Girls' Empowerment in Digital Skills

GEMS

D.2.1. Research and investigation methodology and toolkit

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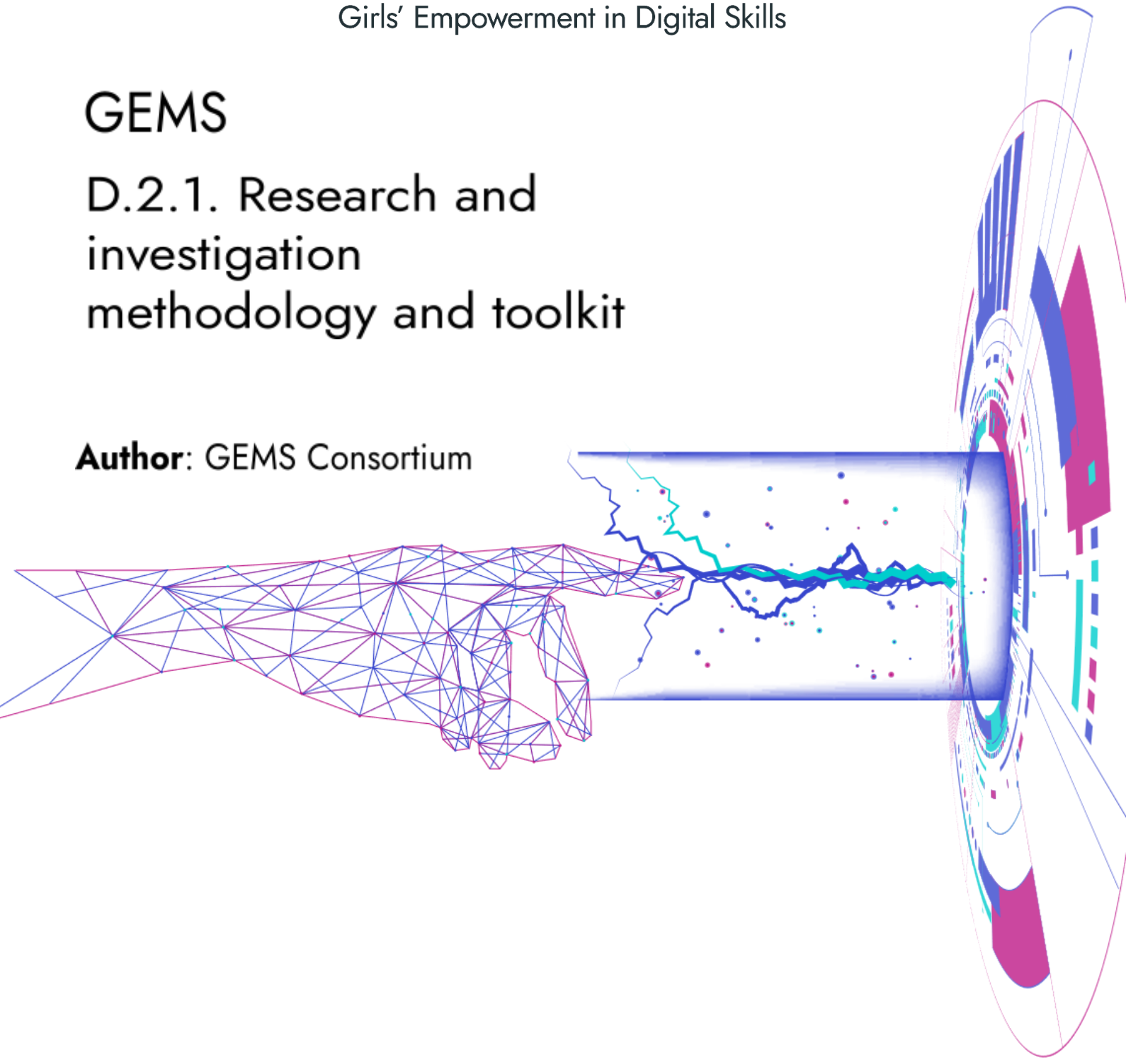

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Project acronym	GEMS
Project title	Girls' Empowerment in Digital Skills
Number	2025-1-IT02-KA220-HED-000352062
Work package	WP2
Submission Date	
Lead Partner	Tallinn University
Version	1
Type	
Dissemination level	PU

Version	Date	Modified by
1st initial version	27.11.25	Kai Pata, Terje Väljataga
2nd version containing the partner corrections	2.12.25	Terje Väljataga, Kai Pata
3rd version containing the corrections by project coordinator request	5.02.26	Kai Pata
4th version containing the corrections for Quality Assurance Committee comments	04.06.26	Kai Pata

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Artificial Intelligence (AI) tools were used during the preparation of this deliverable to support activities such as language editing, text refinement, summarisation of literature, drafting of preliminary methodological descriptions, and improvement of document structure. AI-generated outputs were reviewed, verified, and revised by the authors and project partners before inclusion in the final document. All methodological decisions, research design, analytical framework, survey instruments, interview protocols, interpretations, and conclusions presented in this report remain the responsibility of the GEMS consortium. The authors have critically assessed the accuracy, relevance, and appropriateness of all content and have ensured that the final version complies with the project's scientific, ethical, and quality standards.

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Executive summary

The GEMS (Girls' Empowerment in Digital Skills) project aims to address the persistent underrepresentation of girls and young women in ICT education and careers by identifying the factors that influence their motivation, participation, and career aspirations, while also documenting effective practices that promote gender inclusion in the sector. This deliverable presents the research methodology, analytical framework, data collection instruments, and ethical procedures that will guide Work Package 2 (WP2).

The methodology is informed by recent research showing that gender disparities in ICT are driven primarily by structural and sociocultural barriers rather than by differences in ability or motivation. Key obstacles include gender stereotypes, limited access to role models, low self-efficacy, inadequate institutional support, and misconceptions about ICT careers. Conversely, evidence suggests that mentoring, exposure to female role models, inclusive learning environments, advanced problem-solving curricula, and flexible learning pathways can significantly improve girls' engagement and persistence in ICT.

The study combines three complementary research strands:

1. Desk research reviewing contemporary evidence on barriers and enabling factors affecting girls' participation in ICT.
2. Survey research involving 300 participants across six partner countries, including girls aged 14–19 and young women aged 20–28, to examine motivations, perceptions, self-efficacy, digital skills, social influences, and career intentions.
3. Interviews and focus groups with educators, higher education staff, youth workers, and policymakers to identify and validate 60 examples of effective practices that support girls' ICT learning and career development.

The survey is built upon a theoretically grounded framework combining Bandura's Social Cognitive Theory and the Technology Acceptance Model. It investigates eleven interconnected constructs, including self-efficacy, digital skills, belonging, recognition, sociocultural pressures, personal relevance, and career intentions. The analytical model proposes that external factors shape beliefs and attitudes, which subsequently influence motivation and ICT career aspirations.

Quantitative analysis will include reliability testing, factor analysis, regression analysis, and Structural Equation Modelling (SEM) to identify the strongest predictors of ICT career intentions and test the proposed causal pathways. Qualitative findings from interviews and open-ended survey responses will complement the statistical analysis by providing deeper insights into barriers, motivations, and successful intervention strategies.

The research outcomes will directly inform the development of the GEMS Teaching Framework for Inclusive Digital Education (WP3) and the GEMS Educational Programme and Mentorship activities (WP4). The resulting evidence base and collection of best practices will support educators, policymakers, and institutions in designing more inclusive, motivating, and effective pathways that encourage girls and young women to pursue ICT studies and careers.

1. Introduction

WP2 focuses on identifying and analysing the main factors and barriers that shape girls' and young women's motivation to engage in ICT (information and communication technology) studies and careers, as well as gathering examples of effective practices and innovative initiatives that support greater gender balance in the sector. It will contribute to identify **young female ICT students' perspectives** on gender inclusion in ICT **higher education and girls interests and perceptions in the ICT field**. Comparative research on key factors influencing young women's motivation consists of a) a review of the existing evidence-based literature about key factors and barriers influencing girls careers in ICT (Informed by A.2.2.1); b) the development of an interview protocol for different stakeholder groups (professors, high school teachers, youth workers and policymakers) to investigate innovative projects and practices carried out to boost girls' interests in ICT(A.2.1); c) a survey for field research targeting young women studying ICT on their perceptions about their ICT education as well as targeting young girls students 14-19 about the factors influencing their motivation in ICT careers (A.2.3.1) and about the programs that are best fitted for working with gender bias in ICT from the girls/women point of view (A.2.3.2).

D.2.1 Research and investigation methodology and toolkit - provides a detailed framework outlining the research approach, tools and processes for collecting data, analyzing key factors influencing young women's aspirations. It outlines in the introduction section the gaps as well as best practices in pursuing ICT related studies and professions, with the aim of deducting lessons learned from literature. It includes the survey templates, the informed consent form and the interview model with a pool of questions.

The desk research on literature about A.2.2.1 was done in parallel to the methodology deliverable to prepare the survey instrument. The preliminary findings of international literature point to the changes compared with the older stereotype based approaches in gender bias to ICT. The academic desktop research task regards the national research documents' analysis. Instructions: https://docs.google.com/document/d/1Z1zjptMmOtBYmQRxxEELMjuTrD86O5GwWnttXFHWpiw/edit?tab=t.0#heading=h.9c6pr3fzwn4c

Earlier studies frequently attributed low participation rates to deficits in individual interest or ability. Current analysis, however, overwhelmingly positions the barriers as structural and environmental, rooted in pervasive gender stereotypes, cultural expectations, and inadequate institutional support systems (Bakir et al., 2025). The main considerations from the desk research were the following:

The academic research published since 2020 clearly demonstrates that the underrepresentation of young women in ICT is predominantly a systemic visibility and structural support issue, rather than a lack of motivation or ability (Table 1). Women are demonstrably motivated by the high economic returns of ICT careers but are actively deterred by cultural gatekeeping, teacher and parental biases, and outdated pedagogical approaches that fail to showcase the sophisticated, creative nature of the profession. This is where the GEMS project clearly intends to contribute in providing supportive creative methodologies. We are collecting these supportive methodologies as good practices through the interviews suggested in the methodology. These findings from our survey about how different factors influence girls/women in choosing ICT learning and professions, and the interviews about the gender-supportive ICT teaching practices will feed to the development of A.3.1. Teaching framework for digitally inclusive education.

Table 1. Comparative Analysis of Internal vs. External Factors Affecting Female ICT Participation (2020-2025 Literature Synthesis in T.2.2)

Factor Category	Example Variables	Impact on Participation
External/ Environmental	Gender stereotypes and societal expectations (Bakir et al., 2025). Teacher bias—boys called on more often, girls interrupted more (Bakir et al., 2025). Limited knowledge about ICT careers within families/social networks (Kurti et al., 2024). Evidence indicates a counterintuitive efficacy paradox: courses focused on teaching basic, utilitarian skills, such as MS Word and Excel, actively deter female students from pursuing	Strong deterrence from choosing ICT study paths due to reinforced stereotypes (Bakir et al., 2025). Reduced motivation and weakened sense of belonging in STEM classrooms (BarNir et al., 2011). Restricted opportunities for career exploration due to lack of accurate information (Kurti et al., 2024).

	ICT careers (Crowther & Briant, 2022).	
Internal/Personal	Low interest resulting from misperceptions about ICT careers Low ICT self-efficacy (Msambwa et al., 2025). Lack of career clarity and future planning (Kurti et al., 2024).	Reduced engagement and early disengagement from STEM subjects (Msambwa et al., 2025). Lower confidence in ability to acquire ICT skills (Msambwa et al., 2025).

Effective strategies must be holistic, combining micro-level pedagogical reforms (Advanced Interactive Problem-Solving curriculum design and long-term role modeling) with macro-level infrastructure investments (leveraging digital technology to provide mobility and flexibility) (Crowther & Briant, 2022; Kurti et al., 2024; BarNir et al., 2011).

Table 2. Effective Intervention Strategies for Enhancing Female Self-Efficacy and Career Commitment

Intervention Type	Mechanism of Action	Targeted Outcome	Supporting Evidence

Curricular Reform	Introduce advanced, complex, problem-solving ICT content (Crowther & Briant, 2022) Avoid an overemphasis on basic administrative ICT skills (Excel, Word), which deters interest (Bakir et al., 2025)	Increased self-efficacy from engaging with authentic, higher-order ICT problem-solving (Crowther & Briant, 2022)	Basic-skill–focused curricula shown to reduce female ICT motivation (Crowther & Briant, 2022)
Socialization Training	Provide long-term exposure to female ICT professionals to counter stereotypes (BarNir et al., 2011) Build mentorship structures and social support networks (BarNir et al., 2011) Deliver bias-awareness training for teachers and parents (Bakir et al., 2025;)	Increased motivation and confidence through relatable role models (BarNir et al., 2011) Improved accuracy in career assessment and reduced impact of misinformation (Kurti et al., 2024)	Long-term interaction with women scientists identified as the strongest driver of girls' STEM motivation (BarNir et al., 2011) Teacher and parent biases shown to significantly affect career intention (Bakir et al., 2025;)

Workplace/ Retention	Value diverse contributions and ensure inclusive culture (Shore et al., 2011) Provide flexible or hybrid learning/working options attractive to women with caregiving roles (Franz-Odendaal & Marchand, 2022) • Ensure safe, supportive environments free of stereotype threat (Msambwa et al., 2025)	Higher retention in ICT programs due to belonging and recognition (Shore et al., 2011) Increased participation by women who rely on flexible modalities (Franz-Odendaal & Marchand, 2022)	Flexibility shown to increase women's participation and learning persistence (Franz-Odendaal & Marchand, 2022) Inclusive environments proven to support retention and reduce attrition (Shore et al., 2011)

1.1 Research goals and questions

The main objective is to analyse key factors and barriers in influencing girls' and young women's interest and motivations to pursue careers in ICT and to provide relevant best practices and strategies to overcome them.
The research in WP2 is done in three strands. A.2.2.1. The desktop research informs how to make the research strategy. It also informs the research paper A.2.2.3. The survey research A.2.2.2 informs what girls in high schools and youth education, and young women in ICT education see as their motivators and obstacles in ICT careers. In task A.2.3. the best practices A.2.3.1 are identified and validated using the interviews with stakeholders A.2.3.2. They will be reported in A.2.4 Design and drafting of Compendium of lessons learnt and best practices.
Guiding research questions in WP2 are as follows:

1) What key factors and barriers influence girls' and young women's engagement with ICT learning and career pathways?
2) What motivations, interests, and external influences shape the ICT-related career aspirations of girls and young women?
3) How do female university students in ICT programs perceive their learning experiences, support systems, and challenges within higher education?
4) Which existing practices, policies, or educational methods are currently used to promote

gender balance in ICT, and how effective are they perceived by stakeholders?
5) How can the findings inform future strategies and resources aimed at increasing gender balance in ICT education and careers?

The findings from the research will inform WP3 (Teaching framework for an inclusive digital education) and WP4 (GEMS educational programme and mentorship) activities. In particular, first-hand insights from women studying ICT in the partner countries will help clarify how female students perceive their experiences across different ICT programs and specializations, and identify which types of programs are most successful in attracting them to the field. These insights will provide teaching guidelines and training programs that draw on a wide range of educational perspectives and expertise, ensuring their relevance and adaptability across diverse European education systems. Implementing the project's educational program and mentorship in several countries will support a more rigorous assessment of their effectiveness in different settings.

2. Methodology

2.1 Sampling in each country

The whole sample in the six partner countries (300) is made of two age groups: aged 14-19 (120) and 20-28 (180). The collected data will be analysed focusing on the comparison of age groups. Since the sample is relatively small (50 per country) the country's data will not be representative.

2.1.1 Survey sample

Survey respondents will be selected from two age groups as required by the proposal:

- **Girls aged 14-19. At least 120 girls will be contacted (20 per country)**

We suggest that girls will be selected from the secondary education level, accessing points should be schools (at ICT lessons or ICT rich problem solving activities where relevant) and hobby education facilities (where some ICT education is taught).

- **Young women in ICT aged 20-28. At least 180 students will be contacted (30 per country)**

We suggest that sample should be taken from the higher education level (HEIs, applied HEIs) study programmes where ICT is taught for the vocation (programmes of ICT, or integrated programmes e.g. ICT for social sciences, Human Computer Interaction or other relevant).
Each country is responsible for asking the approved consent from the participants of the survey and focus groups (see Annex 1).

2.1.2. Interview sample

Interviews to identify the best practices regarding secondary school and higher education ICT teaching approaches for girls will be conducted. The interview discussion aims to elicit the best practice for girls and identify its positive aspects and negative pitfalls and discuss these gaps also with the relevant policymakers. The **interviews should concentrate on describing the best**

practices on how ICT should be advertised and taught so that girls could get more interest in ICT jobs. The interviews can also focus on the aspect of teachers and higher education staff members ICT career inclusiveness if this is perceived important by the informants. In total **60 samples of practices will be collected (10 practices per country).**
The planned to be investigated practices must be reported in this document of GEMS good practices (Deadline 15. February).

The full report of practices from each country must be reported by 15th of April.

Please upload the practices in this A.2.3.1. folder and use the practice reporting template for each.

The number of **interview respondents in the whole sample will be 60 secondary school teachers (10 per country); 120 professors (20 persons per country); 24 youth workers (4 persons per country); 24 policymakers (4 per country).**

We recommend to compose interviews in focus groups of 4-5 persons for discussing specific good practices. However you can also do individual interviews.
In case if you are doing focus groups around the practice you may follow this model:

- Secondary education teachers (**3 focus** groups in each country, in each focus groups 3-4 teachers and 1 relevant policymaker will be called around)
- Higher education professors (**6 focus** groups in each country, in each 3-4 professors around specific practice and 1-2 relevant higher education policymakers)
- Youthworkers (**1 focus group**, involves 4 youthworkers and a policymaker from youthwork)

Before the interviews partners are requested to document the interview sample to this file (Deadline 15. February):

The interviews must be done by 30th of March.

The participants are asked for informed consent (See Annex 1). The partner can organize the interviews in a zoom environment to record the discussion and make the transcript.

The best practice will be described based on the interviews you are doing of this practice using the reporting template (see Practice description template below).

2.2 Research instruments

2.2.1 Survey

The goal of the survey is to identify the key factors influencing young women's aspirations and identifying best practices.

The gender imbalance in Information and Technology (ICT) education and careers is a persistent structural issue, resulting not primarily from differences in innate ability, but from a complex interaction of psychological factors and pervasive sociocultural norms (Schinzel, 2005).

2.2.1.1. Causes of gender imbalance in ICT

1. **Low Self-Efficacy and the Confidence Gap:** Despite young women often performing similarly to young men in technical subjects, they report significantly less confidence in their capabilities, with this confidence gap beginning in early elementary school (Johnson et al., 2008; Akbulut & Looney, 2007; Msambwa et al., 2025). This deficit in Self-Efficacy (the belief in one's capability to succeed) is the single most powerful predictor of reduced motivation and intention to pursue an ICT career (Bandura, 1997; Johnson et al., 2008). If a young woman does not *believe* she can execute the necessary courses of action, she will not choose to persist in the field. A substantial body of recent research confirms that **low self-efficacy remains one of the strongest and most consistent predictors of young women's underrepresentation in ICT and related STEM pathways**. Despite performing at levels equal to or higher than their male peers, girls and women continue to report significantly **lower confidence in their technical abilities**, a trend observable as early as late elementary school and intensifying throughout adolescence (Johnson et al., 2008; Akbulut & Looney, 2007; Msambwa et al., 2025). Contemporary longitudinal studies show the same pattern: girls with equivalent or superior grades in math, computing, or engineering tasks nonetheless rate their abilities lower than boys with the same performance profiles (Master et al., 2022; Rodriguez & Blaney, 2023). Within Bandura's (1997) self-efficacy theory, this imbalance represents a core motivational barrier: individuals who believe they lack the capability to succeed are unlikely to attempt, persist, or re-engage with challenging activities. ICT and computing education amplify this pattern: new evidence from computing-education studies shows that **self-efficacy predicts course enrollment, task persistence, and even help-seeking behavior more strongly than actual academic ability** (Cai et al., 2023; Fisher et al., 2024). Among women, this effect is even more pronounced, with computing self-efficacy emerging as a critical predictor of whether they will pursue an ICT major or consider ICT-related careers (Master et al., 2022; Fisher et al., 2024). Recent meta-analyses demonstrate that the **confidence gap**, rather than performance, explains the gender disparity in advanced ICT course-taking and career choice (Sáinz et al., 2022; Fisher et al., 2024). Importantly, even minor self-doubt early in a learning pathway strongly predicts later attrition—a phenomenon known as the "leaky pipeline" (Rodriguez & Blaney, 2023). This shows that self-efficacy is not merely correlated with interest: it is **causal**, shaping how students interpret challenges, whether they persist, and how they form long-term identity as "technical" or "non-technical" individuals. New intervention studies confirm the reverse is also true: **when girls' self-efficacy increases, ICT interest, motivation, and career intentions increase sharply**. Programs providing mastery experiences, hands-on projects, and structured feedback produce measurable gains in computing self-efficacy, which in turn predict increased intention to pursue ICT education (Bennett et al., 2024; Msambwa et al., 2025). These recent findings reaffirm that **self-efficacy is the most influential psychological mechanism** determining whether young women choose to enter or persist in ICT (Bandura, 1997; Master et al., 2022; Fisher et al., 2024).
2. **Harmful Sociocultural Stereotypes:** The portrayal of ICT careers in media and culture as primarily masculine creates strong Sociocultural Pressures (Michie and Nelson, 2006; Bakir et al., 2025). This narrow and rigid conceptualization, often reducing ICT to coding or gaming, actively discourages young women who are often motivated by the field's potential

for societal impact and social value (Vainionpää et al., 2019). These stereotypes erode the sense of belonging and increase worry about professional isolation. Newer research shows still that sociocultural stereotypes about information and communication technology (ICT) careers — portraying them as "male," "nerdy," socially isolating, or incompatible with stereotypically feminine traits — continue to shape young people's perceptions and strongly influence gender disparities in tech. Even in countries with high gender-equality indices, such stereotypes remain deeply rooted and apply pressure that discourages many girls from imagining themselves in ICT roles (Simon et al., 2023; Beroíza-Valenzuela, 2025). New empirical evidence shows that these stereotypes not only persist — they actively reduce girls' interest in tech education. In a study of 873 middle-school students, authors found that students who endorsed the stereotyped association "tech = male, caregiving = female" were significantly less likely to report interest in tech-oriented education; girls in particular gravitated away from tech when they perceived it as gender-typed (Simon et al., 2023). Similarly, a large-scale 2025 study of 1,658 adolescents found that stereotypical beliefs about "who belongs in tech" strongly predicted lower technology-career aspirations among girls (Harehdasht & Saki, 2025). More recently, cognitive-bias research using reaction-time based measures has documented **implicit gender–career associations** in STEM: individuals assigned female (or identifying as women) show faster associations of "woman ↔ non-STEM / caregiving" and "man ↔ STEM/tech" than the reverse, indicating that implicit stereotypes remain pervasive in many educational and cultural contexts — even among younger cohorts (Beroíza-Valenzuela, 2025). Such implicit associations can subtly shape decision-making long before conscious career choice, influencing self-perception, sense of belonging, and confidence in pursuing ICT. Qualitative studies of university-level software engineering students echo this: many women (and non-binary students) describe feeling that "they don't fit the image of a software engineer," noting masculine norms, tokenism, and stereotype threat as major reasons for alienation (Boman, Andersson & Neto, 2024). These experiences contribute directly to lower belonging and higher dropout or exit risk. Further, structural analyses show that broader social messaging — from media portrayals, educational materials, and institutional cultures — reinforces the idea that ICT is for "geeks," "introverts," or "males," and that women in technology are an exception rather than the norm (Engineering-STEM reviews, 2024). These portrayals not only reduce interest, but also increase anticipated social isolation, concerns about "not belonging," and perceived incompatibility with one's identity or values (2023; Social Science Reports, 2023). Taken together, this literature confirms that **harmful sociocultural stereotypes remain a powerful deterrent**: they shape early perceptions of who "belongs" in tech, reduce girls' aspirations, discourage engagement with computing, and contribute to persistent underrepresentation and attrition. Addressing these stereotypes — through representation, inclusive curricula, and stereotype-challenging interventions — remains critical for achieving gender equity in ICT.

3. **Lack of Role Models and Networks:** A consistent finding in recent STEM education research is that the absence of visible, relatable female role models significantly undermines girls' and women's sense of belonging in technical fields. This effect aligns with Bandura's (1997) concept of *self-efficacy*, where "vicarious experiences"—observing similar others succeed—serve as a critical mechanism for strengthening confidence. When women lack evidence that "people like me" can succeed in ICT or engineering roles, their confidence in their own capabilities decreases (Wood & Bandura, 1989; Bandura, 1997).

González-Pérez et al. (2024) found that women in STEM rely more heavily on role models than men, with female role models significantly boosting their intrinsic motivation, self-efficacy, and professional orientation. Experimental findings by authors in *Social Psychology of Education* (2025) showed that exposure to authentic narratives from female professionals increased girls' perceived "fit" with STEM careers and elevated their intentions to pursue similar paths. Other research demonstrates that structured mentoring with female professionals improves younger girls' technological attitudes and mathematics self-efficacy (Martínez-Calvo et al., 2024). Longitudinal evidence also shows that STEM "counterspaces"—programs intentionally designed to provide representation, community, and supportive networks—lead to gains in students' science identity, academic self-concept, and career commitment (Rainey et al., 2025). Across studies, role models work through several documented psychological mechanisms: Vicarious experience (observing similar others succeed) (Bandura, 1997). Social persuasion and encouragement, especially when coming from gender-concordant models (González-Pérez et al., 2024). Reduction of stereotype threat and increased sense of belonging (Martínez-Calvo et al., 2024). Strengthening of STEM identity, which predicts persistence and career choice (Rainey et al., 2025).

2.2.1.2. Survey explanation and analytical framework

The constructs from the survey create a robust framework rooted in motivation and social cognitive theories, particularly useful for analyzing career choice among underrepresented groups.

The proposed causal model outlines the likely flow of influence, suggesting that environmental factors (Sociocultural Pressures, Access) shape initial capacity and beliefs, which in turn drive the individual's emotional response (Affect) and ultimate career intentions (Motives and Goals).

Proposed causal model: Drivers of ICT career intent

This model illustrates the hypothesized relationships where constructs in one tier or cluster influence constructs in subsequent tiers, leading to the ultimate motivation for digital jobs.

Model overview: Causal flow

External context and capacity -> **Core beliefs and attitudes** -> **Motivational states and intent**

1. External Context and Capacity (Exogenous Factors)

This tier includes factors that are shaped by the external environment and form the foundation of a student's technical ability and confidence (Table 3).

Table 3. External Context and Capacity

Construct	Description	Causal Influence (→)

Practicing Opportunities	Access to formal and non-formal training (Q27, Q28).	-> **Digital Skills** (Experience builds competence)
Digital Skills & Performance	The student's objective assessment of their ability to perform tasks (Q19, Q20, Q21).	-> **Self-Efficacy** (Competence builds confidence)
Recognition	Validation of competence from peers and the community (Q25, Q26).	-> **Self-Efficacy** (External validation reinforces confidence)
Belonging	The existence of role models and peer networks in ICT (Q29, Q30).	-> **Self-Efficacy** (Seeing others like oneself succeed increases belief in self)
Sociocultural Pressures	External stereotypes, isolation worries, and support (Q15, Q16, Q17, Q18).	-> **Self-Efficacy** and **Technology Belief/Values** (Stereotypes undermine confidence and the perceived value of the field)

2. Core Beliefs and Attitudes (Mediating Factors)

This tier represents the student's personal interpretation and confidence level, which mediates the influence of external factors on motivation (Table 4).

Table 4. Core Beliefs and Attitudes

Construct	Description	Causal Influence (→)
Self-Efficacy	Confidence in the ability to succeed at technology tasks (Q22, Q23, Q24).	-> **Affect, Digital Learning Mindset,** and **Motives/Goals** (Confidence increases positive emotions, makes learning seem achievable, and encourages goal setting)
Technology Belief / Values	Belief in the societal impact and ethical fit of the field (Q4, Q5, Q6).	-> **Motives/Goals** (Alignment with personal values fuels motivation)
Personal Relevance	Perceived utility for career and daily life (Q10, Q11).	-> **Motives/Goals** (Perceived usefulness increases effort and intent)

3. Motivational States and Intent (The Direct Predictors)

These constructs are the final, most direct drivers of the intention to pursue an ICT career (Table 5).

Table 5. Motivational States and Intent

Construct	**Description**	**Causal Influence (→)**
Affect	Emotional enjoyment of digital tasks (Q1, Q2, Q3).	-> **Motives/Goals** (Positive emotion sustains interest and long-term goal pursuit)
Digital Learning Mindset	Beliefs about the nature of learning technical skills (Q7, Q8, Q9).	-> **Motives/Goals** (Belief that learning leads to positive outcomes fuels career intent)
Interest, Motives and Goals	The desire and intention to enter the field (Q12, Q13, Q14).	->**Career Intent/Action** (This is the measured outcome)

This causal model is constructed by drawing primarily on two foundational psychological theories frequently applied to technology adoption and career choice: **Albert Bandura's Social Cognitive Theory (SCT)** and **Fred Davis's Technology Acceptance Model (TAM)** (Davis, 1989), supplemented by research on gender barriers in Information and Communication Technology (ICT) careers. These frameworks have been used since they have been widely tested with the survey constructs and have proven to provide valid and reliable results. This will help to associate the findings also with the existing literature.

1) Albert Bandura's Social Cognitive Theory (SCT) and Self-Efficacy

SCT provides the central framework for explaining how an individual's internal beliefs drive their actions, particularly the core role of self-efficacy.

- **Self-Efficacy as a Key Mediator:** Bandura defines self-efficacy as "People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances". In the model, **Self-Efficacy** (Q22-Q24) is positioned as the critical mediator, influencing effort, persistence, choice of activities, and goal setting.
- **Sources of Self-Efficacy:** The model follows SCT by linking external factors to the formation of self-efficacy. Key sources include:

    - **Enactive Mastery Experiences:** Represented by **Digital Skills and Performance** (Q19-Q21) and **Practicing Opportunities** (Q27, Q28). Past success (performance) is the most powerful source of efficacy.
    - **Social Persuasions and Vicarious Experiences:** Represented by **Recognition** (Q25, Q26) and **Belonging** (Q29, Q30). Observing role models (vicarious experiences) and receiving peer/social support (social persuasions) increase the belief in one's own capability.
- **Self-Efficacy and Career Intent:** Multiple studies specifically confirm the centrality of self-efficacy in ICT career selection. Self-efficacy is often the single key factor in selecting an ICT career.

2) Fred Davis's (1989) Technology Acceptance Model (TAM)

TAM explains user acceptance of technology based on a set of core beliefs, which are incorporated into the model's structure.

- **Perceived Usefulness (PU) and Relevance:** TAM defines Perceived Usefulness as "the degree to which a person believes that using a particular system would enhance their job performance". This concept is directly mapped to the **Personal Relevance** construct (Q10, Q11), establishing that if a technology is seen as useful for future job market success, it drives adoption and motivation.
- **Attitude and Intent:** TAM's foundation relies on predicting behavior (career intent) based on beliefs and attitudes. In the proposed model, **Affect** (the emotional attitude, Q1-Q3) and the **Digital Learning Mindset** (beliefs about the ease/interest of learning, Q7-Q9) feed directly into the **Motives and Goals** (Intent, Q12-Q14).

3) Sociocultural and Gender Barriers Research

Research specific to women in IT careers highlights the importance of external, non-technical factors, justifying the inclusion and placement of **Sociocultural Pressures** (Q15-Q18) and **Technology Belief/Values** (Q4-Q6).

- **Sociocultural Barriers:** Perceptions and gender biases (e.g., stereotyping digital jobs as "lonely and nerdy" or highly masculine) create potential barriers to entry for women. In the model, these pressures are placed high in the hierarchy, directly impacting both self-confidence (**Self-Efficacy**) and the perceived attractiveness/suitability of the field (**Technology Belief/Values**).
- **Value Alignment:** For many students, particularly young women, motivation is driven not just by extrinsic rewards (salary) but by intrinsic rewards and the ability to apply skills to social or environmental benefit. The **Technology Belief/Values** construct (Q4-Q6) captures this alignment, hypothesizing that high value alignment is a necessary precursor for forming strong career intentions (**Motives/Goals**).

The model combines the predictive power of TAM (relevance and mindset driving intent) with the explanatory depth of SCT (how competence, confidence, and social context drive beliefs), creating a comprehensive framework for analyzing the psychological and social drivers of ICT career choice in your research.

2.2.1.3. Survey procedures

The survey will be conducted online anonymously using Google Forms (or other relevant software) Survey: Young Women's Motivation for ICT Careers - Google Forms
The survey will be translated to local languages. Each partner is responsible to run the survey in their own survey software and collect the data into the spreadsheet. The qualitative question: there is a possibility for automatic translation in the later phase into English and validate the soundness of this translation. This is the responsibility of partners before sharing the file with GEMS.

2.2.1.4. The survey structure

The survey will start with the informed consent part (see Annex 1).

Survey has short socio-demographic part:

- Country:
- Age Group: 14-19; 20-28
- Your occupation (several answers may be ticked):
    - Learner at general education
    - Learner at vocational or higher education
    - Participating in digital hobby education
    - Employed in some job
    - Employed in a digital job
    - Currently not learning or working
- Motivation for ICT Education (30 Items)

Instructions: Please indicate the extent to which you agree or disagree with the following statements, using the 5-point scale.

1. Strongly disagree	2. Disagree	3. Uncertain	4. Agree	5. Strongly agree

Section 1: Affect as Related to Technology Use (Emotional Aspect of Attitudes)

These items measure the emotional response to engaging with technology or digital tasks.

#	Statement	Construct

1	Doing digital tasks makes me feel happy.	Affect (Positive)
2	I feel relaxed when approaching digital tasks.	Affect (Low Anxiety)
3	I often feel frustrated when encountering digital problems.	Affect (Negative)

Section 2: Technology Belief / Values (Belief in the Value and Societal Function of Technology Use)

These items address the perceived social, ethical, and societal importance of digital fields, which is often a key motivator or barrier for young women.

#	Statement	Construct
4	Digital jobs offer important opportunities to contribute to society.	Values (Societal Impact)
5	It is important to me that my future job aligns with strong social values (e.g., healthcare, climate action).	Values (Social Alignment)
6	I believe digital technology is essential for solving future environmental and social problems.	Values (Sustainability Role)

Section 3: Digital Learning Mindset (Beliefs about the Learning Process)

These items assess beliefs about the nature of learning digital skills, including enjoyment and perceived difficulty.

#	Statement	Construct
7	I usually enjoy learning new digital skills.	Digital Learning Mindset (Interest)
8	I believe learning digital skills helps me become more creative.	Digital Learning Mindset (Outcome Belief)
9	I think that mastering digital skills to a professional level is too difficult for me.	Digital Learning Mindset (Perceived Difficulty)

Section 4: Personal Relevance

These items measure the perceived utility and fit of ICT skills for the individual's practical life and career trajectory.

#	Statement	Construct

10	Digital skills will be highly relevant and necessary for my future job.	Personal Relevance (Career)
11	Learning technology-related subjects is directly useful for my everyday life.	Personal Relevance (Practical)

Section 5: Interest, Motives and Goals (Future Intent and Desire)

These items measure specific interests and motivations regarding future career paths and technical skill acquisition.

#	Statement	Construct
12	I am strongly interested in learning programming or coding skills.	Motives/Goals (Specific Interest)
13	My main goal is to use digital skills to achieve success in the job market (e.g., high salary, stable employment).	Motives/Goals (Extrinsic Goal)
14	I am motivated to pursue a career in technology-related fields (e.g., IT, AI, data science).	Motives/Goals (Career Intent)

Section 6: Sociocultural Pressures (Addressing "Why Girls Do Not Go to Learn Digital Jobs")

This is a critical section that directly addresses external pressures, stereotypes, and lack of support—key obstacles for young women in ICT.

#	Statement	Construct
15	I believe that digital jobs are suitable for both men and women.	Sociocultural Pressures (Gender Stereotype)
16	My family and friends encourage me to pursue ICT education.	Sociocultural Pressures (Social Support)
17	I worry that if I work in ICT, I will be the only woman in the room.	Sociocultural Pressures (Isolation Worry)
18	Digital professions are often portrayed in the media as typically isolating or unexciting.	Sociocultural Pressures (Stereotype Obstacle)

Section 7: Digital Skills and Performance (Self-Assessment of Capability)

These items measure the respondent's assessment of their actual current competence level (what

they *can do*).

#	Statement	Construct
19	I believe my current digital skills are sufficient to start studying or working in the technology field.	Digital Skills (Global Assessment)
20	I have the necessary digital skills to solve complex problems independently.	Digital Skills (Problem-Solving)
21	I have sufficient skills to use AI tools effectively in my learning and tasks.	Digital Skills (Specific Skill)

Section 8: Self-Efficacy (Confidence in Own Abilities)

These items measure the respondent's confidence and belief in their ability to succeed with future or difficult digital tasks (what they *believe they can do*).

#	Statement	Construct
22	I am confident that I can easily learn any new digital tool I need for a job.	Self-Efficacy (Adaptability Confidence)
23	I am confident that I can handle unexpected technical problems without external help.	Self-Efficacy (Problem-Solving Confidence)
24	I rarely feel helpless when working on challenging digital tasks.	Self-Efficacy (Low Helplessness)

Section 9: Recognition in ICT Related Activities, Roles, Learning, Jobs

This measures the actual and desired external validation and acknowledgment of the respondent's digital competence.

#	Statement	Construct
25	I am often asked by friends or classmates to help them with digital issues.	Recognition (Competence Validation)
26	I would feel proud if my career was recognized by others as highly technical or digital.	Recognition (Desire for Public Pride)

Section 10: Practicing Opportunities (Access and Quality of Learning)

These items address the opportunities available for learning and practicing skills, rephrased to fit

the agreement scale.

#	Statement	Construct
27	My school provides high-quality classes where I can practice advanced digital skills.	Practicing Opportunities (Formal Access/Quality)
28	I often participate in non-formal digital hobbies or events (e.g., coding clubs, hackathons).	Practicing Opportunities (Non-Formal Access)

Section 11: Belonging to ICT Related Social Support Networks

These items address social ties, exposure, and the existence of role models in the digital field.

#	Statement	Construct
29	I have friends who are passionate for digital technologies.	Belonging (Peer Network)
30	I personally know several women who work in technical or digital roles.	Belonging (Role Models/Network Composition)

2.2.2 Questionnaire data management process

Questionnaire data are collected with the online survey in Google Forms. Each partner translates the Google Forms file in their own language. The surveys must be anonymous, not collecting participants' emails. In front of the survey the information and informed consent part is provided that participants must agree upon.

The survey data will be collected in an Excel spreadsheet in every country. The national survey data spreadsheets will be shared in the folder Survey data - Google Drive , Tallinn University team will make the integrated dataset and analyze the results for the research paper.

The survey data from partner countries are summarised to write a scientific paper on young woman motivation to ICT education. Scientific paper will contribute to inclusive policy making by highlighting key factors influencing girls' ICT motivations.

Timeline: The national surveys must be conducted, and the spreadsheets shared by 15th of March. The national survey data spreadsheets will be shared in the folder Survey data - Google Drive.

2.2.3 Questionnaire data analysis process

The quantitative analysis will be conducted by Tallinn University in four integrated stages, moving from foundational data checks to advanced testing of the causal model.

Sample Size Adequacy

Sample size of 300 respondents is statistically sufficient for the proposed analysis.

Factor	Statistical Requirement	Adequacy of N=300
Statistical Power	Testing causal models requires sufficient power to detect weak-to-moderate effects.	**Excellent.** A sample of N=300 is well above the minimum recommendation for multiple regression and general statistical testing, ensuring high power.
Structural Equation Modeling (SEM)	SEM requires large sample sizes, often measured by the ratio of respondents (N) to the number of parameters being estimated.	**Sufficient.** A common rule of thumb is to have 10-20 respondents per observed variable (item). With 30 items, the ratio is 300/30 = 10:1. This is the baseline recommendation for complex path analysis or SEM, providing stable estimates and reliable model fit statistics.
Cross-Group Analysis	The study aims to compare two age groups (14–19 and 20–28).	**Adequate, but requires careful management.** If the N=300 is split evenly across two age groups (150 in each), the sample size remains sufficient for comparative analyses (ANOVA, t-tests). However, if we plan to compare across multiple countries simultaneously, the sample size per country will become small, making cross-country SEM difficult. For a scientific paper focused on the *overall model*, N=300 is solid.

Stage 1: Data Preparation and Construct Validation

Before testing any causal relationships, we will ensure that the 30 survey items reliably measure the 11 intended theoretical constructs.

Analytical Goal	Recommended Technique	Purpose and Policy Relevance

Data Cleaning and Descriptives	Descriptive Statistics (Means, Standard Deviations, Frequencies)	Understanding the basic characteristics of the sample (age, role, country) and identifying the average levels of the core constructs (e.g., Is Self-Efficacy generally high or low?).
Internal Consistency	**Cronbach's Alpha**	Assessing the reliability of the multi-item constructs (e.g., **Self-Efficacy** has three items; they must be internally consistent). Any construct with an alpha below 0.70 should be reviewed or excluded.
Dimensionality Check (Crucial)	**Confirmatory Factor Analysis (CFA)** or **Exploratory Factor Analysis (EFA)**	CFA because we have a pre-defined theoretical model. It confirms whether the 30 items actually cluster into the 11 proposed constructs (**Affect, Values, Self-Efficacy,** etc.) as intended. This validates the foundation of your entire causal model.

Stage 2: Hypothesis Testing and Key Predictor Identification

This stage tests which constructs are most strongly related to your ultimate outcome variable: **Motives/Goals (specifically, Career Intent, Q14)**.

Analytical Goal	Recommended Technique	Purpose and Policy Relevance
Bivariate Relationships	**Pearson Correlation**	Identifying initial linear relationships. For example, determine if **Self-Efficacy** or **Affect** is positively correlated with the **Career Intent** construct.
Multivariate Prediction	**Multiple Regression Analysis**	Determining the *independent* predictive power of the core belief constructs (e.g., Self-Efficacy, Values, Affect, Personal Relevance) on the **Career Intent** construct (Q14). This tells policymakers which factors deliver the highest return on intervention investment.

Sociocultural Impact	**Standard Regression**	Specifically testing the degree to which **Sociocultural Pressures** (Q15-Q18) independently predicting **Career Intent**, after controlling for foundational factors like **Digital Skills** and **Practicing Opportunities**. This directly answers the question about barriers unique to young women.

Stage 3: Testing the Causal Model

This stage directly tests the pathways proposed in your theoretical causal model (e.g., Practicing Opportunities -> Digital Skills -> Self-Efficacy -> Affect -> Career Intent).

Analytical Goal	Recommended Technique	Purpose and Policy Relevance
Causal Pathway Analysis	**Structural Equation Modeling (SEM)** or **Path Analysis**	**SEM is the definitive approach.** It simultaneously tests all hypothesized direct and indirect relationships in your model. For instance, it can test if **Sociocultural Pressures** *indirectly* hurt **Career Intent** by first undermining **Self-Efficacy** (mediation).
Model Fit	SEM Fit Indices (CFI, TLI, RMSEA)	Determines how well your entire theoretical model (the 11 constructs and all their arrows) fits the real-world survey data. A good fit provides strong evidence supporting your theoretical explanation for ICT career motivation.

Stage 4: Group Comparisons and Qualitative Integration (Policy Focus)

The goal is to move beyond general findings to produce actionable insights for specific groups (e.g., young learners vs. slightly older women in the workforce).

Analytical Goal	Recommended Technique	Purpose and Policy Relevance
Group Comparison	**ANOVA or Independent Samples t-tests**	Compare mean scores on critical variables (e.g., **Self-Efficacy, Recognition,** and **Sociocultural Pressures**) across key demographic groups (e.g., age groups 14-19 vs. 20-28; learners in general education vs. vocational education). This identifies where specific interventions are needed.

Thematic Deepening	**Thematic Content Analysis (for open-ended Q)**	Analyze the qualitative responses to the open-ended question ("Please describe what currently hinders you...") to generate themes. These themes should be used to contextualize and enrich the quantitative findings, particularly the nature of the **Sociocultural Pressures** identified in Q15-Q18.

2.2.4 Interviews around best practice cases

The interviews **will focus on eliciting the Good Practice on gender sensitive teaching for ICT learning and careers (A.2.2).**

Before conducting the interviews the national teams will identify in secondary education, hobby education and higher education sectors the potential practice cases where girls/women are specifically empowered towards ICT learning and careers (report the selected cases by 15th of February, see above).

The interviewed people are selected based on these best practices (see the Sampling part above) and should have some experience related with the specific practice. The policy-makers and decision-makers should be selected who are relevant for coordinating and empowering this practice. The high/secondary school teachers, professors, youth workers and policymakers should be interviewed. Report the interviewed people in this file by March 15th.

The interviews may be held face-to-face recording the discussion or in zoom recording the discussion. After the interview the interview transcripts are made in the national language. The partners are responsible for analyzing the transcripts in the local language and transforming the results in English to the Practice description template.

2.2.4.1. Interview theoretical principles

Best ways to remove the gender imbalance in ICT learning and careers are strategies that target the psychological and social environment to directly intervene in the Self-Efficacy gap and redefine the narrative surrounding digital careers. The best practice approaches should theoretically:

1. Reframe the Narrative (Values and Relevance): **Interventions must redefine ICT by emphasizing its Personal Relevance** (Perceived Usefulness, or PU, as per Davis, 1989) and **Technology Belief / Values—specifically its potential for addressing major societal and sustainability challenges** (Vainionpää et al., 2019). Education should shift away from isolated technical exercises toward **applied, project-based learning where technology is framed as a tool for social change.**
2. Build Self-Efficacy through Mastery and Recognition: Confidence must be built intentionally through **early, consistent enactive mastery experiences (Practicing Opportunities)**

and Recognition (Bandura, 1997). Programs must offer high-quality, **supportive learning environments where successes are publicly acknowledged**. This validation is particularly effective when **received from peers and trusted figures**.

3. Increase Visibility and Networks (Belonging): Organizations and educational institutions must actively **promote female Role Models in diverse digital roles**. **Creating strong Social Support Networks directly combats the anxiety of isolation** (Schinzel, 2005) and strengthens the sense of Belonging that mediates confidence and career intent.

2.2.4.2 The interview questions

This interview should target a specific example case and aims to describe this case with the help of the focus group participants.

Interview questions can be found here.

The aim is to understand what in this practice example **works well in creating environments where girls and young women feel confident, included, and motivated to pursue ICT skills and careers.**

2.2.5 Practice description template

Practice description refers to the good practices A.2.2 which we identify and validate with interviews. **By 15th of February the good practice cases should be identified in this table.**

After interviews are done, every partner follows the practice description template for reporting. **In total 60 practices will be described (10 by each partner)** that help to understand what are the best practices of involving girls to study ICT in secondary school, hobby education and higher education level.

Template for documenting practices here.

The partners collect the practice' templates in the folder.

Timeline: The good practices should be collected by April 15th 2026

- The Programme/practice name
- The Country
- The Educational level (secondary, hobby education, higher education)
- 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. NOTE. Illustrate each of the practice elements with the specific interview examples.
    - How can girls/women discover this ICT learning opportunity? (e.g. marketing the opportunity, at meeting places, social suggestions)

  - 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 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)?
  - How is girls/women confidence and self-efficacy built towards ICT?
  - What way engagement to networks extends girls' social motivation to learn ICT (e.g. events, competitions, fairs) ?
  - 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)?
  - What are the elements of ICT career opportunities in the programme (e.g. job shadowing, practice, career guidance, positive career perception)
  - What are the elements of ICT entrepreneurship in the programme (e.g. hackathons, product development, marketing)
  - Other
- What is the evidence that this practice works, how it is monitored and assessed?

  NOTE. Illustrate each of the practice elements with the specific interview examples.

- Who are involved in teaching and on which basis (e.g. paid role, voluntary engagement)
- What assets and resources are required for this practice to be successful (e.g. tuition fee)
- 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)
- What policies are required for this practice to be successful

  NOTE. Illustrate each of the practice elements with the specific interview examples.

- References: Link to the practice curriculum etc.

2.2.6. Limitations

Several methodological limitations should be acknowledged when interpreting the findings of this research. The survey sample is designed to support comparative analysis between age groups rather than provide nationally representative findings. With approximately 50 survey respondents per country, country-level analyses should be interpreted with caution and viewed as exploratory rather than representative. The survey research relies primarily on self-reported perceptions, attitudes, and experiences. Such measures may be affected by social desirability bias, recall bias, or differences in respondents' interpretations of survey questions.

The cross-sectional nature of the survey captures participants' views at a single point in time and therefore cannot establish definitive causal relationships between the investigated factors and ICT career intentions. The proposed causal model should therefore be interpreted as a theoretically informed explanatory framework rather than proof of causality. SEM will be performed only if model fit and sample-size requirements remain satisfactory, otherwise path analysis or multiple regression will be used, which would make the methodology more robust. Variations in national educational systems, ICT curricula, cultural contexts, and translation of survey instruments may introduce contextual differences that limit direct comparability across countries.

The identification of best practices with interviews relies on individual stakeholder interviews or focus group interviews. Participants may be more likely to discuss successful initiatives than unsuccessful ones, potentially introducing positive reporting bias.

Risks Related to Data Collection

The main risks affecting the implementation of the study include:

- Lower-than-expected survey participation rates;
- Difficulties recruiting interview participants from all stakeholder groups;
- Uneven distribution of respondents across age groups or countries;
- Delays in obtaining institutional permissions or participant consent;
- Scheduling challenges affecting focus group participation;
- Differences in the availability of documented good practice examples across partner countries.

To mitigate these risks, partners will implement the following contingency measures:

1. Expanded Recruitment: If survey participation targets are not reached through the initial recruitment channels, partners may recruit through additional schools, higher education institutions, youth organisations, hobby education providers, and professional networks.
2. Flexible Interview Formats: Interviews may be conducted individually or in focus groups, either face-to-face or online, depending on participant availability.
3. Adaptation of Stakeholder Distribution: If the planned number of respondents within a specific stakeholder category cannot be achieved, additional participants may be recruited from other relevant stakeholder groups while maintaining the overall objective of collecting evidence on gender-inclusive ICT practices.
4. Minimum Acceptable Interview Sample: The target of 228 interview participants across all stakeholder groups is intended to ensure broad representation. However, the validity of the qualitative findings depends primarily on the diversity and richness of collected practice descriptions rather than on achieving an exact numerical target. If fewer interviews are completed, the sample will still be considered adequate provided that all partner countries

contribute practice cases; all major stakeholder categories are represented; sufficient information is collected to document and validate the planned practice descriptions.

5. Practice-Based Sampling Adjustment: If some countries identify fewer suitable practice examples than expected, the sampling strategy may be adjusted to prioritise depth of investigation over the number of cases. Additional interviews may be conducted around highly relevant practices to ensure comprehensive documentation.
6. Monitoring and Early Intervention: Recruitment progress will be monitored regularly at consortium level. Countries that experience recruitment difficulties will receive support from the coordinating partners to identify additional recruitment channels and stakeholders.
7. Impact on Data Analysis: Should recruitment targets not be fully achieved, quantitative analyses will be adapted accordingly. Advanced analyses such as Structural Equation Modelling will only be conducted if sample size assumptions remain satisfied. If necessary, the analysis strategy will place greater emphasis on descriptive statistics, regression analysis, and qualitative findings while clearly reporting any limitations resulting from reduced sample sizes.

All deviations from the planned methodology will be documented transparently in the final research report and subsequent scientific publications.

2.3 Ethics application process

This research ensures that we do not harm any participant. Ethics and data management in the project follows the Personal Data Protection Act and other relevant legal acts, good scientific practice according to the European Code of Conduct for Research Integrity (ALLEA) and is compliant to the Ethics procedures in every partner country. The information of the project and the informed consents (See Annex 1) must be given for every participant and signed by them. The underaged children can participate if their parents are providing the consent. Children above 15+ can sign the consent by themselves.

The survey participants will fill the survey anonymously, and the consent will be positioned in the first page of the survey. The login to the survey will be anonymous, no emails will be collected.

The consents from interviewed persons will be signed on paper and every partner country is responsible for keeping the consents until the end of the project in a safe storage room, also anonymizing the interview transcripts to keep the anonymity of the participants. The Partners should use the digital and zoom files for making transcripts, the sound and video files must be destroyed 1 week after transcripts are made and verified. Next the transcripts are anonymized and used for creating the practice templates in English. The transcripts in local language will be stored by partners until the end of the project.

The open question answers from the survey and the transcript examples from the interview that are described in the Practice Templates will be used for the research paper keeping the respondents anonymous.

Annex 1. Informed Consent

Note. Please modify the parts in italic for the survey or the interview.

Before deciding to participate in the study, please carefully review all the information provided in the document:

Research Project Details:

- **What is the project title?** GEMS - Girls' Empowerment In Digital Skills
- **What kind of research is this?**
  - GEMS is an Erasmus+ project that investigates how to involve girls/women to ICT learning and careers
  - The project coordinator is Angelo Gelardi.
  - The project consortium consists of 7 partners: PMF SRL (Italy), Tallinn University (Estonia); University of Ljubljana (Slovenia), Ramon Llull University (Spain), Frederick University (Cyprus), ipcenter.at GmbH (Austria), University of Catania (Italy)
- This project addresses practices how to involve girls/women to ICT learning and careers
- **Who can be contacted if you have doubts?** (A person in your country)
- **Email Address/ Mobile:** add email of this person
- **What is the purpose of participation?**
  - The purpose of participation is to obtain the perspective of stakeholders about how to involve girls/women to ICT learning and careers
- **How and why were you selected?**
  - We have contacted you because you belong to the project's target group. Your participation is completely voluntary, and you can withdraw at any time without any obligation. Your data can be removed until the data are anonymized. After that your anonymous data cannot be removed.
- **What benefit will society/a specific group gain from this study?**
  - We will get to know what way to bring more girls and women to ICT learning and jobs
- **What benefit do you gain from participating in the study?**
  - I can share my experience.
- **What risks or harms might you incur due to participation?**
  - Your participation involves no risks.
- **What does your participation involve?**
  - Your participation involves completing an online *survey/interview*
  - To start the *survey/interview*, you need to sign an informed consent beforehand. *The survey takes an average of **20 minutes** to complete. The **interview will take part 1 h.***

- **Will you be informed of the results? Dissemination of results:**
  - The public GEMS website will provide generalized results.
- **Will the results be disseminated or published?**
  - The results obtained will be published in open-access scientific media and disseminated on social networks. Under no circumstances will the identities of the participants in the study be disclosed.
- **How is your data protected? Data Protection:**
  - **Is the *survey/interview* confidential?** Yes
  - **The data are anonymous** Yes
  - **Will your data be used for further research? Secondary use of data:**
    - The anonymous data collected through the survey can be used in research related to this project if you give your permission.

I hereby confirm that:

- I have read and understood the information given to me about the study.
- I have read and understood the objectives and procedures of the study.
- I have read and understood the shortcomings of the process.
- My participation is completely voluntary.
- I understand that I can withdraw from the study at any time without giving explanations, and this will have no negative consequences for me.

For all the reasons mentioned above,

I confirm my consent to participate in this study YES NO

I consent to the secondary analysis of anonymized data YES NO

In witness whereof, I sign this document.

Participant: ..... Responsible Researcher:.....

..... 2026.

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