ATTRACTING GIRLS TO TECHNOLOGY THROUGH PUBLIC-PRIVATE PARTNERSHIP: THE HEDY LAMARR CHAIR AT THE UNIVERSITY OF MALAGA

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ABSTRACT

Over the past decade, the city of Malaga (Spain) has doubled its technology sector, yet it still faces a shortage of skilled talent. Additionally, women in tech roles in Spain represent less than 20%. The low number of engineering female students at the University of Malaga (UMA) hampers efforts to increase women representation in the local tech industry. The Hedy Lamarr Chair for Women and Technology at UMA, a public-private partnership, encourages girls to pursue engineering degrees. This initiative designs activities to engage girls with technology, supported financially and through their involvement by participating companies. The project also provides role models, reveal potential, and offer teacher training. In 2023, more than 3,000 students aged 3 to 18 benefited from these efforts in Malaga.
A key activity is the "Lamarr Chair Challenge and Hilda Ericsson Competition", a hands-on activity which integrates into the secondary school curriculum. The third edition, carried out in 2024, focused on artificial intelligence (AI) for sustainability. Workshops enabled girls (around 15 years old) to develop AI projects addressing issues like water conservation and marine cleanup.

Keywords - Women in Technology, Engineering Education, STEM Outreach

1. INTRODUCTION

The engineering profession has long been recognized as a driving force behind technological advancement and economic prosperity. With the growing demand for skilled engineers to support advancements in technology, it is imperative to draw from the widest possible talent pool to meet industry needs.

Despite the critical importance of this field, with a high transformative power on human behavior and the organization of society, women are notably underrepresented in Science, Technology, Engineering, and Mathematics (STEM) areas. This trend is pervasive across Europe, and the city of Malaga (Spain) is no exception.

The city of Malaga is settled in Andalucia, the most populated region in Spain. Although most commonly known as a resort city in Southern Europe, Malaga has more than doubled the number of workers in innovative economic sectors. In 2013, there were 8,600 people employed in technology positions in the city; today, that number has already reached 20,000 [1].

Within the information and communication technology (ICT) field, the participation of women in Spain continues to be below 20% [2]. Moreover, they often find themselves in junior or support roles, with little opportunity for advancement. They are also less likely to hold an executive position, become ICT entrepreneurs, and rarely attain the highest levels in policy-making or standardization bodies. The reasons behind the low number of female students in engineering are not fully understood, but a series of activities and best practices have been identified that are known to enhance the attraction of technology fields for girls [3].

The underrepresentation of women in STEM is not just a matter of social equity; it is a significant barrier to the potential growth and innovation within the field. Research has consistently shown that diverse teams, which include a mix of genders, backgrounds, and perspectives, are more creative and effective at problem-solving [4]. Groups with at least one female member outperformed all-male groups in collective intelligence tests. Innovation is richer and more productive: patents produced by mixed-gender teams were cited 30 to 40 percent more frequently than the average citation rate.

In a rapidly evolving field like telecommunications, where technological changes and complex challenges are constant, it is crucial to bring diversity to teams to generate a broader range of ideas and approaches. Technology companies established in the Malaga area are facing challenges due to the scarcity of women in their teams, which impacts diversity and innovation potential. The low enrollment of female students in engineering at the University of Malaga (UMA) hampers efforts to increase women representation in the workforce at the area of influence.

Under these circumstances, UMA established the Hedy Lamarr Chair for Women and Technology in 2021, in collaboration with Accenture, Avanade, DEKRA, Ericsson, Google, Keysight, and MetroMalaga. The partnership expanded in 2023 to include AirZone, TDK, and Premo, and further extended to NTT Data in 2024. Chairs are conceived as strategic and stable unions between the University and companies and institutions, whereby both parties benefit from the results of research, development and innovation.

The mission of the Hedy Lamarr Chair is to encourage girls to pursue engineering degrees. To attract female students, the

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Hedy Lamarr Chair designs activities related to technology in the girls' areas of interest supported both financially and with personnel by the participating companies and UMA.

Naming the Chair after Hedy Lamarr is a fitting tribute for several reasons. Lamarr, an Austrian-American actress and inventor, symbolizes innovation and perseverance. Most famous for her Hollywood career, she also co-invented frequency-hopping spread spectrum technology, which aligns with the Chair's focus on attracting girls to tech fields and highlights the impact women can have in these industries.

In this work, we describe the context, rationale, and activities undertaken by the Lamarr Chair, along with the main results achieved. A key activity is the "Lamarr Chair Challenge and Hilda Ericsson Competition", which is described in-depth.

The rest of this paper is organized as follows. This introduction is completed by a description of various programs aimed at attracting girls to engineering and technology fields. Section 2 provides the context for the creation of the Hedy Lamarr Chair. Section 3 offers an overview of the Chair's activities, while Section 4 describes a key activity: the challenge conducted over several months in UMA labs. The paper brings to a close with a conclusion section.

1.1 Selected programs for attracting women to technology

Numerous high-profile projects and initiatives have been launched aiming to close the gender gap in science and technology by empowering and educating girls and women. This section focuses on showcasing notable global undergraduate programs and their key features, rather than providing a comprehensive overview. It is important to note that programs or activities specifically aimed at the career development of STEM students are excluded, as are the numerous initiatives conducted by associations and universities at the local level.

SciGirls [3] is a pioneering program designed to engage middle school girls in STEM through hands-on activities and real-world experiences. Launched at the US by PBS and the National Science Foundation, SciGirls features a mix of interactive television episodes, online content, and community outreach initiatives that focus on developing critical thinking and problem-solving skills. SciGirls' curriculum emphasizes collaborative learning and showcases female role models in STEM fields to inspire participants and demonstrate the diverse opportunities available in these disciplines.

Technovation [5] empowers girls aged 10-18 to become tech leaders by guiding them through developing mobile apps to address community problems. The program includes mentorship and culminates in a global competition.

Girls Who Code [6] also aims to close the gender gap in technology by teaching coding to girls from middle school to college. The organization offers summer immersion programs, after-school clubs, and college loops, providing a supportive community and networking opportunities to inspire young women to pursue tech careers.

The Institute of Electrical and Electronics Engineers (IEEE) runs initiatives like Women in Engineering (WIE), which provides mentorship and workshops to inspire girls to pursue STEM careers. The WIE Student-Teacher and Research Engineer/Scientist (STAR) Program [7] focuses on mentoring young girls in pre-university education, encouraging them to pursue STEM careers through mentorship, workshops, and hands-on activities.

Girls in ICT Day, organized by the International Telecommunication Union (ITU) [8], promotes careers in ICT through workshops and mentoring. EQUALS, a global partnership co-founded by ITU, aims to close the digital gender gap by improving women access to digital technologies and promoting their leadership in tech.

While these examples highlight some of the prominent efforts, it's important to note that there are hundreds of similar initiatives globally, each contributing in various ways to empowering women and closing the digital divide.

2. CONTEXT

The vibrant Malaga technology sector is rapidly emerging as a hub of innovation and growth, attracting top talent and leading companies from around the globe. Between 2,500 and 3,000 workers per year are needed by companies located in Malaga to cover their needs [9] after the exponential growth in recent decades.

Although women have experienced a more pronounced and constant increase in the hiring rate in the ICT sector than in all sectors as a whole (43.58% in Andalucia), only the 25,66% of the contracts registered in the Andalusian ICT sector during 2023 were made to women [2]. In fact, Spain follows the same trend than the rest of Europe and the number of women in ICT has not improved in the last 10 years [10]. That means that even with the efforts made over the last decade to encourage girls and women to pursue technology careers, the percentage of female tech workers in the world has actually decreased from 35% in 1984 to 32% in 2020 [11]. This gender disparity is particularly evident in the telecommunications sector: only about 12% of the engineering workforce in telecommunications are women [12].

One main reason for this imbalance reported by industry is the lack of women formed in technology. In a context in which the percentage of the European population studying in ICT-related fields has been declining for the past decade [2], the gap between men and women in these fields has increased. Motivating women in ICT education can contribute to a more direct and efficient labor insertion, fostering technological innovation. It is therefore crucial to develop programs that prepare students for technological challenges and, at the same time, promote a more inclusive and equitable sector.

2.1 Vocations

In the Spanish education system, ICT-related subjects are progressively introduced across various educational stages. After Infant Education, in Primary Education (ages 6-12) digital literacy focuses on basic computer skills, Internet use, and safe online practices. During Secondary Education (ages

12-16), students follow in the first two years Technology, which includes basic programming, digital tools, and understanding technological systems. In the third and fourth years, Information and Communication Technology becomes an elective, focusing on more advanced digital skills, including office software and basic programming.

Spanish universities offer a range of undergraduate and postgraduate engineering programs, including degrees in Telecommunication Engineering, Electronics, and Computer Science. Other STEM degrees also contribute significantly by supplying the sector with highly qualified professionals. These programs provide a solid theoretical foundation and practical experience, equipping students to tackle complex issues and drive technological innovation.

A study by the European Commission (EC) [13] underscores a concerning trend: over the past decade, the percentage of the European students pursuing ICT-related fields has been declining. Specifically in Spain, there is a low percentage of university graduates in STEM degrees [14]: 18.8% compared to 25.1% in Europe. Furthermore, the proportion of graduates in these fields with respect to the population aged 20 to 29 years was 14.1 per thousand compared to 19 per 1000 in the EU.

A survey done to students at the high school ranging 12-18 years in Spain [16] reported the main reasons that explain the rate of enrollment in Engineering and Architecture: lack of orientation and knowledge (65%, from which a 25% who do not know the professional opportunities and a 5% who do not know any engineers) and perceived academic difficulty (40%), sometimes due to the negative testimonials from students in STEM.

In [15] the ratio for male and female graduates can be found for a wide set of countries and study areas. There are almost twice as many male as female STEM graduates in the EU: 28.7 males per 1000 male inhabitants aged 20–29 years and 14.8 females per 1000 female inhabitants in the same age range. In relative terms, the gender gap for this field of education was most marked in Spain, where the ratios between male and female indicators is 2.6. The number of new female students in engineering and architecture in Spain decreased more dramatically (a 33% reduction in 2017 compared to 2010) than the number of new male students (26%) [16]. Situation is not different in the U.S. where just one in four tech graduates are women [11]. Interestingly, a paradox in the participation of women in ICT studies has been confirmed by several studies [17]: data suggest that the more egalitarian the countries (e.g., Norway or Finland), the lower the female participation in STEM fields. On the other hand, countries with less advanced equality policies have higher levels of female presence in STEM fields. The primary reason appears to be that ICTs offer women greater economic autonomy.

At the local level, the data is somewhat more encouraging. In the 2023/2024 academic year, the average percentage of newcomers to engineering studies at the University of Malaga was above 28% (see Table 1 for a list of the offered bachelor studies and the distribution of newcomers per gender in two academic years, 2021/2022 and 2023/2024). However, the distribution is highly varied: two engineering degrees (Chemical Engineering and Industrial Design) have more women than men, while others (Electronics, Computer Science) have only around 10% female students. (The number of total students is also uneven, ranging from only 20 in Telecommunication with Maths to 183 in Informatics.) Most of the 1683 students in Table 1 are locals coming from the Malaga area. This fact opens an opportunity to improve the number of female students by focusing on attracting more girls from the schools in the surroundings.

Table 1 – Statistics for UMA engineering and maths bachelors. Percentage of female newcomers: (1) academic year 2021/2022; (2) academic year 2023/2024

Degree	**(1)**	**(2)**
Telecommunication Engineering School		
Telematics	17.1	29.2
Telecommunication Systems	17.1	24.6
Electronics for Telecommunication	15.1	13.1
Telecommunication Technologies	25.0	35.8
Sound and Image	18.6	33.3
Telecommunication Technologies + Maths	6.3	45.0
Industrial Engineering School		
Industrial Design and Product Development	55.3	57.0
Electrical	19.0	16.7
Industrial Electronics	19.0	10.8
Mechanical	19.8	20.2
Industrial Electronics + Electrical	21.6	18.8
Mechanical + Industrial Design	34.3	45.2
Industrial Technologies	30.7	27.6
Electronics, Robotics, and Mechatronics	23.7	27.5
Energy	35.4	19.1
Industrial Organization	31.2	31.1
Industrial Electrical + Mechanical	11.1	16.7
Computer Engineering School		
Computers	8.3	-
Cibersecurity and Artificial Intelligence	-	9.5
Informatics	17.1	29.5
Software	9.8	15.2
Health	62.0	53.2
Informatics + Math	19.1	23.5
Science Faculty		
Mathematics	48.4	43.9
Chemical Engineering	51.6	52.7
UMA Eng.+Maths	27.5	28.5

A report on the situation of women in universities in Spain [18] highlights that most surveyed women (65%) reported choosing their field of study (mainly education and health) based on personal affinity or an early vocation, while only 19% selected their studies based on strong job prospects.

In the same study, 43% of women believe that they are directed towards those fields from an early age, and 39% feel that their schooling did not promote vocational diversity equitably. The influence of background in study and profession selection is, however, subtle: while 69% of women believe that gender biases influence university choices, only 27% feel personally influenced by these biases, with this perception being stronger in younger age groups. The survey in [16] gave another interesting result: Girls with female role models in the scientific-technological field show a higher rate of interest

in STEM subjects than those with none (41% vs 26%).

Stereotypes and societal expectations are still determining factors when choosing higher education. The distribution of women and men across academic disciplines seems to be affected by perceptions of intellectual brilliance. In [19] it was shown that the gendered notions of brilliance are acquired as early as 6 and have an immediate effect on children's interests. These stereotypes discourage women's pursuit of tech career. [11] found that girls' interest and enjoyment in tech wanes in high school.

2.2 Creation of the Hedy Lamarr Chair

Lecturers at the University of Malaga recognized the significant gender imbalance in engineering areas, with very few women enrolling in these studies. Existing programs to attract girls to technology as those described in subsection 1.1 have a weak presence in Malaga, with most Spanish initiatives concentrated in Madrid and Barcelona. Most students at UMA come from the surrounding areas, which highlights the importance of focusing local outreach efforts. By engaging with the local community, UMA has the potential to significantly increase female student enrollment.

A variety of initiatives were locally created to attract more girls to STEM. One of our earliest programs, "ComoTu," was launched in 2017. It consisted in talks and hands-on activities in schools for all students. The program inspires young girls by showcasing female role models across the entire STEM spectrum.

Building on this effort, UMA introduced in 2019 the "Campamentos Tecnológicos para Chicas," a two-week summer program exclusively for girls offering immersive experiences in three key areas: computer science (pioneering in 2018), telecommunications, and industrial engineering. These camps provided an opportunity for girls to engage directly with technology in a supportive and encouraging environment, fostering their interest and skills in these fields.

Also private initiatives were launched, such as the program on "Science and Technology for Women" by Malaga Tech Park, which aimed to promote scientific and technological vocations in female students. Many industries have also their own programs, mainly addressed to their employees' children but also reaching external girls. These efforts collectively strive to reduce the gender gap in these fields by fostering an encouraging and motivating educational atmosphere.

Moreover, some professional associations, such as that of telecommunication technical engineers, also launched programs for girls. In fact, engineering societies and colleges have a significant role to play in fostering an inclusive environment. By creating a supportive community and advocating for systemic changes, these organizations can help to remove barriers and create a more welcoming environment for women in engineering.

Despite these initiatives, local companies continued to express a demand for more female engineers, but the number of women in those studies remained low. In response, UMA decided to consolidate and expand their efforts by launching a comprehensive program. This initiative, known as the

Figure 1 – Logo for the Hedy Lamarr Chair for Women and Technology at the Universidad de Málaga (left), for the participant entities at UMA (center) and companies (right)

"Cátedra Mujer y Tecnología Hedy Lamarr," was established to conduct a variety of activities designed to attract girls to technology. Created with the support of seven companies (Accenture, Avanade, DEKRA, Ericsson, Keysight, Google, and MetroMalaga) and 25 involved university teachers in Telecommunications, Industrial Engineering and Computer Science, the program aimed to create a significant impact. Now, the Cátedra has grown to include 11 companies (with AirZone, NTT Data, Premo, and TDK joining) and more than 40 university teachers, including now also Chemical Engineering. By working directly with schools at Malaga area and offering engaging, hands-on experiences, the Hedy Lamarr Chair aims to inspire a new generation of women to pursue careers in STEM at the University of Malaga, addressing both the educational gap and the industry demand for female talent. The initiative emphasizes a localized approach, specifically targeting the Málaga area to attract female students to UMA. Fig. 1 displays the logos for the Chair and the participating entities, as typically used in public presentations. The text is in Spanish: "Cátedra" (Chair), "chicas" (girls), "Mujer" (woman), and "Tecnología" (technology), while Lamarr is the family name for Hedy Lamarr.

3. HEDY LAMARR CHAIR OVERVIEW

3.1 Activity design

Activities at the programs described in subsection 1.1 are good starting points to understand in which forms girls can be influenced. Specifically, after 25 years of work with girls, the SciGirls program has developed a set of common strategies for girl engagement. Basically, girls thrive in collaborative environments and are motivated by hands-on, open-ended investigations and the freedom to apply their creativity. Their performance improve with specific, positive feedback on effort and strategies, while critical thinking and relationships with role models further boost their confidence and trust in their abilities.

For the analysis of this and other program tips as well as available information on girls opinion, it can be understood that one of the most impacting strategies involves outreach programs where female engineers visit schools. For instance,

they can conduct workshops, participate in career days, and mentor students, offering both inspiration and practical advice on how to navigate a path into engineering.

As justified in subsection 2.1, efforts must start very early and be sustained throughout the educational and professional pipeline. Boys and girls who may not initially be interested in technology also receive valuable education, besides girls interested in STEM are not viewed as anomalies.

Another crucial area of work addresses the lack of self-confidence that can significantly influence girls' interest in STEM. Hands-on activities play a vital role in fostering their efforts, enhancing their problem-solving strategies, and demonstrating that their skills can improve with practice [3]. For female teenagers, establishing a network of girls interested in technology is particularly important, as peer support becomes fundamental during this developmental stage.

Visibility and recognition are crucial components in promoting gender diversity within the engineering field. Highlighting the achievements and contributions of female engineers through media, industry conferences, and award programs serves to challenge the prevailing stereotypes and demonstrate the significant impact that women can have in engineering.

Influencing teachers and guidance counselors is an indirect yet effective approach to combating stereotypes. In Spain, women represent 77% in primary education. Most of them did not study maths beyond compulsory secondary school, and perceive themselves as lacking in mathematical proficiency [16].

Patrons are integrated into the Chair beyond merely sponsoring activities; they actively collaborate in designing and implementing them. For instance, during the 2023-2024 academic year, female personnel at Google's Málaga site conducted in-person talks and workshops on cybersecurity, their area of expertise, reaching more than one thousand students.

3.2 Activities carried out

The Hedy Lamarr Chair undertakes various initiatives designed to make ICT more appealing and accessible to girls. The first activity was reinforcing the "ComoTu" program to expand the efforts in the technological area, attracting new female engineers to join the cause. The Hedy Lamarr Chair's programs cater to a wide age range, engaging girls from as young as 3 years old up to 18 years old, ensuring continuous support and inspiration throughout their educational journey.

A pilot program for company visits was successfully launched in 2024, involving both boys and girls touring the sites of patrons. During these visits, female engineers provide explanations about their work and share their professional experiences in various tech roles. Additionally, other female workers, such as language experts and artists working in technology, also participate. They offer a unique perspective on the need for diversity in current teams, highlighting how various skill sets and backgrounds contribute to innovation and problem-solving in the tech industry.

Figure 2 – A picture taken during one session of "Science with families"

One innovative activity "Science with families" involves training parents and grandparents in conducting science experiments. During class breaks, these trained relatives then teach primary school children, both girls and boys, sharing their newfound knowledge and enthusiasm for science (see Fig. 2). This activity usually takes place on special days, fosters an intergenerational learning environment and inspiring young students through the active involvement of their family members in science education. As participants are mainly mothers and grandmothers, children can see a complete new role in science for women.

In addition to supporting the summer "Technological Campus for Girls", the Hedy Lamarr Chair has introduced a new initiative with a similar approach named "Lamarr Chair Challenge and Hilda Ericsson Competition". This key activity, held for girls and a limited number of boys, will be detailed in the following section. Both activities primarily aim to demonstrate to female teenagers that they have the potential to create technology, rather than just consuming it.

The summer Campus are conducted daily by female bachelor engineering students. This setup provides a close and relatable influence.The hands-on nature of the camp, combined with the mentorship from these undergraduate students, fosters a supportive and inspiring environment for the teenage girls.

Both Tech Campus and Lamarr Chair Challenge are held in the engineering labs at UMA. The labs offer a practical and immersive learning experience, allowing participants to engage with real-world problems and develop their own innovative solutions. By including presentations for parents, these initiatives also help families understand and appreciate their daughters' potential in technology, further reinforcing a supportive community around their educational achievements.

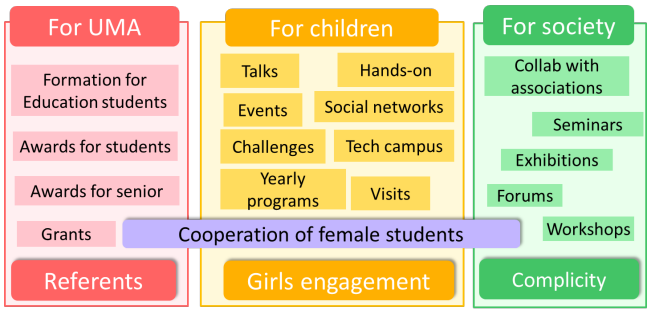

Figure 3 – Summary of activities at Hedy Lamarr Chair

In an innovative cross-disciplinary workshop, female engineering students at UMA collaborated with a group of education students (all of whom were women, as no men were currently enrolled in the involved subjects in Education studies) to introduce them to basic technology skills, such as programming a simple robot and writing a basic app. The engineering students guided the future educators through hands-on activities, explaining key engineering principles and demonstrating how these concepts translate into real-world applications. This interactive session provided the education students with valuable insights into the role of engineers, broadening their understanding of technology's potential in the classroom and inspiring them to integrate STEM concepts into their future teaching practices.
Visibility and recognition is pursued by a number of activities. The Hedy Lamarr Chair offers two awards funded by DEKRA: one for young female students and another for senior women. The award for young students focuses on the social impact of their activities. The most recent edition in 2024 was awarded to a student from Equatorial Guinea, who is launching a program in her country aimed at women's digitalization. The second award recognizes the outstanding trajectory of a woman with exemplary results in her field. The latest recipient, honored for her more than 25 years of work in cybersecurity, exemplifies this commitment to excellence.
Additionally, the Chair offers grants funded by Keysigth Technologies to support master's degree studies. These grants, awarded based on academic excellence, specifically aim to increase the female enrollment in master's programs, addressing the fact that the percentage of women in these programs is even lower than at the undergraduate level.
Finally, there is a number of other activities such as primary school teacher formation, conferences, etc. whose public are adults and families. Giving parents the chance to meet women currently developing their career as engineers help to give girls a family support for their interests.
A summary of the activities is given in Fig. 3 and the number of participants in some of them in Table 2. We have seen some immediate results —such as teenage girls from our summer campus programs enrolling as students—. However, assessing the impact of activities conducted in primary schools is more complex as these initiatives require a decade or more to yield measurable outcomes, and tracking individual students over such a long period is currently not feasible. We are committed to finding better ways to evaluate our success, but it remains a significant challenge.

Table 2 – Number of participants in some activities

Activity	**21/22**	**22/23**	**23/24**
Talks and hands-on	~1500	~3000	~3300
Challenge	43	65	82
Summer campus	90	90	90
Industry visits	-	-	73

4. LAMARR CHAIR CHALLENGE AND HILDA ERICSSON COMPETITION

4.1 Framework of the Challenge

In this activity, the Hedy Lamarr Chair invites secondary school students from the third grade (14 years old) to pre-university (17 years old) to participate in the Lamarr Chair Challenge. This challenge is designed to develop students' technological skills while fostering their connection and commitment to the environment. The activity fits seamlessly into academic programs, primarily in ICT subjects, but also in those soft-skills that are promoted interdisciplinarily.
Additionally, the activity exposes students to professional realities, enhances their critical thinking, and equips them with tools to understand the social dimensions of technology. Each team of students is paired with a mentor who guides them through the project, offering expert advice and support. Having a mentor provides students with valuable insights, personalized feedback, and a direct connection to the tech industry, enriching their learning experience and boosting their confidence.
Teamwork and collaborative learning are emphasized, allowing students to create new networks with peers interested in technology and to develop their communication skills.

4.2 Challenge description

The challenge is structured in phases. In the first step, students participate in an ideas competition over a topic which might be of interest for girls. The second stage of the challenge is a technological course adapted to the participant teenagers. In the third phase, students who wish to deepen their proposals can organize into groups and develop a prototype with the help of a mentor. From them, a jury select one to award the Hilda Ericsson Competition Prize.
The theme of the Lamarr Chair Challenge varies with each edition. In the third edition, the focus is on AI and its applications across various areas of society. Secondary school students are challenged to develop a project addressing the following question:
How would you improve the world around you, sustainably, with artificial intelligence?
The goal is to explore improvements that can be achieved in various social domains, enhancing people's health, children's education, or the state of the planet, while maintaining sustainability within the framework of the United Nations Sustainable Development Goals (SDGs).
Boys are permitted to participate in the activity, with the stipulation that each group consisting of three or more members may include one male participant. As boys often

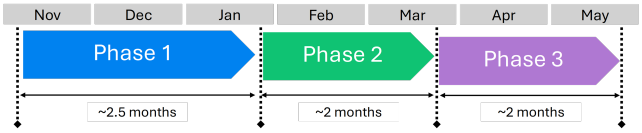

Figure 4 – Time plan for Lamarr Chair Challenge and Hilda Ericsson Competition in 2024

show a higher willingness to engage in tech activities, their presence can encourage greater participation from girls. Additionally, this mixed-gender arrangement provides boys with the opportunity to experience being in the minority, fostering empathy and a deeper understanding of diverse perspectives within the tech field.

4.3 Development phases

As previously introduced, the Lamarr Chair Challenge is developed in three phases, extending in total more than six months (see Fig. 4 for the time plan in 2024).

Phase 1 - Ideas competition

In a first phase, the exercise proposed by the Hedy Lamarr Chair Challenge to secondary school students is a competition of ideas that allows progress in the achievement of one of the objectives of sustainable development. The students prepare, individually or in groups of up to five people, a video of a maximum of three minutes in which they describe the idea. Although some girls participate on their own, commonly with their parent support, most proposals are encouraged and organized by teachers.

A limited number of participants in phase 1 is awarded a high-value technological initiation course in phase two. The award criteria are based on the relevance of the idea in addressing a real need (25%), its originality, innovation, and interdisciplinary approach (20%), and the clarity and precision of the proposed objectives (20%). Additional factors include the technical feasibility of the idea (15%), the quality of the presentation narrative and language (10%), and the visual appeal and dynamism of the video (10%).

Phase 2 - High-value technological initiation course

Each session in this phase, conducted over six Friday afternoons at labs at the Telecommunications Engineeering School of the Universidad de Malaga (see a picture in Fig. 5), consists of an initial talk followed by two hours of hands-on work. The talks can be either introductory or complementary to the formation, providing essential knowledge and context. The hands-on work sessions are designed to equip the girls with the necessary tools and skills to develop their projects in the third phase.

Both the talks and hands-on work sessions are tailored to specific topics. In 2024, the talks addressed subjects such as the applications of AI in the agriculture sector, the energy requirements for AI, and concluded with a session on how to create a successful project. The hands-on sessions introduced AI concepts, provided statistical analysis and data treatment techniques, and offered tools for AI model generation and app implementation. All selected tools were free, visual, and user-friendly to accommodate participants with no prior

Figure 5 – A picture taken during the phase 2 of the Hedy Lamarr Challenge

training.

Phase 3 - Hilda Ericsson Competition

During phase 3, the students, organized into teams, prepare projects for the Hilda Ericsson Competition. The training received in phase 2 enables them to refine their initial ideas, ensuring they are well-developed and technically feasible. In this phase, each team benefits from the guidance of a mentor, who is a professional or researcher in the field. Participants have access to the facilities and equipment at the University of Málaga to support the development of their ideas.

At the end of phase 3, students prepare a submission that includes all relevant information about their project. They present their idea along with a prototype as proof of concept. Their work is then reviewed by a jury (3 engineers from Ericsson Spain and 2 from UMA) who evaluate the projects. The jury assesses, among others, the technical quality of the prototype (25%), the relevance of the prototype to the proposed idea (15%), and the effectiveness of the teamwork (5%).

The results are truly impressive, showcasing the boundless creativity of teenagers. With their dedication and the support of their mentors, they are able to tackle complex technical projects with remarkable skill and ingenuity. Here are a few examples from 2024: One project features an app that scans clothing labels and analyzes the materials to determine their environmental impact; another app translates the amount of water used into the number of steps a user would need to take as compensation; an AI-driven application tailors homework recommendations to individual students, adjusting the level based on relevant factors such as age and academic level.

4.4 Feedback from participants

During the three editions of the challenge, it has been observed an increased interest among students to participate, getting almost double requests to join the challenge during the third year compared to the first one.

During the distinct phases of the challenge, feedback from participants is gathered through a survey so that actions can be taken to enhance the future editions. A summary of the results can be found in Fig. 6 and Fig. 7. At the end of the process, girls are also asked about the significance of the prize, a 5G smartphone. While the prize initially served as a

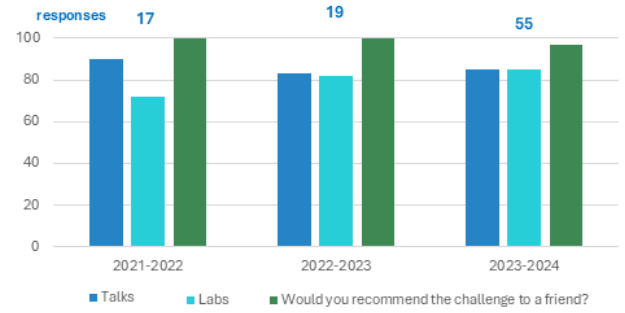

Figure 6 – Satisfaction with phase 2 activities

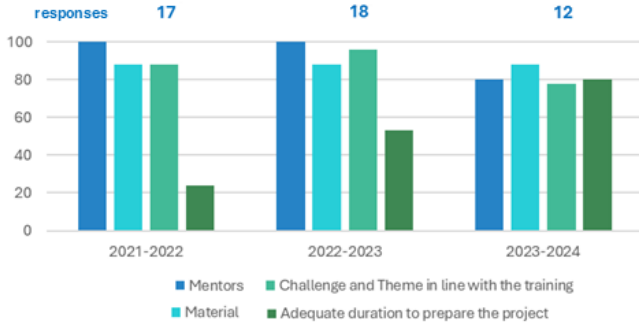

Figure 7 – Satisfaction with the awards activity (phase 3)

strong motivator for engagement, its importance diminished as they progressed through the challenge.

Regarding the participant company, implication of the staff on the design of the program is high. Diversity and Inclusion (D&I) are central to Ericsson's values and culture. Ericsson is also aware of that industries leading their companies in D&I consistently outperform the market in key metrics such as profitability, decision-making, risk identification, and innovation revenues. Recognizing this, Ericsson is committed to fostering diverse teams to drive impactful innovations that benefit society.

5. CONCLUSION

The telecommunications industry and the broader engineering field stand to benefit immensely from increasing the representation of women engineers. The current gender disparity not only limits the potential for innovation and problem-solving but perpetuates an inequitable status quo.

The Hedy Lamarr Chair is dedicated to boosting the enrollment of women in technology programs at the University of Malaga. It achieves this through a diverse range of initiatives, supported by a robust public-private partnership that includes active involvement from participating companies. Only in the academic year 2023/2024 more that 3,000 girls and boys in Malaga has benefited from the activities.

By implementing comprehensive strategies that include early outreach, visibility, recognition, and supportive policies, industry and academia can foster a more inclusive environment. This will not only help to attract and retain talented women engineers but also drive the future growth and success of the engineering profession as a whole.

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