

Article

From Students to Educators: A Qualitative Interview Study of Female Faculty Perspectives on Gender Equality in Technology Higher Education

Yekaterina Kovaleva¹ , Jussi Kasurinen¹ , Vidya K. Sudarshan²  and Ari Happonen^{1,3*} 

¹ Software Engineering, LUT University, 53850 Lappeenranta, Finland; yekaterina.kovaleva@lut.fi (Y.K.); jussi.kasurinen@lut.fi (J.K.)

² College of Computing & Data Science, Nanyang Technological University, Singapore 639798, Singapore; vidya.sudarshan@ntu.edu.sg

³ School of Computing, College of Engineering and Technology, Kattankulathur Campus, SRM Institute of Science and Technology, Kattankulathur 603203, India

* Correspondence: ari.happonen@lut.fi

Received: 29 June 2026; **Revised:** 10 July 2026; **Accepted:** 12 August 2026; **Published:** 16 October 2026

Abstract: To explore why women remain underrepresented in the technological sector despite longitudinal initiatives toward gender equality, this qualitative study examines perspectives from 15 female faculty members across eight countries. Participants are women who have navigated this landscape twice: first as technology students, and now as faculty who observe, teach, and influence the next generation. Through grounded theory analysis, the study captured both changes in attitudes towards technology careers across different life stages and the role of faculty in promoting inclusive change. The dual perspective and cross-cultural analysis from Finland, Jordan, Malaysia, India, Kenya, Spain, Namibia, and the Netherlands revealed unique insights contributing to existing gender-inclusivity discussions. The findings align with Social Cognitive Career Theory but extend it: career decision-making is seen as a continuous, experience-based process throughout life, not just a threshold event in adolescence. To ensure that female experiences foster positive attitudes toward technology, universities need to take systemic actions to create a comfortable learning environment. These actions should start with providing faculty training on inclusivity, as interviews revealed low faculty awareness of classroom-level practices. The multicultural perspective also showed that while gender perceptions varied across regions, they differed from field to field. This led to the conclusion that it is not industries that are gendered, but rather the image of them, which suggests promoting technology from a new, inclusive angle, especially in countries with high structural equality, where interviewees appeared less tolerant of potentially hostile environments and tended to avoid them.

Keywords: Gender Equality; Engineering Education; Software Engineering; Women in Technology and ICT (Information and Communication Technology); Lifelong Career Development; Grounded Theory Methodology with Qualitative Interviews; Cross-Cultural Qualitative Research; Social Cognitive Career Theory (SCCT)

1. Introduction

Women are globally underrepresented in technical fields, which concerns researchers around the world [1,2] and is also reflected in limitations in gender studies in this research area [3]. Studies suggest that this phenomenon

is related to the overall perception of technical fields as more suited for men and, therefore, hinders women from pursuing careers in technology despite equal abilities.

To address this imbalance, educational institutions examine and design interventions [4–7]. Existing initiatives suggest changes on different levels of institutional practices, starting from providing inclusive study material to building female-only educational programs [8]. The effectiveness of these interventions depends on how faculty members perceive them and whether they act and implement gender inclusivity in their daily teaching activities and content with students, both online and in class. While faculty members are responsible for the curriculum and classroom climate, their voices are often missing from the inclusion discussions [9–11].

This study explores women's experiences and perspectives in technical fields through the lens of female faculty. Here, our study aims to provide female faculty-based dual-perspective views. Firstly, they can share their own experiences as former technology students and professionals. Secondly, as educators, they can observe student participation and implementation of institutional practices.

For the set research goals, the following research questions are to be addressed:

RQ1: How do women in technology describe their educational and professional journeys, and what has shaped their careers?

RQ2: How do women perceive the gender dynamics in technological higher education?

RQ3: What insights and recommendations do women in technology have for creating more inclusive and supportive educational environments?

The data for the research were collected through 15 semi-structured interviews with female faculty members from different technological disciplines and from 8 different countries. To explore gender paradox phenomena [12], Finland was chosen as the primary research context. Although Finland is consistently ranked highly in societal and sustainable development metrics [13], including international gender equality indexes [14], women remain underrepresented in technological education and careers [12]. Interviews from Jordan, Malaysia, India, Kenya, Spain, Namibia, and the Netherlands allowed a broader perspective and different cultural contexts to be considered. For example, in some of these countries, technological fields, such as Information and Communication Technology (ICT), are dominated by female students. This brings valuable insights to this study. The findings collected through Grounded Theory analysis are interpreted primarily through a social cognitive career theory (SCCT) lens to position the paper within existing theoretical reasoning.

2. Related Studies

2.1. Women in Technology

The gender gap in technology concerns researchers and institutions worldwide [1,2,4,15]. Global reports show that women make up only 35% of STEM students (Science, Technology, Engineering, and Mathematics), with 25% employed in the job market [1]. Notably, the situation varies across STEM fields. Women are generally more represented in science fields like chemistry [16]. However, they make up only 15% of the engineering workforce [1]. For this reason, this study focuses on technology fields. The term includes fields like ICT, engineering, manufacturing, and construction [17].

Meanwhile, team diversity is associated with a positive workplace climate and innovation [18–21]. Diverse perspectives lead to solutions that better serve diverse user needs [22]. In addition, fields like ICT are growing fast and face constant demand for skilled professionals [23,24]. Women who are underrepresented in ICT [1,25] could become a key resource for closing the workforce gap.

The well-documented underrepresentation of women in technology can be attributed to a combination of many factors. From an early age, women often tend to have limited exposure to computing compared to men [5,26–28], and are frequently confronted with stereotypical, male-dominated views of the field in the absence of alternative perspectives [29–31]. Early interest and a sense of belonging are important factors in shaping a career path [32,33], with parents and educators being both potential catalysts and barriers for developing interest and skills towards technology, depending on their beliefs [34–36]. Even when women decide to pursue a technological career, their confidence and self-efficacy [26,37–39] may be undermined by limited prior experience and persistent biases, despite strong academic achievements and abilities [40–42]. Many female students report having had experiences of discrimination during their studies [43–45]. In the workplace, women experience difficulties maintaining work-life

balance, face overt and subtle discrimination, in addition to a lack of proper acknowledgment and recognition [46], which further reinforces their uncertainty about belonging in the field.

These barriers become more apparent in the formal education stage and have a direct impact on shaping gender equality in the industry [47]. As careers in technology usually require advanced skills, future professionals should acquire higher education-level diplomas. This positions higher education as a gateway to technological careers and as the place where first experiences with the field are gained. Therefore, universities should focus on broadening diverse participation and inclusion [6,32]. They can provide early exposure opportunities [48,49], organize gender-awareness talks [50], ensure inclusive curricula [8], and introduce growth mindset interventions [51]. These efforts can strengthen women's engagement and persistence in the field. However, concerns remain regarding the long-term effectiveness and sustainability of inclusive interventions [52].

In the big picture, to understand how gender-inclusive interventions are implemented in universities and what makes them impactful and long-term effective, it is important to consider the perspectives of faculty members, who in fact implement these actions in classroom practices and carry out the policies and rulings of the education units [53,54].

2.2. Theoretical Framework

The study is conducted using grounded theory. Although the results were analyzed inductively first, the authors aligned with social cognitive career theory (SCCT) to situate this research within a theoretical context. The SCCT implies that career choices are based on three core components: self-efficacy beliefs (confidence in ability to succeed in a domain), outcome expectations (beliefs about the likely consequences of pursuing a path), and personal goals [55].

The environment is not presented as a separate element but is integrated as part of the model [56]. The theory divides environmental influences into distal and proximal factors. Distal factors form attitudes toward the career long before the decisions are made. For example, early-age gender role cues affect self-efficacy and outcome expectations. Proximal factors affect the choices directly, like family encouragement or financial pressure. These factors can moderate career choices by determining how strongly interest actually turns into a goal, and a goal into action. In some cases, environmental pressures override interest altogether, particularly where family expectation or economic necessity outweighs personal preference.

3. Materials and Methods

Our research presents international interview results, which have been analyzed using grounded theory methodology for in-depth data collection and phenomenon processing purposes. Grounded theory was selected to let themes and categories emerge inductively from participants' stories [57], which was considered appropriate given the exploratory, comparative nature of this study across multiple cultural contexts. The study aimed to capture the experiences of female faculty members in technological fields, focusing on pathways into the field, challenges they faced, their observations as educators, and the institutional environments that shape gender equality.

The research dataset consists of 15 semi-structured interviews with female faculty members in technological disciplines across diverse geographical contexts. Faculty members were selected to share their dual experience. First, as former technology students, they reflected on their own pathway and evaluated the changes that occur over time. Second, as current faculty members and enablers of change, they shared their observations regarding gender situations and practice applications [58]. This biographical dual lens—rarely mobilized in gender and STEM qualitative research—yields insights that neither a student sample nor an educator sample alone can provide [59]. Participants were recruited primarily through academic and professional networks, following a purposive sampling strategy. Sampling required that participants currently hold a faculty position in a technology-related discipline and have both studied and subsequently held an academic position in the field. Some individuals whom we offered to take part in the interview declined. No participant withdrew after agreeing to be interviewed.

Finland was selected as the primary context as it represents a recognized case of the gender-equality paradox [12] with low female representation in technology despite high ranking in structural gender equality and supposed equal opportunities [2]. The remaining countries were selected to provide contrasting socio-cultural and gender-equality contexts.

Recruitment continued until subsequent interviews ceased to produce new codes or themes, indicating that theoretical saturation had been reached within the study's scope and timeframe [60].

Overall, the interviewed participants do include lecturers, associate professors, deans, and researchers in Software Engineering, Computer Science, and Mechanical Engineering, among others. In other words, the scale and scope of the coverage have been selected to be representative, across multiple roles and with the responsibilities these roles bring. The interviewed persons do represent institutions in Europe (Finland, Spain, and the Netherlands), Africa (Namibia, Kenya), and Asia (Jordan, India, Malaysia). To ensure anonymity, each participant was assigned an interview ID (Interviewee 1–15). Informed consent was obtained from all participants prior to data collection. The metadata is presented in **Table 1**.

Table 1. Interview participants metadata.

ID	Academic Position	Domain	Country of Work	Industry Experience
1	Lecturer	Computer Science	Jordan	No
2	Associate Professor	Software engineering	Spain	No
3	Principal Lecturer	Industrial management	Finland	Yes
4	Lecturer	Information Systems	Finland	No
5	Lecturer	Mechanical Engineering	Malaysia	Yes
6	Dean	Engineering Science	Finland	Yes
7	Associate Professor	Architecture/Building Science	Malaysia	Yes
8	Senior Lecturer	Mechanical Engineering	Malaysia	No
9	Associate Professor, Dean	Computer Science	Kenya	No
10	Doctoral Researcher	Software Engineering	Finland	Yes
11	Doctoral Researcher	Software Engineering	Finland	Yes
12	Doctoral Researcher	Software Engineering	Finland	Yes
13	Professor	System Engineering	India	Yes
14	Assistant Professor	Computer Science	Netherlands	No
15	Senior Lecturer	Information Technology	Namibia	Yes

The interviews lasted approximately one hour to an hour and a half, and these interviews were conducted in English via the video conferencing platform Microsoft Teams, using a semi-structured format guided by questions on participants' educational backgrounds, career decision-making, experiences of gender discrimination, institutional practices, and visions for improving diversity in technology. All interviews were audio-recorded with participants' consent and subsequently transcribed using Microsoft Teams' automated transcription feature, followed by manual verification against the recordings by the research team.

The analysis followed grounded theory traditions for the coding process [57,61]:

- Open coding: transcripts were examined line by line to identify initial codes to capture every idea.
- Axial coding: the process of grouping related open codes to reflect emerging patterns.
- Categorization: axial codes were combined into higher-level categories.

During initial transcript review, the first author used analytic memos to record emerging questions and observations. These memos supported the coding procedure. Coding was conducted manually, using qualitative analysis software NVivo. Coding was led by the first author, with the second and last authors reviewing coded transcripts at each stage (open coding, axial coding, categorization) and resolving disagreements through discussions until consensus was reached.

The authors acknowledge that the sensitive nature of this gender-related multicultural research requires careful data interpretation. To mitigate the risks, the research team included international, mixed-gendered authors to support balanced interpretations of the experiences described by participants. The authors acknowledge that complete methodological neutrality is neither achievable nor, within a grounded theory epistemology, theoretically desirable. The epistemological goal is not to eliminate researcher perspective but to make it transparent, traceable, and analytically productive.

4. Results

This chapter presents the findings from the interview analysis. It describes interviewees' experiences as women who decided to study technology and pursue a technology career together with their observations as educators.

4.1. Choice of Major

When analyzing the respondents' choice of major, it was found to be mostly based on personal interest, often supported by early exposure; career opportunities, such as market demand, competitive salaries, growth potential, and workplace comfort; and family opinions and recommendations. The importance of early exposure was consistently highlighted, aligning with findings from previous research [62].

For many respondents, parents influenced their career decisions, either through pressure or support. Among the interviewees, 5 out of 15 reported being pushed into a career by their parents, regardless of their personal interests. Respondents from Asia and Africa stated that it is common for parents to encourage children towards prestigious careers, such as engineering and medicine.

"If you are Asian and you are smart, you have to be in the science stream... either a lawyer, a doctor or an engineer. If given a choice, I would have opted to be an archaeologist." Interviewee 5.

Some respondents were supported by their family to pursue their interest in technology-related fields. Studies showed that close relatives can become role models and nurture a natural interest in technology [5].

"I am the first from my family to select technical education... my brothers also followed me, now our family has many engineers." Interviewee 13.

Interviewee 15 demonstrated the impact of early exposure to computers on her career decisions, recalling how her sister introduced her to video games at school:

"By the time I was nine years old, I knew - whatever I do in life must involve computers."

Some interviewees pursued technology only after completing their first degrees in other fields. They mentioned a male-dominated culture as a factor that influenced their initial choice of this career, regardless of personal interest:

"Only people I knew working in technology were men... I didn't think my personality fit. I lacked the courage." Interviewee 11.

Although many described their education as challenging, they identified determination, passion, curiosity, and adaptability as key qualities that kept them on track, along with support from their family, peers, and colleagues.

"You do need grit and a lot of persistence to overcome the difficulties you will face in a STEM career." Interviewee 8.

4.2. Workplace Choice

The previous section shows that choice of the field of study was mostly based on personal interests, career prospects, or parental advice. In comparison, later workplace choices are strongly influenced by a combination of correspondence to personal values (such as interest, passion, personal fit, flexibility, and creativity) and overall comfort in the environment. Discrimination and hostility push women to seek alternative occupations despite potential financial loss (Interviewees 3 and 11). This finding is supported by another study [46].

For example, the choice of a career in academia was supported by its flexibility, interest in research, and a desire to teach, as well as comfortable working conditions:

"I didn't choose academia - academia chose me. They approached me, and I fell in love with teaching." Interviewee 15.

"If not for the nature of my job, I would not be able to spend so much time with my daughter." Interviewee 8.

Some of the interviewees were still influenced by their parents' career advice. Thus, for instance, Interviewee 1 chose academia over industry as it was a respectful position for a woman:

"...my professor... told me you can work as a lab supervisor... my mother... said it is a very good opportunity..."

Interviewee 5 switched from industry work to academia as her parents considered the former workload unsafe:

"My father saw me coming back from work at midnight... said: 'Lady should not be doing all this. Go and take a Master's and be a lecturer.'"

4.3. Socio-Cultural Context

Our research data demonstrate that even in countries with a more traditional view of gender roles, perceptions of the technological field, specifically ICT, might differ from the masculine image often observed in countries with high structural equality, such as Finland. In fact, in India and Jordan, computing-related fields are more gender-balanced and are considered to be "soft" and "feminine" fields compared to core industries like mechanical and electrical engineering:

"Mechanical engineering is hard work, you need energy... computer science is only brain work, so girls prefer it." Interviewee 13.

"...I hoped to be a medical engineer or mechatronics engineer. Then the people around me told me that these are for boys. Software engineering is better for you." Interviewee 1.

These findings once again confirm that many industries are not gender-specific but are perceived as such by some societies.

At the same time, in these regions, women face mobility restrictions with limited access to study abroad due to safety concerns.

Interviewees, regardless of the region, highlighted the importance of work-life balance and women's caregiving roles. In some countries, motherhood can limit career opportunities. While women from Europe did not report having children as a problem during recruitment, they still emphasized the importance of adequate parental leave and equal participation in childcare for both parents. Interviewees 10 and 14 mentioned this as an important factor for immigration and choosing a place to live.

"In China, companies don't want to hire people who are going to experience pregnancy... they want to avoid financial loss." Interviewee 10.

4.4. Discrimination Experience

Among interviewees, the majority have mentioned experiencing some form of bias. These cases were present in both the work and educational environments.

Thus, Interviewee 6 faced a microaggression from her educator:

"I was the only girl in physics class... the teacher did sometimes make inappropriate jokes. He didn't mean harm but wasn't aware of how that might come off."

A big concern was microaggressions coming from peers:

"There were only six or seven ladies out of seventy-five. I continuously experienced men talking me down, not considering my opinions, interrupting me..." Interviewee 12.

Many participants felt undervalued in their workspace:

"When I did something significant, it wouldn't be celebrated. But when a male sysadmin did, it would be announced." Interviewee 9.

"We were two women with blonde hair, and clients constantly confused us." and "They assumed we'd plan events because we're outgoing women. We hated it." Interviewee 11.

The noticeable pattern was that while participants from Europe and Africa reported experiencing more subtle forms of discrimination, respondents from Asia were more tolerant of gender discrimination or did not recognize certain practices as discriminatory in the same way. For example, separating female and male students for coursework was intended to reduce intersexual interaction in India, corresponding to their cultural values.

Respondents often observed discrimination in teamwork. When women work in a mixed team, they are undervalued and assigned to tasks that are assumed to be more feminine [63]. This dynamic was present in both educational and professional settings. Students tend to self-segregate into gendered teams to feel more comfortable. However, this does not reflect the reality of the industry.

"Sometimes male colleagues assumed I would take documentation or front-end tasks." Interviewee 14.

"In group work I was always the facilitator... scheduling, keeping documents up to date, making submissions ... I once tried not to do it... then no one else did anything until right before the deadline." Interviewee 12.

The lack of confidence in their skills pushes women to avoid "hard tasks" and limit their learning experience.

"Most of the time the ladies say, 'I'm not good at coding, let me do documentation.'" Interviewee 15.

The potential benefits of team diversity can only be achieved in a comfortable environment. It is important for educators to recognize that women may face pressure within teams, which can hinder them from fully participating in teamwork and developing diverse skills [21,64].

The findings suggest that respondents from European countries, especially Finland, seek psychological comfort when making career choices, even despite financial losses (Interviewees 3 and 11). They show lower tolerance for subtle biases and carefully evaluate their "personality fit" within the field (Interviewee 12). This may result from the long-term impact of equality initiatives in their societies and increased awareness of discrimination [47]. This leads to the conclusion that high awareness about masculinity associated with certain industries helps women to better recognize and avoid hostile environments. In addition, decent pay rates across different careers support women in choosing more comfortable pathways.

4.5. Study Approach Differences

Faculty members acknowledged the gender differences in students' behavior. Female students tend to be more dedicated to their studies. They earn better grades and focus on coursework quality. Male students, on the other hand, are more proactive in networking and developing skills for potential employment. This could create a gap in career readiness and limit women's employment opportunities.

"...the males are more aware about the new trends in technology... The girls are mainly focusing on the courses..." Interviewee 1.

"Male students are much more likable, interactive, ready to volunteer. Female students shy away unless made compulsory." Interviewee 5.

Interviewee 7 observed that women's strong focus on academic achievements might be related to high parental expectations.

These findings suggest that women can overlook employment opportunities and limit their ability to enter the industry. This leads to a recommendation to involve women in extracurricular activities like hackathons and industry projects to broaden their exposure and professional networks [65].

4.6. Institutional Interventions

This study shows that, although classroom-level inclusive initiatives are highly researched [4], educators often lack awareness of actions they can take individually. When asked about gender-inclusive practices, most interviewees suggested institutional-level initiatives, such as school visits, workshops, hackathons, women's networking communities and faculty diversification, while rarely mentioning daily classroom practices.

When talking about outreach initiatives, respondents supported the idea of hands-on experience for young girls to get the feeling that they are capable:

"To attract girls, you must demystify computing—show them how to build a website in one day so they see they can do it." Interviewee 9.

At the same time, highlighting that these events can serve as networking opportunities and increase awareness about career prospects:

"If I'd been taken to a Women in Tech event in high school, I'd probably be in IT already." Interviewee 11.

There were also discussions about university-industry collaboration, such as industry visits and projects. However, Interviewees 4, 6, and 12 acknowledged that they should be organized consciously not to reinforce the existing stereotypes about the field.

"Company presentations reinforced stereotypes: dark room programmers, no social life. That made me doubt if I belong." Interviewee 12.

While there were no explicit questions about quotas, the topic emerged in 6 interviews with a clear division in opinions. Supporters pinpoint the need to change the industry dynamics, which cannot happen without additional stimulus [66]. They also emphasize the sense of security that quotas help to achieve.

"Quotas are always criticized as not hiring the best people. But without them, recruitment bias continues." Interviewee 11.

"In Sweden, equality demand was clear: the position was for females, open wage policy, equal teams, female professors present... more supportive culture." Interviewee 3.

While those who are against quotas highlight the "forced" nature of these actions.

"Maybe we don't have to increase women in tech... I want women to have all the real information... I don't want to force anyone." Interviewee 2.

Regardless of prevailing institutional initiatives, interviewees suggested several classroom-level actions: using impactful projects in coursework and ensuring that study materials are inclusive.

5. Discussion

The results section has described the themes that appeared during the interview analysis process. This section opens the discussion about the interpretation of the findings within the existing theoretical context. As Grounded Theory was applied for this research, **Table 2** presents the inductively emerged categories from the coding process.

Table 2. Code-based categories.

Category	Subcategory	Codes
Internal drivers	Personality	Creativity; Flexibility; Proactivity
	Interest and values	Interest; Passion; Personal fit; High trend awareness; Career prospects; Psychological and physical safety; Role models
External expectation	Socio-cultural norms	Prestige culture; "SE is a 'soft' career"; "This is not for girls"; Female caretaking role; Politeness and Reservedness (as expected feminine traits)
	Family expectations	Family influence; Mobility restriction; Safety concerns; Career prospects; Focus on academic achievements
Experience	Positive	Early exposure; Networking; "Side" projects; Psychological and physical safety; Quotas; Role models; Exposure events
	Negative	Microaggression; Biased recruitment; Glass ceiling; Low female representation; Exclusion; Feeling undervalued; Unwanted role assignment; Gendered teams; Unequal contribution; Disrespect

The authors would like to acknowledge that due to the relatively small sample size, the results should be understood as a lens emerging from the data, rather than a fully developed or validated model.

The interviews revealed three main contributors affecting the career choices of women in technology: internal drivers, external expectations, and experience. Internal drivers represent individuals' personality, interest, and values. External expectations consist of two subcategories grounded in the interview data: socio-cultural norms,

which represent cultural gender expectations, overall social attitude towards technology fields, and the role of women within it; and family expectations. Experience, positive or negative, can reshape the other two categories over time. Participants' stories suggested the interconnections between these categories presented in **Figure 1**.

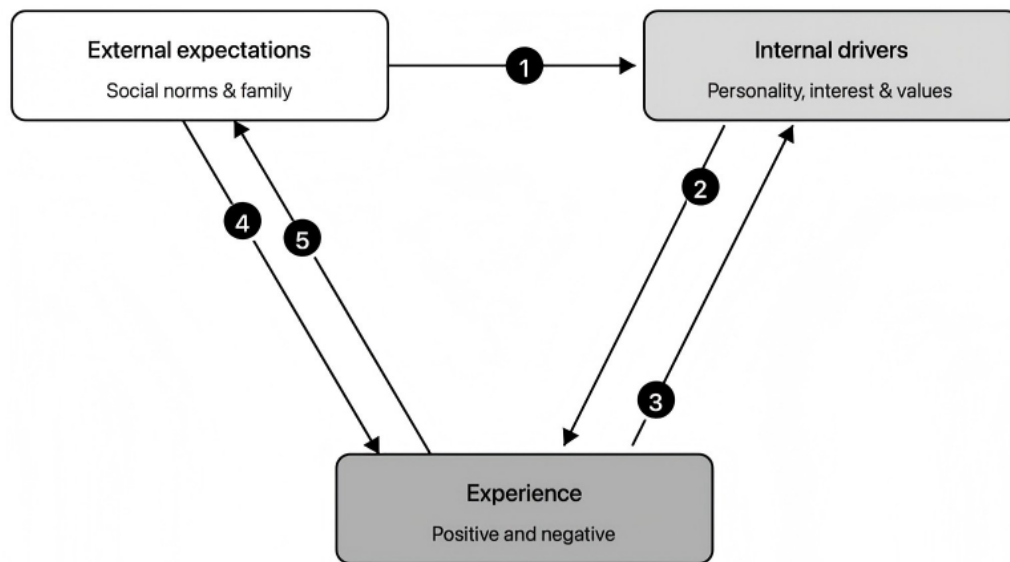


Figure 1. Suggested Model of Career-Decision Mechanisms.

The model proposes five mechanisms:

1. External expectations often determine which personality traits are nurtured among genders. At the same time, they form individuals' values. Thus, for instance, interviewees referred to familial expectations as the reason for female students' focus on academic achievements.
2. Internal drivers lead individuals to seek out experiences. For example, Interviewee 11 was purposefully looking for IT networking events to find a supportive environment when changing her career.
3. Experience can gradually change individuals' interests and personality. Positive experience strengthens attitudes towards technology, while negative weakens. Thus, several interviewees dropped out of the industry due to hostile environments.
4. External expectations can produce experiences. Like stereotypes existing in society produce discrimination.
5. Meanwhile, experience can weaken or diminish the importance of external expectations. Networking events and exposure to role models helped several interviewees to keep their career in technology and challenge the hostility. In other words, the "authority" of the external expectations can gradually disappear through acquiring positive experience.

These inductively revealed findings correspond to the SCCT. Internal drivers share the ground with self-efficacy, outcome expectations, and personal goals, which represent the core of SCCT [55]. While the environment is integrated within the SCCT model and not as a separate element, it still reflects external expectations in the suggested model [56].

The important observation of this study is that career choice is not something that happens once but stays relevant throughout life. The model is dynamic, mostly through experience that shapes attitudes towards or against a technology career. When negative factors outweigh positive ones, individuals may switch careers. This draws the difference between the suggested model and SCCT.

While SCCT acknowledges that self-efficacy and outcome expectations can change through experience, its focus remains on the interests and choices that are formed in early adulthood [55]. This study suggests treating experience as a continuous, lifelong force that can affect career change at any stage.

This is exactly why educational institutions and industry should focus on providing individuals with positive experiences, since reshaping socio-cultural expectations and personalities is harder to achieve, if necessary at all.

6. Conclusions

The study's finding reframes a long-standing problem: it is not women who are incompatible with technology, but rather technology's image that has been constructed as incompatible with women. Across eight culturally distinct contexts, from Finland to Kenya to Jordan to Malaysia, the evidence share the same insight: industries are not gendered, their representations are [67]. This conclusion is both diagnostic and forward-looking: if the barrier is imagistic rather than structural, the solution does not lie in numerical quotas but in a deliberate reimagining of what a technology professional looks like, sounds like, and does. The scope of the study provided a unique opportunity to capture dual perspectives of women who were both former technology students and current educators, while also taking different cultural contexts into consideration. Through grounded theory analysis, the study revealed several theoretical and practical contributions, including extending SCCT to a lifelong, rather than adolescent, framework.

6.1. Theoretical Contributions

Inductively, three core categories emerged to explain the technology career choice phenomenon: internal drivers, external expectations, and experience. The model mechanisms align with the existing SCCT theory, which, on the one hand, supports the proposed model's validity and, on the other, opens the discussion for further research. This study's principal theoretical contribution is to extend the perception of the career-choice timeline. Social Cognitive Career Theory has dominated research on women's career choices in STEM for over two decades. It consists of three components: self-efficacy beliefs, outcome expectations, and personal goals. However, the theory frames career formation as a process that occurs primarily in early adulthood, rather than as a continuous process. The findings challenge this: across eight cultural contexts and multiple career stages, the fifteen women in this study showed that career commitment and career change are equally available at thirty-five as at eighteen, provided accumulated experience sufficiently influences the balance between internal drivers and external expectations. Therefore, our findings propose treating career choice as a lifelong action rather than a decision made in early adulthood and focusing on providing positive experiences for female students and professionals to engage and retain them in technology.

The international nature of this study revealed that perceptions, not industries, are gendered. In some countries, ICT fields like software engineering and computer science are perceived as "soft" disciplines and, therefore, more suitable for women than other technical fields. Meanwhile, it is not the case in the European Union, where only 19.5% of ICT specialists are women [68]. Previous research has already shown that gender representation in technology differs across countries depending on cultural stereotypes and field "image" [16]. Since the findings reveal that the problem is based on what society believes about the field and not, for example, economic factors, the solution needs to shape how the fields are represented and talked about.

That leads to another finding of this study: structural equality does not eliminate bias. In countries with high gender-equality rankings, women still experience gender discrimination. However, structural equality increases awareness about biases and unfair treatment, making women less tolerant of a hostile environment. Knowing potential risks, women decide to avoid environments where they can be discriminated against. This phenomenon can explain the gender equality paradox [12] and aligns with Stereotype Threat theory, which suggests that even awareness of stereotypes is enough to hinder career choices [69]. This once again emphasizes the importance of the "image" of the fields [70] and how they are represented. If women who are less tolerant of discrimination believe they will be treated unfairly, they will not join the fields.

6.2. Practical Contributions

Across countries, faculty members showed limited awareness of classroom-level inclusion. When asked to suggest gender-inclusive actions, participants usually named institutional practices like outreach activities or diversity policies. At the same time, they mentioned that gender discrimination frequently emerges in the classroom, for example, during teamwork. Classroom climate depends on faculty awareness and pedagogical practice [10,54]. Institutional policies alone cannot ensure educators include inclusivity in their daily practice. Therefore, institutions should provide training in inclusive pedagogy. This can also help align learning experiences with career preparation, as interviewees indicated that female students tend to be more coursework-focused and do not pay enough attention to networking and extracurricular activities. Promoting industry collaboration and partnerships with gen-

der inclusiveness in mind can improve women's career readiness and ensure persistence in the field, as exposure to professional communities and applied experiences facilitate transitions to the workforce [48].

As family influence emerged as an important factor in this study, universities should design outreach activities to engage families. These initiatives can inform about career prospects and challenge gender stereotypes that persist in technology. This recommendation is particularly important in countries where technological fields are not "self-promoted" as prestigious and financially attractive. Engaging young girls in hands-on and welcoming outreach events gives universities a chance to demonstrate how accessible technological fields can be. Although ICT is perceived as a gender-neutral field in some countries, many industries still require image transformation regardless of the region.

Increasing the visibility of female faculty can strengthen representation and a sense of belonging. Like the voices in this study, fifteen women who have navigated tech education, excelled professionally, and now shape their field as educators, they represent more than individual stories. They are a largely untapped source of institutional knowledge. If universities are serious about gender inclusion, they must listen to those who have lived with both the problem and the solution. Future research that engages these dual perspectives and tests the lifelong, experience-driven career model will better turn gender equality policies into inclusive classroom realities. Our study participants are promoting impactful and targeted recruitment, such as quotas with females in technology branded call for applicants, which may be a good tool to help diversify teaching staff.

6.3. Limitations

The data sample of the study (15 participants) is limited and is unevenly distributed across the eight countries, which restricts making national-level claims. Instead, it only identifies thematic patterns.

The focus on faculty members limits the study to the perspectives of women who have remained in academia.

Cultural interpretations of discrimination and gender roles vary significantly. Further comparative studies could deepen the understanding of how these differences shape women's trajectories in technology.

Data analysis and interpretation may have been influenced by the researchers' perspectives and prior assumptions. Authors acknowledge that member-checking wasn't conducted; credibility of results was supported by team-based code review.

6.4. Future Research Directions

Future research can explore whether career choice patterns differ across life stages with more balanced sampling. To investigate the difference between adolescents' career choices and those of individuals who decide to switch careers. Including future longitudinal studies to examine whether and at what career stage the erosion of external expectation authority through positive experience mechanism, is most active, and whether this erosion differs systematically by cultural context.

A wider geographical scope can help to capture more cultural and institutional patterns of female pathways into technology.

It would also be valuable to include the perspectives of male faculty members, both to understand their role in shaping classroom climates and to compare their perceptions with those of female colleagues.

Based on the findings, we have practical recommendations to design faculty training and to consider using modern Artificial Intelligence (AI)-based leadership and manager role self-orientation, as well as empathic AI Avatar-based training programs to develop the supporting system in evaluation policy and material inclusion, without forgetting to study gender and racial biases. [71]. Follow up studies and area special researchers can evaluate such new methods potentials and effectiveness of such an initiative. Where, future research should empirically evaluate whether AI-facilitated inclusive pedagogy training produces measurable shifts in faculty awareness and classroom climate, assessed through pre-post observation protocols and student experience surveys. This can also be expanded to developing micro-level everyday practice guidelines to ensure comfortable classroom climates.

Author Contributions

Conceptualization, Y.K., J.K., and A.H.; methodology, J.K. and A.H.; investigation, Y.K. and A.H.; formal analysis, Y.K., J.K., V.K.S., and A.H.; writing—original draft preparation, Y.K.; writing—review and editing, Y.K., J.K., V.K.S., and

A.H.; supervision, J.K. and A.H. All authors have read and agreed to the published version of the manuscript.

Funding

This work was supported by the South Karelia Regional Fund Grant (05232010) and LUT University internationalization grant.

Institutional Review Board Statement

Ethical review and approval were waived for this study in accordance with the Finnish National Board on Research Integrity (TENK) 2019 guidelines, as the research involved voluntary semi-structured interviews with adult academic professionals, posed no risk to participants, and did not meet the criteria for formal ethical review. Informed consent was obtained from all participants prior to participation, and all data were anonymized.

Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

Data Availability Statement

The data presented in this study are not publicly available due to privacy and ethical restrictions, as the interview transcripts contain information that could compromise the anonymity of the participants.

Conflicts of Interest

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

AI Use Statement

During the preparation of this work, the authors used Grammarly for text spelling, grammar, and wording editing as well as Claude for image generation. The authors subsequently reviewed and edited the content as necessary and take full responsibility for the final content of the published article.

References

1. Global Education Monitoring Report Team. *Global Education Monitoring Report 2024, Gender Report: Technology on Her Terms*; GEM Report UNESCO: Paris, France, 2024. [CrossRef]
2. World Economic Forum. Gender Gap Report 2025. Available online: <https://www.weforum.org/publications/global-gender-gap-report-2025/> (accessed on 17 September 2025).
3. Ewim, D.R.E.; Dosunmu, A.G. Bridging Gaps: The Intersection of Women in Engineering and Gender Studies—Challenges, Advances, and Future Directions. *Discov. Glob. Soc.* **2025**, *3*, 43. [CrossRef]
4. Kovaleva, Y.; Kasurinen, J.; Kindsiko, E.; et al. State-of-the-Art Review on Current Approaches to Female Inclusiveness in Software Engineering and Computer Science in Higher Education. *IEEE Access* **2024**, *12*, 1360–1373. [CrossRef]
5. Kovaleva, Y.; Sivasankaran, P.N.; Happonen, A. Who Is That Girl? Drawing a Portrait of a Female Student in Software Engineering. In Proceedings of the 2024 36th International Conference on Software Engineering Education and Training (CSEE&T), Würzburg, Germany, 29 July–1 August 2024; pp. 1–5. [CrossRef]
6. Sax, L.J.; Blaney, J.M.; Lehman, K.J.; et al. Sense of Belonging in Computing: The Role of Introductory Courses for Women and Underrepresented Minority Students. *Soc. Sci.* **2018**, *7*, 122. [CrossRef]
7. Kovaleva, Y.; Happonen, A.; Kindsiko, E. Designing gender-neutral software engineering program. stereotypes, social pressure, and current attitudes based on recent studies. In Proceedings of the Third Workshop on Gender Equality, Diversity, and Inclusion in Software Engineering, Pittsburgh, PA, USA, 20 May 2022; pp. 43–50. [CrossRef]
8. Kovaleva, Y.; Happonen, A.; Kindsiko, E. Literature-Based Practices for Designing Female-Inclusive Software Engineering and Computer Science Programs. In *Intelligent Sustainable Systems*; Nagar, A.K., Jat, D.S., Mishra, D.K., et al., Eds.; Springer: Singapore, 2024; 828, pp. 247–260. [CrossRef]

9. Margas, N. Inclusive Classroom Climate Development as the Cornerstone of Inclusive School Building: Review and Perspectives. *Front. Psychol.* **2023**, *14*, 1171204. [CrossRef]
10. O'Leary, E.S.; Shapiro, C.; Toma, S.; et al. Creating Inclusive Classrooms by Engaging STEM Faculty in Culturally Responsive Teaching Workshops. *Int. J. STEM Educ.* **2020**, *7*, 32. [CrossRef]
11. Miralles-Cardona, C.; Chiner, E.; Tichá, R.; et al. Teacher Educators' Perceptions of Factors Influencing Gender Mainstreaming Implementation in University Teaching 30 Years after Beijing. *J. Int. Comp. Comp.* **2025**, *25*, 29–44. [CrossRef]
12. Stoet, G.; Geary, D.C. The Gender-Equality Paradox in Science, Technology, Engineering, and Mathematics Education. *Psychol. Sci.* **2018**, *29*, 581–593. [CrossRef]
13. D'Adamo, I.; Della Sciucca, M.; Gastaldi, M.; et al. Indicator Assessment of Sustainable Development Goals: A Global Perspective. *Sustainability* **2025**, *17*, 8259. [CrossRef]
14. Freidenvall, L. Rankings and Benchmarks: Understanding Gender Equality Measures in the Nordics. *Policy Stud.* **2026**, *47*, 1–20. [CrossRef]
15. Parmaxi, A.; Christou, E.; Fernández Valdés, J.; et al. Gender Equality in Science, Technology, Engineering and Mathematics: Industrial Vis-a-Vis Academic Perspective. *Discov. Educ.* **2024**, *3*, 3. [CrossRef]
16. Cheryan, S.; Ziegler, S.A.; Montoya, A.K.; et al. Why Are Some STEM Fields More Gender Balanced than Others? *Psychol. Bull.* **2017**, *143*, 1–35. [CrossRef]
17. Institute for Statistics (UIS). International Standard Classification of Education (ISCED). Available online: <https://www.uis.unesco.org/en/methods-and-tools/isced> (accessed on 3 August 2025).
18. Ayele, B.K.; Wu, W.; Chen, C. Does Diversity Climate Matter? The More Respected I Feel, the Better I Can Do: Unravelling the Mechanisms Enabling Employees' Extra-Role Performance. *Behav. Sci.* **2024**, *14*, 1164. [CrossRef]
19. Kohl, K.; Prikladnicki, R. Benefits and Difficulties of Gender Diversity on Software Development Teams: A Qualitative Study. In Proceedings of the XXXVI Brazilian Symposium on Software Engineering, Virtual Event, Brazil, 5–7 October 2022; pp. 21–30. [CrossRef]
20. Usher, M.; Barak, M. Team Diversity as a Predictor of Innovation in Team Projects of Face-to-Face and Online Learners. *Comput. Educ.* **2020**, *144*, 103702. [CrossRef]
21. Vedres, B.; Vásárhelyi, O. Inclusion Unlocks the Creative Potential of Gender Diversity in Teams. *Sci. Rep.* **2023**, *13*, 13757. [CrossRef]
22. Elnagar, S. Is Software Design Gender Biased? A Study on Software-Design Effect on Task Performance. *Int. J. Inf. Manag. Data Insights* **2025**, *5*, 100312. [CrossRef]
23. OECD. *Bridging Talent Shortages in Tech: Skills-First Hiring, Micro-Credentials and Inclusive Outreach*; OECD: Paris, France, 2024. [CrossRef]
24. World Economic Forum. The Future of Jobs Report 2025. Available online: <https://www.weforum.org/publications/the-future-of-jobs-report-2025/digest/> (accessed on 28 July 2025).
25. McKinsey. Women in tech: The best bet to solve Europe's talent shortage. Available online: <https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/women-in-tech-the-best-bet-to-solve-europes-talent-shortage> (accessed on 28 July 2025).
26. Kallia, M.; Sentance, S. Are Boys More Confident than Girls? The Role of Calibration and Students' Self-Efficacy in Programming Tasks and Computer Science. In Proceedings of the 13th Workshop in Primary and Secondary Computing Education, Potsdam, Germany, 4–6 October 2018. [CrossRef]
27. Pirttinen, N.; Hellas, A.; Haaranen, L.; et al. Study Major, Gender, and Confidence Gap: Effects on Experience, Performance, and Self-Efficacy in Introductory Programming. In Proceedings of the 2020 IEEE Frontiers in Education Conference, Uppsala, Sweden, 21–24 October 2020; pp. 1–7. [CrossRef]
28. Wang, M.-T.; Moghadam, S.H. Diversity Barriers in K-12 Computer Science Education: Structural and Social. In Proceedings of the 2017 ACM SIGCSE Technical Symposium on Computer Science Education (SIGCSE'17), Seattle, WA, USA, 8–11 March 2017; pp. 615–620. [CrossRef]
29. Awoniyi, F.C.; Jokotagba, S.T. Parental Influence, Career Counselling, and Role Models in Girls' STEM Career Choices: Evidence from Three Public Universities in Ghana. *Eur. J. STEM Educ.* **2025**, *10*, 5. [CrossRef]
30. Edano, G.; Estranza, M.; Abines, S.L.; et al. Through Their Lenses: Women's Experiences and Narratives About a Male-Dominated Industry. *Div. J.* **2025**, *10*, 3341. [CrossRef] (in Portuguese)
31. Floris, M.; Pinna, R.; Veglianti, E. Unveiling Gender Disparities in Male-Dominated Industries: An Intersectional Perspective. In *Feminist Perspectives in Business Studies*; Bannò, M., D'Allura, G.M., Eds.; Edward Elgar Publishing: Cheltenham, UK, 2025; pp. 171–196. [CrossRef]
32. Lewis, C.; Bruno, P.; Raygoza, J.; et al. Alignment of Goals and Perceptions of Computing Predicts Students'

- Sense of Belonging in Computing. In Proceedings of the 2019 ACM Conference on International Computing Education Research, Toronto, ON, Canada, 12–14 August 2019; pp. 11–19. [\[CrossRef\]](#)
33. Wang, M.-T.; Degol, J.L. Gender Gap in Science, Technology, Engineering, and Mathematics (STEM): Current Knowledge, Implications for Practice, Policy, and Future Directions. *Educ. Psychol. Rev.* **2017**, *29*, 119–140. [\[CrossRef\]](#)
 34. Nazario, P.; Ryoo, J.J.; Flapan, J.; et al. Plugging into Power: Family and Community Engagement to Help Dismantle Inequalities in Computer Science (CS) Education. *J. Res. Technol. Educ.* **2025**, *57*, 265–279. [\[CrossRef\]](#)
 35. Rankin, Y.; Agharazidermani, M.; Thomas, J. The Role of Familial Influences in African American Women's Persistence in Computing. In Proceedings of the 2020 Research on Equity and Sustained Participation in Engineering, Computing, and Technology (RESPECT), Portland, OR, USA, 10–11 March 2020. [\[CrossRef\]](#)
 36. Stanko, T.; Zhirosh, O. Young Women Who Choose IT: What Role Do Their Families Play? In Proceedings of the 2017 7th WEEF, Kuala Lumpur, Malaysia, 13–16 November 2017; pp. 88–93. [\[CrossRef\]](#)
 37. Archer, G.; Bohmann, L.; Carter, A.; et al. Understanding Similarities and Differences in Students across First-Year Computing Majors. In Proceedings of the 2016 IEEE Frontiers in Education Conference, Erie, PA, USA, 12–15 October 2016.
 38. Milesi, C.; Perez-Felnker, L.; Brown, K.; et al. Engagement, Persistence, and Gender in Computer Science: Results of a Smartphone ESM Study. *Front. Psychol.* **2017**, *8*. [\[CrossRef\]](#)
 39. Smith, S.; Sobolewska, E.; Bhardwaj, J.; et al. Exploring Women's Motivations to Study Computer Science. In Proceedings of the 2018 IEEE Frontiers in Education Conference, San Jose, CA, USA, 3–6 October 2018.
 40. Alonso-Virgós, L.; Fondon, M.D.; Espada, J.P.; et al. Women in Science and Technology Studies. A Study about the Influence of Parents on Their Children's Choice of Speciality. And about the Trend of the Different Specialities in Spanish Students. In Proceedings of the 2021 IEEE Global Engineering Education Conference, Vienna, Austria, 21–23 April 2021; pp. 122–130. [\[CrossRef\]](#)
 41. Lehman, K.J. An Untapped Recruitment Pool: Undecided Students in CS1 Courses. In Proceedings of the 2019 RESPECT, Minneapolis, MN, USA, 27 February 2019. [\[CrossRef\]](#)
 42. Lehman, K.J.; Sax, L.J.; Zimmerman, H.B. Women Planning to Major in Computer Science: Who Are They and What Makes Them Unique? *Comput. Sci. Educ.* **2016**, *26*, 277–298. [\[CrossRef\]](#)
 43. Kapoor, A.; Gardner-McCune, C. Considerations for Switching: Exploring Factors behind CS Students' Desire to Leave a CS Major. In Proceedings of the 23rd Annual ACM Conference on Innovation and Technology in Computer Science Education, Larnaca, Cyprus, 2–4 July 2018; pp. 290–295. [\[CrossRef\]](#)
 44. Marklund, M.; Gustavsson, S. "Why Am I Even Doing This?": The Experiences of Female Students in CS from an Insider Perspective. In Proceedings of the 2018 International Conference on Learning and Teaching in Computing and Engineering (LaTICE), Auckland, New Zealand, 19–22 April 2018; pp. 77–81. [\[CrossRef\]](#)
 45. Yates, J.; Plagnol, A.C. Female Computer Science Students: A Qualitative Exploration of Women's Experiences Studying Computer Science at University in the UK. *Educ. Inf. Technol.* **2021**, *27*, 3079–3105. [\[CrossRef\]](#)
 46. Trinkenreich, B.; Britto, R.; Gerosa, M.A.; et al. An Empirical Investigation on the Challenges Faced by Women in the Software Industry: A Case Study. In Proceedings of the 2022 ACM/IEEE 44th International Conference on Software Engineering: Software Engineering in Society, Pittsburgh, PA, USA, 21–25 May 2022; pp. 24–35. [\[CrossRef\]](#)
 47. Montes, C.M.; Johansson, J.; Dunvald, E. Factors Influencing Gender Representation in IT Faculty Programmes: Insights with a Focus on Software Engineering in a Nordic Context. *arXiv preprint* **2025**, *arXiv:2504.08957*. [\[CrossRef\]](#)
 48. Lang, C.; Craig, A.; Egan, M. The Importance of Outreach Programs to Unblock the Pipeline and Broaden Diversity in ICT Education. *Int. J. Inf. Commun. Technol. Educ.* **2016**, *12*, 38–49. [\[CrossRef\]](#)
 49. Lawlor, G.; Byrne, P.; Tangney, B. "CodePlus"—Measuring Short-Term Efficacy in a Non-Formal, All-Female CS Outreach Programme. *ACM Trans. Comput. Educ.* **2020**, *20*, 1–18. [\[CrossRef\]](#)
 50. Khan, A.; Wei, Y. Free Talk Zone: Inclusive Pedagogy to Encourage Women in Computer Science. In Proceedings of the 2017 International Conference on Computational Science and Computational Intelligence, Las Vegas, NV, USA, 14–16 December 2017; pp. 1108–1114. [\[CrossRef\]](#)
 51. Burnette, J.L.; Hoyt, C.L.; Russell, V.M.; et al. A Growth Mind-Set Intervention Improves Interest but Not Academic Performance in the Field of Computer Science. *Soc. Psychol. Pers. Sci.* **2020**, *11*, 107–116. [\[CrossRef\]](#)
 52. Perez-Felnker, L.; Erichsen, K.; Li, Y.; et al. Computing Education Interventions to Increase Gender Equity from 2000 to 2020: A Systematic Literature Review. *Rev. Educ. Res.* **2025**, *95*, 536–580. [\[CrossRef\]](#)
 53. Durrani, N.; Kataeva, Z. STEM Teachers' Agency for Gender Equality in STEM Education: A Mixed-Methods Study. *Int. J. Educ. Res.* **2025**, *131*, 102585. [\[CrossRef\]](#)

54. Mora, A.M.M.; Chiva, I.; Lloret-Catala, C. Faculty Perception of Inclusion in the University: Concept, Policies and Educational Practices. *Soc. Incl.* **2021**, *9*, 106–116. [CrossRef]
55. Lent, R.W.; Brown, S.D.; Hackett, G. Toward a Unifying Social Cognitive Theory of Career and Academic Interest, Choice, and Performance. *J. Vocat. Behav.* **1994**, *45*, 79–122. [CrossRef]
56. Lent, R.W.; Brown, S.D.; Hackett, G. Contextual Supports and Barriers to Career Choice: A Social Cognitive Analysis. *J. Couns. Psychol.* **2000**, *47*, 36–49. [CrossRef]
57. Urquhart, C. *Grounded Theory for Qualitative Research: A Practical Guide*, 2nd ed.; SAGE: London, UK, 2023.
58. Bettinger, E.P.; Long, B.T. Do Faculty Serve as Role Models? The Impact of Instructor Gender on Female Students. *Am. Econ. Rev.* **2005**, *95*, 152–157. [CrossRef]
59. Sebastián-Tirado, A.; Félix-Esbrí, S.; Form, C.; et al. Are Gender-Science Stereotypes Barriers for Women in Science, Technology, Engineering, and Mathematics? Exploring When, How, and to Whom in an Experimentally-Controlled Setting. *Front. Psychol.* **2023**, *14*, 1219012. [CrossRef]
60. Guest, G.; Bunce, A.; Johnson, L. How Many Interviews Are Enough?: An Experiment with Data Saturation and Variability. *Field Methods* **2006**, *18*, 59–82. [CrossRef]
61. Corbin, J.; Strauss, A. *Basics of Qualitative Research (3rd ed.): Techniques and Procedures for Developing Grounded Theory*; SAGE Publications, Inc.: Thousand Oaks, CA, USA, 2008. [CrossRef]
62. Chen, C.; Rothwell, J.; Maynard-Zhang, P. In-School and/or out-of-School Computer Science Learning Influence on CS Career Interests, Mediated by Having Role-Models. *Comput. Sci. Educ.* **2024**, *34*, 753–777. [CrossRef]
63. Nguyen-Duc, A.; Jaccheri, L.; Abrahamsson, P. An Empirical Study on Female Participation in Software Project Courses. In Proceedings of the 2019 IEEE/ACM 41st International Conference on Software Engineering: Companion Proceedings, Montreal, QC, Canada, 25–31 May 2019; pp. 240–241. [CrossRef]
64. Verwijs, C.; Russo, D. The Double-Edged Sword of Diversity: How Diversity, Conflict, and Psychological Safety Impact Software Teams. *IEEE Trans. Softw. Eng.* **2024**, *50*, 141–157. [CrossRef]
65. Kovaleva, Y.; Happonen, A.; Mbogho, A. Towards Gender Balance in Modern Hackathons: Literature-Based Approaches for Female Inclusiveness. In Proceedings of the Third Workshop on Gender Equality, Diversity, and Inclusion in Software Engineering, Pittsburgh, PA, USA, 20 May 2022; pp. 19–26. [CrossRef]
66. Kovaleva, Y.; Hyrynsalmi, S.; Saltan, A.; et al. Becoming an Entrepreneur: A Study of Factors with Women from the Tech Sector. *Inf. Softw. Technol.* **2023**, *155*, 107110. [CrossRef]
67. Williams, J.C. *Bias Interrupted: Creating Inclusion for Real and for Good*; Harvard Business Review Press: Brighton, MA, USA, 2021.
68. Eurostat. ICT Specialists in Employment. Available online: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=ICT_specialists_in_employment (accessed on 3 August 2025).
69. Aronson, J.; Lustina, M.J.; Good, C.; et al. When White Men Can't Do Math: Necessary and Sufficient Factors in Stereotype Threat. *J. Exp. Soc. Psychol.* **1999**, *35*, 29–46. [CrossRef]
70. Archer, L.; DeWitt, J.; Osborne, J.; et al. "Balancing acts": Elementary school girls' negotiations of femininity, achievement, and science. *Sci. Educ.* **2012**, *96*, 967–989. [CrossRef]
71. Groom, V.; Bailenson, J.N.; Nass, C. The influence of racial embodiment on racial bias in immersive virtual environments. *Soc. Infl.* **2021**, *4*, 231–248. [CrossRef]



Copyright © 2026 by the author(s). Published by UK Scientific Publishing Limited. This is an open access article under the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Publisher's Note: The views, opinions, and information presented in all publications are the sole responsibility of the respective authors and contributors, and do not necessarily reflect the views of UK Scientific Publishing Limited and/or its editors. UK Scientific Publishing Limited and/or its editors hereby disclaim any liability for any harm or damage to individuals or property arising from the implementation of ideas, methods, instructions, or products mentioned in the content.