges and require logical thinking, creativity and teamwork.

### **ICT career support elements**

The career element is early exposure to cybersecurity as a real ICT pathway. The programme frames cybersecurity careers as meaningful, impactful and future-oriented. Since participants are young, the focus is awareness-building rather than placement.

### **ICT entrepreneurship elements**

Entrepreneurship is not explicit, but the programme promotes innovation, creativity and initiative-taking through active cybersecurity problem-solving.

### **Other**

Effectiveness is monitored through participation and engagement levels, feedback from girls, teachers and facilitators, observations of confidence and skill development and Erasmus+ reporting mechanisms. Educators and project experts affiliated with European University Cyprus participate through paid project roles. Assets include Erasmus+ funding, digital learning materials, skilled facilitators and coordination capacity. Support mechanisms include free participation, local or school-based delivery, online participation and the girls-only format. Policies required include gender equality in education, openness to innovative ICT and cybersecurity learning and alignment with European digital education and inclusion strategies.

Key mechanism: empowering cybersecurity identity and interactive learning

## **FA-ST: Fast prototyping and entrepreneurial skills to promote female-founded start-ups in STEM**

Country: Cyprus

Level of education: Hobby / non-formal education closely linked to higher education

Age group of girls/women: Girls and young women aged 18-30

### **How does this practice engage girls/young women in ICT learning and careers?**

FA-ST engages young women by positioning ICT and STEM as tools for entrepreneurship, leadership and social mobility. The programme is particularly designed to reach women facing socio-economic barriers, including women with migrant backgrounds, limited family support or early school leaving. It

identifies engaging ways to present STEM to women, prepares and tests a non-formal learning programme to support skills development and start-up creation, and develops a platform for displaying talents and business ideas. Fast prototyping is used as an accessible entry point because it allows participants to transform ideas into tangible technology-based solutions.

#### **How do girls/women learn about this opportunity?**

Participants can discover FA-ST through European University Cyprus and Erasmus+ communication channels, community organisations supporting women and migrants, entrepreneurship and employment-related outreach and word-of-mouth among women seeking empowerment opportunities.

#### **Learning formats supporting participation**

Learning is women-focused, hands-on, collaborative and project-based. It emphasises agency, teamwork, leadership and decision-making. The non-formal format allows flexibility and adaptation to participants' diverse backgrounds, making the programme relevant to women who may not fit traditional higher education routes.

#### **Instruction, mentoring, partnerships**

Facilitation is delivered by experts in ICT, entrepreneurship and gender equality. Mentoring supports personal development and confidence building. Partnerships provide real-world relevance and validation, while gender bias and social barriers are acknowledged rather than ignored.

#### **Confidence and self-efficacy development**

Confidence is built through rapid prototyping, which creates quick success experiences. Entrepreneurial skill-building strengthens self-belief and independence. Leadership-oriented activities reinforce participants' identities as creators, innovators and decision-makers rather than passive learners.

#### **Networks and social motivation**

Participants become part of a European Erasmus+ entrepreneurship network. Peer interaction creates a community of aspiring women innovators, while networking opportunities support motivation and belonging.

#### **Learning materials and tasks**

Tasks are challenge-based, solution-oriented and linked to social and economic needs. Learning is interdisciplinary, combining ICT, business, design and innovation. The emphasis is on practical skill mastery and real-world applicability.

#### **ICT career support elements**

FA-ST supports career opportunities by introducing ICT-enabled entrepreneurship as a pathway. Skills developed in the programme can support employability, freelancing and start-up creation. ICT is framed as a means of economic independence.

#### **ICT entrepreneurship elements**

Entrepreneurship is central. The practice includes fast prototyping, entrepreneurial skills training, product development, idea validation, leadership and innovation mindset.

#### **Other**

Effectiveness is monitored through participation and retention rates, participant feedback, assessment of skills development and confidence growth and Erasmus+ reporting mechanisms. Trainers, mentors and facilitators affiliated with European University Cyprus and project partners teach and mentor in paid project roles. Assets include Erasmus+ funding, prototyping tools, digital resources, skilled facilitators and coordination capacity. Support mechanisms include free participation, flexible learning formats and inclusive outreach. Required policies include gender equality in STEM and entrepreneurship, adult and non-formal learning support and institutional commitment to inclusion and innovation.

Key mechanism: fast prototyping and entrepreneurship as empowerment

### **BridgeSTEAM - Free, girls-only intensive ICT/STEAM programme**

Country: Cyprus

Level of education: Secondary education / hobby non-formal education delivered as an outreach programme linked to STEAM education

Age group of girls/women: Girls aged 14-16

**How does this practice engage girls/young women in ICT learning and careers?**

BridgeSTEAM engages girls by offering a free, girls-only, hands-on and impact-oriented introduction to ICT and STEAM. It explicitly counters stereotypes and builds early confidence in digital skills. Participants learn HTML and CSS, robotics, AI and website creation, even when they have no previous experience. The programme connects ICT skills to Sustainable Development Goals and real-world impact, making digital learning meaningful rather than abstract. Gender equality workshops are integrated so that stereotypes around ICT and STEAM are directly addressed. Female role models are included in each cohort, offering mentoring and examples of real STEAM pathways.

**How do girls/women learn about this opportunity?**

Girls typically discover BridgeSTEAM through school communication channels, the Digital Skills and Jobs Platform, social media, programme marketing, teachers, parents, word-of-mouth and local outreach in Nicosia, Larnaca and Limassol.

**Learning formats supporting participation**

The girls-only format promotes inclusion and confidence. The intensive two-day format keeps motivation high while remaining accessible. Project-based learning encourages agency and creativity, and collaborative activities foster teamwork and leadership.

**Instruction, mentoring, partnerships**

Workshops are facilitated by trained educators and ICT professionals. Female role models mentor participants and answer questions. Gender bias is explicitly discussed and challenged, while partnerships with STEAM professionals reinforce relevance.

**Confidence and self-efficacy development**

Confidence is built through completing a functional website and other ICT tasks. These visible outputs create mastery experiences. Positive feedback, peer support and exposure to relatable role models strengthen self-belief and ICT identity.

**Networks and social motivation**

Girls become part of a local STEAM girls' community. Interaction with role models expands professional aspirations, and repeated cohorts across cities create visibility and continuity.

**Learning materials and tasks**

Tasks are practical, creative and age-appropriate. They combine coding, SDGs, design, robotics and AI. Learning emphasises doing, testing and improving, with clear links between skills and real-life applications.

**ICT career support elements**

Career elements include counselling, study orientation, exposure to diverse ICT and STEAM pathways and positive framing of ICT as impactful and socially relevant.

**ICT entrepreneurship elements**

Formal entrepreneurship modules are not included, but building digital products and solving real-world problems supports entrepreneurial mindset, creativity and initiative.

**Other**

Evidence includes high participation and demand across cities, observable increases in confidence and engagement, feedback from participants and facilitators and successful completion of ICT projects. Educators and ICT professionals deliver workshops, while female role models often contribute as voluntary mentors. Required resources include facilitators, mentors, equipment, software, venues and outreach. Support mechanisms include free participation, multiple locations, short duration and the girls-only setting. Policies required include gender equality in education, support for non-formal STEAM learning and alignment with digital skills and inclusion strategies.

Key mechanism: girls-only safe space and visible digital product creation

**New Teachers' Network - Girls in STEAM Academy**

Country: Cyprus

Level of education: Primary and secondary education supported through teacher professional development and non-formal education

Age group of girls/women: Indirect beneficiaries are girls of primary and secondary school age; direct participants are teachers of all educational levels

### **How does this practice engage girls/young women in ICT learning and careers?**

This practice engages girls indirectly by transforming the school environment in which their perceptions of ICT and STEAM are formed. By empowering teachers to challenge stereotypes and actively promote STEAM to girls, the initiative influences motivation, confidence and long-term aspirations. Teachers are trained to recognise and counter gender bias in everyday classroom practices. They learn to proactively encourage girls' participation in ICT-related activities and embed gender equality into STEAM teaching. Teacher expectations are treated as important because they shape girls' self-perception and willingness to participate.

### **How do girls/women learn about this opportunity?**

Girls encounter the impact through teachers who are members of the Educators' Network, school-based activities hosted by Girls in STEAM Academy, classroom practices shaped by gender-aware pedagogy and STEAM-related events or activities. Teachers discover the network through Girls in STEAM Academy communications, professional networks, school leadership and outreach.

### **Learning formats supporting participation**

The practice is not a single course for girls but a professional development and network model. Teachers participate voluntarily, access resources and implement changes in their own classrooms. This supports inclusion across mixed-gender school settings because the teacher becomes a facilitator of gender-aware participation.

### **Instruction, mentoring, partnerships**

Girls in STEAM Academy staff and trainers provide training, resources and coordination. Teachers then become change agents within schools. The model supports teachers in avoiding gender bias, encouraging girls and hosting Academy initiatives.

### **Confidence and self-efficacy development**

Girls' confidence is built when teachers actively invite them into STEAM activities, give encouragement, challenge stereotypes and normalise girls' success in technology-related tasks. The mechanism is cumulative because repeated teacher support can change classroom culture over time.

### **Networks and social motivation**

The Educators' Network creates a professional community among teachers committed to inclusive STEAM. Through this network, schools can host activities, share resources and extend opportunities to girls who may otherwise have limited access.

### **Learning materials and tasks**

Resources include training materials, educational resources, communication infrastructure and school-based implementation tools. Tasks depend on teachers' classroom contexts but are oriented toward inclusive STEAM practice and encouragement of girls.

### **ICT career support elements**

Teachers introduce girls to ICT and STEAM study and career pathways and begin positive career framing early. Girls gain awareness of ICT as achievable and valuable.

### **ICT entrepreneurship elements**

No explicit entrepreneurship activities are included, but the approach encourages initiative, creativity and problem-solving, which are foundations of entrepreneurial thinking.

### **Other**

Evidence includes growth and engagement of the Educators' Network, teacher participation in activities, hosting of Academy initiatives, qualitative feedback from teachers and increased visibility of girls in STEAM school activities. Teachers are paid professionals implementing changes in classrooms, while Girls in STEAM Academy staff and trainers provide resources. Participation in the network is voluntary. Required assets include training materials, coordination infrastructure, educator time and school support.

External support mechanisms include free participation, flexible involvement and school-based delivery. Policies required include gender equality in education, professional development frameworks and school leadership support for inclusive STEAM practices.

Key mechanism: teacher professional development as a multiplier for classroom inclusion

### **ETOIMES programme - Mentoring and Professional Development for Young Women in STEAM**

Country: Cyprus

Level of education: Higher education / non-formal professional development education

Age group of girls/women: Young women in STEAM, approximately 20-30 years old, including final-year students, recent graduates and early-career professionals

#### **How does this practice engage girls/young women in ICT learning and careers?**

ETOIMES supports young women who are already on a STEAM or ICT pathway by strengthening their confidence, employability, leadership skills and professional identity. It focuses on the transition from education to the labour market, a stage where women may face workplace bias, uncertainty, limited networks or lack of confidence. The programme combines professional skills with gender equality awareness, addressing both employability needs and gender-related workplace challenges. Mentoring by experienced women in STEAM provides role models and personalised guidance over time. Community-building among peers reduces isolation and creates a supportive network of women with similar ambitions.

#### **How do girls/women learn about this opportunity?**

Participants can discover ETOIMES through Girls in STEAM Academy communication channels, social media and online campaigns, university networks, career services and word-of-mouth among STEAM graduates and students.

#### **Learning formats supporting participation**

The programme is women-only and creates a safe and empowering environment. Learning is interactive, practical and reflective. Workshops promote agency, leadership and self-advocacy, while peer exchange encourages collaboration rather than competition. The combination of in-person and online workshops, including evening scheduling, supports accessibility.

#### **Instruction, mentoring, partnerships**

Workshops are facilitated by professionals and trainers with expertise in employability and STEAM careers. Mentors provide one-to-one guidance over six months. Partnerships, including PwC Cyprus, link the programme to real workplace contexts. Gender bias and workplace challenges are addressed explicitly and constructively.

#### **Confidence and self-efficacy development**

Confidence is built through skills-based workshops on CVs, interviews and communication, through mentoring that supports resilience and through positive reinforcement that helps participants recognise their strengths and potential. The six-month mentoring phase creates sustained confidence-building rather than a short one-off intervention.

#### **Networks and social motivation**

Participants join a community of women in STEAM. Mentoring relationships extend professional networks, and networking opportunities reduce isolation and increase motivation. The peer community is central because it helps young women feel that they are progressing alongside others.

#### **Learning materials and tasks**

Tasks are practical, career-related and immediately applicable. Workshops focus on real challenges women face entering the labour market. Learning is interdisciplinary because it combines technical backgrounds with soft skills, workplace communication and self-advocacy.

#### **ICT career support elements**

Career elements include guidance and job-search strategies, interview preparation, workplace communication skills, exposure to STEAM work environments through partners and positive framing of ICT careers as attainable and rewarding.

**ICT entrepreneurship elements**

There are no explicit start-up modules, but the programme promotes initiative, leadership and growth mindset, which support entrepreneurial thinking.

**Other**

Evidence includes completion of workshops and mentoring cycles, participant feedback, self-reported confidence growth, engagement and retention throughout the six-month mentoring phase and certificates of attendance. Professional trainers and facilitators work in paid roles, while mentors with STEAM experience may participate voluntarily or through outreach. Girls in STEAM Academy coordinates the programme. Assets include trained facilitators, mentors, physical and online spaces, coordination capacity, partner support and free participation. Policies required include gender equality in employment, recognition of non-formal learning and mentoring and employer engagement in diversity and inclusion.

Key mechanism: mentoring and employability support for transition into STEAM careers

## Annex 4. Practices in Estonia

The interviews in Estonia were done with different stakeholders (N=48). Most of the interviews were individual interviews around cases but some were focus group interviews around the practice.

The 23 cases practices were identified. 13 cases were selected as best practices. The data were transcribed and reorganized using the interview protocol. The selection of best practices was made based on the learning level and type (formal-informal), considering that practices would reveal different approaches to engage girls and women to ICT. Below the Tables 1-6, each practice is described in details.

### SCHOOLS IN ESTONIA

Across the reviewed dataset, a total of 8 school-related practice cases were identified within the folder. From these, 4 cases were selected for deeper analysis, based on their explicit relevance to gender-inclusive ICT learning and diversity of approach (curricular, extracurricular, and competition-based).

The selected cases include:

- Real School Informatics and Olympiads
- Robotics integration at Gustav Adolf Grammar School
- AI and programming electives in general education
- Cybersecurity competition pathway (CyberNut, CyberPin, CyberPuur)

Table 1: ICT education provision for girls at schools (Estonia)

| Case Name                               | Level  | Description                                                               | Gender-Inclusive ICT Support Characteristics                 | Example Practices                                                                                                                                                                                 |
|-----------------------------------------|--------|---------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Whole-Class Informatics Participation   | School | Informatics taught inclusively with all students involved in competitions | Removes self-selection bias; normalizes girls' participation | <ul style="list-style-type: none"> <li>• <b>Real School Informatics and Olympiads</b></li> <li>• Class-wide participation model</li> <li>• Olympiad preparation embedded in curriculum</li> </ul> |
| Curriculum-Integrated Robotics Learning | School | Robotics and programming embedded into regular school curriculum          | Early exposure; hands-on learning reduces stereotypes        | <ul style="list-style-type: none"> <li>• <b>Gustav Adolf Grammar School robotics practices</b></li> <li>• LEGO robotics in physics</li> <li>• Experiment-based ICT learning</li> </ul>            |
| Open Elective ICT & AI Courses          | School | Schools offer optional AI/programming courses accessible to all students  | Low barrier entry; interest-driven participation             | <ul style="list-style-type: none"> <li>• <b>General education AI courses</b></li> <li>• Programming electives</li> <li>• Interdisciplinary student research projects</li> </ul>                   |
| Progressive Cybersecurity Competitions  | School | Structured national competitions with increasing difficulty levels        | Builds confidence gradually; early engagement of girls       | <ul style="list-style-type: none"> <li>• <b>CyberNut</b> (beginner level)</li> <li>• <b>CyberPin</b> (intermediate)</li> <li>• <b>CyberPuur</b> (advanced competition)</li> </ul>                 |

## Recurring Small-Level Practices in Schools in Estonia

Analysis shows that gender inclusion at the school level is not driven by single interventions, but by repeating micro-level practices embedded in teaching and participation structures. These practices appear across multiple cases and form the core of inclusive implementation.

*Table 2: Recurrent Micro-Practices Supporting Gender Inclusion at Schools in Estonia*

| Micro-Practice                     | Description                                                                    | Found In Cases                              |
|------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------|
| Whole-class participation          | ICT activities integrated so all students participate, avoiding self-selection | Real School, AI electives                   |
| Low-threshold entry tasks          | Beginner-friendly tasks that reduce fear of failure                            | CyberNut, AI courses                        |
| Hands-on, practical learning       | Learning through building, experimenting, and applying                         | Robotics, AI courses                        |
| Progressive skill pathways         | Structured levels from beginner to advanced                                    | CyberNut → CyberPuur                        |
| Mixed-gender collaboration         | Group work ensuring balanced participation                                     | Robotics, university-linked school projects |
| Early exposure to ICT              | Introducing ICT concepts at younger ages                                       | Robotics, competitions                      |
| Teacher encouragement and guidance | Active role of teachers in motivating participation                            | Real School, robotics                       |
| Linking ICT to real-world context  | Showing relevance beyond abstract coding                                       | AI projects, robotics applications          |

## Key Analytical Insight

A central finding is that gender inclusion emerges through accumulation of small, repeated practices rather than single targeted interventions. The most effective school-level approaches:

- Normalize participation (everyone is included)
- Reduce psychological barriers early (low-threshold entry)
- Emphasize doing over abstract performance (hands-on learning)
- Provide structured progression (clear pathways forward)

These micro-practices collectively reshape how ICT is experienced, making it more accessible, less intimidating, and more socially inclusive, particularly for girls.

## HOBBY / NON-FORMAL EDUCATION IN ESTONIA

Within the dataset, 6 practice cases related to hobby and non-formal ICT education were identified. From these, 4 cases were selected for deeper analysis, based on their relevance to gender inclusion and diversity of approach (e.g., girls-only initiatives, open clubs, competition pathways, and outreach activities).

The selected cases (see table 3) include:

- Unicorn Squad (girls-only STEM programme)
- Coding and robotics hobby clubs
- Cybersecurity hobby pathways linked to competitions
- NGO and community-led STEM outreach initiatives

*Table 3: Recurrent Micro-Practices Supporting Gender Inclusion at non-formal education (Estonia)*

| Case Name                       | Level | Description                                         | Gender-Inclusive ICT Support Characteristics               | Example Practices                                                                              |
|---------------------------------|-------|-----------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| Girls-Only STEM Learning Spaces | Hobby | Non-formal programs designed specifically for girls | Safe environment; builds confidence and identity in ICT    | • <b>Unicorn Squad programme</b> • Girls-only tech workshops • Female mentor-led activities    |
| Open Coding & Robotics Clubs    | Hobby | Extracurricular clubs open to all students          | Peer learning; flexible participation; inclusive if guided | • School-based robotics clubs • Coding hobby groups • Informal maker activities                |
| Cybersecurity Hobby Pathways    | Hobby | Informal pathways linked to national competitions   | Interest-based progression; identity building              | • Practice platforms for <b>CyberNut/CyberPin</b> • Cyber clubs • Independent competition prep |
| NGO & Community STEM Outreach   | Hobby | Programs targeting underrepresented groups in ICT   | Active inclusion strategies; outreach to girls             | • <b>Non-formal ICT/STEM outreach initiatives</b> • Mentoring programs • Community workshops   |

## Recurring Small-Level Practices in Hobby / Informal Education in Estonia

The analysis shows that gender inclusion in non-formal settings relies heavily on participation design and social environment, rather than formal curriculum structures. Across cases, a set of repeating micro-level practices can be identified.

*Table 4: Recurrent Micro-Practices Supporting Gender Inclusion (Estonia)*

| Micro-Practice                              | Description                                                   | Found In Cases                      |
|---------------------------------------------|---------------------------------------------------------------|-------------------------------------|
| Girls-only learning spaces                  | Dedicated groups for girls to reduce pressure and stereotypes | Unicorn Squad, NGO initiatives      |
| Voluntary and interest-driven participation | Learners choose activities based on curiosity and motivation  | Hobby clubs, cybersecurity pathways |
| Hands-on, project-based activities          | Learning by doing in informal and creative settings           | Unicorn Squad, robotics clubs       |

| Micro-Practice                             | Description                                            | Found In Cases                 |
|--------------------------------------------|--------------------------------------------------------|--------------------------------|
| Peer support and community building        | Strong group identity and collaborative learning       | Clubs, Unicorn Squad           |
| Role model visibility                      | Exposure to female mentors or instructors              | Unicorn Squad, NGO programmes  |
| Flexible progression pathways              | No rigid structure; learners advance at their own pace | Cyber pathways, clubs          |
| Informal mentoring and guidance            | Support from instructors or more experienced peers     | Clubs, outreach initiatives    |
| Outreach targeting underrepresented groups | Active recruitment and inclusion of girls              | NGO initiatives, Unicorn Squad |

## Key Analytical Insight

In contrast to school settings, where inclusion is often structurally enforced, hobby and informal education rely on creating supportive environments that sustain engagement. The most characteristic features are:

- Psychological safety (especially through girls-only or supportive group settings)
- Autonomy and motivation (participation is voluntary and interest-driven)
- Identity formation (participants begin to see themselves as “belonging” in ICT)

These practices are particularly important during adolescence, where gender gaps tend to widen. Informal learning environments therefore act as a critical bridge between initial exposure (school) and long-term engagement (education and careers).

## HIGHER EDUCATION, ADULT EDUCATION IN ESTONIA

Within the dataset, 9 practice cases related to higher, vocational, and adult ICT education were identified. From these, 5 cases were selected for deeper analysis, based on their relevance to gender inclusion and diversity of institutional approaches (university programmes, interdisciplinary studies, vocational training, and adult reskilling pathways).

The selected cases include:

- Tallinn University Informatics Bachelor’s Programme
- Cybersecurity and database course practices
- HCI / Interaction Design Master’s programmes
- Digital Humanities minor
- Vocational and adult ICT retraining programmes

*Table 5: ICT education provision for women at vocational, higher and adult education (Estonia)*

| Case Name                                     | Level             | Description                                                    | Gender-Inclusive ICT Support Characteristics                | Example Practices                                                                                                                                                                                  |
|-----------------------------------------------|-------------------|----------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interdisciplinary ICT “Life Projects”         | Higher Ed         | Courses combining ICT with real-world and creative domains     | Reframes ICT as meaningful; attracts diverse students       | <ul style="list-style-type: none"> <li>• Life projects courses</li> <li>• ICT + design collaborations</li> <li>• Museum/creative industry projects</li> </ul>                                      |
| Human-Centered ICT (HCI / Interaction Design) | Higher Ed         | Programs combining ICT with design and user experience         | High female participation; human-centered framing           | <ul style="list-style-type: none"> <li>• HCI Master’s programme</li> <li>• Interaction Design curriculum</li> <li>• UX/UI project-based learning</li> </ul>                                        |
| Vocational & Adult ICT Retraining             | Higher Ed / Adult | Flexible ICT education pathways for adults and career changers | Supports women re-entering workforce; practical orientation | <ul style="list-style-type: none"> <li>• Vocational education programs (multiple institutions)</li> <li>• Adult retraining courses</li> <li>• Applied ICT training</li> </ul>                      |
| Formal ICT Degree Programmes                  | Higher Ed         | Traditional ICT programmes with inclusive teaching approaches  | Focus on skills; collaborative learning; flexible pathways  | <ul style="list-style-type: none"> <li>• Tallinn University Informatics Bachelor’s Programme</li> <li>• Cybersecurity courses</li> <li>• Database course practices (Moodle, group work)</li> </ul> |
| Interdisciplinary Digital Fields              | Higher Ed         | ICT combined with humanities and social sciences               | Lowers entry barrier; attracts non-traditional ICT learners | <ul style="list-style-type: none"> <li>• Digital Humanities minor</li> <li>• ICT + humanities integration</li> <li>• Creative digital projects</li> </ul>                                          |

## Recurring Small-Level Practices in Higher, Vocational, and Adult Education in Estonia

At this level, gender inclusion is less about initial access and more about **retention, reframing ICT, and enabling diverse pathways**. Across cases, several **repeating micro-level practices** support inclusive participation.

Table 6: Recurrent Micro-Practices Supporting Gender Inclusion (Estonia)

| Micro-Practice                         | Description                                                     | Found In Cases                                    |
|----------------------------------------|-----------------------------------------------------------------|---------------------------------------------------|
| Interdisciplinary framing of ICT       | Combining ICT with design, humanities, or societal applications | HCI programmes, Digital Humanities, life projects |
| Real-world and meaningful project work | Linking ICT to societal or user-centered problems               | Life projects, HCI, cybersecurity courses         |

| Micro-Practice                                          | Description                                               | Found In Cases                              |
|---------------------------------------------------------|-----------------------------------------------------------|---------------------------------------------|
| Flexible learning formats                               | Online, modular, or blended learning options              | HCI Master's, adult retraining programs     |
| Collaborative and group-based learning                  | Emphasis on teamwork over individual competition          | Database course, university programs        |
| Multiple entry pathways                                 | Opportunities for non-traditional or late entry into ICT  | Vocational education, adult retraining      |
| Skills-focused rather than stereotype-driven evaluation | Emphasis on competence and motivation over prior identity | Cybersecurity courses, informatics programs |
| Applied and practice-oriented teaching                  | Hands-on tasks aligned with real ICT work contexts        | Vocational training, database course        |
| Career relevance and transition support                 | Clear links between studies and employment opportunities  | Vocational programs, informatics degree     |

## Key Analytical Insight

A central finding is that gender inclusion at higher, vocational, and adult levels depends on broadening what counts as ICT and who can participate. The most effective approaches:

- Reframe ICT as interdisciplinary and socially meaningful
- Provide flexible and alternative entry routes
- Support diverse learner profiles, including career changers

Unlike earlier levels, where the focus is on access and engagement, this stage emphasizes retention, progression, and transformation of participation patterns. These practices help ensure that women not only enter ICT pathways but also persist and succeed within them.

## Real School Informatics and Olympiads

**Country:** Estonia

Level of education: General education (upper secondary)

Age group of girls/women: ~15–19

This practice normalizes girls' participation in ICT by embedding informatics learning and competitions within mainstream school education. Rather than relying on self-selection, all students encounter computational thinking and programming, reducing gendered participation gaps. The gradual progression from classroom learning to Olympiad participation helps girls build confidence through mastery experiences and public recognition.

### How does this practice engage girls/young women in ICT learning and careers?

Engagement is achieved through **mandatory whole-class participation**, ensuring that girls are included from the outset rather than self-selecting out. Motivation is supported by progression to high-level competitions and recognition of achievement.

**How do girls/women learn about this opportunity?**

Through school curriculum and teachers; participation is embedded in regular lessons, not externally marketed.

**Learning formats supporting participation**

- Whole-class learning (not selective)
- Individual + collaborative problem solving
- Mixed-gender environment

**Instruction, mentoring, partnerships**

- Strong teacher guidance and coaching
- Individual encouragement for competition participation
- Preparation for national/international olympiads

**Confidence and self-efficacy development**

- Gradual increase in task complexity
- Success in competitions builds competence-based confidence
- Equal participation normalizes girls' success

**Networks and social motivation**

- Participation in olympiads and competitions
- Exposure to national/international peer networks

**Learning materials and tasks**

- Algorithmic and logic-based tasks
- Increasing difficulty levels
- Focus on deep problem-solving skills

**ICT career support elements**

- Clear pathway from school → competitions → ICT studies
- Visibility of high achievement in ICT

**ICT entrepreneurship elements**

- Not explicitly present

**Other**

- Key mechanism: removal of self-selection bias

**Robotics Integration at Gustav Adolf Grammar School**

**Programme/practice name:** Robotics integration at Gustav Adolf Grammar School

**Country:** Estonia

**Level of education:** General education (lower & upper secondary)

**Age group of girls/women:** ~12–18

Robotics is integrated into regular learning activities, allowing students to experiment with technology through hands-on projects. The tangible nature of robotics helps reduce stereotypes that ICT is abstract or inaccessible, while collaborative problem-solving strengthens confidence and engagement among girls.

**How does this practice engage girls/young women in ICT learning and careers?**

Engagement is based on hands-on robotics integrated into curriculum, making ICT tangible and accessible.

**How do girls/women learn about this opportunity?**

Through regular school lessons (physics/technology), not external promotion.

**Learning formats supporting participation**

- Hands-on experimentation
- Mixed-gender teamwork
- Project-based learning

**Instruction, mentoring, partnerships**

- Teacher-led facilitation

- Collaborative group work
- Informal peer support

**Confidence and self-efficacy development**

- Learning-by-doing reduces fear of failure
- Visible results (working robots) reinforce competence
- Equal participation in structured classroom setting

**Networks and social motivation**

- Possible participation in **robotics events or competitions**
- Classroom-based peer interaction

**Learning materials and tasks**

- LEGO robotics kits
- Experiment-based tasks
- Problem-solving through design and testing

**ICT career support elements**

- Early exposure to engineering and ICT fields
- Awareness of technical pathways

**ICT entrepreneurship elements**

- Limited; focus is on technical skill development

**Other**

- Key mechanism: **early exposure + practical learning**

**AI and programming electives in general education**

Country: Estonia

Level of education: General education (secondary)

Age group of girls/women: ~15–19

These elective courses provide accessible entry points into emerging digital technologies. By allowing students to explore AI and programming based on interest rather than prior expertise, the practice supports curiosity, autonomy, and early identification with digital careers.

**How does this practice engage girls/young women in ICT learning and careers?**

Engagement is based on voluntary participation with low entry barriers, allowing girls to enter ICT based on interest rather than prior identity.

**How do girls/women learn about this opportunity?**

- Through school course selection systems
- Teacher recommendations
- Peer influence

**Learning formats supporting participation**

- Elective courses (voluntary)
- Project-based and interdisciplinary learning
- Mixed-gender groups

**Instruction, mentoring, partnerships**

- Teacher guidance
- Sometimes links to university-level expectations or projects
- Supportive classroom environment

**Confidence and self-efficacy development**

- Students choose topics of interest
- Success in self-directed projects
- Reduced pressure compared to compulsory subjects

**Networks and social motivation**

- Presentation of projects

- Possible participation in school or external events

**Learning materials and tasks**

- AI and programming tasks
- Interdisciplinary projects
- Real-world problem contexts

**ICT career support elements**

- Preparation for ICT-related university studies
- Exposure to emerging fields (AI)

**ICT entrepreneurship elements**

- Limited but possible through project-based work

**Other**

- Key mechanism: interest-driven entry + interdisciplinarity

## CyberNut, CyberPin, CyberPuur

**Country:** Estonia

**Level of education:** General education (with links to hobby level)

**Age group of girls/women:** ~10–18 (extending beyond school age)

This structured cybersecurity pathway introduces students to increasingly advanced challenges through age-appropriate competitions. The progression model helps girls experience repeated success, strengthening self-efficacy and creating a clear pathway from beginner participation to advanced cybersecurity engagement.

**How does this practice engage girls/young women in ICT learning and careers?**

Engagement is achieved through a progressive competition pathway, starting with very accessible tasks and leading to advanced cybersecurity challenges.

**How do girls/women learn about this opportunity?**

- Through **schools and teachers**
- National promotion of competitions
- Peer networks

**Learning formats supporting participation**

- Individual participation in competitions
- Optional preparation in groups/clubs
- Mixed-gender participation

**Instruction, mentoring, partnerships**

- Teacher or coach support
- Informal mentoring through preparation activities
- National-level organization

**Confidence and self-efficacy development**

- Step-by-step progression (easy → complex)
- Early success builds confidence
- Recognition through competition results

**Networks and social motivation**

- Participation in **national competitions**
- Interaction with broader cybersecurity community

**Learning materials and tasks**

- Realistic cybersecurity challenges
- Problem-solving tasks with increasing complexity
- Practical, scenario-based exercises

**ICT career support elements**

- Clear pathway into cybersecurity field

- Identification of talent for further development

**ICT entrepreneurship elements**

- Not explicitly present

**Other**

- Key mechanism: progressive pathway + low entry threshold

**Unicorn Squad**

**Country:** Estonia

**Level of education:** Hobby / non-formal education

**Age group of girls/women:** ~8–14

Unicorn Squad is a girls-focused technology programme that combines practical STEM activities, role models, and community support. By providing a psychologically safe environment where girls can experiment, make mistakes, and succeed together, the programme strengthens confidence, belonging, and ICT identity.

**How does this practice engage girls/young women in ICT learning and careers?**

Engagement is based on girls-only participation, creating a safe and supportive environment where girls can explore ICT without gender stereotypes or comparison pressure. Motivation is increased through hands-on STEM activities and relatable role models.

**How do girls/women learn about this opportunity?**

- Social media and online campaigns
- School outreach and partnerships
- Word-of-mouth and peer recommendations

**Learning formats supporting participation**

- Girls-only groups
- Hands-on, activity-based learning
- Collaborative teamwork

**Instruction, mentoring, partnerships**

- Female instructors and role models
- Supportive mentoring style
- Partnerships with schools and communities

**Confidence and self-efficacy development**

- Safe environment encourages participation without fear of judgment
- Success in practical tasks builds competence
- Positive reinforcement from mentors

**Networks and social motivation**

- Community events and group activities
- Strong peer network among participants

**Learning materials and tasks**

- Practical STEM and ICT tasks (electronics, coding, experiments)
- Playful and creative problem-solving
- Real-life relevance

**ICT career support elements**

- Early exposure to ICT careers
- Visibility of women in technology

**ICT entrepreneurship elements**

- Limited, but creativity and problem-solving skills are developed

**Other**

- Key mechanism: safe space + identity building

## Coding and robotics hobby clubs

Country: Estonia

Level of education: Hobby / non-formal education

Age group of girls/women: ~10–18

These voluntary clubs offer flexible opportunities for sustained engagement with technology outside formal schooling. Peer learning, practical experimentation, and interest-driven participation allow girls to develop competence while exploring digital skills at their own pace.

### **How does this practice engage girls/young women in ICT learning and careers?**

Engagement is based on interest-driven participation and regular practice in coding and robotics, allowing girls to develop skills over time in a flexible environment.

### **How do girls/women learn about this opportunity?**

- Schools (teachers and announcements)
- Local hobby education providers
- Peer recommendations

### **Learning formats supporting participation**

- Voluntary participation
- Mixed-gender groups
- Project-based and collaborative learning

### **Instruction, mentoring, partnerships**

- Instructor-led sessions
- Peer mentoring within groups
- Sometimes links to competitions or events

### **Confidence and self-efficacy development**

- Gradual skill development
- Repeated practice and experimentation
- Peer support reduces intimidation

### **Networks and social motivation**

- Participation in club communities
- Events and competitions

### **Learning materials and tasks**

- Coding exercises and robotics builds
- Practical problem-solving tasks
- Iterative experimentation

### **ICT career support elements**

- Skill development aligned with ICT fields
- Awareness of further learning opportunities

### **ICT entrepreneurship elements**

- Occasionally project-based innovation, but not central

### **Other**

- Key mechanism: **sustained engagement through interest**

## Cybersecurity hobby pathways (linked to CyberNut, CyberPin, CyberPuur)

Country: Estonia

Level of education: Hobby / non-formal education

Age group of girls/women: ~12–20+

Building on introductory cybersecurity activities, these pathways provide continuous opportunities for learners to deepen their knowledge through clubs, competitions, and advanced challenges. The structured progression supports identity formation and long-term engagement with ICT fields.

### **How does this practice engage girls/young women in ICT learning and careers?**

Engagement is based on self-directed learning linked to competitions, allowing participants to deepen skills through practice and progression.

### **How do girls/women learn about this opportunity?**

- Through school competitions
- Online platforms and communities
- Peer networks

### **Learning formats supporting participation**

- Individual and group preparation
- Flexible, self-paced learning
- Mixed-gender participation

### **Instruction, mentoring, partnerships**

- Informal mentoring (teachers, peers, coaches)
- Community-based support
- Links to national competition structures

### **Confidence and self-efficacy development**

- Incremental success in solving challenges
- Recognition through competition performance
- Development of specialized expertise

### **Networks and social motivation**

- Participation in cybersecurity competitions
- Interaction with wider ICT community

### **Learning materials and tasks**

- Realistic cybersecurity scenarios
- Challenge-based learning
- Increasing task complexity

### **ICT career support elements**

- Clear pathway into cybersecurity careers
- Identification and development of talent

### **ICT entrepreneurship elements**

- Not explicitly present

### **Other**

- Key mechanism: flexible progression + community engagement

## **NGO and community-led STEM outreach initiatives**

**Country:** Estonia

**Level of education:** Hobby / non-formal education

**Age group of girls/women:** ~10–18 (varies)

Community organisations actively recruit and engage girls in STEM and ICT activities through workshops, outreach events, and local initiatives. These programmes broaden access to technology learning opportunities and help reach girls who may not otherwise encounter ICT-related experiences.

### **How does this practice engage girls/young women in ICT learning and careers?**

Engagement is achieved through targeted outreach to underrepresented groups, including girls, often in regions or communities with less access to ICT opportunities.

### **How do girls/women learn about this opportunity?**

- Outreach in schools and communities
- Events and workshops

- Partnerships with local organizations

**Learning formats supporting participation**

- Workshops and short programmes
- Often mixed groups, sometimes targeted at girls
- Interactive and participatory formats

**Instruction, mentoring, partnerships**

- Facilitators and mentors from NGOs
- Partnerships with schools and industry
- Role model involvement

**Confidence and self-efficacy development**

- Exposure to ICT in accessible formats
- Encouragement and support from mentors
- First positive experiences with technology

**Networks and social motivation**

- Events, fairs, and community gatherings
- Opportunities to meet peers and professionals

**Learning materials and tasks**

- Short, engaging ICT tasks
- Practical and relatable challenges
- Introductory-level activities

**ICT career support elements**

- Raising awareness of ICT careers
- Providing first contact with the field

**ICT entrepreneurship elements**

- Occasionally through workshops or innovation events

**Other**

- Key mechanism: active inclusion + outreach

**Tallinn University Informatics Bachelor's Programme**

**Country:** Estonia

**Level of education:** Higher education (Bachelor)

**Age group of girls/women:** ~19–25

**How does this practice engage girls/young women in ICT learning and careers?**

Engagement is achieved through a broad and flexible ICT curriculum, allowing students with different interests and backgrounds to enter and remain in the field. Motivation is supported by diverse subject areas and career pathways.

**How do girls/women learn about this opportunity?**

- University admission channels
- School counselling and teachers
- Online information and peer recommendations

**Learning formats supporting participation**

- Mixed-gender groups
- Lectures combined with practical assignments
- Project-based learning

**Instruction, mentoring, partnerships**

- Academic supervision and guidance
- Collaboration with industry (in some courses)
- Supportive learning environment

**Confidence and self-efficacy development**

- Gradual skill development across courses

- Opportunities to succeed in different ICT domains
- Feedback through assignments and projects

**Networks and social motivation**

- University peer networks
- Participation in academic and ICT-related events

**Learning materials and tasks**

- Diverse ICT topics (programming, systems, etc.)
- Practical assignments and projects
- Increasing complexity over time

**ICT career support elements**

- Preparation for ICT professions
- Exposure to different ICT career paths

**ICT entrepreneurship elements**

- Limited, depending on elective courses

**Other**

- Key mechanism: **broad access + flexible pathways**

**Cybersecurity and database course practices**

**Country:** Estonia

**Level of education:** Higher education (Bachelor level courses)

These university-level courses emphasize applied learning through authentic technical tasks and real-world problem solving. Practical projects help students build professional competence while demonstrating the relevance of ICT skills in contemporary digital environments.

**Age group of girls/women:** ~19–25

**How does this practice engage girls/young women in ICT learning and careers?**

Engagement is supported through practical, applied courses that connect ICT skills to real-world contexts, increasing relevance and motivation.

**How do girls/women learn about this opportunity?**

- As part of university curriculum
- Course selection within study programmes

**Learning formats supporting participation**

- Blended learning (e.g., Moodle, video lectures)
- Group work and pair programming
- Mixed-gender participation

**Instruction, mentoring, partnerships**

- Structured course guidance
- Automated feedback tools
- Instructor support

**Confidence and self-efficacy development**

- Continuous assessment and feedback
- Opportunities to practice and improve
- Emphasis on skill acquisition

**Networks and social motivation**

- Collaboration with peers
- Participation in course-based communities

**Learning materials and tasks**

- Real-world cybersecurity scenarios
- Database problem-solving tasks
- Applied and practice-oriented exercises

**ICT career support elements**

- Direct relevance to ICT job roles
- Development of in-demand technical skills

**ICT entrepreneurship elements**

- Not central

**Other**

- Key mechanism: **applied, practice-oriented learning**

**HCI / Interaction Design Master's programmes**

**Country:** Estonia

**Level of education:** Higher education (Master's)

**Age group of girls/women:** ~22–30+

By connecting technology with human needs, design, and user experience, these programmes broaden the image of ICT beyond traditional technical stereotypes. The human-centered framing attracts diverse learners and demonstrates how computing can address societal challenges.

**How does this practice engage girls/young women in ICT learning and careers?**

Engagement is based on human-centered and design-oriented framing of ICT, which attracts a more diverse student population, including many women.

**How do girls/women learn about this opportunity?**

- University marketing and websites
- International promotion
- Peer and academic recommendations

**Learning formats supporting participation**

- Project-based learning
- Interdisciplinary teamwork
- Often flexible/online learning options

**Instruction, mentoring, partnerships**

- Close supervision and mentoring
- Collaboration with industry or external partners
- Supportive and inclusive teaching approaches

**Confidence and self-efficacy development**

- Emphasis on creativity and user-centered solutions
- Opportunities to apply diverse skills
- Positive feedback on project outcomes

**Networks and social motivation**

- Participation in design and ICT communities
- Conferences, workshops, and collaborative projects

**Learning materials and tasks**

- UX/UI design projects
- Real-world user problems
- Interdisciplinary assignments

**ICT career support elements**

- Clear pathways into UX, design, and ICT roles
- Portfolio development

**ICT entrepreneurship elements**

- Possible through design and product development projects

**Other**

- Key mechanism: **reframing ICT as human-centered**

### Digital Humanities minor

**Country:** Estonia

**Level of education:** Higher education (minor programme)

**Age group of girls/women:** ~19–25

This interdisciplinary programme combines digital technologies with humanities disciplines, providing a low-threshold entry route for students who may not identify with traditional computing fields. It illustrates how ICT can support creativity, culture, communication, and research.

#### **How does this practice engage girls/young women in ICT learning and careers?**

Engagement is achieved through integration of ICT with humanities, attracting students who might not otherwise choose ICT.

#### **How do girls/women learn about this opportunity?**

- University curriculum options
- Academic advising
- Peer recommendations

#### **Learning formats supporting participation**

- Interdisciplinary courses
- Mixed-gender groups
- Project-based learning

#### **Instruction, mentoring, partnerships**

- Academic support from multiple disciplines
- Collaborative teaching

#### **Confidence and self-efficacy development**

- Lower entry barrier for non-technical students
- Gradual introduction to ICT tools
- Success in combining existing strengths with ICT

#### **Networks and social motivation**

- Interdisciplinary student communities
- Academic collaboration

#### **Learning materials and tasks**

- Digital tools applied to humanities problems
- Creative and analytical tasks
- Interdisciplinary projects

#### **ICT career support elements**

- Alternative pathways into ICT-related roles
- Broadening of career possibilities

#### **ICT entrepreneurship elements**

- Limited

#### **Other**

- Key mechanism: lowering barriers through interdisciplinarity

### Vocational and adult ICT retraining programmes

**Country:** Estonia

**Level of education:** Vocational / adult education

**Age group of girls/women:** ~20–50+

These programmes provide flexible opportunities for women and other non-traditional learners to enter or re-enter the digital workforce. Through practical learning, career-focused training, and accessible progression routes, they support career transitions and lifelong participation in ICT.

#### **How does this practice engage girls/young women in ICT learning and careers?**

Engagement is based on providing alternative entry routes into ICT, especially for women changing careers or re-entering the workforce.

**How do girls/women learn about this opportunity?**

- Public training programmes
- Employment services
- Online platforms and advertisements

**Learning formats supporting participation**

- Flexible schedules (part-time, modular)
- Practice-oriented training
- Mixed-gender groups (often with high female participation)

**Instruction, mentoring, partnerships**

- Instructor-led training
- Links to industry and employment services
- Practical guidance

**Confidence and self-efficacy development**

- Focus on practical skills
- Step-by-step learning
- Supportive environment for beginners

**Networks and social motivation**

- Peer groups of adult learners
- Links to professional networks

**Learning materials and tasks**

- Job-relevant ICT tasks
- Applied exercises
- Real-world scenarios

**ICT career support elements**

- Strong focus on employment outcomes
- Career transition support

**ICT entrepreneurship elements**

- Occasionally included (depending on programme)

**Other**

- Key mechanism: flexible access + career transition pathways

## Annex 5 Practices in Italy

Across the Italian cases, gender-inclusive ICT learning is supported through a broad ecosystem of practices that span early school exposure, non-formal empowerment spaces, higher education pathways, and professional networks. Rather than relying on one single intervention, the Italian model combines proximity-based outreach, stereotype disruption, mentoring, immersive orientation, interdisciplinary degree pathways, scholarships, and industry partnerships.

At the school level, the strongest approaches bring ICT and STEM directly into girls' immediate educational and community environments. Practices such as mobile laboratories, school-embedded workshops, AI-assisted study support, robotics activities, and immersive professional orientation reduce access barriers and challenge the idea that technical fields are distant, abstract, or male-coded. These initiatives are particularly important in fragile educational contexts, where girls may have fewer opportunities to encounter ICT through formal curriculum alone.

In hobby and non-formal education, the focus shifts toward identity-building, safe experimentation, peer collaboration, and role-model visibility. Intensive camps, mobile STEM labs, and VR-based career orientation provide girls with practical experiences and opportunities to imagine themselves as future ICT learners or professionals. In higher education and professional networks, the Italian cases emphasize retention, diversification, and career transition through interdisciplinary programmes, engineering degrees, data science pathways, international networks, scholarships, mentoring, and industry recognition.

Taken together, the Italian cases reveal a progressive model of gender inclusion in ICT:

- Access and exposure → bringing ICT opportunities directly to girls through schools, communities, and outreach
- Engagement and confidence → building self-efficacy through hands-on, collaborative, and non-competitive learning
- Retention and professional identity → supporting women through degrees, mentoring, networks, scholarships, and industry pathways

### SCHOOLS IN ITALY

Across the reviewed Italian dataset, seven school-related practice cases were identified. These cases were selected because they explicitly address gender inclusion in ICT and STEAM learning through different mechanisms: proximity-based outreach, stereotype disruption, intensive camps, immersive career orientation, robotics, AI-supported learning, and university-led orientation.

The selected cases include:

- Il Cielo Itinerante
- SEMU A Scuola
- PINKAMP — Le Ragazze Contano!
- W.O.W. Women Orientation Workshops
- Robotica Project
- StudIAmo Insieme
- OUI — Ovunque da Qui

*Table 1: ICT Education Provision for Girls at Schools (Italy)*

| Case Name                          | Level                              | Description                                                                                 | Gender-Inclusive ICT Support Characteristics                                                           | Example Practices                                                        |
|------------------------------------|------------------------------------|---------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Hands-on Scientific Dissemination  | School / Community                 | Scientific labs and / interactive workshops delivered in fragile educational contexts       | Relatable young female STEM role models help girls build early confidence and interest                 | Il Cielo Itinerante; experiential laboratories; near-peer role modelling |
| Hands-on Robotics Normalization    | School                             | Laboratory-based robotics workshops focused on building and programming                     | Normalizes girls' presence in technical fields through tangible success and iterative problem-solving  | Robotica Project; robotics labs; programming and troubleshooting         |
| School-Embedded Technical Outreach | School                             | Free technical and scientific courses delivered directly within school laboratories         | Dismantles the myth of ICT as a male domain through direct experience and female teacher collaboration | SEMU A Scuola; lab-based learning; female teacher-mentor synergy         |
| Intensive STEM Empowerment Camps   | School / University Outreach       | Two-week intensive programme combining online lectures and in-person collaborative projects | Small, non-competitive group work supported by university tutors builds autonomy and confidence        | PINKAMP; project-based learning; leadership and soft skills development  |
| VR-Driven Career Orientation       | School / Career Orientation        | Immersive VR and workshops showcasing the daily work of female ICT professionals            | Normalizes women in technical roles through virtual exposure to professional environments              | W.O.W.; immersive storytelling; professional networking sessions         |
| AI-Assisted Personal Empowerment   | School                             | AI-based digital tools supporting independent study and personalized learning               | Reduces judgement anxiety through private tutoring and mastery experiences                             | StudIAmo Insieme; AI study support; personalized learning tools          |
| Inclusive University Orientation   | School / Higher Education Outreach | Large-scale orientation programme led by universities for high school students              | Supports informed choice and reduces gender-related bias by showing the social impact of ICT careers   | OUI — Ovunque da Qui; university orientation; career pathway awareness   |

## Recurring Small-Level Practices in Schools in Italy

Analysis of the Italian school-level cases shows that inclusion is fostered through repeated micro-practices that address social, psychological, and logistical barriers. These practices prioritize direct contact with role models, proximity-based delivery, hands-on activities, and safe spaces for experimentation.

*Table 2: Recurrent Micro-Practices Supporting Gender Inclusion at Schools in Italy*

| Micro-Practice                  | Description                                                                                                                    | Found In Cases                                                |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| Relatable role modelling        | Young female trainers, university students, researchers, teachers, and ICT professionals act as visible and reachable examples | Il Cielo Itinerante, PINKAMP, SEMU A Scuola, W.O.W., OUI      |
| Proximity-based delivery        | ICT and STEM activities are brought directly into schools, neighbourhoods, and fragile educational contexts                    | Il Cielo Itinerante, SEMU A Scuola, OUI                       |
| Collaborative project work      | Girls work in teams on creative or real-world technical challenges, reducing isolation and competition pressure                | PINKAMP, SEMU A Scuola, Il Cielo Itinerante, Robotica Project |
| Explicit bias dismantling       | Activities directly challenge myths that ICT, robotics, or engineering are male domains                                        | SEMU A Scuola, PINKAMP, OUI                                   |
| Non-competitive learning spaces | Exploration, experimentation, and learning-by-doing are prioritized over narrow performance comparison                         | PINKAMP, Il Cielo Itinerante, StudIAmo Insieme                |
| Early normalization of ICT      | Complex fields such as AI and robotics are introduced early, before stereotypes fully solidify                                 | Il Cielo Itinerante, Robotica Project, StudIAmo Insieme       |
| Judgement-free digital tools    | AI or virtual tools allow girls to practise privately and fail safely without social judgement                                 | StudIAmo Insieme                                              |
| Immersive career storytelling   | Professional lives of women in ICT are made visible through VR or direct testimony                                             | W.O.W., OUI                                                   |

## Key Analytical Insight

A central finding at the school level in Italy is that gender inclusion is most effective when early exposure is combined with high-proximity delivery and technology-mediated safe spaces.

The most effective school-level approaches:

- Bring ICT learning directly to girls' schools and communities
- Use relatable female role models and near-peer mentors
- Emphasize hands-on, collaborative, and creative learning

These micro-practices collectively create an “ecology of support” that addresses both technical learning and psychological barriers. ICT becomes less abstract and intimidating, and more visible as a creative, social, and achievable field for girls.

## HOBBY / NON-FORMAL EDUCATION IN ITALY

Within the Italian dataset, non-formal education practices are closely connected to outreach, intensive immersion, community-based STEM learning, and career imagination. These initiatives often bridge school and extra-school environments by giving girls access to practical learning experiences outside ordinary curriculum structures.

The selected cases include:

- Il Cielo Itinerante
- PINKAMP — Le Ragazze Contano!
- W.O.W. Women Orientation Workshops

*Table 3: ICT Education Provision in Hobby / Non-Formal Education (Italy)*

| Case Name                           | Level                       | Description                                                                                                         | Gender-Inclusive ICT Support Characteristics                                                    | Example Practices                                         |
|-------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Proximity-Based Scientific Outreach | Hobby / Community           | Hands-on workshops and mobile laboratories brought directly to community centres and areas of educational fragility | Near-peer female STEM trainers and learning-by-doing build early confidence and belonging       | Il Cielo Itinerante; mobile labs; female STEM tutors      |
| Intensive STEM Empowerment Camps    | Hobby / University Outreach | Two-week intensive programme combining online university lectures with in-person collaborative project work         | Small-group collaboration and university tutoring foster autonomy, peer support, and confidence | PINKAMP; project-based learning; university-led mentoring |
| VR-Driven Career Orientation        | Hobby / Career Orientation  | Immersive workshops using VR to showcase the daily professional lives of female ICT professionals                   | Virtual exposure normalizes women’s presence in technical and male-coded roles                  | W.O.W.; immersive storytelling; professional networking   |

## Recurring Small-Level Practices in Hobby / Informal Education in Italy

The Italian non-formal cases show that inclusion relies heavily on access, social motivation, practical success, and identity-building. The initiatives create emotionally safe learning conditions where girls can test technical interests without fear of failure.

*Table 4: Recurrent Micro-Practices Supporting Gender Inclusion (Italy)*

| Micro-Practice | Description | Found In Cases |
|----------------|-------------|----------------|
|----------------|-------------|----------------|

|                                    |                                                                                                     |                                      |
|------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------|
| Proximity-based delivery           | High-quality STEM/ICT activities are brought directly into local territories and fragile contexts   | Il Cielo Itinerante                  |
| Near-peer role modelling           | Young women university students, researchers, or trainers make ICT pathways feel reachable          | Il Cielo Itinerante, PINKAMP, W.O.W. |
| Hands-on experiential learning     | Girls build, experiment, prototype, and solve problems through practice                             | PINKAMP, Il Cielo Itinerante         |
| Intensive immersion                | Concentrated formats create sustained engagement and deeper technical confidence                    | PINKAMP                              |
| Immersive professional orientation | VR and storytelling allow girls to “step into” women’s technical careers                            | W.O.W.                               |
| Safe and inclusive spaces          | Non-competitive environments support questioning, experimentation, and leadership                   | PINKAMP, Il Cielo Itinerante         |
| Peer leadership                    | Older girls or young women act as tutors or peer educators, strengthening confidence and leadership | Il Cielo Itinerante, PINKAMP         |
| Community-based access             | Activities are connected to local associations, schools, libraries, and families                    | Il Cielo Itinerante                  |

## Key Analytical Insight

In the Italian non-formal cases, gender inclusion is built through proximity, immersion, and identity formation.

The most effective approaches:

- Remove logistical and socio-economic barriers by bringing opportunities closer to girls
- Use young female mentors as credible and relatable models
- Create non-competitive spaces where experimentation is valued
- Connect technical learning with community, creativity, and social relevance

These practices are especially important for girls who may not otherwise access ICT enrichment opportunities. Non-formal learning therefore functions as a bridge between initial exposure and sustained interest in ICT pathways.

## HIGHER EDUCATION, ADULT EDUCATION, AND PROFESSIONAL NETWORKS IN ITALY

At higher education and professional levels, the Italian cases emphasize retention, diversification, recognition, and transition into ICT careers. Practices include interdisciplinary programmes, engineering degrees, data science pathways, international networks, scholarships, industry mentoring, and professional events.

The selected cases include:

- LM-43 Digital Humanities Master’s
- EUGAIN

- L-8 Bachelor's Degree in Computer Engineering
- LM-32 Master's Degree in Computer Engineering
- LM-Data Master's Degree in Data Science
- Amazon Women in Innovation
- ACM WomENCourage
- Women in STEM – Confindustria

Table 5: ICT Education Provision for Women at Higher Education and Professional Levels (Italy)

| Case Name                                        | Level                           | Description                                                                                             | Gender-Inclusive ICT Support Characteristics                                                         | Example Practices                                                                                |
|--------------------------------------------------|---------------------------------|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Interdisciplinary Digital Pathways               | Higher Education                | Programmes integrating humanities, data and science, applied ICT                                        | Low-threshold entry for women from non-technical backgrounds; strong interdisciplinary peer cohesion | LM-43 Digital Humanities; LM-Data; internships; project-based learning                           |
| Transnational Professional Networks              | Higher Education / Research     | European network supporting gender balance across academic and career stages                            | Reduces professional isolation through mentoring, mobility, and international collaboration          | EUGAIN; thematic workshops; mobility-based training visits                                       |
| Structured Engineering Programmes                | Higher Education                | Bachelor's and Master's programmes in Computer Engineering with gender-inclusion and retention measures | Addresses the leaky pipeline through mentoring, visibility, and structural support                   | L-8 Computer Engineering; LM-32 Computer Engineering; peer tutoring; role-model seminars         |
| Prestige-Based Mentoring and Industry Programmes | Higher Education / Professional | Scholarships, mentoring schemes, and industry-led initiatives for women in STEM and ICT                 | Signals that female excellence in ICT is valued and connects students to professional networks       | Amazon Women in Innovation; Women in STEM – Confindustria; industry mentoring; networking events |
| International Empowerment Events                 | Higher Education / Professional | International conferences and events celebrating women in computing                                     | Builds professional identity through peer recognition and access to global research communities      | ACM WomENCourage; workshops; poster sessions; networking                                         |

## Recurring Small-Level Practices in Higher, Professional, and Transition Contexts in Italy

At this level, gender inclusion is less about first exposure and more about persistence, professional identity, and access to networks. The Italian cases show how formal degree programmes and professional communities can support women's retention in ICT.

*Table 6: Recurrent Micro-Practices Supporting Gender Inclusion (Italy)*

| Micro-Practice                    | Description                                                                                                  | Found In Cases                                                              |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Interdisciplinary framing of ICT  | ICT is combined with humanities, data science, economics, or applied domains to lower entry barriers         | LM-43 Digital Humanities, LM-Data, EUGAIN                                   |
| Mobility-driven inclusion         | Mobility grants and visits support participation in international research and professional communities      | EUGAIN                                                                      |
| Network-based mentoring           | Students and early-career women gain access to senior role models, researchers, and industry professionals   | EUGAIN, LM-43, Amazon Women in Innovation, Women in STEM – Confindustria    |
| Applied professional validation   | Internships, projects, and real-world tasks provide evidence of competence and relevance                     | LM-43, L-8, LM-32, LM-Data, EUGAIN                                          |
| Self-sustaining peer communities  | Informal networks continue beyond individual events or funding cycles                                        | EUGAIN, LM-43, ACM WomENCourage                                             |
| Prestige-based incentivization    | Competitive scholarships and public recognition signal that women's ICT excellence is institutionally valued | Amazon Women in Innovation, Women in STEM – Confindustria                   |
| Degree-level structural inclusion | Inclusion measures are embedded into formal engineering and data science programmes                          | L-8, LM-32, LM-Data, LM-43                                                  |
| Career transition support         | Programmes help women connect academic learning with future ICT roles                                        | Amazon Women in Innovation, Women in STEM – Confindustria, ACM WomENCourage |

## Key Analytical Insight

A central finding is that Italian higher education and professional-level initiatives support inclusion by broadening what counts as ICT and by strengthening women's professional identity.

The most effective approaches:

- Reframe ICT through interdisciplinary and socially meaningful pathways
- Provide formal and informal mentoring networks

- Offer scholarships and public recognition at critical transition points
- Connect women to industry, research, and international communities
- Support persistence in engineering and data-intensive programmes

Unlike school-level practices, where the focus is on access and confidence, this stage emphasizes retention, recognition, and professional belonging. These initiatives help ensure that women not only enter ICT pathways but are supported to remain, progress, and become visible within them.

## Il Cielo Itinerante

**Country:** Italy

**Level of education:** Primary and lower secondary education; non-formal education

**Age group of girls/women:** 6–13 years (primary target); 20–28 years (trainers/mentors)

This outreach initiative brings STEM and digital learning opportunities directly to children living in underserved and geographically isolated communities. Through hands-on workshops and interactive science activities, the programme reduces access barriers while helping girls experience technology as approachable, enjoyable, and relevant.

**How does this practice engage girls/young women in ICT learning and careers?** Engagement is achieved by bringing high-quality STEM and digital laboratories directly into contexts of educational fragility to challenge gender stereotypes. It utilizes young female trainers with STEM backgrounds who act as relatable role models, presenting technology as a creative and socially relevant field.

**How do girls/women learn about this opportunity?** Through local non-profit organizations, after-school centers, oratories, and community summer camps. The proximity-based model brings labs directly into the educational settings already attended by families.

### Learning formats supporting participation

- Experiential and collaborative workshops
- Mixed-group learning with guaranteed equal visibility and leadership for girls
- Safe and non-judgmental environment for experimentation

### Instruction, mentoring, partnerships

- Professional female STEM trainers as near-peer mentors
- Partnerships with local associations, schools, and libraries
- Community-based engagement to reach marginalized groups

### Confidence and self-efficacy development

- Built through "learning-by-doing" and hands-on success
- Immediate evidence of competence through prototype building
- Overcoming "stereotype threat" by seeing women in technical roles

### Networks and social motivation

- Peer education and collaboration between different ages
- Direct exchange with trainers and founders about their professional STEM journeys

### Learning materials and tasks

- Age-appropriate mobile laboratory equipment
- Creative challenges focused on critical thinking and problem-solving

### ICT career support elements

- Early and informal orientation to scientific and digital professions
- Normalization of women's presence in engineering and physics

### ICT entrepreneurship elements

- Foundations of design thinking through collaborative prototyping

### Other

- Key mechanism: **Proximity-based delivery** to remove logistical barriers

### What is the evidence that this practice works, how it is monitored and assessed?

Effectiveness is monitored through participant questionnaires, trainer observations, and internal analysis of attitude changes toward STEM. The project has reached thousands of participants in marginalized territories.

## SEMU A Scuola - Associazione SEMU

**Country:** Italy

**Level of education:** Secondary education

**Age group of girls/women:** 15–17 years

SEMU A Scuola introduces students to digital technologies through direct practical experiences that challenge stereotypes about ICT. By allowing girls to engage actively with technology rather than observing it passively, the programme helps dismantle perceptions of ICT as a male-dominated field.

**How does this practice engage girls/young women in ICT learning and careers?** The practice focuses on the active deconstruction of gender myths in technical fields. By providing direct experience with science and technology, the programme demonstrates that ICT disparities are the result of social bias rather than inherent ability.

**How do girls/women learn about this opportunity?** Through courses reactivated by the SEMU association directly within partner schools. Access is organic as the initiative "comes to the students" in their own school laboratories.

### **Learning formats supporting participation**

- Mixed-group courses to normalize female presence in technical settings
- Hands-on laboratory experiences designed to capture female interest
- Non-competitive, exploration-based learning

### **Instruction, mentoring, partnerships**

- Female ICT professionals available as private mentoring contacts
- Female school teachers acting as in-school role models
- Collaboration with school management for curricular integration

### **Confidence and self-efficacy development**

- Reframing the confidence gap as a societal misconception
- Providing concrete proof of technical competence through lab work

### **Networks and social motivation**

- Creation of an informal contact network with female tech professionals

### **Learning materials and tasks**

- Practical sessions focused on scientific and technical materials

### **ICT career support elements**

- Support for informed decision-making regarding university pathways
- Expanding the perceived range of technical careers available to girls

### **ICT entrepreneurship elements**

- Contact with professionals provides early awareness of tech industry logic

### **Other**

- Key mechanism: **Normalization of presence** via school-embedded labs

**What is the evidence that this practice works, how it is monitored and assessed?** Effectiveness is assessed via immediate session feedback and longitudinal tracking of participants' university career choices.

## PINKAMP — Le Ragazze Contano!

**Country:** Italy

**Level of education:** Upper secondary education; non-formal education

**Age group of girls/women:** 15–18 years

PINKAMP provides girls with project-based digital learning experiences supported by university students and educators. Small-group collaboration, mentoring, and non-competitive participation create a supportive environment that builds confidence and autonomy while strengthening girls' interest in STEM and ICT pathways.

**How does this practice engage girls/young women in ICT learning and careers?** The practice provides a 70-hour intensive immersion combining university lectures with hands-on project work in Computer Science and Engineering. It tackles stereotypes by addressing the "glass ceiling" and fostering technical and personal development.

**How do girls/women learn about this opportunity?** Primarily through word of mouth, social media, and institutional promotion via regional school offices.

### **Learning formats supporting participation**

- Collaborative small groups (5 girls per group)
- Mixed online (foundational) and in-person (laboratory) phases
- Inclusive, non-competitive learning environment

#### **Instruction, mentoring, partnerships**

- University professors and researchers as instructors
- PhD and Master's students as tutors
- Role models from the ICT industry participating in round tables

#### **Confidence and self-efficacy development**

- Building competence through solving real STEM problems
- Empowerment sessions focusing on self-confidence and leadership
- Presentation of projects to a jury providing validation of skills

#### **Networks and social motivation**

- Creation of a persistent peer community of "pinkampers"
- Direct networking with companies and professionals

#### **Learning materials and tasks**

- Applied projects in STEM domains (e.g., Computer Science, Engineering)

#### **ICT career support elements**

- Academic orientation through university exposure
- Professional orientation via contact with ICT industry experts

#### **ICT entrepreneurship elements**

- Simulation of innovation contexts through project design and presentation

#### **Other**

- Key mechanism: **High-intensity immersion** within a safe technical community

**What is the evidence that this practice works, how it is monitored and assessed?** Effectiveness is monitored through retention rates, satisfaction surveys, and the quality of projects presented to the jury.

## **W.O.W. (Women Orientation Workshops)**

**Country:** Italy

**Level of education:** Secondary and Higher Education; non-formal

**Age group of girls/women:** 16–22 years

W.O.W. uses immersive technologies such as virtual reality to expose girls and young women to the daily work of female professionals in ICT and STEM. By making career pathways visible and relatable, the programme helps participants imagine themselves in similar professional roles.

**How does this practice engage girls/young women in ICT learning and careers?** The programme uses **Virtual Reality (VR)** technology to allow participants to "step into" the professional lives of female ICT professionals. It makes technical roles relatable by showcasing daily work life and career paths through immersive storytelling.

**How do girls/women learn about this opportunity?** Through events organized at schools and universities, department websites, and career orientation fairs.

#### **Learning formats supporting participation**

- Immersive VR workshops
- Interactive group discussions
- Entrepreneurship and career orientation workshops

#### **Instruction, mentoring, partnerships**

- Virtual mentoring through immersive professional interviews
- Partnerships with technology companies and professional networks

#### **Confidence and self-efficacy development**

- Normalization of women's presence in male-coded ICT environments
- Reducing career anxiety through direct "virtual" exposure to professional settings

#### **Networks and social motivation**

- Participation in wide-scale orientation events
- Access to a network of professional success stories

#### **Learning materials and tasks**

- Immersive professional interviews and case studies
- Collaborative orientation activities

### **ICT career support elements**

- Comprehensive career guidance for STEM and ICT pathways
- Direct visibility of diverse female professional profiles

### **ICT entrepreneurship elements**

- Dedicated workshops focused on entrepreneurial skills and innovation

### **Other**

- Key mechanism: **Immersive professional normalization** via Virtual Reality

**What is the evidence that this practice works, how it is monitored and assessed?** Effectiveness is assessed through participant feedback, tracking of orientation choices, and engagement metrics from event participation.

## **LM-43 Digital Humanities — Master's Degree Programme (University of Catania)**

**Country:** Italy

**Level of education:** Higher education (Master's level)

**Age group of girls/women:** Primarily 20–30-year-old postgraduate students

This interdisciplinary master's programme combines humanities and digital technologies, offering an alternative pathway into ICT for students from non-technical backgrounds. The programme broadens participation by demonstrating how computing can support cultural, social, and creative work.

**How does this practice engage girls/young women in ICT learning and careers?** The programme provides an interdisciplinary entry point for women from non-tech backgrounds into the ICT sector. It combines technical digital skills with project management and humanities, ensuring professional transition through company internships.

**How do girls/women learn about this opportunity?** Through university course catalogues, department websites, Career Days, and peer influence among undergraduate students.

### **Learning formats supporting participation**

- Applied, project-oriented learning
- Predominantly female student body reducing "stereotype threat"
- Compulsory attendance fostering strong peer cohesion

### **Instruction, mentoring, partnerships**

- University lecturers and internal tutors
- Strong partnerships with ICT companies for curricular internships
- Involvement in empowerment programs like YES (Young Entrepreneurship Skills)

### **Confidence and self-efficacy development**

- Ongoing validation of technical individual competencies by lecturers
- Reduction of "Imposter Syndrome" through peer density
- Confidence gained from real-world applicability of digital tools

### **Networks and social motivation**

- Interaction with employers during annual Career Days
- Participation in entrepreneurship-focused student networks

### **Learning materials and tasks**

- Methodological instruction in digital tools applied to real-world projects

### **ICT career support elements**

- Direct pathways to employment via structured internships
- Alignment of training with labor market needs (100% employment rate at 3 years)

### **ICT entrepreneurship elements**

- Exposure to digital economy logic through the YES program

### **Other**

- Key mechanism: **Interdisciplinary entry route** to lower transition barriers

**What is the evidence that this practice works, how it is monitored and assessed?** Effectiveness is evidenced by the 100% employment rate tracked via AlmaLaurea (national graduate platform) at three years post-graduation.

## **EUGAIN - European Network For Gender Balance in Informatics**

**Country:** Italy (as part of a European Network)

**Level of education:** All levels, from primary school to academia and research

**Age group of girls/women:** All ages, from primary school pupils to senior researchers

EUGAIN supports women in computing through international networking, mentoring, and collaboration opportunities. By connecting female students, researchers, and professionals, the network reduces isolation and strengthens long-term participation in ICT-related academic careers.

**How does this practice engage girls/young women in ICT learning and careers?** Engagement is achieved through a pan-European network that identifies and develops good practices across all career transitions (e.g., from school to university, PhD to professorship).

**How do girls/women learn about this opportunity?** Through the project website, thematic workshops, synergy events, and the wide circulation of an open-access book.

#### **Learning formats supporting participation**

- Thematic workshops and hackathons
- Funded mobility visits for early-career researchers
- Both mixed-gender and women-only formats

#### **Instruction, mentoring, partnerships**

- Structured mentoring as a central tool (e.g., WoCa Lunch program)
- Collaboration between academic institutions, industry, and public administration

#### **Confidence and self-efficacy development**

- Confidence-building as a structural challenge through peer support
- Exposure to visible and relatable female role models

#### **Networks and social motivation**

- Creation of sustainable transnational networks and synergy events
- Multi-phase events to develop collaborative and entrepreneurial capacities

#### **Learning materials and tasks**

- Co-design of digital solutions documented in an open-access book

#### **ICT career support elements**

- Strategies for achieving equity in academic and professional careers
- Pathways between academic training and professional employment

#### **ICT entrepreneurship elements**

- Innovation-oriented hackathons and co-design of digital solutions

#### **Other**

- Key mechanism: **Mobility-driven inclusion** to reduce geographic and financial barriers

**What is the evidence that this practice works, how it is monitored and assessed?** Effectiveness is evidenced by the persistence of the network and collaborative working relationships two years after the formal conclusion of funding.

## **OUI — Ovunque da Qui (University of Catania Orientation Programme)**

**Country:** Italy

**Level of education:** Secondary education; Higher education orientation

**Age group of girls/women:** 17–19 years (high school students)

This university orientation programme supports informed educational choices by exposing students to diverse study opportunities, including digital and technological fields. Through guidance and awareness-building activities, it helps reduce gender bias in educational decision-making.

**How does this practice engage girls/young women in ICT learning and careers?** The programme engages girls through a wide-scale orientation strategy that focuses on making technical university paths visible and accessible. It actively counters the "male domain" myth by presenting ICT and engineering degrees through a balanced gender lens, ensuring that girls receive accurate information about the multi-faceted nature of digital careers.

**How do girls/women learn about this opportunity?** Through the University of Catania's official orientation portal, institutional visits to secondary schools, and dedicated orientation fairs organized at the regional level.

#### **Learning formats supporting participation**

- Informational workshops and seminars
- Direct interaction with university staff and students
- Orientation "camps" and open days

- Mixed-gender environment focused on inclusive guidance

#### **Instruction, mentoring, partnerships**

- Guidance from university orientation experts and researchers
- Partnerships with regional high schools to facilitate access
- Mentoring provided by senior university students sharing their academic journey

#### **Confidence and self-efficacy development**

- Reducing decision-making anxiety through clear career path information
- Validation of students' technical interests during orientation dialogues
- Normalizing the entry into STEM through early exposure to the university environment

#### **Networks and social motivation**

- Connection with the University of Catania's wider academic community
- Peer networking with other students facing similar educational choices

#### **Learning materials and tasks**

- Orientation guides and digital tools for self-assessment
- Case studies on successful STEM and ICT professional profiles

#### **ICT career support elements**

- Detailed mapping of ICT-related degree programmes
- Explicit focus on the employability and societal impact of digital careers

#### **ICT entrepreneurship elements**

- Introduction to innovation ecosystems within the university framework

#### **Other**

- Key mechanism: **Early structural orientation** to dismantle stereotypes before university enrollment.

**What is the evidence that this practice works, how it is monitored and assessed?** Effectiveness is monitored through tracking enrollment trends in technical departments and analyzing participant feedback on the usefulness of orientation sessions.

## **StudIAmo Insieme (AI-based Study Support)**

**Country:** Italy

**Level of education:** Upper secondary education

**Age group of girls/women:** 15–19 years

StudIAmo Insieme uses AI-supported learning tools to provide personalized academic support. By making digital technologies directly relevant to students' everyday learning needs, the programme demonstrates practical benefits of ICT while fostering digital confidence.

**How does this practice engage girls/young women in ICT learning and careers?** The project engages girls by providing a modern, technology-driven learning environment where they can master complex subjects through **Artificial Intelligence**. It positions ICT not just as a subject to study, but as a supportive tool for academic success, fostering a positive and functional relationship with digital systems.

**How do girls/women learn about this opportunity?** Through pilot programmes implemented in partner high schools and digital learning platforms promoted by the University of Catania.

#### **Learning formats supporting participation**

- Personalized virtual tutoring based on AI
- Independent, self-paced digital learning
- Hybrid support combining digital tools with human oversight

#### **Instruction, mentoring, partnerships**

- AI-driven instruction providing immediate, personalized feedback
- Scientific supervision by researchers from the Department of Engineering
- Collaboration between high school teachers and tech developers

#### **Confidence and self-efficacy development**

- Building "mastery experiences" through successful independent problem-solving
- Reducing the fear of judgment through a private, virtual tutoring interface
- Immediate validation of competence through real-time AI feedback

#### **Networks and social motivation**

- Engagement with a community of students using digital innovation to succeed
- Interaction with technical researchers who supervise the project

**Learning materials and tasks**

- AI-powered interactive study materials and exercises
- Personalized learning paths adapted to individual student needs

**ICT career support elements**

- Direct exposure to AI applications, building foundational understanding of ICT trends
- Building the technical confidence needed to pursue advanced ICT studies

**ICT entrepreneurship elements**

- Not explicitly present, though use of cutting-edge AI fosters an innovative mindset

**Other**

- Key mechanism: **Functional empowerment** through AI-assisted independent learning.

**What is the evidence that this practice works, how it is monitored and assessed?** Effectiveness is assessed through usage logs, competence development indicators, and participant feedback on learning autonomy,

## Robotica Project

**Country:** Italy

**Level of education:** Secondary education

**Age group of girls/women:** 14–18 years

The Robotica Project introduces students to robotics through hands-on design and experimentation activities. Practical success experiences help normalize girls' participation in technical fields and strengthen self-efficacy through visible achievements.

**How does this practice engage girls/young women in ICT learning and careers?** The practice engages girls through hands-on robotics laboratories that normalize the presence of women in "hard" technical fields. By focusing on the construction and programming of robots, it provides a tangible and creative entry point into engineering and computer science.

**How do girls/women learn about this opportunity?** Through curricular and extra-curricular school projects and laboratory announcements within technical and scientific high schools.

**Learning formats supporting participation**

- Hands-on laboratory workshops
- Project-based learning (building functional robots)
- Mixed-gender collaboration in a shared technical space

**Instruction, mentoring, partnerships**

- Supervision by high school STEM teachers
- Collaboration with university robotics departments for advanced guidance
- Peer support within technical project groups

**Confidence and self-efficacy development**

- Building confidence through "learning-by-doing" and visible results
- Normalizing female success in traditionally male-coded activities
- Overcoming failure through iterative robot testing and refinement

**Networks and social motivation**

- Participation in local or national robotics competitions
- Connection with other schools and students interested in technical innovation

**Learning materials and tasks**

- Robotics kits and programming interfaces
- Collaborative tasks focused on building, testing, and troubleshooting

**ICT career support elements**

- Direct exposure to engineering and programming logic
- Clarifying the links between robotics and future ICT careers

**ICT entrepreneurship elements**

- Product development logic simulated through robot design and functional completion

**Other**

- Key mechanism: **Normalization of presence** in high-tech environments through tangible success.

**What is the evidence that this practice works, how it is monitored and assessed?** Effectiveness is monitored through project completion rates and analysis of changes in students' attitudes toward engineering and ICT.

## Amazon Women in Innovation

**Country:** Italy

**Level of education:** Higher education (University)

**Age group of girls/women:** 19–23 years (undergraduate students)

This scholarship and mentoring initiative recognizes and supports talented female university students pursuing STEM and ICT-related studies. The programme combines financial support, visibility, and professional recognition to strengthen persistence and ambition in digital careers.

**How does this practice engage girls/young women in ICT learning and careers?** This practice engages women through a high-profile structural support model that combines financial scholarships with professional mentoring. It targets excellent female students in STEM fields, validating their career choice and providing them with a clear path toward industry leadership.

**How do girls/women learn about this opportunity?** Through university scholarship announcements, departmental websites, and corporate communications from Amazon.

### Learning formats supporting participation

- One-to-one mentoring sessions with industry professionals.
- In-person and virtual professional development workshops.
- Participation in a high-status professional network.

### Instruction, mentoring, partnerships

- Mentoring provided by senior female professionals from the tech industry.
- Institutional partnership between Amazon and key Italian technical universities.
- Strong focus on professional role modeling and identity building.

### Confidence and self-efficacy development

- Validation of excellence through a highly competitive selection process.
- Strengthening professional identity through direct contact with successful women in tech.
- Reduction of economic stress, allowing students to focus on technical mastery.

### Networks and social motivation

- Membership in an elite network of "Women in Innovation".
- Access to corporate events and professional networking circles.

### Learning materials and tasks

- Professional orientation and leadership development materials.
- Applied career advice tailored to the tech industry context.

### ICT career support elements

- Direct pathways to professional industry entry.
- Mentoring focused on CV building, interview preparation, and workplace navigation.

### ICT entrepreneurship elements

- Exposure to the corporate innovation logic of a global tech leader.

### Other

- Key mechanism: **Prestige-based validation and mentoring** to sustain retention and leadership.

**What is the evidence that this practice works, how it is monitored and assessed?** Effectiveness is monitored through scholarship completion rates, long-term tracking of professional placement, and mentor-mentee feedback sessions.

## ACM WomENCourage

**Country:** International (with strong Italian involvement/leadership)

**Level of education:** University and early career; non-formal education

**Age group of girls/women:** 22–30 years (Master's, PhD students, and young researchers)

WomENCourage brings together women in computing through conferences, workshops, and networking opportunities. By creating a supportive international community, the initiative strengthens professional identity, belonging, and leadership aspirations among women in ICT.

**How does this practice engage girls/young women in ICT learning and careers?** ACM WomENCourage engages young women through an annual international event focused on celebration, empowerment, and technical excellence. Participants are actively involved in poster presentations, technical workshops, and high-level

networking, which strengthen both their technical expertise and their professional confidence in a supportive international community.

**How do girls/women learn about this opportunity?** Through academic and professional mailing lists, university departments, social media channels, and the wide visibility of the ACM (Association for Computing Machinery) network.

#### **Learning formats supporting participation**

- International poster sessions for work presentation and feedback
- Interactive workshops and hackathons on innovative ICT topics
- Peer mentoring and informal reflective sessions
- Women-focused but inclusive environment

#### **Instruction, mentoring, partnerships**

- Structured mentoring ecosystem with senior professionals and academics
- Partnerships with technology companies for career networking and job interviews
- Voluntary contributions from a global network of ICT experts

#### **Confidence and self-efficacy development**

- Recognition and validation of technical competence through public work presentations
- Storytelling and sharing of career pathways to normalize success
- Building a sense of belonging to a global ICT community

#### **Networks and social motivation**

- Direct interaction with international researchers, industry leaders, and peers
- Opportunities for job interviews and direct connection with the ICT industry

#### **Learning materials and tasks**

- Innovation-oriented challenges and professional development materials

#### **ICT career support elements**

- Career exploration through workshops and seminars on emerging tech
- Access to scholarships for students with limited opportunities

#### **ICT entrepreneurship elements**

- Hackathons and project presentations that simulate innovation and entrepreneurial contexts

#### **Other**

- Key mechanism: **Transnational networking and prestige-based validation** of young researchers.

**What is the evidence that this practice works, how it is monitored and assessed?** The practice shows high effectiveness through sustained high participation (over 250 female participants per edition) and positive feedback from participants regarding career impact and professional network expansion.

## **Bachelor Degree in Computer Engineering (L-8) – University of Catania**

**Country:** Italy

**Level of education:** Higher Education – Bachelor's degree (first cycle, L-8)

**Age group of girls/women:** Approximately 18–24 years old

This programme addresses gender imbalances through supportive teaching practices, mentoring opportunities, and efforts to improve retention of women in engineering. The emphasis is not only on recruitment but also on helping women persist and succeed throughout their studies.

#### **How does this practice engage girls/young women in ICT learning and careers?**

The programme features open access regardless of secondary school background, avoiding the exclusion of girls from non-technical licei. Engagement relies on strong and immediate graduate employment rates and the Amazon Women in Innovation scholarship, which provides a dedicated annual scholarship and personalised mentorship for a newly enrolling female student. Periodic company seminars and meetings with female alumni broaden career perceptions and provide direct role models.

#### **How do girls/women learn about this opportunity?**

Through institutional orientation channels such as the Salone dell'Orientamento (OUI project), Open Days, school visits, social media, and the Salone dello Studente. Reaching families is considered particularly important, given their significant influence on girls' choice of technical degree pathways.

#### **Learning formats supporting participation**

- Project-based learning in mixed groups, supporting shared responsibility and collaborative problem-solving.
- Hands-on laboratory work, central to all engineering courses.

- Students, including women, take on peer tutoring and university governance roles.
- Role equity in all teaching activities.

#### **Instruction, mentoring, partnerships**

- Amazon Women in Innovation: dedicated scholarship and mentorship programme for female students enrolling for the first time, funded by Amazon across 7 Italian universities
- General tutoring services available to all students
- Psychological support desk (sportello di ascolto) at departmental level
- Individual lecturer support for students showing signs of difficulty
- Company seminars presenting ICT professional roles and career paths

#### **Confidence and self-efficacy development**

- Meetings with female alumni currently working in ICT provide concrete role models and real-life evidence that the career path is achievable
- Interviewees note that female students encounter the most difficulties before enrolment (self-selection barriers and preconceptions), not during the programme itself
- Amazon WII scholarship signals institutional recognition of female talent in ICT

#### **Networks and social motivation**

- Students participate in various competitions and external events to develop technical skills.<sup>1</sup>
- Amazon WII recipients gain access to Amazon's professional and industry network.<sup>1</sup>
- The creation of dedicated internal student communities for women in Computer Engineering has been identified as a relevant future development to strengthen peer belonging.

#### **Learning materials and tasks**

- Course content is applied and professionally oriented, with projects and real-world problem contexts embedded across multiple modules.<sup>1</sup>
- The future integration of examples and case studies featuring women in ICT roles is identified as a relevant enhancement.

#### **ICT career support elements**

- Company seminars presenting the diversity of ICT professional roles
- Female alumni testimonial meetings (organised in some academic years)
- Strong graduate employability immediately after the Bachelor's degree
- Internships as part of the standard degree path

#### **ICT entrepreneurship elements**

- No structured entrepreneurship elements currently documented; competitions and external events accessible to all students may provide related dimensions

#### **Other**

- Key mechanism: Open-access programme design and structured, gender-targeted support (Amazon WII)

**What is the evidence that this practice works, how it is monitored and assessed?** Gender-disaggregated enrollment statistics show a positive trend in female participation. However, gender-disaggregated analysis of academic performance, satisfaction, and dropout rates is not yet systematically implemented. The sustained association with the Amazon Women in Innovation initiative is a concrete indicator of growing gender inclusivity.

## **Master's Degree in Computer Engineering — University of Catania, DIEEI**

**Country:** Italy

**Level of education:** Higher education — Master's degree (second cycle, LM-32)

**Age group of girls/women:** Approximately 22–27 years old

The master's programme provides advanced technical specialization while supporting women through inclusive academic environments and professional development opportunities. Students strengthen their expertise while developing a stronger professional identity in computing.

**How does this practice engage girls/young women in ICT learning and careers?** The programme selects students based solely on competences, ensuring a formally equal entry environment. It covers cutting-edge fields (AI, cybersecurity, cloud computing, IoT) with excellent graduate employment rates, which are key attractors. Female students, though a minority, demonstrate strong professional motivation and assume active, equal roles in

all academic activities. Key Concern: Female participation has dropped from approximately 50% fifteen years ago to under 20% today.

**How do girls/women learn about this opportunity?** Through Open Days, orientation events, school-based visits, and social media channels. Strengthening orientation activities in the final years of upper secondary school, including engaging families, is identified as a priority.

#### **Learning formats supporting participation**

- Project-based learning and group work across multiple courses
- Hands-on laboratory activities as a core engineering learning format
- Mixed-gender working groups with equal roles and autonomous participation for all students
- Very low dropout rate at Master's level, indicating an effective and supportive learning environment

#### **Instruction, mentoring, partnerships**

- Industry partnerships for theses and internships select students exclusively on competence.<sup>2</sup>
- The presence of women in faculty leadership roles, has demonstrably positive individual effects on female students' persistence.<sup>2</sup>
- General tutoring is available to all students.

#### **Confidence and self-efficacy development**

- Confidence barriers are observed to filter women out primarily before reaching the Master's level (at Bachelor's entry), rather than during the programme itself
- Female guest speakers provide role model evidence when organised

#### **Networks and social motivation**

- Students are informed of external ICT events and competitions.
- Industry partner network through thesis and internship collaborations
- The creation of dedicated internal student communities for women in ICT is identified as a priority development to strengthen belonging.

#### **Learning materials and tasks**

- The applied, project-oriented approach covers real-world ICT problems (AI, cybersecurity, cloud, IoT).
- Incorporating success stories of women in ICT and diverse role models into course content is identified as a key enhancement.

#### **ICT career support elements**

- High and rapid graduate employability is a consistent feature.
- Career support includes industry seminars, internships, thesis projects with industry partners, and occasional female testimonials.

#### **ICT entrepreneurship elements**

- No dedicated entrepreneurship modules. External competitions with entrepreneurial dimensions are communicated to students.

#### **Other**

- Key mechanism: Competence-based equality and female faculty role modelling.
- The documented decline in female participation from ~50% to under 20% is a critical finding requiring urgent policy attention.

**What is the evidence that this practice works, how it is monitored and assessed?** The low dropout rate at Master's level is positive. However, the lack of systematic gender-disaggregated monitoring (enrolment, performance, satisfaction) means the evidence base is weak. The documented decline in female enrolment is indirect evidence of a structural problem. Implementing longitudinal gender-disaggregated monitoring is identified as an urgent priority.

## **Master Programme in Data Science (LM-Data) — University of Catania (Interdipartimentale: DIEEI, DMI, DEI)**

**Country:** Italy

**Level of education:** Higher education — Master's degree (second cycle)

**Age group of girls/women:** Young adult women, approximately 22–30 years old

This interdisciplinary programme combines computing, mathematics, and data analysis to address real-world challenges. Its broad application areas attract diverse student profiles and demonstrate the societal relevance of advanced digital skills.

**How does this practice engage girls/young women in ICT learning and careers?** Engagement is driven by its interdisciplinary structure and open access to students from diverse first-cycle degree backgrounds (economics, mathematics, engineering), which effectively lowers the entry barrier for women with non-purely technical backgrounds. First-year courses are designed to level incoming competences. The programme's multi-sector positioning frames ICT careers as relevant to various fields, including informatics, economics, engineering.

**How do girls/women learn about this opportunity?** Through orientation activities conducted by the three participating departments (DIEEI, DMI, and DEI), media channels, and information shared by lecturers. Communication is currently gender-neutral.

#### **Learning formats supporting participation**

- Levelling courses in the first year reduce skill differences and prevent students from non-ICT backgrounds from being disadvantaged.<sup>3</sup>
- Project-based methodology and applied tasks promote practical skill mastery.<sup>3</sup>
- Interdisciplinarity makes diverse academic profiles an asset.

#### **Instruction, mentoring, partnerships**

- General tutoring and student support are available.<sup>3</sup>
- The interdepartmental structure (DIEEI, DMI, DEI) creates a varied academic environment.<sup>3</sup>
- Occasional seminars with researchers and industry professionals provide professional exposure. Structured mentoring is recommended for enhancement.

#### **Confidence and self-efficacy development**

- Confidence supported indirectly through the programme's levelling structure: first-year courses equalise skill gaps and prevent students from non-ICT backgrounds from feeling disadvantaged
- No significant difficulties observed among female students, including those from non-technical backgrounds
- Interdisciplinary framing allows women from economics and social science backgrounds to find direct relevance between data science and their prior academic identity

#### **Networks and social motivation**

- The interdisciplinary nature connects students to a broad professional community spanning multiple domains.
- Structured networking events or ICT communities specifically oriented toward female students are recommended to strengthen this dimension.

#### **Learning materials and tasks**

- Content is connected to diverse fields of application (economics, engineering, medicine), supporting motivation from women with varied academic interests.
- Project work and problem-solving tasks are central to the methodology.

#### **ICT career support elements**

- The programme is framed as a direct pathway to the data analyst profession across multiple sectors.
- Occasional industry contacts through seminars provide informal career orientation.

#### **ICT entrepreneurship elements**

- No dedicated entrepreneurship modules; however, data science competences in analysis, modelling and decision-making across sectors provide a strong foundational skillset applicable to innovation-oriented and entrepreneurial ICT roles

#### **Other**

- Key mechanism: Interdisciplinary open-access design and levelling courses to broaden participation.
- The three-department collaboration (DIEEI, DMI, DEI) is a distinctive organisational feature.

**What is the evidence that this practice works, how it is monitored and assessed?** Current data does not indicate significant issues in female students' persistence or academic performance. The consistent capacity to attract students from non-ICT backgrounds is indirect evidence of its inclusive access model. A structured gender-specific monitoring framework, including satisfaction surveys and gender-disaggregated statistics, is recommended to strengthen the evidence base.

## **Women in STEM – Scholarship Programme (Fondazione Giuseppina Mai / Confindustria)**

**Country:** Italy

**Level of education:** Higher education — First year of Master's degree (second cycle) in STEM disciplines

**Age group of girls/women:** Approximately 22–26 years old

The scholarship programme provides financial support and public recognition for women pursuing STEM and ICT studies. By reducing economic barriers and signalling institutional commitment to gender equality, it encourages participation and persistence in technical education.

**How does this practice engage girls/young women in ICT learning and careers?** The programme targets women at the critical transition from Bachelor's to Master's degree, a point where many leave technical pathways. It provides economic support (€3,000 scholarship) and public recognition, connecting recipients to a consortium of major Italian industrial players (Confindustria, Fondazione Bracco, Chiesi, Enel) who actively seek gender-diverse talent. The public recognition reinforces the value of their STEM career choice.

**How do girls/women learn about this opportunity?** Through university official channels, including institutional websites and departmental communications, the Confindustria and Fondazione Mai websites, and dissemination through the Foundation of Italian Universities' national network

#### **Learning formats supporting participation**

- Financial enablement: The scholarship allows recipients to dedicate greater time and energy to their Master's studies, including ICT laboratory work and research projects.
- CV preparation and motivational letter writing support the articulation and strengthening of professional identity.
- Cohort of winners forms a national informal peer community of high-achieving women in STEM.

#### **Instruction, mentoring, partnerships**

- The multi-stakeholder partnership with major Italian employers (Confindustria, Enel, etc.) signals that industry values and seeks gender diversity in technical roles.
- The award ceremony provides informal networking opportunities with company representatives and HR professionals.
- Recommendation: Pairing each winner with a woman professional from one of the partner companies for a sustained development relationship would significantly strengthen the programme's impact on confidence and career orientation.

#### **Confidence and self-efficacy development**

- Being selected from a nationally competitive pool serves as a concrete validation of the young woman's capability in STEM.
- Public recognition at a high-profile industry event reinforces the message that the recipient's STEM choice is valued by the professional world.
- The motivational letter requirement supports self-awareness and professional identity consolidation.

#### **Networks and social motivation**

- The award ceremony at Assolombarda connects winners to a national network of companies and institutions within the Confindustria ecosystem.
- The growing cohort of past recipients across three editions creates an informal peer community of women recognised for their commitment to STEM.

#### **Learning materials and tasks**

- No structured learning resources or tasks are part of the programme design
- Selection criterion of internship experience (where available) signals that applied, real-world ICT competence is recognised and rewarded

#### **ICT career support elements**

- The consortium of supporting companies represents a gateway to ICT and STEM career opportunities for winners.
- The public celebration of female STEM excellence at a national industry event reinforces the message that STEM careers are accessible and valued for women.
- The programme explicitly positions STEM fields as strategic for Italy's development and high in demand for specialised competences.

#### **ICT entrepreneurship elements**

- No entrepreneurship-specific elements currently formalised; the involvement of Confindustria and Space Work Srl suggests potential for entrepreneurship-related networking

#### **Other**

- Key mechanism: Prestige-based financial support at the Bachelor's-to-Master's transition.
- The programme has shown institutional continuity with three consecutive editions and a growing number of scholarships (11 → 13)

**What is the evidence that this practice works, how it is monitored and assessed?**



Evidence of effectiveness is drawn from sustained institutional continuity (three editions), a growing number of scholarships, and high initial application volume (162 applicants for 10 scholarships) demonstrating national demand. Recommendation: Implementing follow-up monitoring of recipients' academic completion and career outcomes is required to strengthen the evidence base and advocate for expansion.

## Annex 6 Practices in Slovenia

Across the Slovenian cases, gender-inclusive ICT learning is supported through a combination of early exposure, interdisciplinary learning, mentoring, project-based collaboration, and strong links between education, research, and innovation ecosystems. Unlike models that rely primarily on isolated interventions, the Slovenian practices demonstrate how inclusive participation in ICT can emerge through long-term engagement structures that connect schools, universities, research institutions, NGOs, and industry actors.

At the school level, the dominant approach is normalization of participation through practical experimentation, creative problem-solving, and integration of ICT into broader STEAM learning. Rather than presenting ICT as a narrow technical field, Slovenian initiatives frequently frame technology as collaborative, socially meaningful, and connected to real-world challenges. Robotics, programming, digital creativity, and maker-oriented activities help girls experience ICT through tangible and visible outcomes.

In hobby and non-formal education, the focus shifts toward confidence-building, identity formation, and sustained engagement through communities of practice. Coding clubs, hackathons, mentoring initiatives, and outreach programmes create spaces where girls can experiment, collaborate, and gradually develop a sense of belonging in technical domains. Visibility of female mentors and researchers is particularly important in counteracting stereotypes and supporting persistence.

At higher education and professional levels, inclusion is supported through interdisciplinary programmes, applied research projects, entrepreneurial pathways, networking, and flexible entry opportunities into digital professions. Slovenian practices often emphasize innovation, sustainability, and societal impact, helping broaden the image of ICT beyond purely technical or masculine-coded identities.

Taken together, the Slovenian cases reveal a progressive model of gender inclusion in ICT:

- Access and normalization → integrating girls into creative and hands-on ICT learning environments
- Engagement and identity-building → sustaining participation through mentoring, collaboration, and project work
- Retention and diversification → supporting women's transition into higher education, innovation ecosystems, and digital careers

A key cross-cutting characteristic is that successful Slovenian approaches position ICT as collaborative, creative, and socially relevant, rather than isolated technical performance.

### SCHOOLS IN SLOVENIA

Across the reviewed Slovenian dataset, school-level cases emphasize practical experimentation, interdisciplinary learning, and inclusive participation structures. The strongest approaches reduce intimidation through project-based learning and collaborative activities.

The selected cases include:

- Robotics and Maker Education Initiatives
- Girls in STEM School Outreach Activities
- Creative Coding and Digital Media Projects
- Problem-Based STEAM Learning Programmes

*Table 1: ICT Education Provision for Girls at Schools (Slovenia)*

| Case Name                              | Level           | Description                                                                    | Gender-Inclusive ICT Support Characteristics                           | Example Practices                                                |
|----------------------------------------|-----------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------|
| Hands-on Robotics and Maker Learning   | School          | Robotics, electronics, and maker activities integrated into school learning    | Practical experimentation reduces stereotypes and increases confidence | Robotics workshops; maker labs; design-and-build activities      |
| Creative Coding and Digital Expression | School          | Programming linked with storytelling, media, and creative production           | Broadens image of ICT beyond technical stereotypes                     | Digital storytelling; creative coding; multimedia projects       |
| Problem-Based STEAM Learning           | School          | Interdisciplinary projects connecting ICT with science and societal challenges | Collaborative learning and real-world relevance support inclusion      | STEAM challenges; sustainability projects; group problem-solving |
| Girls-Focused STEM Outreach            | School Outreach | Activities specifically encouraging girls' participation in STEM and ICT       | Role-model visibility and encouragement reduce self-exclusion          | Outreach events; mentoring sessions; women-in-STEM presentations |

## Recurring Small-Level Practices in Schools in Slovenia

The Slovenian school-level cases demonstrate that gender inclusion emerges through repeated practical and collaborative learning experiences rather than through isolated interventions.

*Table 2: Recurrent Micro-Practices Supporting Gender Inclusion at Schools (Slovenia)*

| Micro-Practice                         | Description                                                          | Found In Cases                   |
|----------------------------------------|----------------------------------------------------------------------|----------------------------------|
| Hands-on experimentation               | Girls learn through building, prototyping, and testing               | Robotics and maker initiatives   |
| Creative and interdisciplinary framing | ICT linked to art, storytelling, sustainability, and societal issues | Creative coding; STEAM learning  |
| Collaborative project work             | Group tasks reduce isolation and competition pressure                | STEAM and robotics programmes    |
| Early exposure to ICT                  | Girls encounter technology before stereotypes fully solidify         | Outreach and robotics activities |
| Female mentor visibility               | Women researchers, teachers, and professionals act as role models    | STEM outreach initiatives        |

|                                     |         |                                                                         |                                            |
|-------------------------------------|---------|-------------------------------------------------------------------------|--------------------------------------------|
| Real-world orientation              | problem | ICT connected to meaningful societal or environmental challenges        | STEAM and innovation projects              |
| Low-threshold participation         |         | Beginner-friendly tasks encourage participation without prior expertise | Creative coding and outreach programmes    |
| Teacher encouragement and mediation |         | Teachers actively support girls' participation and confidence           | School outreach and project-based learning |

## Key Analytical Insight

A central finding is that Slovenian school-level initiatives support inclusion by reframing ICT as collaborative, creative, and socially meaningful.

The most effective school-level approaches:

- Reduce fear of failure through experimentation and prototyping
- Connect ICT with creativity and real-world challenges
- Use collaboration rather than competition as the dominant learning structure
- Provide girls with visible female role models in technical fields

These practices collectively help girls perceive ICT as accessible, relevant, and compatible with diverse identities and interests.

## HOBBY / NON-FORMAL EDUCATION IN SLOVENIA

Within the Slovenian dataset, non-formal education practices focus strongly on communities of practice, coding clubs, mentoring, maker culture, and innovation-oriented participation.

The selected cases include:

- Coding Clubs and Digital Creativity Communities
- Hackathons and Innovation Challenges
- Girls' Mentoring and Outreach Programmes
- Community Maker and STEM Spaces

*Table 3: ICT Education Provision in Hobby / Non-Formal Education (Slovenia)*

| Case Name                            | Level              | Description                                                            | Gender-Inclusive ICT Support Characteristics                            | Example Practices                                               |
|--------------------------------------|--------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|-----------------------------------------------------------------|
| Coding Clubs and Digital Communities | Hobby / Non-formal | Regular coding and digital creativity activities for young people      | Sustained engagement and peer support strengthen confidence             | Coding clubs; digital projects; peer learning                   |
| Innovation Challenges and Hackathons | Hobby / Non-formal | Team-based problem-solving events focused on technology and innovation | Collaborative challenge formats reduce exclusion and support leadership | Hackathons; innovation competitions; interdisciplinary teamwork |

|                                       |                   |                                                                                     |                                                                   |                                                              |
|---------------------------------------|-------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------|
| Girls' Mentoring and STEM Outreach    | Hobby / Outreach  | Programmes connecting girls with women mentors and STEM professionals               | Identity-building and role-model visibility encourage persistence | Mentoring sessions; outreach workshops; women-in-tech events |
| Community Maker and Innovation Spaces | Hobby / Community | Open spaces for experimentation with robotics, electronics, and digital fabrication | Informal participation and experimentation reduce intimidation    | Maker spaces; fabrication labs; collaborative workshops      |

## Recurring Small-Level Practices in Hobby / Informal Education in Slovenia

Across Slovenian non-formal education cases, gender inclusion depends heavily on participation culture, peer communities, and opportunities for experimentation.

*Table 4: Recurrent Micro-Practices Supporting Gender Inclusion (Slovenia)*

| Micro-Practice                         | Description                                                | Found In Cases                       |
|----------------------------------------|------------------------------------------------------------|--------------------------------------|
| Peer community-building                | Strong group identity supports sustained engagement        | Coding clubs and maker communities   |
| Mentoring and role models              | Female mentors and professionals strengthen ICT identity   | Outreach and mentoring programmes    |
| Collaborative challenge-based learning | Girls work together on meaningful technical tasks          | Hackathons and innovation events     |
| Flexible participation pathways        | Learners engage at their own pace and interest level       | Coding clubs and maker spaces        |
| Hands-on experimentation               | Informal environments encourage trying and failing safely  | Maker spaces and robotics activities |
| Creative self-expression               | Digital tools used for creative and personal projects      | Digital creativity programmes        |
| Recognition and visibility             | Public presentation of projects reinforces competence      | Hackathons and outreach events       |
| Community access and openness          | Activities accessible outside formal curriculum structures | Community STEM spaces                |

## Key Analytical Insight

The Slovenian non-formal education cases show that sustained engagement depends strongly on social belonging, experimentation, and identity-building.

The most effective approaches:

- Create communities where girls feel they belong in ICT
- Support experimentation without fear of judgement
- Combine creativity, innovation, and technical learning
- Provide visible pathways through mentoring and peer collaboration

Non-formal learning therefore acts as a bridge between first exposure and long-term persistence in ICT pathways.

## HIGHER EDUCATION, ADULT EDUCATION, AND PROFESSIONAL NETWORKS IN SLOVENIA

At higher education and professional levels, Slovenian practices emphasize interdisciplinary programmes, applied innovation, entrepreneurship, research collaboration, and women's participation in digital professions.

The selected cases include:

- Interdisciplinary Digital Innovation Programmes
- Women in Research and ICT Networks
- Applied ICT and Entrepreneurship Initiatives
- Flexible Adult Digital Skills and Retraining Pathways

*Table 5: ICT Education Provision for Women at Higher Education and Professional Levels (Slovenia)*

| Case Name                                     | Level                           | Description                                                          | Gender-Inclusive ICT Support Characteristics                     | Example Practices                                           |
|-----------------------------------------------|---------------------------------|----------------------------------------------------------------------|------------------------------------------------------------------|-------------------------------------------------------------|
| Interdisciplinary ICT and Innovation Pathways | Higher Education                | ICT programmes connected with design, sustainability, and innovation | Broadens participation and attracts diverse student profiles     | Digital innovation projects; interdisciplinary teamwork     |
| Women in Research and ICT Networks            | Higher Education / Research     | Academic and professional networks supporting women in STEM and ICT  | Mentoring and networking reduce professional isolation           | Research networks; conferences; mentoring activities        |
| Applied ICT Entrepreneurship and Innovation   | Higher Education / Professional | Innovation and entrepreneurship activities linked to ICT learning    | Encourages leadership, creativity, and real-world relevance      | Startup incubators; applied innovation projects             |
| Flexible Adult Digital Skills Pathways        | Adult Education                 | Modular and flexible digital-skills learning opportunities           | Supports career changers and women re-entering education or work | Adult retraining; blended learning; professional upskilling |

## Recurring Small-Level Practices in Higher, Vocational, and Adult Education in Slovenia

At this level, Slovenian practices support inclusion through interdisciplinarity, innovation ecosystems, and professional networking.

*Table 6: Recurrent Micro-Practices Supporting Gender Inclusion (Slovenia)*

| Micro-Practice                          | Description                                                                | Found In Cases                              |
|-----------------------------------------|----------------------------------------------------------------------------|---------------------------------------------|
| Interdisciplinary framing of ICT        | ICT connected with design, sustainability, entrepreneurship, and research  | Innovation and digital programmes           |
| Applied project work                    | Students solve real-world problems through collaborative projects          | Applied ICT and innovation initiatives      |
| Networking and mentoring                | Women gain access to professional and academic support networks            | Women in research and ICT networks          |
| Flexible learning formats               | Modular and blended learning support diverse participation                 | Adult retraining programmes                 |
| Innovation and entrepreneurship support | Women encouraged to lead and develop innovation projects                   | Startup and entrepreneurship initiatives    |
| Professional identity-building          | Women develop confidence as researchers, innovators, and ICT professionals | Research and innovation networks            |
| Career transition support               | Programmes support entry into new digital career pathways                  | Adult digital-skills initiatives            |
| Collaborative learning culture          | Team-based approaches reduce exclusion and increase participation          | Interdisciplinary higher education projects |

## Key Analytical Insight

A central finding is that Slovenian higher education and professional-level initiatives broaden participation by embedding ICT within innovation, interdisciplinarity, and societal impact.

The most effective approaches:

- Reframe ICT as creative, collaborative, and innovation-oriented
- Support women through mentoring and professional networking
- Provide flexible and alternative pathways into digital careers
- Connect ICT learning with entrepreneurship and societal challenges

Unlike school-level practices, where the focus is on exposure and confidence, this stage emphasizes retention, leadership, and professional belonging. These initiatives help ensure that women not only enter ICT pathways but continue to develop as innovators, researchers, and digital professionals.

## ONA VE (She Knows) – Association for Networking of Women Professionals and Promotion of Knowledge

**Country:** Slovenia

### Level of Education

Non-formal education, with relevance for upper primary education, secondary education, higher education, and early career transition. Ona Ve should not be described as a formal school-based programme. Its primary function is not to deliver a curriculum, but to increase the visibility and recognition of women experts in public space, media, professional events, and wider society. It contributes to girls' and young women's engagement in STEM and digital fields mainly through role-model visibility, public storytelling, media representation, networking, partnerships, and awareness-raising.

The practice is relevant to education because it can influence how girls and young women imagine their future educational and professional pathways. However, its educational role is mostly indirect and non-formal. It can support schools, universities, public campaigns, youth-oriented activities, and career-orientation initiatives by making women experts more visible and accessible.

Therefore, the most accurate classification is:

Non-formal education / awareness-raising / role-model and visibility initiative, with links to:

- upper primary education, especially through early awareness and stereotype reduction;
- secondary education, especially through career orientation and role-model exposure;
- higher education, especially through networking, confidence-building, and professional identity development;
- early career transition, especially through visibility, mentoring, public recognition, and professional networks.

### Age Group

The practice has several relevant target groups:

- upper primary school pupils, approximately 12–15 years old, mainly through early awareness, stereotype reduction, and exposure to women role models;
- secondary-school girls, approximately 15–19 years old, especially when making educational and career choices;
- higher education students, approximately 19–25 years old, particularly women considering or entering digital, technical, STEM, entrepreneurial, or public expert roles;
- early-career women and professionals, approximately 20–30+ years old, especially those developing their expert identity, visibility, confidence, and professional networks;
- women experts themselves, who are supported in becoming more publicly visible and recognised.

The strongest direct relevance for girls is from upper primary and secondary education onward, while the strongest direct relevance for women experts is at the higher education, professional, and public-expert level.

### Engagement of Girls

Ona Ve supports girls' engagement in digital and STEM fields by increasing the public visibility of women experts and by challenging the idea that technical, digital, scientific, entrepreneurial, or expert spaces are primarily male spaces. The practice is based on the assumption that girls are more likely to consider STEM-related pathways when they can see women who are already recognised as competent experts in these fields.

The focus group highlights that girls often grow up surrounded by implicit messages about which areas are “for them” and which are not. Ona Ve responds to this by creating more symbolic and practical evidence that women belong in digital, technical, STEM, business, media, and public expert spaces.

An important element is the STEMfluencerke campaign, which presents women engineers and digital professionals as role models for younger generations in formats close to girls' everyday media use, especially social media. In this way, engagement is not understood only as participation in a specific workshop or event, but as a broader process of recognition, encouragement, and public normalisation.

The interview also stresses that girls' disengagement does not necessarily result from lack of ability. It may result from not feeling included, not being addressed, not seeing enough women in visible roles, or not receiving encouragement at the right moment.

### **How Girls Learn About It**

Girls and young women learn about Ona Ve and related activities through public communication, media visibility, social media, schools, public events, partner organisations, campaigns, and existing women's networks.

Important channels include:

- media appearances of women experts;
- the Ona Ve expert database and public communication;
- Instagram and other social media formats;
- public events and discussions;
- school visits and cooperation with educational institutions;
- workshops and campaigns;
- partnerships with organisations already working with young people;
- local initiatives outside major urban centres.

The focus group emphasises that girls need to encounter women experts where they already are: in digital environments, in schools, through social media, at public events, and in their local communities. The interview adds that discoverability is shaped not only by explicit promotion, but also by the broader public environment: what girls see in media, what teachers communicate, what families expect, and which professional examples are repeatedly made visible.

### **Learning Formats**

Ona Ve does not use one fixed educational format. Instead, it operates through a combination of non-formal, public, media-based, experiential, and network-based formats.

Relevant formats include:

- public storytelling;
- media appearances;
- expert databases;
- social media campaigns;
- public talks and discussions;
- workshops;
- school visits;
- exhibitions;
- informal networking events;
- contact with women experts from practice;
- campaigns such as STEMfluencerke;
- empowerment-oriented activities that encourage women to present their achievements.

The focus group stresses the value of concrete, experiential, and life-connected formats. Girls and young women benefit from seeing real people, real career paths, and real examples of work, rather than only abstract descriptions of STEM or ICT professions.

The interview also points out that learning happens through everyday educational practice. Small pedagogical choices, examples, language, and classroom interactions can either invite girls into technical fields or gradually signal that they do not belong there.

### **Mentoring and Partnerships**

Mentoring and partnerships are important elements of Ona Ve, although mentoring is not always organised as a formal one-to-one programme. In the focus group, mentoring is described more broadly as access to role models, conversation partners, interlocutors, and women who have already walked a similar path and can help others interpret challenges.

Partnerships are central to the practice. Ona Ve works through connections with media, schools, public campaigns, local initiatives, companies, professional communities, and organisations that already reach young people. The

interview strongly emphasises the importance of supporting local organisations that already have trust, reach, thematic knowledge, and credibility, rather than imposing centralised solutions from outside.

This partnership-based model is especially important in Slovenia because opportunities are not equally visible or accessible everywhere. Decentralised cooperation can help girls and young women outside Ljubljana or other larger centres feel less excluded from digital and STEM opportunities.

### **Confidence Development**

Confidence development is one of the strongest themes across both sources. Ona Ve addresses confidence by making women's expertise visible, by encouraging women to speak about their achievements, and by showing girls that women can occupy digital, technical, entrepreneurial, and public expert spaces with authority.

The interview highlights that women are often socialised into passivity: they may wait to be recognised instead of actively naming and communicating their own achievements. Ona Ve challenges this by encouraging women to step forward, present their expertise, and become more visible.

The focus group further connects women's underrepresentation in digital and technical fields with lower confidence, self-doubt, perfectionism, and fear of making mistakes publicly. Confidence is therefore not treated as only an individual psychological trait, but as something shaped by representation, language, social expectations, peer support, and repeated experience of being taken seriously.

For girls, confidence develops when they see women who look credible, relatable, and successful in fields that may otherwise appear distant or male-dominated. It also develops when failure, experimentation, and learning are presented as normal parts of growth rather than as signs that they do not belong.

### **Networks**

Networks are one of the key support mechanisms in Ona Ve. They are important both for women experts and for girls or young women who are beginning to imagine themselves in digital and STEM fields.

For women experts, networks provide visibility, recognition, professional opportunities, and access to people who can invite them to public events, media appearances, panels, projects, or collaborations. For girls and young women, networks provide role models, reference points, encouragement, and a sense that they are not alone.

The focus group presents networking as more than professional exchange. It creates psychological safety, reduces isolation, and makes it easier to ask for help or advice. Local and micro-level networks are especially important, because access to opportunities is not evenly distributed across the country.

The interview adds that networks also connect funding, implementation, public presence, and community-building. In this sense, Ona Ve functions as part of a broader ecosystem for inclusion, rather than as a single isolated intervention.

### **ICT Career Support**

Ona Ve supports ICT and digital career development mainly through visibility, role models, exposure to practice, and public recognition of women experts. The practice helps girls and young women see what digital, technical, STEM, and ICT-related careers can look like in real life.

Career support is provided through:

- visible women experts in media and public space;
- campaigns presenting women engineers and digital professionals;
- school and public activities;
- social media storytelling;
- contact with practitioners;
- networking opportunities;
- encouragement to speak about one's achievements;
- examples of diverse professional pathways.

The focus group emphasises that many girls still make educational decisions within narrow or stereotyped frameworks. They need earlier, clearer, and more humanly accessible representations of digital and technical professions. Bringing experts from practice into educational spaces is therefore an important form of career support.

The interview also highlights a distinction between access and retention. Slovenia may have relatively good foundations in access to education, but women may disappear later from technical professions because of

workplace culture, family-career expectations, lack of recognition, or insufficient long-term support. Ona Ve addresses this by strengthening visibility, legitimacy, professional agency, and public recognition.

### ICT Entrepreneurship

Ona Ve does not focus on ICT entrepreneurship in the narrow sense of start-up incubation, business training, or venture creation. However, entrepreneurship is present in a broader sense through women's agency, initiative, self-direction, public visibility, and ability to create professional opportunities.

The focus group includes experiences of women who built their own professional paths, companies, initiatives, and networks in digital environments. It also highlights the importance of mentors, interlocutors, and communities for women on entrepreneurial journeys, especially in male-dominated sectors.

In this broader interpretation, Ona Ve supports entrepreneurial potential by helping women:

- recognise and communicate their own expertise;
- become publicly visible;
- build professional networks;
- access collaborators and mentors;
- claim space in professional environments;
- develop confidence and independence;
- create alternative pathways where institutional support is missing.

The practice therefore supports ICT entrepreneurship indirectly, through empowerment, visibility, networks, and professional self-positioning.

### Key Good Practice Elements

Ona Ve can be described as a multi-layered gender-inclusive model based on:

- increasing the visibility of women experts in public space;
- strengthening media representation of women in digital, STEM, technical, entrepreneurial, and expert roles;
- presenting relatable role models for girls and young women;
- using social media and youth-relevant communication formats;
- challenging stereotypes through language, representation, and public storytelling;
- building networks among women experts, practitioners, schools, media, and local organisations;
- supporting confidence by encouraging women to speak about their achievements;
- making digital and technical career paths more concrete and accessible;
- connecting girls with real examples from practice;
- supporting local and decentralised access to opportunities;
- addressing both educational choice and longer-term retention in technical professions;
- recognising that inclusion requires cultural change, not only formal access.

| Good practice element                  | Supporting quote                                                                                                                                                                          |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Increasing visibility of women experts | "The association was founded in September 2021 with the aim of increasing the visibility and recognition of women experts in the media, at public events, and generally in public space." |
| Need for stronger visibility in ICT    | "We saw that precisely in the ICT field there was the greatest drought in being invited to participate."                                                                                  |
| Self-minimisation as a barrier         | "We saw that especially in this STEM field, in ICT, there is a lot of diminishing of importance, diminishing of knowledge, by women themselves."                                          |

|                                                         |                                                                                                                                                                            |
|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Targeted role-model campaign for girls                  | “We somehow wanted to place women engineers from STEM fields on a pedestal, so that they would be the role models and the influencers for young girls.”                    |
| Youth-relevant communication formats                    | “We wanted to present their personal stories in a format that is close to girls, which is why we chose Instagram.”                                                         |
| Positive response from girls and professionals          | “The campaign received a very strong response, both from other women engineers and from young people.”                                                                     |
| Local partnerships                                      | “If we wanted to support the inclusion of women in STEM or digital professions, we did not do it ourselves, but supported an organisation that was already working on it.” |
| Local reach beyond capital cities                       | “We were always looking for local organisations that could reach as many people as possible, not only in the capital cities but also at the edges of countries.”           |
| Confidence-building through speaking about achievements | “You have to say yourself what you have done. Not to brag, but to inform.”                                                                                                 |
| Shift from passivity to active role                     | “That was a big mental shift — from passivity to an active role. And that was very present among women as well.”                                                           |
| Mentors and interlocutors matter                        | “What was missing most were conversation partners.”                                                                                                                        |
| Local and decentralised access                          | “Someone from Upper Kungota or Bohinj is not really helped much if the first thing is in Kranj.”                                                                           |
| Networking creates long-term value                      | “When you need something later, you know whom to call and it is not awkward.”                                                                                              |
| Language shapes inclusion                               | “If you read ‘we invite all innovators’, younger women who are not yet so empowered may not see themselves in such a camp.”                                                |
| Schools need stronger links with practice               | “I think the school system should be updated a bit and should bring in more people from practice.”                                                                         |
| Early exposure before higher education decisions        | “Through these kinds of projects we should also enter primary schools.”                                                                                                    |
| Role models support belonging                           | “One thing is that we tell them they can do anything, but another is that they actually see women around them who have careers in digital technologies and STEM.”          |
| Cultural patterns shape participation                   | “I think a lot of it is cultural.”                                                                                                                                         |

|                                               |                                                                                                                         |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Retention after education remains a challenge | “I think we are quite good in education in terms of gender representation, but then it drops later in the professions.” |
| Work and family structures affect retention   | “The problem appears later — in professions and in balancing career and family.”                                        |

## Interview Summary with Dr. Nataša Pirc Musar, President of the Republic of Slovenia

The interview with Dr. Nataša Pirc Musar, President of the Republic of Slovenia and co-founder of the association ONA VE, highlights the importance of systemic, educational, and societal support for the inclusion of girls and young women in STEM fields, with a particular emphasis on computer science and ICT. One of the central ideas of the interview is that girls and boys need role models, as these significantly influence young people’s perceptions of which professional and life paths are attainable for them. The President also understands her public role as an opportunity to show girls that even the highest public offices and demanding professional fields are open to women — conveying the message that “no mission is impossible.” She encourages girls to follow their dreams and their own inner judgement, even when it differs from the expectations of their surroundings or parents, arguing that ideally one’s profession should become something that genuinely brings joy.



The President starts from the belief that it would be unwise for any society to neglect half of its potential, represented by women. Due to the historical division of gender roles, the path towards equality is more difficult and therefore, in her view, requires targeted policies rather than merely relying on goodwill. She distinguishes between equal rights and equality through the following metaphor: equal rights mean giving everyone shoes, whereas equality means giving everyone shoes in the correct size. She refers to UN data suggesting that, at the current pace, gender equality would only be achieved in 133 years, and highlights measures aimed at accelerating this process — from European regulations requiring at least one-third representation of women on the boards of publicly listed companies (also justified by findings that gender-diverse boards are more profitable) to domestic mechanisms such as the “zipper system” on electoral candidate lists. She emphasises that the goal of feminist policies is not for men to have less, but for women to gain approximately equal opportunities.

She is particularly critical of the state of computer science education in Slovenian primary schools. She points out that, since 1 September 2025, Slovenia has been the only European Union country without computer science as a subject in primary education. As a result, early encouragement of interest in computer science, ICT, artificial intelligence, and digital professions depends largely on the enthusiasm of individual teachers and schools outside the regular curriculum. She therefore identifies the introduction of computer science as a compulsory subject from the fifth grade onwards as a key measure, with content that would gradually incorporate digital literacy, data literacy, artificial intelligence, and fundamental computing concepts up to the ninth grade. She considers the current situation — a maximum of 35 hours per year only in the seventh grade — entirely insufficient, while objections regarding the need for additional teacher training are, in her opinion, merely excuses, since teaching content and methods are continuously updated regardless. Early exposure to these fields is also important because girls are often not even given the opportunity to perceive computer science and digital technologies as possible

educational or career choices; these areas are still widely regarded as traditionally “male,” whereas female representation in sciences such as chemistry and biology is considerably higher.

The interview also emphasises the importance of upbringing free from gender stereotypes. The President stresses that self-confidence, the sense of competence, and perceptions of suitable career paths are shaped already in childhood, making it essential that boys and girls receive equal upbringing and that girls are given opportunities to explore different interests, including those traditionally perceived as “male.” When entering STEM, computer science, and ICT fields, girls often require additional confidence, as they are entering environments where women are still relatively underrepresented. She illustrates this with the observation that women typically apply for a position only when they are more than 90% confident in their competences, whereas men tend to apply already at less than 60% confidence.

In the second part of the interview, the association ONA VE is presented as an example of good practice. Dr. Pirc Musar co-founded the association together with Marta Kos, Emilija Stojmenova Duh, and Mateja Malnar Štembal. She explains that the association’s main goal was to achieve balanced (50:50) representation of women in the media and public sphere. The founders observed that men are invited as experts far more frequently — in the prime-time news programme *Odmevi*, they measured a ratio of approximately 70% men to 30% women — even in fields where highly competent female experts exist. The association therefore functions as a concrete support infrastructure by maintaining a platform that currently includes approximately 700 female experts from different fields, including STEM and ICT, ensuring that journalists, editors, and event organisers can no longer claim that female expert voices are unavailable. As a positive example of progress, she mentions defence expert Jelena Juvan, who today regularly explains military and defence topics in the media — an area previously almost exclusively reserved for male commentators. Monitoring media representation through measurements demonstrates progress, although slow, which is why the President stresses that this is “a marathon, not a sprint,” requiring continuous awareness-raising among editors, who “hold the scissors and the cloth,” and persistent efforts towards change.

The President places strong emphasis on supportive communities, networking, and mentorship. In her opinion, visible female experts and role models show girls that they do not have to “break the ground alone,” since the path becomes easier when another woman has already paved the way before them. She sees mentorship as a particularly important mechanism of empowerment because it enables girls and young women to establish direct contact with successful female professionals, reduces fear of the unknown, and strengthens the feeling that success in these fields is achievable. As a positive example, she mentions the Engineer of the Year initiative, in which the winner spends an entire year visiting schools and presenting her profession to young people; among the inspiring examples she highlights an aircraft mechanic working in a strongly male-dominated environment.

Towards the end of the interview, the President reiterates that efforts towards gender equality do not mean reducing opportunities for men, but rather creating approximately equal opportunities for girls and women. She also stresses that men must be included in discussions about equality as a broader societal objective. At the same time, she warns that this is “a marathon, not a sprint” and a never-ending process that requires constant awareness-raising and advocacy. Her personal guiding principle summarises her approach well: if one remains silent, nothing will happen; if one speaks openly about important issues, at least there is a chance that the goal may be achieved. It is precisely in this — in persistent, vocal, and systematic efforts towards equal opportunities — that she sees the path towards ensuring equal participation of girls and young women in STEM fields.

These insights directly support the objectives of the GEMS project, especially its focus on the early encouragement of girls’ interest in STEM, particularly computer science and ICT, increasing the visibility of female role models, developing mentorship programmes, recognising and overcoming stereotypes, and creating more inclusive educational environments. The interview confirms that increasing the participation of girls and young women in digital and STEM careers requires simultaneous action across multiple levels: within the education system, the media, public discourse, support communities, and equality policies.

## Inženirke in inženirji bomo! (We Will Be Engineers!) / Inženirka leta (Female Engineer of the Year)

**Country:** Slovenia

**Level of Education:** Upper primary education and secondary education.

The combined practice is most relevant for pupils and students at the point when they begin forming ideas about future educational and career pathways. The broader initiative Inženirke in inženirji bomo also emphasises the importance of reaching pupils before the transition to secondary school, while Inženirka leta is especially focused on secondary-school students, particularly in gymnasium settings.

The practice should therefore not be described as higher education or adult education. Higher education institutions and companies are involved as partners and as examples of future pathways, but the main educational target group consists of pupils and secondary-school students.

### Age Group

The main target groups are:

- upper primary school pupils, approximately 10–15 years old, especially before they make decisions about secondary education;
- secondary-school students, approximately 15–19 years old, especially students in general secondary schools who are considering future study choices;
- girls within these age groups, who are addressed particularly through the visibility of women engineers and the normalisation of engineering as a possible educational and career path.

The most appropriate indicative age range is therefore 10–19 years, with the strongest focus on secondary-school students and an important preventive role in upper primary school.

### Engagement of Girls

The practice engages girls by making women engineers visible, relatable, and publicly recognised. A central problem addressed by the initiative is that girls often do not choose engineering because they rarely see women in these roles and may therefore perceive engineering as a male, isolated, or socially distant field.

The combined model responds to this by bringing engineers and women engineers directly into schools, presenting their personal stories, and showing that engineering is creative, socially relevant, diverse, and professionally meaningful. Girls are encouraged to broaden their view of what engineering is and who can become an engineer.

The initiative does not primarily engage girls through technical instruction, but through identification, recognition, personal contact, and the removal of symbolic barriers. The visibility of diverse women engineers helps girls understand that they do not need to fit one narrow stereotype in order to belong in technical fields.

### How Girls Learn About It

Girls encounter the practice through several channels:

- school visits and organised school events;
- presentations by engineers and women engineers;
- cooperation with schools, especially gymnasiums;
- media coverage of the *Inženirka leta* event;
- public promotion of women engineers;
- social media and online communication;
- video stories and digital materials;
- wider public communication about engineering careers.

The school-based component is especially important because it brings engineering into a familiar educational environment. The public and media component extends the reach of the initiative beyond individual schools and helps influence broader social perceptions, including those of parents, teachers, families, and local communities.

Over time, the initiative has also become more recognisable among schools, with some schools actively approaching the organisers. This indicates that the practice has developed from a promotional activity into a more established outreach model.

## Learning Formats

The main learning format is experience-based outreach rather than formal classroom teaching. Students are introduced to engineering through live events, moderated conversations, personal stories, presentations, practical examples, and direct contact with professionals.

The *Inženirka leta* model includes a live school event, often lasting around two hours, which combines an introductory guidance segment with a moderated conversation featuring engineers and women engineers. The emphasis is on first-hand testimony, because real stories and concrete examples are more persuasive for young people than abstract descriptions of study programmes.

The broader initiative also supports formats such as:

- workshops;
- direct demonstrations;
- video stories from real work environments;
- workplace shadowing;
- exposure to companies;
- conversations with engineers;
- school-based career-orientation events.

Hands-on and practice-based formats are especially valuable because they allow young people to see what engineers actually do. This is important because many students make educational choices without a clear understanding of technical study or engineering work.

## Mentoring and Partnerships

The practice is not primarily organised as a formal one-to-one mentoring programme, but it creates a mentoring-rich environment. Girls meet women engineers, hear their stories, ask questions, and gain access to people who have already navigated study choices, faculty life, employment, and professional identity in engineering.

Partnerships are one of the strongest structural elements of the practice. The model connects:

- schools;
- teachers and school counsellors;
- companies;
- engineers and women engineers;
- universities and technical faculties;
- organisers of the initiative;
- media and public communication channels.

Companies support the initiative financially and provide speakers or workplace exposure. Schools provide access to students and continuity. Teachers and counsellors act as important ambassadors, particularly because they are close to students at key decision-making moments.

This partnership model helps create a bridge between school, higher education, companies, and professional engineering practice.

## Confidence Development

Confidence is developed through visibility, recognition, and direct contact with women who have succeeded in engineering. The initiative helps girls see that engineering is not “someone else’s world”, but a field in which they could also belong.

A major confidence-building mechanism is relatability. Girls meet women engineers who are presented not as distant exceptions, but as real, diverse, approachable people with different personalities, interests, and career paths. This helps challenge the stereotype that engineering is only for one specific type of person.

The *Inženirka leta* component also strengthens the confidence of participating women engineers themselves. By publicly recognising their work, the initiative gives them voice, legitimacy, and visibility. This, in turn, strengthens their role as examples for younger girls.

The practice therefore builds confidence on two levels: it encourages girls to imagine themselves in engineering, and it empowers women engineers to speak publicly about their work and achievements.

## **Networks**

Networks are central to the practice. The initiative creates and maintains connections between schools, companies, engineers, women engineers, universities, organisers, and the wider public.

For girls, networks matter because they show that engineering is not an isolated path. Seeing a community of women engineers makes technical careers feel more socially supported and less exceptional. Peer presence and role-model visibility are especially important because girls may hesitate when they feel alone in technical spaces.

For schools, networks provide access to speakers, companies, and realistic information about study and career pathways. For companies, the initiative creates a channel for long-term talent development and social responsibility. For women engineers, the network provides visibility, recognition, and opportunities to act as role models.

The practice also creates continuity when former students, alumni, or local professionals return to schools and speak to younger generations.

## **ICT Career Support**

Although the initiative is centred more broadly on engineering than only on ICT, it strongly supports ICT, STEM, and technical career orientation. It helps students understand what technical study and engineering work actually involve, what different study pathways look like, and what kinds of opportunities engineering can offer.

Career support is provided through:

- first-hand stories of engineers and women engineers;
- school-based career-orientation events;
- explanation of technical study pathways;
- presentation of real engineering work;
- workplace shadowing;
- exposure to companies;
- video stories from professional environments;
- discussion of creativity, salary, mobility, innovation, and future opportunities;
- encouragement to consider fields beyond familiar or stereotypical choices.

The initiative is especially relevant for students in general secondary schools, who may have strong academic potential but limited knowledge of engineering pathways. It encourages them to broaden their thinking and make more informed, confident choices.

For girls, this support is particularly important because it addresses both lack of information and symbolic barriers. The practice does not only say that engineering is possible; it shows what engineering looks like, who does it, and why it matters.

## **ICT Entrepreneurship**

Entrepreneurship is not the central focus of the practice. However, entrepreneurial thinking is present indirectly through the initiative's emphasis on innovation, creativity, initiative, problem-solving, applied knowledge, and the importance of engineering for economic and social development.

The practice shows girls that technical knowledge can open pathways into:

- innovation;
- leadership;
- product and service development;
- company environments;
- future-oriented work;
- problem-solving for real-world challenges;
- potentially entrepreneurial or intrapreneurial roles.

In this sense, the initiative does not provide entrepreneurship training, but it contributes to an entrepreneurial mindset by presenting engineering as a field where people create solutions, shape technologies, and contribute to society and the economy.

## Key Good Practice Elements

The combined practice can be described as a multi-layered gender-inclusive model based on:

- visible and relatable women engineers;
- direct school outreach;
- first-hand stories from engineering practice;
- public recognition of women engineers;
- media visibility and wider social influence;
- cooperation between schools, companies, universities, and professional engineers;
- early career imagination before key educational transitions;
- practical exposure to engineering work;
- workplace shadowing and company links;
- confidence-building through role models;
- challenging the idea that engineering is a male field;
- strengthening teachers and schools as ambassadors;
- influencing not only girls, but also parents, families, teachers, and the wider social environment.

| Good practice element                         | Supporting quote                                                                                                                                                                     |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Role-model visibility matters                 | “You can show others, especially girls in our case, that women engineers do exist.”                                                                                                  |
| Relatability reduces distance                 | “We are completely normal people, we do not have three arms or four legs.”                                                                                                           |
| Identification supports career choice         | “If you do not have a role model who is similar to you, it is harder to choose a path than if you have someone you can identify with.”                                               |
| Diverse role models matter                    | “The project brings together so many different characters, so many different women engineers, that everyone can somehow find themselves in it.”                                      |
| Addressing girls’ invisibility in engineering | “Why do girls not choose it? Because there are so few of them, they are not visible, and young girls feel that if they choose engineering, they are choosing a path into isolation.” |
| Making women engineers visible as inspiration | “We want to show them that women engineers in Slovenia exist, that they are exceptional, that they do very good things, and that there are remarkable opportunities there.”          |
| Using first-hand stories in schools           | “In person, first-hand, we bring engineers and women engineers into schools, because through their stories they present and inspire young people.”                                   |
| Primary-school outreach is important          | “My path was already strongly set when I enrolled in secondary school, and that is why work with primary-school pupils seems very important to me.”                                  |
| Early intervention is needed                  | “These things have to start already in primary school.”                                                                                                                              |

|                                               |         |                                                                                                                                                                                                             |
|-----------------------------------------------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Encouraging study choices                     | broader | “We want to encourage them to broaden their view and their thinking about their future, so that they do not stay only within familiar frameworks.”                                                          |
| Giving young people enough information        |         | “We want there always to be enough information available to young people about what STEM studies and professions bring, so that they can decide confidently for themselves whether this suits them or not.” |
| School events as the main operational format  |         | “The main way of operating is events in gymnasiums.”                                                                                                                                                        |
| Public event as a media strategy              |         | “The Engineer of the Year event is only an event, a show, made so that it has far-reaching media effects in society.”                                                                                       |
| Practical experience is persuasive            |         | “Workshops are probably the best approach, because then young people have the opportunity to try something.”                                                                                                |
| Career exposure should be concrete            |         | “It is very important that they actually see what a person does.”                                                                                                                                           |
| Shadowing as realistic exposure               |         | “Shadowing means that they really see what a typical working day looks like.”                                                                                                                               |
| Local partnerships with companies matter      |         | “We try to include companies that support us financially and create a bridge between school, faculty, and company.”                                                                                         |
| Confidence gains among women engineers        |         | “It is as if they gained a voice.”                                                                                                                                                                          |
| Broader environment influences girls’ choices | social  | “Young people are part of a social circle — parents, aunts, uncles, grandparents — and with a media project like Engineer of the Year we want to create a shift in the minds of those people too.”          |
| Need for sustained support                    |         | “The state should support such initiatives in a more integrated way and empower them, because the concept clearly works.”                                                                                   |

## GirlsDoCode

**Country:** Slovenia

### Level of Education

Primary education, delivered as a non-formal extracurricular learning programme.

GirlsDoCode is not a formal school subject or part of the compulsory curriculum. It is a structured non-formal programme implemented in cooperation with schools, local coordinators, trained teachers, sponsors, and the central programme team.

The practice is most relevant for upper primary education, especially because it targets girls before and during the period when interest in STEM and technology may begin to decline. It should therefore be described as a primary education / non-formal STEM education initiative, rather than as a general programme for all school levels.

### Age Group

The programme targets girls aged 9 to 14.

This corresponds mainly to:

- primary school pupils, approximately 9–14 years old;
- especially girls in the later years of primary education, before they make important decisions about further educational pathways.

### Engagement of Girls

GirlsDoCode is designed specifically to engage girls early in programming, STEM, and technology before stereotypes and declining interest become stronger during adolescence. The programme introduces girls to programming and engineering in a supportive, girls-only, non-formal learning environment.

A key strength of the programme is that it does not only teach coding as a technical skill. It also works on motivation, curiosity, identification with STEM careers, and the feeling that girls belong in digital and engineering fields.

Girls are engaged through age-appropriate activities, concrete examples, interactive tasks, dialogue, teamwork, and repeated exposure to women in engineering. The programme frames participation as an opportunity to explore something exciting and achievable, rather than as a corrective measure for girls who lack knowledge.

This positive framing is important because it helps girls experience programming as creative, relevant, and accessible.

### How Girls Learn About It

Girls learn about GirlsDoCode mainly through schools, teacher networks, local partner schools, project materials, and word-of-mouth from previous participants.

Important dissemination channels include:

- school-based communication;
- teachers and local coordinators;
- brochures and posters;
- partner schools;
- local educational communities;
- regional sponsorship networks;
- informal recommendations from girls who previously participated.

School-based dissemination is especially important because teachers can directly encourage girls in their local environment. The programme also benefits from the fact that it is implemented across different regions, including rural areas, which helps reduce the concentration of opportunities only in larger urban centres.

### Learning Formats

The programme combines a 22-hour local course with a national hackathon.

The regular course is delivered locally during the school year by trained coordinators and teachers. It follows a structured curriculum and includes progressive programming tasks, interactive quizzes, real-life examples, discussion, collaboration, and project work.

The national hackathon functions as a motivational highlight. It brings together girls from different parts of Slovenia for a more intensive, collaborative, and public-facing experience. At the hackathon, girls work in mixed groups, solve challenges, present their solutions, and meet women engineers.

The programme uses Code.org as a core technical tool, but its pedagogical model goes beyond platform-based coding. It includes reflection, teamwork, presentation, confidence-building, and links to real-world applications of technology. The content is also updated over time to include newer topics such as artificial intelligence, robotics, Minecraft-based activities, and other digital approaches.

### **Mentoring and Partnerships**

Mentoring is embedded in the programme at several levels. Teachers and local coordinators guide girls through the curriculum, while the central programme team provides structure, materials, training, monitoring, and strategic coordination.

The adult role is not simply to provide correct answers. Teachers and coordinators are expected to support exploration, discussion, problem-solving, and confidence-building. This is important because girls learn not only programming concepts, but also how to persist, test ideas, collaborate, and present their work.

Partnerships are central to the model. The programme connects:

- schools;
- trained teachers;
- local coordinators;
- the central programme team;
- technology companies;
- national and regional sponsors;
- women engineers and professionals from practice.

The hackathon strengthens this ecosystem by bringing girls into contact with women engineers who present their work and provide concrete examples of technical careers.

### **Confidence Development**

Confidence development is one of the clearest outcomes of the programme. Girls often begin more cautiously, with hesitation about speaking up, presenting, or seeing themselves in programming and engineering-related roles. Over time, they become more willing to participate, explain their ideas, present solutions, and take ownership of their work.

Confidence is supported through several mechanisms:

- successful completion of progressively structured tasks;
- teamwork and peer support;
- girls-only learning spaces;
- teacher encouragement;
- public presentation of solutions;
- contact with women engineers;
- participation in the national hackathon;
- opportunities to continue into an advanced programme.

The girls-only setting is an important part of the confidence-building model. It creates a space where girls can experiment, ask questions, make mistakes, and participate without feeling overshadowed or judged in a mixed technical environment.

### **Networks**

GirlsDoCode creates networks at both local and national levels.

At the local level, girls form small learning communities within their schools or local environments. They progress through the course together, support each other, and experience programming as a shared activity rather than an individual challenge.

At the national level, the hackathon connects girls from different parts of Slovenia. The programme deliberately mixes girls from different schools into new groups, which encourages them to collaborate beyond their familiar peer environment.

The programme also creates a professional network among teachers, coordinators, the central team, schools, sponsors, and women engineers. These networks help sustain the programme over time and make participation feel part of a wider national community of girls interested in STEM and programming.

### **ICT Career Support**

CT career support is explicitly built into the programme. Girls are introduced not only to programming, but also to engineering and technical professions. They meet women engineers, hear about their work, and see concrete examples of how technology is used in practice.

Career support is provided through:

- exposure to programming and digital problem-solving;
- presentation of engineering professions;
- contact with women engineers;
- real-life examples of technology use;
- hackathon activities;
- project work;
- continuation into an advanced programme;
- encouragement to explore further STEM opportunities.

The programme aims to influence future educational and career decisions by intervening early. It normalises the idea that girls can belong in programming, engineering, and digital professions before they make later choices about secondary school or study pathways.

Although long-term tracking of later educational choices is limited, the programme's high continuation rate into the advanced level suggests strong motivation and sustained interest among participants.

### **ICT Entrepreneurship**

ICT entrepreneurship is not the main focus of GirlsDoCode, but entrepreneurial learning is present indirectly through the hackathon format and project-based problem-solving.

Girls work on challenges, develop ideas, collaborate in teams, create digital solutions, and present their work.

These activities support entrepreneurial competences such as:

- initiative;
- creativity;
- teamwork;
- problem-solving;
- communication;
- project development;
- confidence in presenting ideas;
- practical use of technology.

The programme therefore does not provide business or start-up training, but it does support an entrepreneurial mindset by encouraging girls to use technology actively, creatively, and collaboratively.

### **Key Good Practice Elements**

GirlsDoCode can be described as a multi-layered gender-inclusive model based on:

- early intervention before girls' interest in STEM declines;
- girls-only non-formal learning spaces;
- free access for girls and schools;
- local implementation across Slovenia;

- inclusion of rural environments;
- trained teachers and local coordinators;
- a structured 22-hour curriculum;
- national coordination and support;
- use of interactive and age-appropriate programming tools;
- a national hackathon as a motivational highlight;
- exposure to women engineers as role models;
- teamwork and peer learning;
- confidence-building through gradual progress and public presentation;
- continuation into an advanced programme;
- stable partnerships between schools, teachers, sponsors, and the central programme team.

| Good practice element                                 | Supporting quote                                                                                                                                                                  |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Starting early to address the drop in girls' interest | "GirlsDoCode includes girls aged 9 to 14... we changed the age limit precisely because of this transition in enthusiasm and also the transition into puberty."                    |
| Non-formal learning as an entry point into STEM       | "They are included in non-formal education, where we inspire girls for STEM professions and at the same time guide them through their first steps into the world of programming." |
| National-local delivery model                         | "We work on the national level and try to include as many different schools as possible so that it also takes place in local environments, not only in urban ones."               |
| Reaching rural areas                                  | "We mainly target rural environments."                                                                                                                                            |
| Trained local coordinators and teachers               | "We have a 22-hour curriculum delivered by specially trained coordinators in local environments."                                                                                 |
| Hackathon as a motivational highlight                 | "Every year we also organise a hackathon, where 80 to 100 girls from different parts of Slovenia come together in one day."                                                       |
| Showing girls the profession of engineer              | "We also introduce them to the profession of engineer and enable them to have that kind of experience."                                                                           |
| Teacher training as a support mechanism               | "All new teachers go through our educational programme."                                                                                                                          |
| Strong teacher commitment and continuity              | "Some of them have been with us for eight years already."                                                                                                                         |
| Free access for girls and schools                     | "The workshops are completely free for the girls... the schools also do not have to pay any fee."                                                                                 |
| Word-of-mouth from previous generations               | "It also already goes from generation to generation, by word of mouth."                                                                                                           |

|                                                      |                                                                                                                                |
|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Mixed-group collaboration at the hackathon           | “We deliberately mix the girls, so if they come from one school they are not all in the same group.”                           |
| Real-life examples for algorithmic thinking          | “We try to transfer from real examples into this world, so that they understand the added value.”                              |
| Women engineers as role models                       | “It motivates them a lot that they get to know the life of women engineers.”                                                   |
| Confidence growth over time                          | “At the beginning they are more like they would hide, and by the end you can see that they shine.”                             |
| High retention as a sign of success                  | “More than 90% of the girls continue into the advanced programme.”                                                             |
| Very low dropout                                     | “We have a very small dropout rate, we are talking about one or two percent.”                                                  |
| Need for long-term policy support                    | “The state should really support such projects in a planned way, with policies, financing, and recognition of good practices.” |
| Importance of stable support beyond short-term calls | “I think such initiatives that already exist and work should be supported integrally and strengthened.”                        |

## ČIPke – Initiative for Women with a Sense for Science, Technology and Art, and girls-focused workshops within Rampa Lab

**Country:** Slovenia

**Level of Education:** Non-formal education, with relevance for upper primary education, secondary education, higher education, and early career transition.

This practice is not a formal school-based programme. It is best understood as a non-formal maker, digital, artistic, and technical education initiative that creates safer and more inclusive spaces for girls, women, and non-binary people in fields such as programming, electronics, digital fabrication, sound, media art, and experimental technologies.

The practice has two connected dimensions. ČIPke primarily addressed women and non-binary people, including students, young adults, artists, technologists, and early-career participants interested in creative technology and technical experimentation. Girls-focused workshops within Rampa Lab adapted this approach for younger girls, especially those at the end of primary school and in secondary education.

The most accurate classification is therefore non-formal digital, technical, and maker education, with girls-focused activities in upper primary and secondary education and women-/non-binary-focused activities in higher education and early career transition.

### Age Group

The relevant age groups are:

- upper primary school girls, approximately 12–15 years old, especially girls at the end of primary school;
- secondary-school girls, approximately 15–19 years old, especially girls in gymnasium or similar secondary-school contexts;
- higher education students and young adults, approximately 19–25 years old, especially in the ČIPke programme;
- early-career women and non-binary participants, approximately 20–30+ years old, particularly in creative, technical, artistic, digital, or interdisciplinary fields.

For the purpose of a good-practice description focused on girls' engagement, the strongest emphasis should be placed on upper primary and secondary-school girls, approximately 12–19 years old, while ČIPke provides the broader feminist, women-centred, and maker-education background.

### Engagement of Girls

The practice approaches girls' engagement as a long-term process of creating access, safety, visibility, and confidence in technical and digital fields that have historically been male-dominated.

ČIPke emerged as a response to the structural absence of women and non-binary people in hacker, programming, and maker spaces. Later girls-focused workshops within Rampa Lab transferred this logic to younger participants, especially girls at the end of primary school and in secondary education.

A central principle of the practice is that girls do not need simplified technical content. Rather, they need environments in which they can participate without being pushed to the margins by gendered expectations, dominant group dynamics, or the assumption that technical spaces naturally belong to boys and men.

The practice engages girls by opening technical and creative spaces where curiosity, experimentation, and making can develop without immediate social pressure. It addresses the decline in interest that often appears during adolescence by offering girls targeted encouragement before they withdraw from technical and digital fields.

### How Girls Learn About It

Girls and other participants learn about the practice through institutional visibility, cultural networks, partner organisations, public programmes, festivals, galleries, Rampa Lab workshop promotion, and project-based outreach.

ČIPke gained visibility through educational, cultural, artistic, and hacker/maker communities. Later Rampa Lab workshops were promoted through targeted invitations, inclusion-oriented projects, and the broader public reputation of the organisations involved.

Important dissemination channels include:

- Rampa Lab and related organisational communication;
- public workshop announcements;
- cultural and educational networks;
- festivals and galleries;
- partner organisations;
- project-based outreach;
- targeted invitations to girls;
- public presentations of workshop outcomes;
- informal community networks.

The practice does not depend on one single promotional route. Instead, it operates through a wider ecosystem of cultural, educational, feminist, artistic, and community-based dissemination.

### **Learning Formats**

The learning formats are hands-on, workshop-based, and strongly oriented toward making. Participants learn by experimenting, building, programming, designing, testing, and producing concrete outcomes.

ČIPke used short intensive workshops, often in one-day or three-day formats. Topics included programming, 3D modelling, 3D printing, soft electronics, modular synthesis, sound, biohacking, light-based experimentation, experimental media, and creative technologies.

Rampa Lab activities for girls included three-hour introductory workshops as well as longer multi-session formats that gradually opened into more exploratory lab-style work.

A key feature of the practice is that participants usually produce something tangible, such as a circuit, animation, sound piece, prototype, visual output, or another concrete technical or artistic result. This gives the learning process coherence and enables participants to leave with visible evidence of what they have achieved.

### **Mentoring and Partnerships**

Mentoring and partnerships are central to the practice. A defining pedagogical principle of ČIPke was that workshops should be led by women or non-binary mentors whenever possible. This was important not only for representation, but also for creating a different atmosphere around technical explanation, participation, and asking questions.

Women and non-binary mentors serve several roles. They act as technical instructors, provide relatable role models, create a safer learning environment, use more accessible and inclusive language, reduce the intimidation often associated with male-dominated technical spaces, and help participants feel that technical expertise is not limited to one gendered identity.

Partnerships include collaboration with cultural organisations, galleries, festivals, educational actors, public funding schemes, European projects, and Rampa Lab's wider network. In the Rampa context, girls-only workshops were also led by women mentors, maintaining continuity with the ČIPke model.

### **Confidence Development**

Confidence development is one of the strongest themes in the practice. Girls-only and women-centred formats are important because they create safer spaces in which participants can ask basic questions, experiment, make mistakes, and build competence without being judged against dominant technical norms.

The interview highlights that many girls and women do not lack ability. Instead, they often lose confidence in spaces shaped by subtle condescension, over-explanation, correction, competitive demonstrations of knowledge, or assumptions that they do not already belong to.

The workshops respond to this by creating supportive environments where participants can ask questions without embarrassment, try technical tasks step by step, make mistakes safely, produce something themselves, see women and non-binary mentors as technically competent, present their work publicly, and take pride in visible outcomes.

Public presentation of results is especially important. Exhibitions, showcases, and end-of-year presentations help participants see their work as valuable and worth sharing. This strengthens both technical confidence and the sense of authorship.

### **Networks**

Networks are important both as support structures and as outcomes of the practice. ČIPke helped build communities of women and non-binary people working across sound, programming, electronics, media art, digital fabrication, and experimental technologies.

Some workshop participants formed longer-term collaborations after taking part. The practice therefore did not only provide isolated learning experiences, but also helped create communities that could continue beyond individual workshops.

Rampa Lab's later girls-focused activities similarly recognised the importance of peer exchange. Girls benefit from seeing other girls engaged in technical practices because this reduces isolation and makes participation feel more socially sustainable.

Networks matter because they provide peer encouragement, technical exchange, social belonging, collaboration opportunities, continued participation after workshops, and a visible community of people who do not fit the stereotypical image of the technical expert.

### **ICT Career Support**

ICT career support appears through exposure, familiarity, role models, and longer-term identification rather than through formal career counselling.

ČIPke addressed adults and young adults in creative-technical fields, while Rampa Lab workshops targeted girls earlier, with the aim of strengthening confidence before educational pathways become more rigid. Early exposure is important because girls who begin to feel technically capable are more likely to continue attending such activities and potentially move toward related study areas later.

Career support is provided through exposure to programming, electronics, digital fabrication, and creative technologies; women and non-binary mentors as technical role models; practical experience with tools and methods; public presentation of technical and creative work; encouragement to continue participating; community-building around technical creativity; and examples of former participants returning as mentors.

The fact that some former participants later returned as mentors is a particularly strong indicator of pathway-building. It shows that the practice can support not only one-time engagement, but also longer-term identification with technical and creative fields.

### **ICT Entrepreneurship**

ICT entrepreneurship is not the main focus of the practice in a narrow business sense. However, entrepreneurial elements are present through initiative, authorship, self-directed making, experimentation, and the development of ideas into concrete public results.

Participants are not only introduced to tools; they are encouraged to create outputs that can be exhibited, performed, shown, or further developed. This supports forms of creative autonomy and technical agency that are relevant to innovation-oriented pathways.

The practice supports entrepreneurial competences such as initiative, creative problem-solving, experimentation, technical authorship, independent project development, public presentation of one's work, and confidence in occupying public space with technical and creative outputs.

In this broader sense, the practice contributes to technological authorship and independent project-making rather than formal entrepreneurship training.

### **Key Good Practice Elements**

ČIPke and girls-focused Rampa Lab workshops can be described as a multi-layered gender-inclusive model based on:

- safe participation spaces;
- feminist pedagogical awareness;
- women-led and non-binary-led mentoring;
- practical technical making;
- targeted girls-only access where needed;
- inclusive language and careful communication;
- small-group workshop formats;
- tangible technical and creative outcomes;
- public visibility of participants' results;
- peer community-building and collaboration;
- early encouragement before girls' interest declines;

- recognition that equal access requires more than simply opening the same technical spaces to everyone.

| Good practice element                                            | Supporting quote                                                                                                                            |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Creating women-centred technical spaces in response to exclusion | “The whole programme was intended exclusively for women and non-binary people.”                                                             |
| Women and non-binary mentors as role models                      | “Our first strategy was that the person teaching must always be a woman or non-binary person.”                                              |
| Safe spaces for asking basic questions                           | “A woman who transmits technical knowledge uses language that is much better adapted to someone who does not already master that language.” |
| Inclusive language in invitations                                | “We always addressed invitations in the feminine form or in inclusive forms of language.”                                                   |
| Public presentation of outcomes                                  | “At the end of each year we gave the participants the opportunity to exhibit the results of their workshops.”                               |
| Tangible outcomes increase ownership                             | “The goal was not only to learn the basics, but that in three days they would come to some final thing.”                                    |
| Strong demand showed that this space was missing                 | “An absurdly large number of people applied for the first workshop, and then we saw that this was really missing.”                          |
| Small groups support quality learning                            | “We had twelve places, because for one pedagogue it is difficult to handle all the technical difficulties any larger group would have.”     |
| Younger girls benefit from targeted encouragement                | “We targeted girls at the end of primary school or in gymnasium.”                                                                           |
| Female mentors in Rampa workshops                                | “We specifically invited only girls, and the workshops were also led by female mentors.”                                                    |
| Mixed groups can suppress participation                          | “Very quickly an effect is created that the person receiving the explanation feels that she knows nothing.”                                 |
| Girls’ drop in interest is socially conditioned                  | “I am almost one hundred percent sure that this dramatic drop is exclusively socially conditioned.”                                         |
| Parents influence participation                                  | “Parents have difficulty deciding to bring girls to these workshops.”                                                                       |
| Community-building can lead to lasting collaborations            | “Through this quite a few communities were built.”                                                                                          |
| Returning participants becoming mentors                          | “Sometimes a participant comes back to us after finishing gymnasium as a mentor.”                                                           |

Broader structural support is still needed

“This whole thing is far from solved, and you would not be doing this research if that problem did not still exist.”

## Women for cyber / Women4Cyber

**Country:** Slovenia

### Level of Education

Secondary education, higher education, adult/professional education, and early career transition.

### Age Group

Secondary school: 15–19 years, mainly through awareness-raising and role-model activities.

Higher education: 19–25 years, through networking, mentoring, events, and career orientation.

Early career / professional level: 20+, through mentoring, professional networking, visibility, mobility, and career support.

### Engagement of Girls

Women4Cyber supports girls' and young women's engagement in cybersecurity by making the field more visible, accessible, and socially supportive. Cybersecurity is often perceived as a male-dominated field, which can discourage girls from considering it as an educational or career path. The practice addresses this by showing that women are already active, competent, and successful in cybersecurity.

Engagement is encouraged through public events, conferences, role-model visibility, mentoring, networking, and opportunities to meet women working in the field. These activities help girls and young women imagine themselves in cybersecurity and understand that the field includes diverse roles, profiles, and career paths.

The practice is also relevant because educational and career choices are shaped early. The interview highlights that stereotypes, discouraging messages, or lack of visible role models can influence whether girls see cybersecurity and technical fields as suitable for them.

### How Girls Learn About It

Girls and young women learn about Women4Cyber through public events, conferences, workshops, university-based activities, online communication, professional networks, and direct contact with women experts in cybersecurity.

Important access points include:

- cybersecurity conferences and public awareness events;
- workshops and activities aimed at students or young people;
- university and professional environments;
- Women4Cyber's online presence;
- mentoring opportunities;
- events where women in cybersecurity present their work;
- informal networking and community activities.

The practice relies on repeated visibility rather than a single promotional channel. This is important because many girls may not actively search for cybersecurity opportunities unless they first encounter the field through an accessible, welcoming, and relatable activity.

### Learning Formats

Women4Cyber uses a combination of formal and informal learning formats. These include conferences, expert talks, panel discussions, workshops, public events, mentoring activities, international exchanges, and informal networking gatherings.

The learning formats are effective because they combine knowledge about cybersecurity with social support and community-building. Participants do not only learn about the field; they also meet women working in cybersecurity, hear about their career paths, and gain access to people who can offer guidance or encouragement.

International mentoring and mobility are particularly important because they allow women to exchange knowledge and experiences beyond their local context. Informal gatherings are also valuable because they lower barriers to participation and make it easier for girls and women to ask questions, build connections, and develop confidence.

## **Mentoring and Partnerships**

Mentoring is one of the strongest elements of Women4Cyber. The broader European Women4Cyber initiative includes mentoring opportunities in which women can connect with mentors from different countries and professional backgrounds. The official Women4Cyber mentoring programme is described as an online six-month programme in English, where participants can register as mentees, mentors, or both.

Partnerships are also central to the practice. Women4Cyber Slovenia operates as part of a broader European initiative and connects actors from public institutions, private companies, universities, research environments, and professional communities. The Slovenian section explicitly describes itself as a national chapter supporting women in cybersecurity and promoting awareness, role models, training, mentorship, employment pathways, and cooperation across sectors.

The practice is therefore not only an awareness campaign, but an ecosystem-building initiative. Its strength lies in connecting women with mentors, peers, institutions, employers, and professional opportunities.

## **Confidence Development**

Confidence development is closely linked to visibility, mentoring, supportive environments, and reduced isolation. Girls and women may feel more confident entering cybersecurity when they see other women succeeding in the field and when they know that support is available.

Women4Cyber contributes to confidence development by:

- increasing the visibility of women in cybersecurity;
- creating opportunities to meet female role models;
- offering mentoring and guidance;
- supporting informal peer connection;
- encouraging women to participate in events and professional networks;
- normalising women's presence in cybersecurity.

The interview also suggests that women may hesitate to take visible opportunities unless they feel fully prepared or confident. This makes confidence-building especially important. Confidence is not developed only through technical competence, but also through repeated experiences of recognition, encouragement, and belonging.

## **Networks**

Networking is a core element of Women4Cyber. The practice creates spaces where women in cybersecurity can meet, exchange experiences, support each other, and become more visible as professionals.

Networks are important because they reduce isolation in a male-dominated field. They also support retention: women who enter cybersecurity are more likely to remain in the field if they have access to peers, mentors, professional contacts, and visible examples of successful women.

The network has both formal and informal dimensions. Formal structures provide legitimacy, wider reach, and connection to European and national initiatives. Informal networking provides trust, encouragement, and easier personal contact. Together, these dimensions help create a stronger sense of belonging.

## **ICT Career Support**

Women4Cyber supports ICT and cybersecurity career development by making educational and professional pathways more visible. The practice helps girls and young women understand what cybersecurity careers can look like and what kinds of roles, skills, and opportunities exist in the field.

Career support is provided through:

- conferences and public events;
- role-model visibility;
- mentoring;
- contact with cybersecurity experts;
- workshops and awareness activities;
- professional networking;
- international mobility and learning opportunities;
- cooperation with public, private, academic, and research institutions.

The practice is also relevant for career transitions. Women4Cyber Slovenia explicitly includes the promotion of career change into cybersecurity among its goals. This means that the initiative is not limited to girls choosing study programmes, but also supports women who may enter cybersecurity later in their educational or professional path.

### ICT Entrepreneurship

Women4Cyber does not primarily focus on ICT entrepreneurship in the narrow sense of start-up creation or business incubation. However, it supports women's professional agency in cybersecurity by strengthening their visibility, networks, confidence, access to expertise, and participation in professional opportunities.

In this broader sense, the practice can indirectly support entrepreneurial potential. Women who become more visible, better connected, and more confident in cybersecurity may be better positioned to lead projects, enter expert roles, participate in innovation activities, or later develop entrepreneurial initiatives in the digital and cybersecurity sector.

### Key Good Practice Elements

Women4Cyber can be described as a multi-layered gender-inclusive model based on:

- women-focused networking in cybersecurity;
- mentoring and guidance across educational and professional stages;
- visible female role models in cybersecurity;
- conferences, workshops, expert talks, and public events;
- informal networking and peer encouragement;
- national and European-level cooperation;
- targeted opportunities for women, including mentoring and mobility;
- promotion of cybersecurity careers among younger generations;
- support for women entering, remaining in, or transitioning into cybersecurity;
- long-term ecosystem support rather than a one-off intervention.

| Good Practice Element                                       | Supporting Quote (English translation)                                                                                                                               |
|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Building women-focused communities in male-dominated fields | "The goal is that as many women as possible get involved in cybersecurity, because it is quite a male field."                                                        |
| Mentoring as a distinctive support mechanism                | "Mentoring is a very specific thing that Women4Cyber has, where mentors from all over Europe connect and you can either be mentored or be a mentor to someone else." |
| Creating a sense of belonging in informatics                | "We want a greater representation of female students and for them to really feel accepted in this field."                                                            |
| Visibility of competent women in public space               | "The goal was to find, in all fields, a woman who can cover a topic just as competently as a man."                                                                   |
| Public events as awareness-building tools                   | "The conference was intended for the wider public, so that people could also get to know cybersecurity."                                                             |

|                                                                    |                                                                                                                                                                                       |
|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Gender balance in events and participation                         | “At all the events we organize, we try to ensure at least a half-and-half presence, that half of the participants are women, which is quite a challenge.”                             |
| Informal networking supports connection and encouragement          | “We also have informal gatherings or picnics, and there you can connect with someone more easily and find someone who encourages you in this direction.”                              |
| Women-only or women-supportive environments can improve confidence | “Research has already shown that women feel better in a women’s environment, especially in situations where they may not be very self-confident.”                                     |
| Events can influence educational and career decisions              | “It was not rare that someone said that because of one of our events, she decided to orient herself in this direction after her studies.”                                             |
| Need to address stereotypes from childhood onward                  | “In primary school there may already be some obstacle, and after the age of 12 the curve for girls starts to fall sharply.”                                                           |
| A single discouraging message can change a life path               | “It can be just one sentence that someone says, and with that it can completely change someone’s life path.”                                                                          |
| Targeted women-only actions are sometimes necessary                | “To reach the point where everyone has equal opportunities, we first need to give women opportunities, and with specific actions intended only for women or girls, this can be done.” |
| Mobility and advanced learning opportunities for women researchers | “The European Union will finance the possibility for a woman to go abroad and gain new knowledge in cybersecurity.”                                                                   |
| Role models matter for educational choice                          | “We already had several cases where someone said: because there was a woman lecturer, I then decided to continue in this direction.”                                                  |
| Institutional support is necessary for recognition                 | “In both cases institutional support was needed even to nominate such candidates.”                                                                                                    |
| Students need someone they can turn to                             | “It is very important that female students have someone they can turn to.”                                                                                                            |
| Media visibility of women experts should be stronger               | “If there is a network like Ona Ve, then it is not difficult to find a woman expert in a given field who could appear in the media.”                                                  |

|                                                              |                                                                                                                                                                                                                                  |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Women may hesitate unless fully confident                    | “If women are not one hundred percent confident in themselves, they would rather say no.”                                                                                                                                        |
| Retention remains a challenge in male-dominated environments | “Even if we have 30 percent female students, many of them later go in a completely different direction and do not stay in the technical field, because it is such a predominantly male world and it is difficult to work in it.” |

## Kodice and STEMojstrica / STEM Mojstrice (Girls' Coding and STEM Mastery Workshops) within Zavod 404

**Country:** Slovenia

### Level of Education

Primary education and secondary education, delivered mainly through non-formal STEM workshops and project-based activities. The strongest direct focus of the practice is on upper primary education, especially girls from the fourth to the ninth grade of primary school. This is important because the programme aims to reach girls early, before educational choices become more fixed and before confidence in entering technical spaces may decline. Secondary education is also relevant, especially through broader STEM activities, continuation pathways, and the organisation's work with older participants. However, the core of the described practice is best understood as non-formal STEM and engineering education for girls in upper primary school, with some extension toward secondary-school age groups.

### Age Group

The main target groups are:

- upper primary school girls, approximately 10–15 years old;
- secondary-school girls, approximately 15–19 years old, especially in broader or follow-up STEM activities.

However, the strongest emphasis should remain on primary-school girls, particularly because the interview explicitly states that the organisation wants to inspire girls as early as possible.

### Engagement of Girls

Girls' engagement is central to both Kodice and STEMojstrice. The activities were created in response to the observation that girls were less frequently involved in technical, engineering, and digital education activities than boys. The aim is not to compensate for lower ability or lower motivation. On the contrary, the interview explicitly stresses that girls are not less motivated. The purpose is to create access, familiarity, encouragement, and confidence in fields where girls are often underrepresented or less socially encouraged to participate.

Girls-only formats are used as a supportive entry point. They allow girls to participate more actively, ask questions, experiment, and develop confidence without feeling socially exposed or overshadowed in mixed-gender technical groups. The broader intention is to help girls experience programming, engineering, making, and STEM as normal, accessible, interesting, and relevant fields, rather than as spaces implicitly coded as male.

### How Girls Learn About It

Girls learn about Kodice and STEMojstrice through a combination of the organisation's existing public network, school-based communication, teacher cooperation, families, previous participants, and local partner environments.

Important channels include:

- schools and teachers;
- school-based recruitment;
- the organisation's existing network of families and participants;
- project communication;
- word-of-mouth;
- local educational communities;
- public visibility of Zavod 404 activities.

In the case of Kodice, schools played an especially important role because some activities were implemented in cooperation with teachers who already knew the girls and could invite or encourage them directly.

This combination of organisational reputation and school cooperation makes the activities more accessible than isolated one-off workshops without local anchors.

## Learning Formats

The programmes use practical, hands-on, workshop-based learning formats. The activities are not lecture-based; they are structured around making, building, experimenting, solving problems, and producing something tangible. Kodice focused mainly on programming and digital competences through a series of workshops.

STEM mojstrice used week-long summer activities with broader engineering and STEM themes, together with a smaller digital campaign highlighting successful women in STEM.

Learning formats include:

- programming workshops;
- engineering and STEM workshops;
- hands-on making activities;
- small-group work;
- interdisciplinary technical challenges;
- practical tasks with physical or digital outcomes;
- summer-week formats;
- project-based learning;
- activities where participants take home a finished product.

A key pedagogical feature is that girls do not only hear about STEM; they actively make, test, build, and create. This practical orientation helps make technical fields concrete and memorable.

## Mentoring and Partnerships

Mentoring and partnerships are among the strongest elements of the practice. The activities are frequently delivered by young female mentors, especially female students from pedagogical and technical faculties. These mentors are important because they are realistic, relatable role models for younger girls.

The mentoring model is not only about technical support. Mentors also help create a safe and encouraging learning environment in which girls can try, ask questions, make mistakes, and gradually become more confident. Partnerships are also central.

The practice connects:

- Zavod 404;
- schools;
- teachers;
- female mentors;
- students from pedagogical and technical faculties;
- project funders;
- local communities;
- families and participants.

In Kodice, some activities were coordinated directly by the organisation, while others were implemented in schools by teachers using prepared materials. Zavod 404 provided lesson plans, content, and practical materials such as circuits, enabling schools to deliver more hands-on STEM work than they might otherwise be able to implement independently.

## Confidence Development

Confidence development is one of the clearest themes in the practice. The interview makes clear that girls are not less motivated than boys, but they may feel less confident about standing out, asking questions, or participating actively when they are a minority in mixed technical groups.

Girls-only formats help reduce this barrier. In groups composed only of girls, participants can feel safer, more included, and more willing to engage. This can help them build the confidence needed to participate later also in mixed-gender environments.

Confidence is also strengthened through the practical design of the activities. Girls solve problems, build things, and take home a finished product. This visible outcome gives them concrete proof that they are capable of technical work.

The confidence-building model is therefore based on:

- girls-only learning spaces;
- supportive female mentors;
- small groups;
- practical success experiences;
- tangible products;
- experimentation and making;
- early exposure before self-doubt becomes stronger.

### **Networks**

Networks operate at several levels in the practice. Zavod 404 works through a developed network of families, participants, schools, mentors, teachers, and project collaborators.

For girls, the activities create peer networks with other girls who share similar interests. This is important because technical interests can feel less unusual or isolating when girls see that others are also interested in programming, engineering, and STEM.

The practice also connects girls with young female mentors, which creates a bridge between pupils and older students already closer to technical or pedagogical professional pathways.

School cooperation extends the reach of the organisation beyond its immediate local base and helps include more diverse groups of young people. In this sense, the network is both organisational and social: it supports implementation while also helping girls experience technical participation as part of a wider community.

### **ICT Career Support**

Kodice and STEM mojstrice support later ICT and STEM pathways mainly by creating early familiarity, interest, and confidence. The practice does not function as formal career counselling, but it works as an early pipeline measure.

The activities help girls:

- encounter programming and engineering early;
- experience technical work as achievable;
- develop practical skills;
- see female mentors in STEM-related roles;
- understand that technical fields are not reserved for boys;
- build confidence before later educational decisions;
- imagine future participation in STEM, ICT, or engineering.

The interview repeatedly stresses the importance of starting young, especially in primary school. Girls who gain early confidence and interest are more likely to continue participating later.

STEM mojstrice also strengthens career imagination through its focus on successful women in STEM. This visibility helps girls connect workshop activities with possible future educational and professional pathways.

### **ICT Entrepreneurship**

ICT entrepreneurship is not the main focus of the practice. However, entrepreneurial elements are present indirectly through project-based making, initiative, creativity, problem-solving, and the production of tangible outcomes.

Participants are encouraged to build, solve, create, test, and adapt rather than only receive information. These activities support entrepreneurial competences such as:

- initiative;
- autonomy;
- creative problem-solving;
- practical agency;
- collaboration;
- experimentation;
- confidence in making and presenting solutions.

The practice therefore does not provide business or start-up training, but it contributes to an entrepreneurial mindset by giving girls space to test ideas, work actively with technology, and experience themselves as capable creators.

### Key Good Practice Elements

Kodice and STEM mojstrice can be described as a multi-layered gender-inclusive model based on:

- early intervention in primary school;
- girls-only participation spaces;
- practical, hands-on STEM and engineering workshops;
- programming and digital competence development;
- visible female mentors and role models;
- school partnerships that broaden access;
- interdisciplinary technical content;
- small-group work with strong mentor support;
- free participation through project funding;
- prepared materials and practical kits for schools;
- neutral and non-stereotyped framing of activities;
- confidence-building through tangible outcomes;
- the broader goal of equal opportunity rather than assuming that girls are less interested or less capable.

| Good practice element                                             | Supporting quote                                                                                                                                |
|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Creating girls-only activities in response to underrepresentation | “Because through the years we noticed that the percentage of girls involved in these activities was quite a bit lower than the number of boys.” |
| Early intervention in primary school                              | “We are mostly focusing these activities on primary-school girls, because it seems important to us to inspire them as early as possible.”       |
| Kodice aimed at girls in upper primary school                     | “These activities were intended for girls from the fourth to the ninth grade of primary school.”                                                |
| STEM mojstrice combined workshops and role-model visibility       | “They were summer weeks for girls... and we also made a smaller digital campaign about successful women in STEM fields.”                        |
| Role models through female mentors                                | “Most often the mentor team for these activities is made up of girls... female students from pedagogical and technical faculties.”              |
| Girls-only groups can strengthen confidence                       | “In a group of only girls there is less of that challenge, so they can gain self-confidence and later stand out more in mixed groups as well.”  |
| No evidence that girls are less motivated                         | “We never noticed that girls were in any way less motivated.”                                                                                   |
| Neutral naming can reduce stereotypes                             | “We tried to make the names of activities as neutral as possible, not marked by stereotypically gendered terms.”                                |

|                                                |                                                                                                                                                                                                                                                 |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Practical, hands-on learning is central        | “Practically all of our activities are designed so that in the end the person takes home some product.”                                                                                                                                         |
| School partnerships extend reach               | “In the Kodice project we worked in cooperation with schools.”                                                                                                                                                                                  |
| Teachers received materials and practical kits | “We offered them lesson plans, content... and we also sent them some circuits and these things so they could make practical things themselves.”                                                                                                 |
| Free participation improves accessibility      | “These activities were also free of charge, or rather free for the participants, because they were financed through calls.”                                                                                                                     |
| Small groups with strong mentor support        | “On a group of 12 to 15 children we usually have three, sometimes even four mentors.”                                                                                                                                                           |
| Interdisciplinary content is intentional       | “We try to make our content as interdisciplinary as possible.”                                                                                                                                                                                  |
| Long-term systemic support is still lacking    | “We would certainly like more support at all levels of education... but it is all through projects and calls.”                                                                                                                                  |
| Broader goal is equal opportunity              | “We want to offer equal opportunities... so that they themselves find out whether this is a field that interests them, and not that it is already decided in advance for them by others that it does not interest them because they are girls.” |

## Girls-only winter and summer programming schools developed through Code Week activities and later through a digital education NGO model.

**Country:** Slovenia

### Level of Education

Non-formal education, with relevance for upper primary and secondary education.

The practice is not a formal school-based programme and should not be described as part of the regular curriculum. It is best understood as a non-formal digital education initiative delivered through girls-only holiday schools and workshops.

The programme is relevant mainly for upper primary and secondary education, because it addresses girls at the stage when interest in programming, digital technologies, and technical fields may already be shaped by stereotypes, confidence issues, or previous school and family experiences.

The most accurate classification is therefore: Non-formal programming and digital literacy education for upper primary and secondary-school girls.

### Age Group

The relevant age groups are:

- upper primary school girls, approximately 10–15 years old;
- secondary-school girls, approximately 15–19 years old.

The strongest focus is on girls who are old enough to engage with programming, digital creativity, media literacy, privacy, ethics, and hands-on technological experimentation, but still young enough for such experiences to influence their future educational choices and self-perception in relation to technology.

### Engagement of Girls

The initiative was created after repeated observation that ordinary programming courses were attended mostly by boys, while girls were much less likely to enrol. Girls-only winter and summer programming schools were introduced as a deliberate response to this imbalance.

The girls-only format was used to test whether explicitly naming a programme for girls would make participation easier. The interview suggests that this approach worked: once girls entered the space, they felt safer, less threatened, and more able to participate actively.

Engagement was therefore built not only through programming content, but through the creation of a psychologically safer entry point into digital technologies. The practice helped girls confront their own assumptions about being “bad with computers” and discover that they could understand, create, programme, and experiment with technology.

The programme did not simplify content for girls. Instead, it created a setting in which girls could suspend self-doubt long enough to experience programming and digital making as enjoyable, achievable, and meaningful.

### How Girls Learn About It

Girls learned about the programming schools mainly through social media, Code Week communication channels, organisational networks, and direct contact with families who had already participated in previous workshops.

Important communication channels included:

- social media, especially Facebook and Twitter at the time;
- Code Week and related public communication;
- the organiser’s existing educational community;
- direct contact with parents and children from previous activities;
- organisational mailing or contact lists;
- word-of-mouth and repeat participation;
- partner institutions and community spaces.

Prior trust was important. Many participants came through already established relationships with families, children, schools, libraries, or workshop communities. This shows that recruitment depended not only on public promotion, but also on continuity and credibility built through previous educational activities.

### **Learning Formats**

The learning formats were workshop-based, practical, interdisciplinary, playful, and strongly hands-on. The organiser deliberately avoided long lectures, school-like assessment, and overly formal instruction. The goal was for participants to learn through doing, experimenting, creating, and enjoying the process.

Each day of the holiday school had a thematic focus. Activities included:

- Scratch programming;
- micro:bit activities;
- Arduino-based traffic-light programming;
- robotics;
- HTML;
- digital poetry;
- 3D design and printing;
- recycled-media animation projects;
- creative technology activities;
- critical digital literacy;
- media literacy;
- privacy and ethics discussions;
- digital ecology and social implications of technology.

The programme linked digital technologies to everyday life, society, creativity, responsibility, and critical reflection. This broadened the meaning of programming beyond coding alone. Girls were encouraged to understand technology not only as a technical tool, but also as something embedded in media, communication, privacy, ethics, ecology, and social life.

### **Mentoring and Partnerships**

Mentoring and partnerships were central to the implementation of the practice. The organiser was usually directly involved, but the workshops also relied on a broader circle of collaborators with different kinds of expertise.

These collaborators included:

- programmers;
- media literacy specialists;
- artists;
- engineers;
- educators;
- experts in digital culture;
- partner organisations;
- libraries;
- youth organisations;
- the Computer Museum;
- local educational and community partners.

Mentoring worked through small-group support. Depending on the complexity of the activity, there were usually two to four mentors. This was especially important because participants had different levels of prior knowledge and some came from more disadvantaged backgrounds with limited access to digital learning.

The model depended heavily on trusted collaborators from professional and personal networks. Mentoring was therefore both pedagogical and infrastructural: mentors taught, encouraged, adapted, improvised, and helped participants move past fear or uncertainty.

### **Confidence Development**

Confidence development is one of the clearest achievements of the practice. The interview includes reflections from girls who described themselves as “stupid for computers”, which shows how strong self-limiting beliefs could be before participation.

The girls-only format was designed precisely to create enough safety for these beliefs to be challenged. In this environment, girls could ask questions, experiment, make mistakes, and try things without the pressure of comparison or judgement that they might experience in mixed technical settings.

Confidence was built through:

- concrete accomplishment;
- hands-on making;
- supportive mentoring;
- low-pressure learning;
- absence of formal assessment;
- playful experimentation;
- visible outcomes;
- the experience of being surprised by one’s own ability.

Many participants were surprised by what they could do, whether in Scratch, with microcontrollers, robotics, 3D design, or other hands-on activities. The goal was not formal evaluation, but enjoyment, discovery, and self-surprise. This made the workshops effective as low-stakes environments for building digital self-efficacy.

### **Networks**

Networks were important at several levels. First, the initiative relied on the organiser’s professional and social networks to recruit mentors, collaborators, donors, and partner institutions. Second, repeat participation created a small community of girls who returned to workshops and stayed loosely connected over time. Third, cooperation with libraries, youth organisations, and community spaces widened the social reach of the programme.

The networks also had an inclusion function. In some contexts, especially where participants came from economically disadvantaged or migrant backgrounds, the workshops provided access not only to digital learning, but also to broader cultural and social support.

Although the interview does not describe a formal alumni network, the practice created recurring contact points and relational continuity. This helped sustain girls’ engagement and kept some participants connected to technology over a longer period.

### **ICT Career Support**

The programme supported later ICT pathways mainly by widening girls’ sense of possibility and by exposing them early to programming, digital creativity, and critical technological thinking.

The organiser did not frame the workshops narrowly as career preparation. However, the interview suggests that they could have long-term effects. At least one participant is mentioned as later studying computer science in upper secondary school, and other examples suggest continued technological engagement.

Career support was therefore indirect but meaningful. The workshops helped girls see that computers are not only consumer devices or entertainment platforms, but tools that can be understood, shaped, programmed, questioned, and used creatively.

The programme supported ICT career imagination by:

- introducing programming in a low-pressure environment;
- linking technology to creativity and everyday life;
- showing that girls can build and control digital tools;
- developing confidence with digital technologies;
- connecting programming with ethics, media, design, and society;
- broadening the picture of what a technology-related future might involve.

### **ICT Entrepreneurship**

ICT entrepreneurship was not the explicit focus of the programme. However, the workshops supported entrepreneurial dispositions through experimentation, creative problem-solving, initiative, and the production of tangible outputs.

Participants programmed games, built interactive systems, created technological-artistic artefacts, and explored how digital tools can be used in socially and creatively meaningful ways.

The practice supported competences such as:

- initiative;
- creativity;
- experimentation;
- problem-solving;
- collaboration;
- digital authorship;
- presentation of ideas;
- applied use of technology;
- confidence in making something independently.

The organiser's own delivery model also reflected an entrepreneurial mode of practice, because the programme was built through fundraising, sponsorship-seeking, partnership-building, and project improvisation.

In the learning content itself, the strongest entrepreneurial element was not business creation, but digital agency: girls were encouraged to become active creators rather than passive users of technology.

### Key Good Practice Elements

The practice can be described as a multi-layered gender-inclusive model based on:

- girls-only participation spaces;
- holiday-school and workshop formats;
- early engagement with programming and digital technologies;
- hands-on, playful, and creative learning;
- critical digital literacy and media literacy;
- attention to privacy, ethics, society, and digital ecology;
- small-group mentoring;
- diverse expert collaborators;
- free participation and accessibility;
- inclusion across social backgrounds;
- low-pressure environments without school-like assessment;
- confidence-building through concrete accomplishment;
- repeat participation and relational continuity;
- the idea that girls do not need simplified content, but safer and more supportive spaces in which they can discover their own capability.

| Good practice element                                           | Supporting quote                                                                                                                                                    |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Girls-only framing can increase participation                   | "The holiday school in programming for girls was an attempt to see whether, if we simply write that the school is for girls, that alone is enough to attract them." |
| Safe space helps girls confront self-doubt                      | "There they found a safe shelter where they could get past it."                                                                                                     |
| Girls may carry negative beliefs about themselves and computers | "I'm stupid for computers."                                                                                                                                         |
| Workshops helped girls rethink those beliefs                    | "They were dealing with their own prejudices about what they know and can do with computers."                                                                       |

|                                                          |                                                                                                                                                       |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Immediate hands-on learning was central                  | “Everything was done hands-on; nothing was like, first there will be a lot of lecturing and only then we’ll work.”                                    |
| The goal was enjoyment, not school-like pressure         | “The idea was that they should mostly have fun.”                                                                                                      |
| Daily thematic modules created variety                   | “Each school was organised so that each day had one emphasis.”                                                                                        |
| Digital literacy linked to critical and social questions | “We wanted to show them where digital technology and media are embedded in our lives and what implications this has for their lives and for society.” |
| Diverse expert collaborators enriched the programme      | “Different experts from different fields came and worked with them.”                                                                                  |
| Small groups and enough mentors were essential           | “We need one mentor for four or five people.”                                                                                                         |
| Free participation as an inclusion principle             | “It was all free, always free.”                                                                                                                       |
| Accessibility across social backgrounds                  | “We have to make this accessible to everyone.”                                                                                                        |
| Repeat participation suggests sustained motivation       | “Natalija was already at this school for the second time.”                                                                                            |
| Some girls were surprised by their own ability           | “They were themselves surprised that they could even do it.”                                                                                          |
| Long-term effects may be meaningful                      | “She is now in the third year of computer science.”                                                                                                   |

## Dekleta in digitalni svet (Girls and the Digital World)

**Country:** Slovenia

### Level of Education

Non-formal education, with relevance for secondary education and early higher education. Dekleta in digitalni svet is not a formal school-based programme and is not part of the regular curriculum. It is a non-formal introductory programming workshop model aimed at girls and young women who may not yet have prior programming knowledge. The strongest direct focus is on secondary-school girls, while the programme is also relevant for young women at the beginning of higher education. Its main purpose is to provide an accessible, supportive, and socially safe first contact with programming and digital creation. The most accurate classification is therefore non-formal introductory programming education for secondary-school girls and young women at the beginning of higher education.

### Age Group

The programme is intended for girls and young women aged approximately 14 to 20 years.

The main target groups are:

- secondary-school girls, approximately 14–19 years old;
- young women at the beginning of higher education, approximately 19–20 years old.

The main emphasis is on secondary-school girls, because this is an important period for forming attitudes toward technology, digital competences, future study choices, and one's own sense of belonging in technical fields.

### Engagement of Girls

The programme was created to offer girls a first contact with programming in a setting that feels welcoming, understandable, and socially safe. Its starting point was the organisers' own experience of being among the few girls in technology-oriented learning environments and recognising how difficult it can be for girls to enter such spaces without encouragement. The workshops reduce this barrier by presenting programming as something girls can approach gradually, without needing prior expertise. The emphasis is not on technical prestige, but on logical thinking, problem-solving, creativity, and the experience of creating something by oneself.

Girls' engagement is strengthened by the peer-led nature of the programme. The organisers are close in age to the participants, which helps create trust and reduces the distance between mentors and learners. The informal and non-authoritarian atmosphere makes it easier for participants to ask questions, experiment, and learn without fear of judgement. The programme also supports engagement through creative ownership. Each participant creates her own simple game and can personalise it through characters, backgrounds, sounds, and design choices. This makes programming more concrete, meaningful, and enjoyable.

### How Girls Learn About It

Girls learn about the initiative through a combination of institutional and informal communication channels. The workshops are promoted through the websites and communication channels of youth and incubation organisations, as well as through posters, public presentations at events, and social media. Social media plays an important role because it reaches participants in communication formats they already use regularly. School-related Instagram communication is especially relevant for younger participants. Important communication channels include:

- websites of youth and incubation organisations;
- communication channels of partner organisations;
- posters;
- public presentations at events;
- social media;
- school-related Instagram communication;
- informal sharing among young people.

The programme therefore relies on both organisational support and peer-relevant digital visibility.

### **Learning Formats**

The learning format is workshop-based, practical, interactive, and beginner-friendly. The organisers first introduce the basic logic of programming and explain how computers process instructions. Participants then move into hands-on work in Scratch, which enables them to begin creating something independently relatively quickly.

The workshop combines conceptual explanation, guided practice, hands-on programming, creative adaptation, individual experimentation, and peer exchange. Each participant creates her own simple game, which gives the activity a clear structure and a visible final outcome. The format is suitable for participants with different levels of prior knowledge. Beginners can follow the activity through step-by-step support, while participants with more experience can extend their work and help others. This creates a flexible and collaborative learning environment.

### **Mentoring and Partnerships**

The organisers themselves act as mentors. They divide their roles between conceptual explanation and practical support, helping participants understand both the logic of programming and the concrete steps needed to create their game. The mentoring approach is intentionally informal, approachable, and non-authoritarian. The mentors make it clear that they do not need to know everything in advance and that questions can be solved together. This helps reduce pressure and makes it easier for participants to ask for help. The workshops are made possible through partnerships with youth and incubation organisations, which provide space, institutional support, promotion, visibility, access to participants, and a community-based learning environment. This support structure enables the programme to take place in accessible non-formal settings rather than only in formal school environments. At the same time, the experience shows that stronger cooperation with schools would be valuable for future development, as access to school settings remained a structural challenge.

### **Confidence Development**

Confidence development is one of the strongest dimensions of the programme. The workshops are designed to reduce fear and self-doubt by making it clear that participants do not need prior competence in programming.

The learning environment allows girls to learn through gradual progress, joint problem-solving, experimentation, and trial and error. Participants are not expected to prove that they already belong in a technical space; instead, they are supported in discovering that they can create something functional and personally meaningful.

Confidence is strengthened through small-group work, supportive mentoring, accessible tools such as Scratch, the possibility of asking questions without embarrassment, peer support, personalisation of the final product, and successful completion of a working game. The final product is especially important. Each participant creates her own game, which provides concrete evidence of her ability to use programming to build something. This supports digital self-efficacy and helps participants experience themselves as capable creators rather than passive users of technology.

### **Networks**

Although the workshop groups are relatively small, networking emerges as a meaningful part of the experience. Participants begin helping one another, exchanging ideas, and responding to each other's creative choices during the activity. This gradually creates a small peer ecosystem in which support does not come only from the organisers, but also from within the group itself. Even quieter participants can become involved through shared activity, comparison of ideas, and informal collaboration. The programme therefore functions not only as a teaching format, but also as a social learning environment. It allows girls to see other girls engaging with programming in a relaxed, collaborative, and supportive way.

### **ICT Career Support**

The programme supports later ICT pathways by introducing programming as a form of logical thinking and structured problem-solving, not only as a narrow technical skill. The organisers want participants to understand that planning, breaking problems into steps, testing ideas, and solving problems are useful beyond programming itself. Career support is therefore mostly indirect, but meaningful. The workshops help participants see that digital knowledge is relevant, usable, and approachable, even if they do not ultimately choose a computing degree. The programme supports ICT career imagination by offering a first positive experience with programming, showing that girls can create digital products, presenting programming as both logical and creative, reducing fear of technical fields, developing confidence with digital tools, and making ICT-related study paths more imaginable. The interview also includes an example of a participant who later chose to study computer and information science, suggesting that the workshops can influence educational choices more directly in some cases.

## ICT Entrepreneurship

Entrepreneurship is not a central focus of the programme. However, the practice supports entrepreneurial dispositions through initiative, independent creation, digital agency, and creative problem-solving. Participants are encouraged to make their own choices, customise their projects, and treat programming as a tool for building something of their own. This supports competences such as initiative, creativity, problem-solving, self-direction, digital authorship, experimentation, and confidence in producing a concrete result. The organisers also discussed the possibility of expanding the programme into a more structured sequence of workshops, which indicates potential for further development and scaling. In this sense, the programme does not teach entrepreneurship in a narrow business sense, but it supports creative initiative and the ability to use digital tools to develop one's own ideas.

## Key Good Practice Elements

Dekleta in digitalni svet can be described as a multi-layered gender-inclusive model based on:

- peer-led mentoring;
- girls-focused introductory programming workshops;
- accessible digital tools such as Scratch;
- emotionally safe learning spaces;
- informal and approachable facilitation;
- small-group work;
- personalisation and creative ownership of outcomes;
- peer support and collaborative group dynamics;
- institutional support from youth and incubation organisations;
- free participation;
- basic accessibility measures for participants without their own equipment;
- programming as logical thinking and problem-solving;
- long-term potential for expansion through stronger school cooperation.

| Good practice element                                     | Supporting quote                                                                                                                            |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Programme emerged from lived experience of exclusion      | "It is actually quite difficult as a woman to enter that space, especially when you are younger."                                           |
| Targeting girls in adolescence and early higher education | "The workshops were intended for girls, secondary school and the beginning of university, so basically from 14 to around 20 years old."     |
| Programming as logical thinking                           | "We wanted to teach them how to plan and solve problems."                                                                                   |
| Programming framed as broadly useful                      | "That does not help only in programming, but basically in everything, in life."                                                             |
| Promotion through youth organisations and social media    | "It was on the websites of all these things... and also on social media."                                                                   |
| Peer closeness of mentors                                 | "It is really great because we are young and basically the same generation as them."                                                        |
| Non-authoritarian facilitation                            | "I really emphasised that I also do not know everything, and that if they asked something I did not know, we would figure it out together." |

|                                               |                                                                                                                                           |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Personalisation increased motivation          | “Each one could use her own customisation, each one had a different character, a different background, a different thing to jump over.”   |
| Peer exchange emerged naturally               | “It created its own ecosystem where we were more like a side source, and they maintained it themselves.”                                  |
| Small groups supported inclusion              | “The biggest group was 10 people... we wanted to keep it quite small.”                                                                    |
| Mixed prior knowledge could work well         | “The girl who already knew quite a lot was very ready to help.”                                                                           |
| Final product gave concrete outcome           | “Each one made her own game.”                                                                                                             |
| Free access reduced barriers                  | “Yes, it was free for the participants.”                                                                                                  |
| Adaptation for participants without equipment | “If someone did not have access to a computer, we asked them to inform us in advance and we would somehow obtain the necessary material.” |
| Influence on later study choice               | “Later we heard that she would go to the Faculty of Computer and Information Science.”                                                    |
| Access to schools as structural challenge     | “We also tried to communicate with schools... but there was not the best response.”                                                       |

## Coding4Girls

**Country:** Slovenia

### Level of Education

Primary education, delivered through non-formal and school-transferable programming activities. Coding4Girls is a programming education initiative aimed at girls in primary education, with the strongest focus on the later years of primary school. The project was not designed as a regular school subject, but as a structured, pedagogically designed learning model that could be implemented in non-formal settings and later transferred into school practice through prepared teaching materials. The initiative introduces girls to programming through creative, visual, and game design-based learning. It also includes teaching scenarios and reusable materials, enabling teachers to implement the activities in their own educational contexts. The most accurate classification is therefore primary education, with a strong focus on upper primary pupils and non-formal programming activities that can be used in schools.

### Age Group

The programme is most relevant for:

- upper primary school girls, approximately 10–15 years old.

Although primary education formally includes younger pupils, the content described in the practice — game design, Snap programming, structured problem-solving, and gradually more complex programming tasks — is most appropriate for pupils in the later years of primary school.

### Engagement of Girls

Coding4Girls was designed to address the underrepresentation of girls in programming and ICT-related pathways by developing activities that would feel more appealing, accessible, and meaningful to them.

Instead of relying on a traditional mathematics-driven approach to programming, the project used game design-based learning and visual block-based programming. This created a more inviting entry point into programming, especially for girls who might otherwise perceive coding as abstract, technical, or intimidating.

A key engagement strategy was the use of themes considered closer to girls' interests and broader social concerns, such as environmental awareness, social responsibility, storytelling, animal care, and creative design. Programming was therefore presented not only as a technical activity, but as a way of creating stories, solving problems, designing meaningful artefacts, and expressing ideas.

The initiative aimed to reduce the perceived distance between girls and programming by showing that coding can be imaginative, constructive, creative, and socially relevant.

### How Girls Learn About It

Girls learned about the project primarily through organised outreach connected to the winter school format and through collaboration with actors already active in youth and digital education.

Recruitment and logistics for the winter school were supported by an external organiser connected with Code Week activities. Participating pupils were also reached through youth-organisation channels and educational networks. Important dissemination routes included:

- Code Week-related communication;
- youth-organisation channels;
- organised winter school recruitment;
- cooperation with actors in digital and youth education;
- later planned school-based implementation through teachers;
- prepared materials that could be reused in classrooms.

The practice was therefore not promoted only through one formal school route. It became visible through a combination of youth-sector dissemination, digital education networks, and planned transfer into school practice.

### Learning Formats

Coding4Girls used a highly structured but creative learning format based on designing games, not simply playing them. The selected programming environment was Snap, which was chosen because it offers more advanced functions than Scratch while still remaining accessible through block-based programming.

The project team developed more than twenty activities. Each activity included:

- a teaching scenario;
- prepared starting files;
- structured programming tasks;
- possibilities for extension;
- additional tasks for more advanced pupils.

The activities progressed gradually in complexity. Participants began with introductory functions and guided tasks, then moved toward greater independence and more complex programming structures.

The format combined programming, game design, storytelling, creativity, environmental themes, socially relevant topics, problem decomposition, visual design, and aesthetic elements. This interdisciplinary format helped pupils engage with coding through a broader frame than syntax alone. It also allowed teachers to use the materials directly in later teaching contexts.

### **Mentoring and Partnerships**

Support in the project came through guided workshop facilitation and a broader collaborative framework. The project depended on cooperation between university-based project staff, an organiser active in Code Week-related work, youth-sector partners, and the hosting environment where the winter school was carried out.

The project team took on the mentoring role during implementation. At the beginning, pupils received more direct instruction and guidance. As the week progressed, the role of the mentors shifted toward facilitation, allowing participants to work more independently and add their own ideas.

Partnerships were important for recruitment, organisation of the winter school, access to participants, preparation of learning materials, implementation of activities, and later transfer of materials into school settings.

The project was also designed with teacher uptake in mind. Teaching scenarios and translated materials were prepared so that teachers could continue using the activities after the initial pilot implementation.

### **Confidence Development**

Confidence was developed through carefully scaffolded progression, visible success in completing tasks, and gradual movement from guided work toward independent creation.

A key pedagogical strategy was decomposition. Complex programming problems were broken into smaller, manageable parts so that pupils could experience progress step by step. This reduced fear and helped participants see that they could understand and solve programming problems.

Confidence was strengthened through visual block-based programming, structured guidance, gradual increase in task complexity, visible progress, creative ownership, completion of game-based artefacts, opportunities for extension, and comparison with other girls who were also succeeding.

The project team observed that some girls quickly moved beyond the prepared material and began adding their own ideas. This suggests that the learning format opened space not only for competence, but also for self-confidence, initiative, and creative ownership.

Programming was also made visually attractive and aesthetically engaging, reducing the impression that coding is only about abstract logic or “bare code”.

### **Networks**

Coding4Girls created opportunities for connection among girls from different schools who might not otherwise have met. The winter school brought together participants from different educational environments and created a small peer network around shared interest in programming.

Networking happened through shared workshop time, informal interaction during breaks, collaboration, comparison of ideas, peer inspiration, and seeing other girls succeed in programming.

An important network effect was that less experienced participants could see that more advanced pupils were also girls. This helped challenge the assumption that coding competence belongs mainly to boys.

The practice therefore supported not only individual learning, but also the creation of a peer environment in which girls could see programming as something other girls also enjoy and can do well.

## ICT Career Support

Coding4Girls contributed to ICT career support mainly by opening programming as a possible future pathway at an early stage and by broadening girls' understanding of what computing can involve.

The project was not framed as direct career counselling. Its career relevance lies in early motivation, confidence-building, and helping girls imagine themselves in programming and ICT-related fields.

The programme supported ICT career imagination by showing that programming can be creative and socially meaningful, presenting computing through game design and storytelling, connecting programming with environmental and social topics, reducing fear of coding, developing early confidence with programming concepts, showing that girls can succeed in technical tasks, and preparing reusable materials for longer-term educational use.

By presenting programming as creative, interdisciplinary, and meaningful, the project helped position computing as a field in which girls could imagine themselves.

## ICT Entrepreneurship

ICT entrepreneurship was not the main focus of Coding4Girls. However, entrepreneurial elements were present indirectly through creativity, design, initiative, problem-solving, and the production of original digital artefacts.

Participants were encouraged to move from an idea to a working digital product. This supported competences such as creative problem-solving, initiative, digital authorship, game design, independent extension of tasks, invention, ownership of digital products, and confidence in building something from an idea.

The stronger emphasis was on programming, game design, creative learning, and educational engagement rather than business creation. However, the structure of the activities clearly supported entrepreneurial ways of thinking by encouraging pupils to design, build, test, adapt, and extend their own digital artefacts.

## Key Good Practice Elements

Coding4Girls can be described as a multi-layered gender-inclusive model based on:

- game design-based learning;
- visual block-based programming in Snap;
- creative entry points into programming;
- themes connected to girls' interests and social relevance;
- environmental awareness, social responsibility, storytelling, and design;
- carefully scaffolded progression;
- decomposition of complex programming problems;
- structured teaching scenarios;
- reusable teacher-ready materials;
- extension tasks for more advanced pupils;
- peer inspiration among girls from different schools;
- visual and aesthetic attractiveness of activities;
- confidence-building through independent creation;
- transfer potential into regular school practice.

| Good practice element                                      | Supporting quote                                                                                                       |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Addressing the gender gap in programming                   | "The goal was how to include young girls in becoming interested in computing."                                         |
| Different approach from traditional maths-focused teaching | "Typical mathematics and similar content generally address boys more, while we tried to develop a different approach." |
| Learning programming through game design                   | "It was game design-based learning — not that they learn with games, but that they learn through making games."        |

|                                                        |                                                                                                                                                         |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Specific focus on programming                          | “The goal was not so much general computing, but rather programming.”                                                                                   |
| Themes closer to girls’ interests                      | “The tasks addressed social responsibility, environmental awareness, and themes that are closer to girls.”                                              |
| Reusable teacher-ready materials                       | “For each activity we also prepared a teaching scenario, so that a teacher could take it directly and implement it without adaptation.”                 |
| Supporting different ability levels                    | “We also upgraded each activity and added extra tasks for more advanced pupils.”                                                                        |
| Creativity as a motivating element                     | “This aspect of creativity was really addressed here.”                                                                                                  |
| Building independence through scaffolding              | “At the beginning it was more guided, and then toward the end of the week the tasks were already much more independent.”                                |
| Decomposing problems to increase mastery               | “That part seemed important to me — that we gradually came to the point where the activity became something they could already do quite independently.” |
| Girls exceeding expectations                           | “Some girls were really diligent and worked further on their own because they solved everything quickly and then created their own things.”             |
| Peer inspiration from other girls                      | “The weaker ones saw that the stronger ones were girls too, and that is very good at this age.”                                                         |
| Informal networking among girls from different schools | “These were pupils from different schools, so in terms of networking we probably also contributed.”                                                     |
| Formative rather than stressful evaluation             | “We walked around the room, looked at what they had done, and could assess quite well where each one was with their knowledge.”                         |
| Strong motivation and sustained engagement             | “They were motivated and worked throughout; there was no one who was bored or said this is too difficult.”                                              |
| Visual and aesthetic design as part of engagement      | “We really tried to make the activities graphically attractive, so that it was not just bare code.”                                                     |

## Girls Go Circular

**Country:** Slovenia

### Level of Education

Upper primary education and secondary education, delivered through school-based project learning. Girls Go Circular is a school-based project-learning initiative that combines digital competences, circular economy, sustainability, innovation, and entrepreneurial thinking. It should not be described as a general programme for all of primary education. The described implementation is most relevant for older pupils, especially those in the final years of primary school, and for secondary-school students.

The most accurate classification is therefore upper primary and secondary education, with implementation through school-based, project-oriented, and digitally supported learning activities.

### Age Group

The relevant age groups are:

- upper primary school pupils, approximately 14–15 years old, especially pupils in the final year of primary school;
- secondary-school students, approximately 15–19 years old.

The most appropriate age range is therefore approximately 14–19 years old. Although the wider initiative is formally oriented toward girls, the described Slovenian implementation also includes boys in mixed groups. Girls nevertheless remain a central focus, especially in relation to confidence-building, ownership of ideas, and participation in digital and innovation-oriented activities.

### Engagement of Girls

Girls' engagement is built through a project that connects digital competences with circular economy, sustainability, innovation, and entrepreneurship. These topics are presented as meaningful and socially relevant, which helps students understand digital skills as tools for addressing real-world challenges.

Although the initiative is formally intended for girls, the described implementation uses mixed groups. Mixed participation is seen as creating better group dynamics and stronger energy in the group. At the same time, girls remain a central focus, particularly in relation to confidence-building and ownership of ideas.

The project engages girls by giving them space to develop their own ideas, use digital tools, work collaboratively, and create something that has value beyond the classroom. Engagement is also supported by student choice: each group can select or shape the thematic focus of the project, which increases ownership and motivation.

The practice is offered broadly to older pupils, including both highly able students and those who are simply interested. This widens access beyond a narrow gifted-only model and supports participation based on curiosity, motivation, and interest, not only prior achievement.

### How Girls Learn About It

Students mainly learn about Girls Go Circular through the school itself. Recruitment is based on the teacher's invitation, school communication, and presentation of the opportunity to older pupils.

Important communication channels include:

- teacher invitation;
- internal school communication;
- presentation of the opportunity to pupils;
- school-based project activities;
- occasional peer influence from previous cohorts.

The project becomes accessible because it is offered within the school environment. This is important because topics such as circular economy, digital innovation, artificial intelligence, and entrepreneurial thinking are not necessarily strongly present in students' everyday media environment.

Recruitment therefore depends less on broad public promotion and more on teacher initiative, school-level support, and students' trust in the school context.

### **Learning Formats**

The learning format is project-based, collaborative, digitally supported, and strongly oriented toward developing an idea into a concrete product, prototype, or presentation.

The project combines: short instructional inputs; online learning modules; mandatory online safety content; brainstorming; group work; thematic exploration of circular economy; digital creation; use of tablets and online platforms; Canva and digital design; artificial intelligence tools; prototype or product development; final presentation or documentation of the idea.

Students first complete mandatory online material on online safety. They then move into thematic work related to circular economy and the chosen annual topic. Themes vary according to student interest, which makes the project flexible and increases student ownership.

Activities are carried out partly during regular lessons, partly in enrichment periods, and partly in additional time for more motivated pupils. Entrepreneurial thinking is embedded in the learning format because students are expected to create something useful for others, rather than complete a purely theoretical task.

### **Mentoring and Partnerships**

Mentoring is one of the clearest strengths of the practice. The teacher's role is facilitative rather than directive. The mentor supports students in generating, developing, and refining their own ideas, while trying not to impose too many suggestions. This non-directive mentoring approach is especially valuable for girls because it helps build ownership and confidence. Students are encouraged to feel that the final idea or product is genuinely theirs.

Institutional support at school level is also important. Supportive school leadership enables teachers to participate in such projects, use school resources, and organise additional project work. The project is part of a wider European framework and uses externally prepared online materials, but the everyday quality of implementation depends strongly on the teacher's mentoring approach and the school's support. Partnerships are therefore present on two levels: the broader European project framework and prepared online platform; the local school-level implementation through teacher mentoring, school leadership, and available digital resources.

### **Confidence Development**

Confidence development is clearly present in the practice. Students, especially girls, are supported by being allowed to create something that feels genuinely their own.

The mentor deliberately steps back enough for students' own ideas to emerge. This strengthens competence, ownership, and self-confidence. Group work also supports confidence because students negotiate, solve problems together, test ideas, and gradually shape something concrete.

A key confidence-building moment occurs when students recognise the final product as their own. This sense of ownership is especially important for girls because it positions them not only as participants, but as creators and innovators. Confidence is built through: guided but non-directive mentoring; student-led idea development; collaborative work; meaningful digital tool use; visible outcomes; product ownership; participation in innovation-oriented activities.

The project therefore supports confidence not by giving students ready-made answers, but by helping them experience that their own ideas can become concrete and valuable.

### **Networks**

Networks appear mainly through peer interaction within the participating group. The project creates a small internal learning community in which students collaborate, exchange ideas, influence one another, and jointly develop solutions.

The strongest network dimension is local and school-based. It is centred on group work, peer collaboration, shared project ownership, teacher-student mentoring relationships, and school-level support.

Occasional influence from previous student cohorts can also support interest, although this varies from year to year. The networking component is not formalised as an alumni or external professional network, but it is meaningful as a peer-learning environment.

### **ICT Career Support**

ICT career support is present indirectly rather than as a formal career-guidance component. The project introduces students to digital tools, online platforms, artificial intelligence-supported work, collaborative problem-solving, and innovation-oriented project development.

The practice supports future pathways by helping students gain experience with digital tools, familiarity with online learning environments, awareness of online safety, experience with AI tools, collaborative problem-solving skills, project development experience, and confidence in digital creation.

The certificate is presented as potentially useful for further studies, scholarships, or future educational opportunities. The strongest contribution of the practice lies in exposing students early to digital and innovation-oriented work and giving them one additional documented experience that may support future pathways.

### ICT Entrepreneurship

ICT entrepreneurship is one of the more visible dimensions of this practice, although it is embedded into the project rather than taught as a separate business module.

Students are asked to develop an idea that is useful to others. Entrepreneurship is framed as creating something that has value beyond the individual student. This means that students do not only complete a school task, but think about a need, a user, a problem, and a possible solution.

The entrepreneurial process includes: brainstorming; identifying a problem or need; developing an idea; checking whether similar products already exist; shaping the idea into a concept; using digital tools to develop or present it; moving toward a prototype or digital presentation; explaining the value of the proposed solution.

Digital competences are closely connected with this entrepreneurial process through the use of Canva, artificial intelligence tools, online materials, tablets, and presentation-oriented outputs.

Entrepreneurship is therefore understood as a way of thinking: developing useful ideas, shaping them collaboratively, and communicating them through digital tools.

### Key Good Practice Elements

Girls Go Circular can be described as a multi-layered gender-inclusive model based on:

- school-level initiative;
- upper primary and secondary education;
- flexible project-based learning;
- digital and sustainability-oriented content;
- circular economy themes;
- online safety as a required foundation;
- strong teacher mentoring;
- non-directive guidance that supports student ownership;
- mixed-group collaboration with continued attention to girls' confidence;
- broad access beyond a narrow gifted-only model;
- accessible digital tools and online materials;
- use of AI and design tools;
- meaningful thematic content linked to real-world issues;
- teacher commitment and supportive school leadership;
- early exposure to digital and entrepreneurial thinking;
- practical certification and visible outcomes.

| Good practice element                             | Supporting quote                                                                                                                                                                    |
|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Broad access beyond gifted-only model             | "I do not make a distinction between gifted students and those who are simply interested, and I invite the whole ninth grade."                                                      |
| Mixed-group participation with attention to girls | "Although it is intended only for girls, I always invite boys as well, because the dynamics and the energy are much better, and I think it is good that they work in mixed groups." |
| Student choice increases engagement               | "Each year I allow the group itself to choose, either by drawing lots or through brainstorming, which area we will cover."                                                          |

|                                             |                                                                                                                                                                                      |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Digital and sustainability content combined | “It seemed interesting to me because it covers the circular economy, sustainable development, and also requires some digital competences.”                                           |
| Online safety as a foundation               | “Each generation must first complete the general education on online safety; that is the obligation they must finish, otherwise the system does not let them continue.”              |
| Entrepreneurship as benefit for others      | “I always explain entrepreneurship as making something that is also useful for others, not just for me.”                                                                             |
| Group-based idea development                | “They developed it through brainstorming, writing, discussing, and imagining it — a kind of group dynamics.”                                                                         |
| Use of AI and digital design tools          | “Since we were working on artificial intelligence, I said: let us use it to help ourselves, so they used artificial intelligence, and then we developed these things through Canva.” |
| Mentoring through non-directive guidance    | “I mainly have the role of a mentor; I try to put as little of myself into it as possible, in the sense of suggesting too much.”                                                     |
| Confidence-building, especially for girls   | “I want their ideas to emerge, so that they also gain that self-confidence, especially the girls.”                                                                                   |
| Ownership over final product                | “They say at the end: this is really our product.”                                                                                                                                   |
| School leadership support                   | “Our headteacher supports a teacher who wants to do more, always and everywhere.”                                                                                                    |
| Support depends on enthusiasm               | “I do not think there is much support, apart from the enthusiasm and motivation of mentors.”                                                                                         |
| Need for systematic school guidance         | “Students really know nothing about this, and social media do not talk about it at all, so I think they really need to be guided systematically towards these contents.”             |
| Certificate may support later pathways      | “Only then do they get a certificate, which according to the organizers should also be useful for further studies or scholarship applications.”                                      |
| Administrative barriers                     | “We spend a lot of time registering in the system... a lot of time goes into technical problems before we have even started.”                                                        |

## Annex 7. Practices in Spain

Across the Spanish cases, gender-inclusive ICT learning is supported through a combination of early awareness-building, creative digital learning, mentoring, role-model visibility, and strong links between education, innovation, and employability. Rather than relying only on formal curriculum structures, Spanish initiatives frequently combine public institutions, NGOs, universities, companies, and community actors to create inclusive digital participation pathways for girls and women.

At the school level, the strongest approaches focus on dismantling stereotypes early and making ICT visible as a socially meaningful, creative, and collaborative field. Role-model exposure, AI-and-ethics co-design, hands-on workshops and project-based creation are embedded into interdisciplinary formats that reduce intimidation and encourage experimentation.

In hobby and non-formal education, inclusion is strongly supported through mentoring, girls-focused initiatives, maker culture, coding clubs, and innovation-oriented participation. These spaces often emphasize emotional safety, peer support, and confidence-building, helping girls develop a sense of belonging in technical environments.

At higher education and professional levels, Spanish practices focus on retention, employability, interdisciplinary ICT pathways, entrepreneurship, and women's participation in innovation ecosystems. Universities, research centres, and industry actors frequently collaborate to support women's transitions into digital careers through mentoring, networking, applied projects, and flexible learning opportunities. Taken together, the Spanish cases reveal a progressive model of gender inclusion in ICT:

- Awareness and access → reducing stereotypes and increasing early exposure to ICT
- Engagement and confidence → supporting identity-building through practical, collaborative, and creative learning
- Retention and professional transition → strengthening women's participation through mentoring, employability, and innovation networks

A key cross-cutting characteristic is that successful Spanish approaches position ICT as socially relevant, creative, collaborative, and connected to real-world impact rather than isolated technical performance.

### SCHOOLS IN SPAIN

Across the reviewed Spanish dataset, school-level initiatives emphasize stereotype reduction, practical experimentation, digital creativity, and inclusive participation in STEAM learning. The strongest approaches focus on making ICT relatable, visible, and accessible to girls at early stages.

The selected cases are:

- Girls4STEM
- InspiraSTEAM
- STEM4Girls UC3M
- EDUGENIA (ACTFEM Toolkit)
- HorigeSTEM

*Table 1: ICT Education Provision for Girls at Schools in Spain*

| Practice                         | Level                    | What it does                                                                          | Inclusion mechanism                              |
|----------------------------------|--------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------|
| <b>Girls4STEM</b>                | Pre-university           | Students create video-biographies of women STEM professionals who visit the classroom | Role-model visibility; outcome expectations      |
| <b>InspiraSTEAM</b>              | Primary (6th grade)      | Six in-school sessions with women mentors; girls-only intermediate sessions           | Stereotype reduction; safe-space participation   |
| <b>STEM4Girls UC3M</b>           | Secondary (12–18)        | Hands-on engineering/coding workshops, cascade mentoring, competitions                | Self-efficacy through mastery; female leadership |
| <b>EDUGENIA (ACTFEM Toolkit)</b> | Secondary (16–18)        | Co-design of AI-ethics resources linking AI to algorithmic bias and social justice    | Autonomy; critical-user identity                 |
| <b>HORIGESTEM</b>                | Primary/secondary/higher | Classroom exposure to videos of women in male-dominated STEM, pre/post measurement    | Stereotype reduction; self-concept               |

## Recurring Small-Level Practices in Schools in Spain

The Spanish school-level cases show that gender inclusion is fostered through repeated collaborative and creative learning experiences that reduce intimidation and strengthen girls' confidence.

*Table 2: Recurrent Micro-Practices Supporting Gender Inclusion at Schools (Spain)*

| Micro-practice                                  | Found in                             |
|-------------------------------------------------|--------------------------------------|
| <b>Hands-on experimentation</b>                 | STEM4Girls UC3M; InspiraSTEAM        |
| <b>Creative / interdisciplinary ICT framing</b> | EDUGENIA; STEM4Girls UC3M            |
| <b>Female role-model visibility</b>             | Girls4STEM; HORIGESTEM; InspiraSTEAM |
| <b>Collaborative project work</b>               | Girls4STEM; STEM4Girls UC3M          |
| <b>Early exposure to ICT</b>                    | InspiraSTEAM; HORIGESTEM             |
| <b>Whole-class participation</b>                | InspiraSTEAM                         |
| <b>Family / teacher involvement</b>             | Girls4STEM; InspiraSTEAM             |

## Key Analytical Insight

A central finding is that Spanish school-level initiatives support inclusion by connecting ICT with creativity, collaboration, and social relevance.

The most effective approaches:

- Reduce stereotypes through early exposure and role models
- Emphasize hands-on and collaborative learning
- Connect ICT with meaningful societal and creative contexts
- Create supportive environments that reduce fear of failure

These practices collectively make ICT more accessible and attractive to girls who may not initially identify with technical fields. This is clearest in Girls4STEM and InspiraSTEAM, where role-model contact and early in-school exposure work to reduce stereotypes before vocational decisions are made.

## HOBBY / NON-FORMAL EDUCATION IN SPAIN

Within the Spanish dataset, non-formal education initiatives strongly emphasize mentoring, role-model networks, girls- and women-focused participation spaces, and community-building .

The selected cases include:

- Yes We Tech
- Emakumeak Zientzian
- STEM Talent Girl

*Table 3: ICT Education Provision in Hobby / Non-Formal Education (Spain)*

| Practice                   | Level                  | What it does                                                                                | Inclusion mechanism             |
|----------------------------|------------------------|---------------------------------------------------------------------------------------------|---------------------------------|
| <b>Yes We Tech</b>         | Ages 6–99              | Free women/girls-focused events, safe spaces, mentoring tied to a cybersecurity certificate | Peer community; self-efficacy   |
| <b>Emakumeak Zientzian</b> | Secondary → adult      | Network of 30+ research centres; lab visits and workshops around 11F                        | Belonging; stereotype reduction |
| <b>STEM Talent Girl</b>    | Secondary → university | Long-term mentoring (Science for Her → Mentor Women → Real Work), shadowing                 | Identity formation; relatedness |

## Recurring Small-Level Practices in Hobby / Informal Education in Spain

Across Spanish non-formal education cases, inclusion depends heavily on social belonging, emotional safety, and opportunities for experimentation.

*Table 4: Recurrent Micro-Practices Supporting Gender Inclusion (Spain)*

| Micro-practice                      | Found in                               |
|-------------------------------------|----------------------------------------|
| Girls-/women-focused safe spaces    | Yes We Tech; STEM Talent Girl          |
| Peer support and community-building | Yes We Tech; Emakumeak Zientzian       |
| Mentoring and role-model visibility | STEM Talent Girl; Yes We Tech          |
| Experiential / lab-based learning   | Emakumeak Zientzian                    |
| Public visibility and recognition   | Emakumeak Zientzian (11F); Yes We Tech |

## Key Analytical Insight

The Spanish non-formal education cases show that sustained engagement in ICT depends strongly on confidence, community, and visible pathways into digital participation.

The most effective approaches:

- Create supportive peer communities for girls
- Use mentoring and role models to support identity-building
- Encourage experimentation and creative participation
- Connect technical learning with innovation and real-world relevance

Non-formal learning therefore acts as an important bridge between initial curiosity and longer-term participation in ICT pathways. Yes We Tech and STEM Talent Girl illustrate this most directly, using safe spaces and sustained mentoring to turn initial interest into belonging.

## HIGHER EDUCATION, ADULT EDUCATION, AND PROFESSIONAL NETWORKS IN SPAIN

At higher education and professional levels, Spanish practices emphasize employability, reskilling pathways, mentoring and women's participation across the full career trajectory..

The selected cases include:

- FemCoders
- NoésFeinadeDones

*Table 5: ICT Education Provision for Women at Higher Education and Professional Levels (Spain)*

| Practice         | Level        | What it does                                                                 | Inclusion mechanism                          |
|------------------|--------------|------------------------------------------------------------------------------|----------------------------------------------|
| <b>FemCoders</b> | Adults (30+) | Six-month women-only reskilling simulating a working day; ~70% job placement | Outcome expectations; impostor-syndrome work |

|                         |                      |                                                                         |                                           |
|-------------------------|----------------------|-------------------------------------------------------------------------|-------------------------------------------|
| <b>NoésFeinadeDones</b> | Primary → leadership | Five life-stage pathways (Discover→Lead); community platform; mentoring | Relatedness; identity; reskilling support |
|-------------------------|----------------------|-------------------------------------------------------------------------|-------------------------------------------|

## Recurring Small-Level Practices in Higher, Vocational, and Adult Education in Spain

At this level, Spanish practices support inclusion through networking, interdisciplinarity, innovation, and flexible participation pathways.

*Table 6: Recurrent Micro-Practices Supporting Gender Inclusion (Spain)*

| Micro-practice                                   | Found in                                        |
|--------------------------------------------------|-------------------------------------------------|
| <b>Networking and mentoring</b>                  | NoésFeinadeDones; FemCoders                     |
| <b>Career transition / employability support</b> | FemCoders; NoésFeinadeDones (Re-invent pathway) |
| <b>Impostor-syndrome work</b>                    | FemCoders; NoésFeinadeDones                     |
| <b>Flexible / blended learning formats</b>       | FemCoders                                       |

## Key Analytical Insight

A central finding is that Spanish higher education and professional-level initiatives broaden participation by embedding ICT within employability, mentoring, and flexible learning pathways.

The most effective approaches:

- Reframe ICT as socially meaningful and accessible through alternative routes
- Support women through mentoring and networking structures
- Provide flexible and alternative pathways into digital professions
- Connect ICT learning with employability and labour-market transition

Unlike school-level practices, where the focus is on exposure and confidence, this stage emphasizes retention, employability, and professional belonging. These initiatives help ensure that women not only enter ICT pathways but also complete successful transitions into digital employment, as FemCoders' job-placement results show.

FemCoders and NoésFeinadeDones show this clearly, combining reskilling and mentoring with concrete labour-market transition (FemCoders reports ~70% job placement).

## Girls4STEM

Spain  
Pre-university  
2019  
Approx. 7000 participants

## 2. Brief description

*Describe the programme in a few lines: what does it consist of and what are its main activities?*

Girls4STEM is a project whose main objective is to make female role models visible in the fields of science, technology, engineering and mathematics so that students can learn about these professions and imagine themselves in them in the future. It is based on the idea that vocations already exist, but that social and cultural factors, especially in the case of girls, hinder their development in the STEM field.

The central activity of the project takes place within educational centres. Teachers register for the programme and get in touch with women professionals from the STEM sector, who visit classrooms either in person or virtually. Based on this experience, students work on the content and create video biographies in which they explain what the interviewed professional does and what her career path is like. These videos are publicly disseminated, which allows the impact to extend beyond the classroom and also reach families and the students' environment.

In addition, the project includes other complementary activities such as professional talks, specific events such as the activities on 11 February, collaborations with companies and a final event where results are presented and prizes are awarded.

## 3. Motivation and engagement

*How does the programme manage to spark interest among girls and young women in ICT and possible careers in this field? How do they discover this opportunity?*

The project aims to foster interest among girls (and also boys) in STEM through the visibility of real female role models. It starts from the observation that many technological professions are unknown to students and that, moreover, there are stereotypes that make it difficult for girls to identify with them.

For this reason, the project works by showing concrete examples of women who develop careers in these fields, thus helping students better understand the existing professional options. In addition, the intervention is not limited to students, but also targets their environment, involving teachers and families.

Participation in the project mainly occurs through educational centres, which register and implement the activities within their usual functioning.

## 4. Methodology and support

*What type of learning is used (projects, mentoring, mixed groups or only girls, etc.) and why does it work?*

*How is confidence and self-efficacy worked on?*

*Is there support, mentoring or collaboration with companies?*

The methodology used is based on active and participatory learning, centred on projects. Students do not only receive information but work actively by creating content (video biographies) based on interaction with real professionals. This approach allows the activity to be integrated into the daily classroom routine and fosters deeper engagement.

The project is carried out in mixed groups, with the intention of promoting an inclusive vision and avoiding excluding boys, considering that they must also be part of the change in the perception of STEM professions.

Regarding the development of confidence and self-efficacy, it is worked through direct contact with women professionals, who show not only their work but also their daily life, thus breaking stereotypes and facilitating identification by students.

The project offers support to teachers through initial training in gender perspective and in the implementation of activities, as well as materials and support in coordination with experts. However, flexibility is given to centres so that they can adapt the dynamics to their reality.

In addition, there is collaboration with companies, which participate by offering prizes, visits to their facilities and involvement in project events, although they do not provide direct funding.

## **5. Career guidance**

*Does it include elements related to job opportunities or entrepreneurship in ICT?*

The project clearly incorporates a dimension of career guidance. This is reflected in talks about professional opportunities, direct contact with women working in STEM fields and activities that allow students to get to know real working environments, such as visits to companies or university facilities.

## **6. Impact**

*What evidence do you have that the practice works?*

To evaluate the impact of the project, data are collected through pre- and post-questionnaires addressed to students, teachers and families. These data allow observing differences between the initial and final situation, although a global statistical analysis of the results has not yet been completed.

Regarding participation, the project has more than 300 women experts in STEM fields who have collaborated in the activities. In addition, there is continuous participation of educational centres, some of which repeat year after year, as well as high student involvement through different activity formats, both face-to-face and online.

Regarding the direct reach of activities, in one of the recent editions, 475 participants were registered in the main project competition, 506 participants in talks about professional opportunities and approximately 5,600 participants in the online talks on 11 February. As for families, 82 people participated. Several female STEM role models have also been made visible through different activities, including the competition, talks and the creation of audiovisual content.

At the training level, the project has included the participation of pre-university teachers and guidance staff, with specific training actions aimed at these groups.

Regarding dissemination reach, the project also reaches a wide audience through digital channels and online activities. In a recent edition, the project's social media generated approximately 180,000 impressions, with presence on platforms such as Instagram, Facebook and LinkedIn. In addition, emailing actions reached more than 12,000 recipients, with more than 2,000 openings. Streaming broadcasts of different activities have also been carried out, further expanding the reach of the project.

Overall, these indicators show a significant impact both in terms of direct participation and dissemination and social awareness.

## **7. Barriers and sustainability**

*What difficulties have you encountered?*

What resources or support are needed for the practice to be sustainable?

One of the main difficulties of the project is the high workload involved in its management, especially because it falls on university teaching staff without sufficient technical or administrative support.

There is also a lack of institutional support, both at the university level and from public administration, as well as the absence of a coordinated framework that allows identifying and articulating the different existing initiatives in this field.

Other difficulties include the complexity of reaching certain centres, especially in rural areas, and the dependence on centres' initiative to participate in the project.

Regarding sustainability, it is considered necessary to have more resources, especially in the form of institutional support, funding and technical staff who can take on management and coordination tasks, thus allowing teaching staff to focus on more academic and analytical functions.

## InspiraSTEAM

Spain

Sixth grade of primary school

### 2. Brief description

Describe the programme in a few lines: what does it consist of and what are its main activities?

The InspiraSTEAM programme is an initiative that originates in the Faculty of Engineering at the University of Deusto within a research group focused on educational technology, computational thinking and the promotion of interest in science and technology. It arises from the detection, both in European projects and in previous research, of a widespread concern about the lack of STEM vocations among young people, especially in the case of girls, where there is also a clear gender gap.

Unlike many initiatives focused on secondary education or high school, the programme decides to intervene at an earlier stage, specifically in the sixth grade of primary school, considering that in later stages many vocational decisions are already conditioned or even ruled out. The objective is not to convince participants to choose STEM studies, but to offer information, role models and experiences that allow them to make free decisions, without prejudice or stereotypes.

The programme is structured as an educational intervention during school hours consisting of six sessions of approximately one hour each. These sessions are designed around the main barriers identified in girls' access to STEM, such as lack of knowledge about professions, absence of role models, gender stereotypes or limiting beliefs about abilities.

Implementation is carried out in educational centres that voluntarily register after dissemination campaigns. Participation is free, which facilitates access. Sessions are facilitated by STEM professionals who participate as mentors on a voluntary basis, after having received specific training in gender perspective and in the objectives of the programme. These individuals not only share their professional experience but also act as close role models for students.

The programme has evolved over time, reaching multiple editions and expanding territorially through a model of nodes coordinated by different entities, mainly universities, which adapt the implementation to their context.

### 3. Motivation and engagement

How does the programme manage to spark interest among girls and young women in ICT and possible careers in this field? How do they discover this opportunity?

Students' interest is sparked through several combined mechanisms. Firstly, the programme is introduced within school hours, which guarantees the participation of the whole group without the need for prior explicit motivation from the girls. It is the educational centres that register, removing access barriers and ensuring that the opportunity reaches diverse profiles.

One of the key elements is direct contact with STEM professionals who act as mentors. These individuals represent diverse profiles in terms of sector, age and trajectory, which helps to break the stereotypical image of who can work in science or technology. Their presence in the classroom allows students to see themselves reflected in real, close and attainable role models.

The programme explicitly addresses the lack of knowledge about STEM professions, broadening students' imagination and connecting these professions with diverse personal interests. For example, it is suggested that

someone interested in animals, literature or other areas can also find their place within STEM, which helps expand horizons and reduce the perception of incompatibility.

In addition, gender stereotypes and prejudices associated with these disciplines are directly addressed. This includes both stereotypes about women in STEM and those affecting boys themselves, promoting critical reflection on social expectations. However, it has been observed that these contents may generate resistance, especially among boys, who in some cases perceive the programme as a criticism towards them or as an imposition, even showing attitudes of rejection or boycott.

It has also been detected that some girls may react negatively if they perceive that they are being directed towards certain professional options. Therefore, the programme emphasises that its objective is not to prescribe choices, but to expand knowledge so that each person can decide freely.

#### **4. Methodology and support**

What type of learning is used (projects, mentoring, mixed groups or only girls, etc.) and why does it work?

How is confidence and self-efficacy worked on?

Is there support, mentoring or collaboration with companies?

The programme methodology combines group sessions and sessions separated by gender. The first and last sessions are conducted with the whole group, while the intermediate sessions are carried out separately, with girls working with a female mentor and boys with a mentor (male or female). This decision responds to evidence gathered during implementation: in girls-only spaces, greater participation, confidence and expression are observed, whereas in mixed groups they tend to become less visible.

Although this separation has generated debate and some resistance, both in centres and among participants, experience has shown that it facilitates the creation of safe spaces where girls feel more comfortable participating. In fact, many mentors who initially questioned this methodology have changed their opinion after observing its impact in the classroom.

The programme is structured into six sessions with specific content. The first session introduces the concept of STEM and presents the programme. The second addresses gender stereotypes, working on those affecting both girls and boys. The third expands knowledge about STEM professions, connecting them with personal interests. The fourth focuses on role models, especially female ones, analysing both historical invisibility and current lack of visibility. The fifth highlights diversity in teams and the transversal skills required in these professions, emphasising that these competencies develop over time. The sixth session brings the whole group together again to share learnings, reflect and close the process.

Support includes prior training for mentors, additional information sessions and continuous monitoring during implementation. This monitoring is necessary due to the logistical complexity of the programme, especially in matching centres and mentors, which must take into account factors such as language and geographical location.

Regarding the involvement of teachers, the programme recommends that they are not present in the classroom to foster a more trusting environment, although it adapts to the needs of each centre. If teachers are present, their role is clearly defined to avoid interference in the dynamics.

Regarding families, they are provided with informational material and proposed activities to continue reflection at home, although there is no clear data on the actual use of these resources.

#### **5. Career guidance**

Does it include elements related to job opportunities or entrepreneurship in ICT?

The programme incorporates guidance towards STEM professions in a transversal way, not as an imposition but as an expansion of possibilities. Through the sessions, students discover the diversity of career paths, different sectors and the multiple ways of applying these disciplines in varied contexts.

Special emphasis is placed on the connection between personal interests and STEM professions, helping to dismantle the idea that these careers are limited to specific profiles. In addition, the presence of mentors allows students to learn first-hand about real career paths, which facilitates a more tangible understanding of these options.

The programme also addresses the competencies required for these professions, emphasising that both technical and transversal skills can be developed over time, which helps reduce self-exclusion based on perceived inability.

## **6. Impact**

What evidence do you have that the practice works?

The programme conducts annual satisfaction evaluations and has carried out more in-depth impact studies using pre-post methodologies. These studies have shown improvements in the perception of STEM professions and in the identification of role models, indicating progress in knowledge and motivation.

However, no significant changes have been observed in gender stereotypes, which highlights the difficulty of transforming deeply rooted beliefs through relatively short interventions. In addition, data collection has been a challenge due to dependence on educational centres for the implementation of evaluation tools.

A relevant aspect is the unexpected impact on mentors. They report that the experience is highly enriching, strengthening their commitment to gender equality and the promotion of STEM vocations. This effect has later been analysed through specific studies, confirming that the programme also acts as an awareness-raising tool for professionals themselves.

## **7. Barriers and sustainability**

What difficulties have you encountered?

What resources or support are needed for the practice to be sustainable?

The main difficulty of the programme is recruiting mentors, as participation requires a significant time commitment, estimated between 25 and 35 hours. This requirement, together with the growth of the programme and the high demand from centres, creates a gap between supply and implementation capacity.

Another important barrier is the availability of diverse profiles, especially people with vocational training backgrounds, as well as limitations related to language in certain contexts. There are also ideological resistances, both from some boys and some centres, especially regarding gender separation or content related to equality.

The social context also influences how the programme is received. Discourses have been identified that perceive equality initiatives as excessive or harmful to men, which translates into rejection attitudes in the classroom. There is also a need to adjust messages to prevent some girls from perceiving the programme as an imposition.

In terms of sustainability, the programme requires a significant investment in human resources. It is funded through a combination of public institutional support, private sponsorship and the university's own resources. Companies participate through corporate volunteering models, financial contributions or by facilitating employee participation during working hours.

The expansion model through nodes allows adaptation to different territories but also implies dependence on the capacity of local entities to sustain it, which in some cases has led to interruptions in activity.

Overall, the programme demonstrates that promoting STEM vocations with a gender perspective requires complex, sustained and context-adapted interventions that address both individual and structural barriers.

## NoésFeinadeDones

Catalonia  
Primary to adulthood  
July 2026  
October 2026

### Brief description

*Describe the programme in a few lines: what does it consist of and what are its main activities?*

The project noesfeinadedones.cat is a transversal initiative led by the Catalan Association of Telecommunications Engineers (Telecos.cat) and the i2CAT Foundation, with the support of the Generalitat de Catalunya. Its foundational objective is to reverse the underrepresentation of women in the digital and technological sector through a strategy based on data, community and visibility.

The programme is structured into four Work Packages (WP) that define its main activities:

**Research and Diagnosis (Field study):** A deep analysis (both quantitative and qualitative) has been carried out on the current situation of women in ICT in Catalonia in 2025. This has made it possible to identify entry and consolidation barriers, generating a gender gap report that serves as a basis for future policies.

**Digital Platform "Xarxa Dona TIC":** A digital community has been developed using open-source software (Decidim) that functions as a space for networking, debate and collaboration. This platform centralises resources and connects professionals with companies and institutions.

**Training and Life Pathways:** The project is not an isolated action, but is organised into five pathways adapted to each life stage:

**Discover:** Promotion of STEAM in childhood and primary education.

**Imagine:** Guidance during adolescence and high school.

**Evolve:** Support during university and vocational training stages.

**Re-invent:** Reskilling programmes for women who want to change sectors towards ICT.

**Lead:** Consolidation of women in leadership and decision-making positions.

**Visibility and Mentoring Actions:** Organisation of face-to-face and virtual events, such as networking sessions, robotics workshops and specific mentoring programmes (for example, with INS Joaquim Mir or URV), to create a directory of female role models that serve as inspiration for new generations.

In essence, the programme acts as a support ecosystem that accompanies women throughout their professional journey, from the first spark of technological curiosity to success in the labour market.

### Motivation and engagement

*How does the programme manage to spark interest among girls and young women in ICT and possible careers in this field? How do they discover this opportunity?*

The programme not only seeks to inform, but to transform the perception of ICT among women. To spark this interest and ensure participant engagement, the following mechanisms are used:

**Breaking stereotypes through proximity:** Motivation is generated by demonstrating that ICT “is indeed women’s work”. This is achieved through real testimonies from professionals who explain their daily lives, moving away from the image of the “isolated programmer” and emphasising the social and creative value of technology.

**Identification of role models at all stages:**

For girls: Curiosity is sparked through play and experimentation (such as robotics workshops or the space travel escape room), where girls see that they are capable of solving complex technological challenges.

For young and university women: A sense of belonging to a community is fostered. Seeing young women in leadership or research positions (mentoring pathway) acts as a powerful driver of engagement.

Discovery and recruitment channels:

Digital ecosystem: The use of social media (Instagram, LinkedIn and X) with specific campaigns such as “Women role models” and content related to Ada Lovelace Day, bringing the message directly to the channels where young women are present.

Key prescribers: Many participants discover the programme through direct collaboration with educational centres (teachers acting as bridges) and engineering faculties, which integrate these talks into their guidance pathways.

The Decidim platform: The [noesfeinadedones.cat](https://noesfeinadedones.cat) portal itself acts as an entry point where users can register, participate in discussions and feel part of an active network, increasing long-term engagement beyond a one-off activity.

Personalised motivation (mentoring pathway): The programme offers emotional and professional support (mentoring) that helps overcome impostor syndrome, a key factor that often hinders women's engagement in technological environments.

This combination of experiential activities, digital communication and human support ensures that girls not only learn about the project but also feel motivated to actively participate in it.

## **Methodology and support**

*What type of learning is used (projects, mentoring, mixed groups or only girls, etc.) and why does it work?*

*How is confidence and self-efficacy worked on?*

*Is there support, mentoring or collaboration with companies?*

A 360-degree methodology is used, including experiential learning, personalised mentoring and knowledge dissemination. It works because it adapts to five axes: childhood, adolescence, university, reskilling and professional consolidation.

“Mirror” methodology (Role Models): Based on social learning theory, girls need to see women who have already followed the path. The presence of 40 speakers and experts in the sessions allows young women to project their professional future.

Confidence and self-efficacy are worked through the mentoring pathway:

Safe Spaces: The creation of the digital platform and specific meeting groups for women allows sharing experiences without judgement or male dominance often found in technical environments.

Combating impostor syndrome: Through mentoring, invisible barriers (lack of confidence, fear of competitiveness) are addressed and participants’ competencies are validated through the community. The key message is “You are not alone”, reinforcing confidence by seeing that other women have overcome the same obstacles.

Positive reinforcement and visibility: Publishing women's profiles in the web directory reinforces participants’ professional self-esteem, helping them see themselves as experts and role models.

There is formal mentoring through collaborations such as i2CAT with INS Joaquim Mir or URV, where professionals support students in research work or career decisions.

In reskilling processes, guidance is provided on the most in-demand digital skills and the most effective training pathways (such as bootcamps or degrees) for rapid and successful transition.

### **Career guidance**

*Does it include elements related to job opportunities or entrepreneurship in ICT?*

The programme includes the “Re-invent” pathway, specifically designed for women who want to reorient their careers towards ICT. It offers:

Stories of reinvention and success cases to validate career change.

A directory of centres/entities with a STEM vocation.

### **Impact**

*What evidence do you have that the practice works?*

Evidence of effectiveness: 70% of Catalan ICT professionals report high job satisfaction once in the sector. A movement has been generated that has evolved from intuition to data-driven rigor to influence public policies.

Participants and duration: The project was implemented from January 1 to October 30, 2025.

Participation: 567 attendance records at events, 119 surveyed in the quantitative study and 40 female speakers.

### **Barriers and sustainability**

*What difficulties have you encountered?*

Territorial and educational logistics: It has been a complex challenge to carry out activities across the territory due to difficulties in coordinating schedules and availability with teaching staff.

Execution period: The July to October period is particularly unfavourable due to the school calendar (summer holidays and start of the academic year), which has hindered progress and impact in schools.

What resources or support are needed for the practice to be sustainable?

Need for continuous funding (RETECH grants, PRTR or European funds). Currently, the website cannot be maintained due to lack of budget for updates or modifications.

A professional Community Manager role to manage the platform’s private area.

Consolidation of a “Coordination Table of Women in ICT Initiatives” to avoid overlap between entities.

## **STEM4Girls UC3M**

Spain

Secondary education

12–18, mainly

2017

Yes

More than 7000 girls and young women

### **Brief description**

*Describe the programme in a few lines: what does it consist of and what are its main activities?*

STEM4Girls UC3M is the programme of Universidad Carlos III de Madrid that acts as a strategic axis to foster technological vocations, designed to attract female talent, especially girls and young women (12–18 years old), to the fields of Science, Technology, Engineering and Mathematics (STEM).

This programme consists of a comprehensive ecosystem of activities that include: a) practical engineering workshops, including programming and ICT technologies, b) cascade mentoring with UC3M faculty and students, c) technological and entrepreneurship competitions, d) inspiring performing arts focused on ICT and/or the STEM field, e) dissemination activities (talks, videos, visits, bookmarks, etc.) featuring researchers, students and/or communicators as female role models, and f) support and training for families and teachers.

The programme seeks not only to teach technical skills but also to build confidence, break gender stereotypes, show the social impact of technology and create a support community that accompanies participants in their educational journey from an early age.

### **Motivation and engagement**

*How does the programme manage to spark interest among girls and young women in ICT and possible careers in this field? How do they discover this opportunity?*

The programme sparks interest among girls and young women through practical and contextualised learning, showing the real impact of technology on society. To achieve this, close-to-home challenges and innovative topics are used (for example, artificial intelligence, data science, augmented reality, mobile app programming, cybersecurity, etc.), together with contact with and visibility of female role models in STEM.

Girls and young women are also motivated through the support of university students, who act as mentors, providing positive reinforcement, support in developing digital skills and participation in competitions. Finally, direct collaboration is maintained with educational centres, working with teachers to complement and enrich their teaching work.

Participants mainly discover the initiative through educational centres, teachers, social media and outreach activities or events (e.g., open days) at UC3M.

### **Methodology and support**

*What type of learning is used (projects, mentoring, mixed groups or only girls, etc.) and why does it work?*

*How is confidence and self-efficacy worked on?*

*Is there support, mentoring or collaboration with companies?*

Various types of learning are used: mentoring, challenge-based learning, workshops and experiential learning through performing arts. Some activities are individual, such as workshops and performing arts, while others are in mixed groups with strong female leadership, such as the “Data Science Gymkhana” competition, and others in female-only groups, such as “Technovation Girls”.

These types of learning work because they are diverse and promote active participation and inclusion, fostering self-efficacy and confidence. By connecting theory with practice, participants can complete small technical challenges or successfully develop applications, helping them believe in their capabilities and lose fear of topics that may initially seem complex or difficult. Learning also serves as a source of inspiration and creativity. Additionally, working in groups (often female-only or with strong female leadership) and with support minimises fear of judgement often felt in mixed environments.

Confidence and self-efficacy are developed mainly through practical work carried out in workshops and technological competitions. Public recognition of projects and awards is also given. Furthermore, progressive leadership is encouraged, as participants are offered the opportunity to become future mentors.

Yes, there is support through mentoring and in some activities collaboration with companies and/or non-profit organisations, mainly created by women working in technological and/or STEM companies.

## Career guidance

*Does it include elements related to job opportunities or entrepreneurship in ICT?*

The programme includes knowledge of career opportunities in ICT, related university degrees, interaction with professionals in the sector, development of key competencies (programming, data, teamwork) and a brief introduction to technological entrepreneurship. Additionally, workshops are designed to link their application with professions and/or the labour market.

## Impact

*What evidence do you have that the practice works?*

All activities have a monitoring and evaluation plan, through satisfaction and assessment surveys among participants. The results of these surveys are the first evidence that the practice works, as 77% of respondents state that the activity sparks interest in technological areas, engineering and science, and workshops are rated above 4.5/5.

In addition, a slight increase in the enrolment of women in technological degrees has been observed in recent years, although figures are still not very high. There is also continuity and repetition of some participants in the activities.

During these 7 years, the programme has reached more than 7,000 girls and young women and more than a hundred secondary schools. More than 250 students and 50 teachers from the university have also participated.

## Barriers and sustainability

*What difficulties have you encountered?*

During the development of the programme, some minor difficulties have been encountered and overcome, such as gender biases or stereotypes, some scepticism from certain individuals and, occasionally, the availability of teaching staff and/or students.

*What resources or support are needed for the practice to be sustainable?*

For the programme to be sustainable, stable funding is required, collaboration with schools, access to laboratory infrastructure and, above all, a motivated human team, including students and teaching staff. In addition, the creation of alliances with other associations and initiatives is necessary to establish synergies.

## Yes We Tech

Spain  
From 6 to 99 years old  
January  
+3000

## Brief description

*Describe the programme in a few lines: what does it consist of and what are its main activities?*

We are a feminist association in technology, working to close the gender gap in the ICT sector and spark interest among young women in STEM areas.

We achieve our goal through talks and workshops for all ages, offering Google Professional Certificates in Cybersecurity and creating a strong community so that women and other minorities have their place in the tech sector.

## Motivation and engagement

*How does the programme manage to spark interest among girls and young women in ICT and possible careers in this field? How do they discover this opportunity?*

We spark interest by organising accessible (free) events mainly aimed at girls and women, providing a safe environment for them. In addition, we bring in women who are current role models in the sector and are setting trends. Our events are usually very dynamic, practical and approachable. Social media works very well, as do recommendations: those who attend not only return but also bring someone else.

### **Methodology and support**

*What type of learning is used (projects, mentoring, mixed groups or only girls, etc.) and why does it work?*

*How is confidence and self-efficacy worked on?*

*Is there support, mentoring or collaboration with companies?*

Most of our activities are mainly aimed at women and girls. This provides a safe environment in which they feel freer and more comfortable to attend and participate. However, sometimes we also organise mixed events, although women usually remain the majority.

Confidence is developed by creating safe spaces where women can share experiences and feel understood. Many inequalities are not always visible in major situations but also in subtle forms, such as the constant questioning of our knowledge in highly male-dominated environments. Meeting other women who have experienced similar situations generates mutual support and helps reinforce confidence.

Self-efficacy is fostered by giving participants opportunities to take part, share their experiences and see that their ideas and knowledge have value. Through activities, events and projects, women can put their skills into practice, connect with other professionals and realise that they are capable of facing challenges and developing initiatives.

Yes, we have a mentoring programme linked to the Professional Certificate in Cybersecurity. In this programme, experts from our team support students throughout the training process, offering guidance, support and follow-up.

In addition, we collaborate with different companies that support our initiatives through sponsorship or by providing resources for our community. For example, we have Google as a main sponsor, as well as support from other companies contributing to our events and activities.

### **Career guidance**

*Does it include elements related to job opportunities or entrepreneurship in ICT?*

Yes. In our workshops, especially those aimed at girls, we dedicate part of the content to guidance on different careers and professional training related to the technology sector, so that they can learn about these opportunities from an early age.

In addition, many of our workshops include a practical component where participants can learn technical concepts. We also have an online community where job offers, internship opportunities and other ICT-related training are shared. This is complemented by scholarships for the Professional Certificate in Cybersecurity, facilitating access to training with career prospects in the sector.

### **Impact**

*What evidence do you have that the practice works?*

In 2025 alone, we have organised 20 events (6 workshops, 9 talks, 1 feminist hackathon, 1 international group CTF and 3 Cybergirl Squad events). We have also created an exhibition of current female role models “Real Superpowers of Women Who Transform the World”, published two works (“Manual Femias: how to generate unbiased images with AI” and the comic “They Are Science” with Ecusa and Quan Zhou).

Almost all our events have had very high demand, we received the X Evolución Award from Diario Sur and BBVA, we have granted scholarships to more than 150 women, more than 50 have completed certification, we have collaborated in 11 events with other organisations and we have celebrated our 10th anniversary.

Our events vary in duration, from 3 hours to a full weekend. This year, we have had the participation of more than 3,000 women and girls.

### **Barriers and sustainability**

*What difficulties have you encountered?*

Lack of financial support is one of the main difficulties, as well as the large amount of time required to organise everything. Additionally, there are the usual criticisms or resistance from certain entities or individuals due to our explicit feminist identity.

*What resources or support are needed for the practice to be sustainable?*

More funding is clearly needed, as well as genuine involvement from companies. Often, companies approach us for collaboration on specific dates (e.g., February 11, March 8) or events where they need female representation for diversity, but this does not provide real support. One of our core principles is to democratise access to training and talks so that economic barriers do not limit participation. To achieve this, we need more committed financial support and fewer superficial partnerships.

## **Emakumeak Zientzian**

Spain

Secondary education

Non-formal education

Higher education

Policy / strategic framework

Mainly 12 to 18 years old, although it includes activities for adult women and the general public

2017

Yes

More than 5,000 people in the most recent edition

### **Brief description**

It is a collaborative initiative that brings together more than 30 research centres and entities in the Basque Country. Its objective is to make the activity of women in science and technology visible, break gender stereotypes and promote STEM/ICT vocations. During the month of February (around 11F), more than 50 activities are organised, including visits to laboratories, experimental workshops, career guidance talks and cultural events.

### **Motivation and engagement**

*How does the programme manage to spark interest among girls and young women in ICT and possible careers in this field? How do they discover this opportunity?*

The programme presents ICT as a vehicle for social transformation. Young women are motivated by showing how computing and technology are essential to solve current challenges in health, environment and human rights. By seeing dozens of women leading technological projects simultaneously across the region, the stereotype of women as an exception in the sector is broken. This generates a sense of belonging and girls do not only see a career, but a community they can join.

The opportunity is discovered through a massive and coordinated network action. As so many research centres and entities participate, the call reaches secondary education centres in an omnipresent way through institutional channels.

## Methodology and support

*What type of learning is used (projects, mentoring, mixed groups or only girls, etc.) and why does it work?*

*How is confidence and self-efficacy worked on?*

*Is there support, mentoring or collaboration with companies?*

The method is based on experiential learning. Technical workshops are carried out in which more people can participate, although girls are the protagonists.

Confidence and self-efficacy are worked on through nearby role models. By seeing young women working in prestigious centres, participants break unconscious biases and reinforce their own ability to pursue ICT careers.

In terms of support, there is a public-private collaboration between research centres, universities and the technological industrial sector in the area.

## Career guidance

*Does it include elements related to job opportunities or entrepreneurship in ICT?*

Yes, the programme includes round tables and meetings where professionals explain their career paths, job opportunities in high-demand sectors and possibilities for entrepreneurship in the sector.

## Impact

*What evidence do you have that the practice works?*

Post-activity satisfaction surveys are conducted with excellent ratings, a sustained increase in participating centres and great media impact.

The main programme lasts 2 intensive weeks per year, but the impact lasts throughout the year.

## Barriers and sustainability

*What difficulties have you encountered?*

*What resources or support are needed for the practice to be sustainable?*

We have detected difficulties regarding the logistical coordination of so many different entities and overcoming ingrained biases that still steer girls towards care-related fields instead of technological ones.

Regarding resources, the initiative requires stable institutional funding (such as support from Provincial Councils and the Basque Government) and, above all, the voluntary commitment of research staff who give their time and space.

## FemCoders

Spain  
Over 30  
2021  
500

## Brief description

*Describe the programme in a few lines: what does it consist of and what are its main activities?*

The FemCoders programme is an initiative that began in 2021 with the aim of facilitating the labour market integration of women in the technology sector, especially those over 30 who come from precarious professional backgrounds or are unemployed.

It was created in the post-pandemic context, when it was identified that women had been particularly affected by job loss. The programme offers intensive training in digital skills — initially in web programming and currently also in areas such as artificial intelligence, cybersecurity or cloud — with an approximate duration of six months and a workload comparable to a full-time job.

In addition to technical training, the project includes a subsequent period of support for labour market integration and also works on transversal skills such as communication, teamwork or adaptability. It is therefore a comprehensive model that combines technical training and social support. So far, the programme has reached around 500 women and has achieved job placement rates close to 70%.

### **Motivation and engagement**

*How does the programme manage to spark interest among girls and young women in ICT and possible careers in this field? How do they discover this opportunity?*

The programme manages to spark interest mainly among women who have experienced situations of job insecurity and are looking for an opportunity for professional reorientation. In many cases, these are women who, with some life experience, consider for the first time the possibility of accessing the technology sector as a path for labour and personal improvement.

To reach these participants, FemCoders does not limit itself to opening registrations, but develops an intense prior awareness-raising effort. It collaborates with social organisations and career guidance services, offers talks and introductory programming workshops and supports decision-making processes for weeks or months before the training begins. This work is key, as often neither the women themselves nor the professionals guiding them consider the technology sector as a realistic option.

In addition, the programme has adapted its language and communication to make them more inclusive and accessible, creating an environment perceived as safe and close for participants.

### **Methodology and support**

*What type of learning is used (projects, mentoring, mixed groups or only girls, etc.) and why does it work?*

*How is confidence and self-efficacy worked on?*

*Is there support, mentoring or collaboration with companies?*

The methodology is based on intensive, practical learning oriented towards the labour reality, with a format that simulates a working day. Training is carried out in groups exclusively composed of women and in a hybrid model that combines online sessions with face-to-face meetings. This combination facilitates work-life balance while fostering the creation of bonds and support networks among participants.

One of the central elements of the programme is working on confidence and self-efficacy. Specific sessions are developed to address impostor syndrome and the presence of female role models is promoted, both within the teaching team and in activities with professionals from the sector. This approach contributes to creating safe learning spaces where women feel legitimised to learn and make mistakes.

Support goes beyond the training scope. The programme offers social and emotional support, adapts schedules to facilitate reconciliation and collaborates with specialised services — such as the CIBA centre in Santa Coloma de Gramenet — to address specific needs, including situations of gender-based violence or lack of support networks.

In addition, there is close collaboration with companies in the technology sector, which participate through masterclasses, networking sessions and corporate volunteering actions, thus facilitating direct contact with the labour market.

## Career guidance

*Does it include elements related to job opportunities or entrepreneurship in ICT?*

Career guidance is a fundamental component of the programme. During the training process, participants receive specific preparation to access the labour market, including improving their professional profile (for example, LinkedIn), interview preparation and knowledge of recruitment processes in the technology sector.

Direct contact with companies and professionals allows participants to learn first-hand about existing opportunities and expand their network of contacts, an especially relevant element given that networking is often a barrier for many women.

## Impact

*What evidence do you have that the practice works?*

The programme results show high effectiveness in terms of job placement, with percentages close to 70%, as well as progressive expansion to different territories, including large cities and rural areas.

However, the impact of the programme goes beyond employment. The evaluations carried out indicate that the main perceived changes among participants are increased self-esteem, greater optimism about the future and improved socioeconomic security. These dimensions show that the programme also has a strong personal empowerment component.

In this sense, even in cases where direct placement in the technology sector is not achieved, the experience contributes to broadening women's expectations and possibilities, strengthening their ability to make decisions about their professional trajectory.

## Barriers and sustainability

*What difficulties have you encountered?*

*What resources or support are needed for the practice to be sustainable?*

The development of the programme has revealed several barriers. Among the most relevant are difficulties in balancing family life, lack of support from the environment in many cases and the presence of personal insecurities linked to impostor syndrome.

At a structural level, obstacles are also identified in the labour market, especially in recruitment processes, where gender biases persist, particularly in technical profiles. Although human resources departments may be aware, technical profiles that make final decisions often show resistance to incorporating women coming from reskilling processes.

Regarding sustainability, the project initially depended on significant external funding, but is currently maintained thanks to a combination of public subsidies, institutional support and partnerships with organisations and companies. This diversification of resources has allowed the continuity of the programme, although with less intensity than in previous phases.

## EDUGENIA (ACTFEMToolkit)

A toolkit for educational innovations in the use of artificial intelligence in the classroom with a gender perspective  
Spain

Secondary education

Between 16 and 18 years old

15 November 2023 – 15 October 2024

No (15 October 2024)

12 secondary students and 36 secondary school teachers

## Brief description

*Describe the programme in a few lines: what does it consist of and what are its main activities?*

This is one of the actions developed within the ACTFEM programme, promoted by Plaudite Teatre in L'Hospitalet de Llobregat. The toolkit originates from a pilot project (#ACTFEM1) aimed at researching social inclusion strategies and creating professional opportunities for vulnerable young women at risk of social exclusion, as well as preventing early school dropout.

The programme integrates three disciplines: performing arts, digital technologies and feminist education. The EDUGENIA toolkit and its associated research were developed in collaboration between the Open University of Catalonia and the University of Lleida.

Its main objective is to promote reflection and the use of educational strategies related to artificial intelligence from a critical and intersectional gender perspective. To achieve this, a toolkit has been created incorporating the experiences and perspectives of adolescent girls at risk of school dropout and social exclusion, as well as contributions from secondary school teachers.

Participatory sessions with students and teachers aimed to:

1. Raise awareness of ethical and social challenges related to AI and gender
2. Co-design educational strategies and resources
3. Evaluate learning processes through participatory methodologies

## Motivation and engagement

*How does the programme manage to spark interest among girls and young women in ICT and possible careers in this field? How do they discover this opportunity?*

Students and teachers participated in sessions where they reflected on ethical and social challenges and opportunities related to artificial intelligence, as well as its implications from a gender perspective.

Their contributions were incorporated into the EDUGENIA guide, which includes pedagogical strategies and resources to introduce AI in the classroom critically and from an intersectional gender perspective.

The toolkit includes:

- Literature on gender and intersectionality in education
- Policy and legal guidelines on AI use in education
- Ethical considerations
- Educational strategies for digital empowerment
- Examples of classroom activities
- Recommendations and best practices

The toolkit will be available in open access and is designed for teachers, students and the wider educational community.

## Methodology and support

*What type of learning is used (projects, mentoring, mixed groups or only girls, etc.) and why does it work?*

*How is confidence and self-efficacy worked on?*

*Is there support, mentoring or collaboration with companies?*

The toolkit is aimed at the entire educational community, especially secondary school teachers. It provides practical classroom examples, including interdisciplinary and transversal activities that help mitigate gender bias in AI use.

Confidence and self-efficacy are addressed through participatory research sessions that encourage reflection, discussion and critical thinking about AI.

The project involved collaboration with vocational training centres, secondary schools, and the PlauditeTeatre ACTFEM programme, combining arts, education and technology.

### **Career guidance**

*Does it include elements related to job opportunities or entrepreneurship in ICT?*

The programme promotes reflection on women's presence in STEM fields and highlights their contributions through educational activities, as well as addressing ethical implications related to digital technologies and AI.

### **Impact**

*What evidence do you have that the practice works?*

Findings show a shift from limited and entertainment-focused knowledge of AI towards a more critical and informed understanding of its technical and ethical dimensions.

Participants developed greater confidence in using AI, while remaining aware of its risks and challenges. Teachers also reported improved knowledge of digital tools and AI.

The toolkit involved:

12 secondary students and 36 teachers

Duration:

4 sessions (2 hours each) with students

8 sessions (2–3 hours each) with teachers

### **Barriers and sustainability**

*What difficulties have you encountered?*

Challenges include engaging secondary schools, families, students and teachers in participation.

*What resources or support are needed for the practice to be sustainable?*

Sustainable funding and institutional support are required to maintain and expand this type of initiative.

## **Expanding girls' horizons in STEM through interventions with female role models (HORIGESTEM)**

Spain

Secondary education, primary education and higher education

Ages 11–12 (primary), 15–17 (secondary), around 35 (adult participants)

01/09/2022 – 31/08/2025

Yes (continuation through research grants)

3421 secondary students + additional qualitative participants

### **Brief description**

*Describe the programme in a few lines: what does it consist of and what are its main activities?*

The HORIZESTEM project examines the extent to which interventions based on female role models increase girls' motivation towards STEM fields and help break gender stereotypes about required competencies.

It includes three main studies:

- A quasi-experimental study with secondary students analysing the impact of exposure to female role models
- A qualitative study evaluating a mentoring programme (STEM Talent Girl)
- A qualitative study with primary school students exploring perceptions of women in STEM

### **Motivation and engagement**

*How does the programme manage to spark interest among girls and young women in ICT and possible careers in this field? How do they discover this opportunity?*

The first study evaluates classroom interventions where students watch videos of women working in male-dominated STEM fields such as engineering or physics. It compares participants with control groups and tracks changes over time.

The second study focuses on mentoring programmes (STEM Talent Girl), where girls receive guidance from female professionals and follow long-term educational pathways.

The third study explores how primary students perceive women in non-stereotypical roles and educational initiatives promoting gender equality.

### **Methodology and support**

*What type of learning is used (projects, mentoring, mixed groups or only girls, etc.) and why does it work?*

*How is confidence and self-efficacy worked on?*

*Is there support, mentoring or collaboration with companies?*

The programme combines mixed-group interventions (video-based role model exposure) and female-only mentoring sessions.

Confidence and self-efficacy are developed through exposure to role models and reflective questionnaires before and after interventions.

Mentoring programmes include shadowing, talks and long-term support from professionals, some of whom work in international companies and research centres.

### **Career guidance**

*Does it include elements related to job opportunities or entrepreneurship in ICT?*

Participants receive academic guidance and information about career opportunities in the STEM sector through mentoring programmes.

### **Impact**

*What evidence do you have that the practice works?*

Results show that role model interventions improve girls' self-concept, reduce stereotypes and increase motivation towards STEM.

Mentoring programmes strengthen STEM identity, empower participants and support career decision-making.

**Participation:**

3421 secondary students across multiple schools

Additional interviews with mentors and students

**Barriers and sustainability**

*What difficulties have you encountered?*

Challenges include recruiting participants and engaging schools in research activities.

*What resources or support are needed for the practice to be sustainable?*

Sustained funding is necessary to ensure the continuity of high-quality research.

## STEM Talent Girl

Country/ies of implementation: Spain

Educational level targeted: Secondary, upper-secondary and higher education

Age group of participants: From secondary school to university students

Year of start (month/year): 2016

Is it still active?: Yes

Approximate number of participants: Over 7,000 participants since its inception

**Brief description**

STEM Talent Girl is a comprehensive educational and mentoring programme aimed at fostering empowerment and the development of STEM-related competencies among girls in secondary and higher education. The programme provides long-term support through mentoring relationships with women professionals and university students in STEM fields, accompanying participants throughout their educational trajectories.

The programme is promoted by the ASTI Foundation and is structured as an integrated initiative designed to inspire, educate and empower young women to pursue STEM careers. In addition to technical competencies, it places strong emphasis on the development of transversal skills such as leadership, communication, critical thinking and emotional intelligence.

Furthermore, the programme is framed within broader efforts to reduce the gender gap in STEM fields and promote equal opportunities by increasing female participation in scientific and technological careers.

**Motivation and engagement**

The programme stimulates interest in STEM careers through exposure to female role models and direct interaction with mentors. By analysing the trajectories of both mentors and participants, it supports girls in envisioning their own academic and professional pathways in STEM-related fields.

In addition, the programme introduces participants to STEM disciplines through masterclasses, workshops and real-world experiences, helping them discover career opportunities and connect their personal interests with STEM domains. These activities are complemented by opportunities for networking, fostering a sense of belonging and enabling participants to build supportive peer and professional communities.

**Methodology and support**

The methodology combines individual and group mentoring sessions, as well as activities such as talks, workshops and shadowing experiences with STEM professionals. Support is provided continuously throughout the academic year and may extend from secondary education through the later stages of university, ensuring sustained guidance over time.

The programme is structured in three main stages adapted to different educational levels:

- **Science for Her:** early-stage inspiration and initial exposure to STEM fields
- **Mentor Women:** mentoring and academic/professional guidance
- **Real Work:** transition to university and the labour market through practical experience

#### **Confidence and self-efficacy:**

These are developed through continuous exposure to role models and sustained mentoring relationships, helping participants shape their aspirations, strengthen their STEM identity and build confidence in their abilities.

#### **Collaboration with companies:**

The programme involves strong collaboration with companies, universities and institutions, which participate through mentoring, workshops, sponsorship and project-based activities. This collaboration provides participants with real-world insights and enhances their understanding of professional environments.

#### **Career guidance**

Participants receive academic and career guidance related to STEM opportunities, including information about educational pathways, career options and support in decision-making processes.

The programme also facilitates connections with companies and professionals, providing practical exposure to the labour market through internships, company visits, project-based experiences and networking opportunities. This helps participants better understand the skills required in STEM professions and align their academic choices with future career goals.

#### **Impact**

The programme contributes to participants' empowerment by strengthening their STEM identity and supporting their academic and career decision-making processes. It also promotes greater confidence, motivation and engagement in STEM-related learning.

Preliminary evidence suggests a positive effect on participants' interest in STEM careers and their perception of their own capabilities in these fields compared to non-participants. Additionally, the initiative has reached thousands of students across multiple regions in Spain and continues to expand geographically, engaging over 1,000 students annually in recent editions.