Alignment of the institutional strategy with the teaching action in the implementation of the gender perspective. Design and implementation in the case of the UOC

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Abstract— Both the Equality Unit of the Universitat Oberta de Catalunya (UOC) and the Equity Commission of its Faculty of Computer Science (Estudis d'Informàtica, Multimèdia i Telecomunicació) have been working, among other goals, to ensure a gender perspective in teaching. A key element for this has been the definition of a transversal competence (Ethical and global behavior) that includes the gender perspective that should be implemented in all programs. This paper describes the path followed since the appearance of this institutional impulse, its materialization in this competence, and its final linkage to a subset of the courses of the Bachelor's and Master's Degree in Computer Engineering. The reasoning, the phases, the established guidelines, as well as the selection of the courses are detailed. Beyond this theoretical design process, its actual implementation in all these courses during the 2022-2023 academic year is also analyzed. The contrasted result of the proposal is that this is a viable process thanks to some already existing facilitating factors and the involvement of the interested groups, especially the faculty. However, despite this involvement, it still needs additional momentum to consolidate its implementation and is not free of contradictions and is not yet mature in all key aspects, including some as relevant as that of competency assessment.

Index Terms— Curriculum, Gender perspective, Institutional strategy, Transversal competence.

I. INTRODUCTION

THE need to incorporate the gender perspective in STEM degrees is driven by at least two irrefutable vectors of different magnitude that converge: on the one hand, as

faculty, the very low percentages of female ICT students [1, 2, 3, 4] and ICT researchers [5, 6]; and on the other hand, the awareness of gender inequalities and gaps of all kinds in our societies, and their causes that still hinder the presence that corresponds to women by merit and percentages [2, 7, 8, 9, 10].

This second social and political vector is beginning to be reflected at the Spanish university level in some proposals from university quality agencies (such as AQU, the Catalan quality agency delegated by ANECA [11]) and also in the universities themselves, where internal structures are being created to ensure, at the very least, gender equality policies.

This is also the case of the Universitat Oberta de Catalunya (Open University of Catalonia, UOC), which in 2008 created the Equality Unit[1], which reports to the Vice-Rector's Office for Globalization and Cooperation. Since then, this unit has developed four equality plans, which have evolved into the current one for the period 2020-2025. This equality plan[2] was conceived participatively, based on the diagnostic reports on gender equality at the UOC (2018), and under the reference framework of the UN Agenda 2030 for sustainable development (and its associated Sustainable Development Goals - SDGs [3]) to which the UOC had joined. And specifically, under SDG 5 (Gender Equality).

This plan goes beyond equality policies within the organization: one of its five strategic axes focuses on teaching while another focuses on research, the two central missions of any university. The teaching axis[4] has three strategic objectives (with their respective actions), the first of which is "Mainstreaming the gender perspective in teaching".

Under the umbrella of this institutional initiative and in line with the first vector mentioned above (the low proportion of

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[1] https://www.uoc.edu/portal/es/compromis-social/equitat/igualtat/ index.html
[2] https://www.uoc.edu/portal/es/compromis-social/equitat/igualtat/pla-igualtat/ index.html
[3] https://www.un.org/sustainabledevelopment/es/sustainable-development-goals/
[4] https://www.uoc.edu/portal/es/compromis-social/equitat/igualtat/pla-igualtat/docencia/index.html

women in STEM degrees), in 2019 the new management of our Faculty of Computer Science (the Estudis d'Informàtica, Multimèdia i Telecomunicació, EIMT from now on) decided to promote the creation of the Equity Commission. This commission, as described by its promoters, should order and "define the necessary actions" to "ensure the gender perspective and respect for diversity" in the EIMT. In addition, it would be "led by a woman", "with a female majority", "with members of the different profiles (faculty and administrative staff)", and with the capacity to issue "binding resolutions". This commission was not starting from scratch because the EIMTs had been promoting the *Equit@t* award[5] since 2016, as well as research projects with the *GenTIC* group[6], among other actions.

Both the UOC's Equality Unit and the EIMT's Equity Committee represent the institution's desire to promote a solid and permanent incorporation of the gender perspective in teaching. Nevertheless, this teaching transformation necessarily involves promoting actions that are reflected, ultimately, in specific courses.

Several experiences have already been published at the faculty/department level on the gender perspective and the STEM gap in our field, with the aim of reversing the situation [12, 13, 14, 15, 16]. There is even some on the implementation of good practices in courses [17, 18]. In this paper, we aim to expand this base of experiences, detailing the entire institutional trajectory followed at the UOC to promote the gender perspective to the point of concretizing it in the courses. To this end, we present the path followed so far by the UOC Equality Unit (Section II) and by the EIMT Equity Commission (Section III) to concretize this institutional impulse (Figure 1). We detail this concretion in the Bachelor's and Master's Degree in Computer Engineering (Section IV) and, its final implementation in all the foreseen courses (Section V). Finally, we conclude with a set of critical assessments of this whole process of institutional impulse, along with the drawn conclusions (Section VI).

This paper extends our previous work published in the proceedings of the JENUI 2022 conference [19], which was chosen for submission to IEEE-RITA as one of the best papers of that conference. In this paper additional information is provided, including specific details of the implementation of the proposal in the selected courses, as well as an analysis of the experience of teachers from the beginning of this implementation in the 2022-2023 academic year. In short, the extension focuses on the transition from the formal approach to its actual implementation. To this end, the evidence existing in these courses on the adoption of the given indications has been analyzed, and surveys and semi-structured interviews have been carried out with the teaching staff in charge of these courses.

II. ACTIONS OF THE UOC'S EQUALITY UNIT

As mentioned above, the UOC's last equality plan (2020-2025) establishes teaching as the first strategic axis, and the first strategic objective (of a total of three) of this axis is "Mainstreaming the gender perspective in teaching". This strategic objective is in turn specified in four operational objectives with their respective actions (the first two related to the experience we describe):

1) Incorporate the transversal competence of ethical and global commitment, which includes the gender perspective, in all official undergraduate and master's degree programs.
2) Establish a specific training plan on gender perspective for all UOC teaching staff.
3) Ensure that all courses have learning resources and content without gender bias and making visible the presence of women role models.
4) Extend the gender perspective within the dynamics of the virtual classroom.

In the context of the 1st strategic objective (mainstreaming gender in all official degrees), the official definition of the Ethical and Global Engagement Competency (EGEC from now on) has been established: "*Act honestly, ethically, sustainably, socially responsible and respectful of human rights and diversity, both in academic and professional practice.*" This definition, as we have said, must be understood in the context of the UN 2030 Agenda and its associated SDGs. Therefore, the UOC includes in this EGEC various goals of the Agenda in which it wants to signify itself. Hence, its scope is very ambitious because it includes, in short, up to three major topics:

- Ethical behavior and social responsibility
- Sustainability
- Respect for diversity and human rights

It is in this last point that the gender perspective is considered to be included. Although it is not explicitly mentioned in the EGEC definition (according to its authors, to facilitate its drafting), SDG 5, on gender equality, has been one of those that has inspired, to a greater extent, its definition.

Of course, it has been decided that the EGEC will be included in all new degrees, as well as in the program reports of existing degrees, as revision or adaptation processes are opened.

With the EGEC defined, 2nd operational objective (to establish a specific training plan on gender perspective) has had a good instrument around which to concretize the training plan. From the Vice-Rector's Office and the Faculty of

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TABLE I
ACTIONS PROPOSED BY THE TFIC ACCORDING TO PHASES AND LEVELS

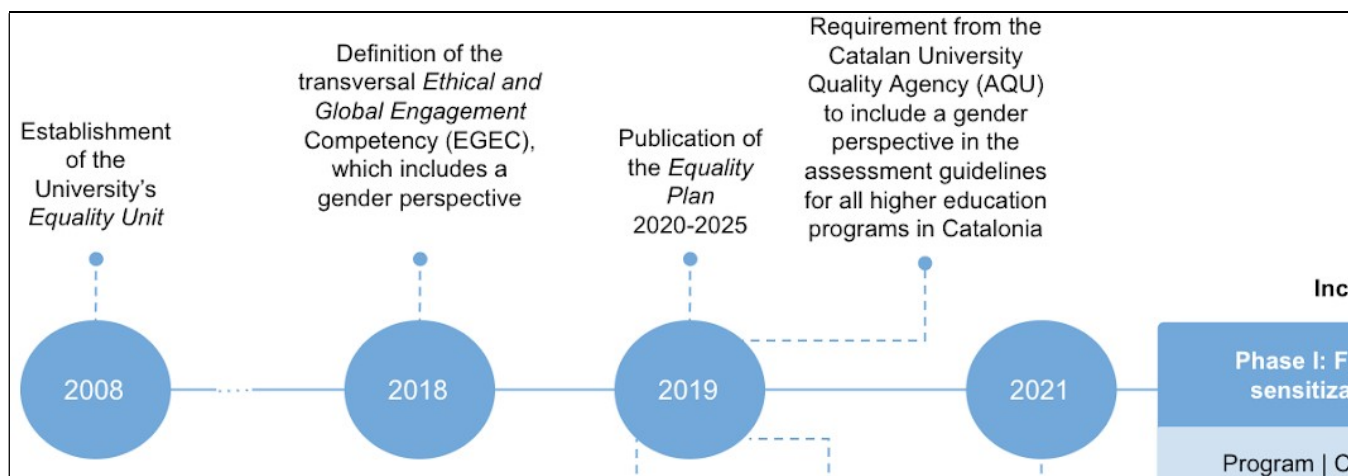|	Phase I: Sensitization (June-December '21) Introduction of the gender perspective	Phase II: Implementation (Dec.'21-Sept.'22) EGEC Introduction
Program Level	Review within a gender perspective the public information of the program (web, brochures, virtual campus) and formal communications with students (welcome messages, beginning of the course, congratulation messages for graduation, dissemination of activities...) guaranteeing the use of: • Non-sexist/inclusive language • Non-stereotyped images • Full names (first and second surname) of the persons involved in the program (faculty and administrative and service staff). Include an explicit statement to this effect, such as: "In this program we ask and commit to communicate and work with respect for diversity, equity and gender equality.	Select, jointly with the faculty members, between two and four courses from each program in which to incorporate the EGEC. Criteria for the courses selection: • Those courses already working on a pre-existing competency related to the new EGEC. • Final Project. Regardless of its nature, the Final Project should include an analysis of its impact on EGEC issues (sustainability, social responsibility, ethics, equity-diversity-gender). • Those courses that already work explicitly in part or in full on EGEC topics (such as Organizational Management, Data Science, Human-Computer Interaction...). • Those courses in which natural scenarios where EGEC issues may impact (such as Project Management, IT Management...). • Those courses with a clear impact on EGEC topics (such as Artificial Intelligence, Videogames...). • Those courses in which the teachers want to get involved voluntarily.
Subject Level	Review in a gender perspective the information of at least one course (teaching guide, formal indications, resources, contents, statements of activities and final tests...) and the formal and informal communications with the students, ensuring the use of: • Non-sexist/inclusive language • Non-stereotyped images • Full names (first and middle names) in bibliographies and references Review the characters/roles of the scenarios/cases proposed in the final activities and tests (gender balance in their responsibilities and proportion). Include in the teaching guides an explicit statement of the following type: "The appropriate follow-up of the course commits you (and us) to make use of the communication spaces in the classroom with respect for diversity, equity and gender equality".	Only for the courses selected in conjunction with the academic program director: • Incorporate the definition of the EGEC in the teaching guide. • Include the Expected Learning Outcomes associated with the ECEG in the subset of activities where applicable. Extend Phase I actions to the rest of the courses of each program.

Figure 1. Overview of the process followed.

humanities of the UOC, in 2019, an internal training course was designed and started to be given to all faculty under the name of "Ethical and Global Commitment". With a dedication of 1 ECTS (25 hours), this course is taught in online mode and includes deliverable activities in relation to three challenges:

- Challenge 1. What can I do for the 2030 Agenda: Propose the implementation of the SDGs in concrete educational actions.
- Challenge 2. Feminine plural, gender-sensitive courses: Revise one course to include the gender perspective.
- Challenge 3. Transversal Ethical and Global Engagement Competency: Design the implementation of the EGEC in a course.

As can be seen, challenge 2 fully addresses the transformation of a course to include the gender perspective.

The participating faculty members must select one of their courses in which they believe the gender perspective could fit and partially or totally reformulate its design and activities. To carry out this reformulation, resources on inclusive language, gender perspective in general, and gender perspective in different academic fields and, in particular, in engineering, are made available to the participants. Some of these resources are developed by the UOC [20, 21], and others are available from AQU [11] and the Xarxa Vives d'Universitats [18].

Since January 2020, in its four editions, nearly 80% of the EIMT faculty members have taken this course. The goal is to make it mandatory for all university faculty. Since it is included in their professional development program, having taken and passed it, it is recognized as a certified merit that can be contributed to the internal processes of periodic evaluation, which facilitates the predisposition to take it.

I. ACTIONS OF THE EIMT EQUITY COMMITTEE

As mentioned in the introduction, in 2019 the EIMT created the Equity Commission to organize all the actions that were being developed and that were appearing in this regard. The arrival of the guideline for the general incorporation of the EGEC made it advisable to create a specific task force within the Commission to focus on this specific implementation. This "Task Force for the Incorporation of the EGEC" (TFIC from now on) was constituted in January 2021.

The TFIC defined two phases (I and II) to incorporate the EGEC (one of sensitization and the other of implementation) and two scopes (the academic program and the subjects) with a set of actions that we summarize in Table I. This definition was made during the first months of 2021 and was supported by some of the documents worked on in the internal faculty training course "Ethical and Global Commitment" [19, 20] promoted by the Equality Unit, presented in Section II.

Phase I (sensitization-raising, from June to December 2021) was aimed not so much at analyzing the initial situation and detecting limitations or practices that could be improved, but rather at increasing the predisposition (which was already high

and positive in most cases) by the faculty and the academic program director, as well as clarifying doubts about what gender mainstreaming meant in terms of process and scope. At the academic program level, academic program directors were encouraged to include the gender perspective in the degree's public documentation (e.g., the web portal, communications with the students, etc.). Along the same lines, at the subject level, all faculty members were encouraged to select their own course in which to include the gender perspective (e.g., in the writing of the course plan, visual references, bibliography, activity statements, etc.)

This process would be extended to the rest of the courses in Phase II. As a complement to the information and process indicated above, a seminar was held for all faculty members focused on the use of inclusive/non-sexist language.

On the other hand, Phase II (implementation, from December 2021 to September 2022) aimed to determine in which specific courses of each program the formal incorporation of the EGEC should be carried out and in what depth. At the academic program level, a set of criteria was established to select the courses likely to include this competency. At the course level, a set of resources was provided to accompany the formal inclusion of this competency. Among them, we highlight the list of Expected Learning Outcomes proposed by the Equality Unit (in Table II we present those of the Master's Degree).

TABLE II
EXPECTED LEARNING OUTCOMES OF THE
PROPOSED EGECs FOR MASTER'S LEVEL

Incorporate the analysis of functional, social, cultural, economic, political, linguistic and gender diversity in academic and professional practice.
Analyze the causes and effects of inequalities based on sex and gender and formulate actions to counteract them.
Design and evaluate academic or professional projects applying criteria of quality, sustainability and social responsibility.
Critically evaluate the application of the ethical principles that guide professional practice, as well as the professional code of ethics, in complex situations.
Act in an ethical, honest and civic manner in academic and professional work, avoiding plagiarism or any other improper use of the work of others.
Resolve in one's own academic or research texts dilemmas of recognition and attribution of ideas and works, based on the ethics and integrity of intellectual work.

These were a starting point for adapting them to the courses and assigning them to the corresponding activities. This assignment of learning outcomes to specific activities implies reformulating them to work on them, which is to say, to work on the EGEC. Once again, one of the recommendations of the TFIC was that this incorporation should be done in a gradual and iterative manner to facilitate its adoption in a way that would minimize reluctance on the part of the teaching staff.

II. ACTIONS IN THE BACHELOR'S AND MASTER'S DEGREES IN COMPUTER ENGINEERING

As we have mentioned, the process of incorporating the EGEC designed by the TFIC was intended to be followed by all the official Bachelor's and Master's programs of the EIMT. In this section, the process followed by the Bachelor's Degree in Computer Engineering and the Master's Degree in Computer Engineering is described.

The revisions of the public information proposed in Phase I were led by the program academic directors with the support of the administrative staff. The texts were revised to enhance the use of inclusive and respectful language (aiming to make everyone feel well mentioned and represented, avoiding the dissemination of messages that promote stereotypes and avoiding generalizations and simplifications that distort reality), complete references to the faculty (name and two surnames), as well as images of the program's website[7], commercial leaflets and virtual campus.

In this same Phase I, at the subject level, five undergraduate and two master's degree courses volunteered to promote, in a more conscious way, the gender perspective. The commitment acquired by these courses was to revise the visual references (including both men and women technologists), to make the bibliographic references explicit (indicating first names without abbreviations), and to use inclusive language avoiding stereotypes in the statements of the activities (for example, in case studies) and in all the messages generated during the course. To make this commitment explicit, the faculty of these courses were encouraged to incorporate the following sentence in their teaching guides: *"Appropriate monitoring of the course commits you (and us) to make use of classroom communication spaces, mainly the forum, from respect for diversity, equity and gender equality, with special attention to the use of inclusive/non-sexist language."*

Regarding to Phase II and the choice of which courses to assign the EGEC to, the academic program directors of the Bachelor's and Master's degrees made an initial proposal (following the criteria indicated in Table I) that was finally agreed upon with the faculty involved.

Thus, the academic director of the Degree applied the following criteria: (1) Compulsory courses that already included a competency related to the new EGEC (this is the case of the courses "Administration and management of organizations" and "Project management", which include the competency *"Ability to exercise professional activity in accordance with the code of ethics and legal aspects around ICT"*); (2) Compulsory first year courses, even though they did not previously include any similar competency (this is the case of the course "Communicative competency for ICT professionals"); (3) Synthesis courses (this is the case of the "Final Project"); and (4) Transversal courses with other Degrees that had been selected to include the EGEC in other

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[7] https://estudios.uoc.edu/es/masters-universitarios/ingenieria-informatica; and https://estudios.uoc.edu/es/grados/ingenieria-informatica

programs, as long as it was coherent with the rest of the general criteria (this is the case of the course "Human-Computer Interaction", a transversal course with the Degree in Software Development Techniques, where it was already selected to include the EGEC).

As for the Master's degree, and also following the criteria of Table I, we started from the 4 courses that had already been assigned the competence *"CG8. Ability to understand and apply the ethical responsibility, legislation and professional ethics of the activity of the profession of computer engineering"* which covered one of the 4 themes of the EGEC (ethics) and which were: "Strategic management of information technologies", "Advanced ICT project management", "Information security management systems" and the "Master's Final Project". In accordance with the criterion that they should be courses with a clear implication in the subject, the academic management proposed 6 more courses: "Large-scale distributed systems", "High performance computing", "Advanced artificial intelligence", "Usability engineering" and "Simulation". The first three, after conversations with the faculty, were discarded due to their current orientation and the difficulty of incorporating new content. On the other hand, in the last three, the faculty accepted the proposal.

As summarized in Table III, in both degree programs, the five courses chosen (out of the 27 that must be taken compulsorily) represent 18.5% of the total, while in the Master's program, the seven courses chosen (out of the 12 compulsory ones) represent 58% of the total.

TABLE III
COURSES SELECTED TO INCLUDE THE EGEC

Bachelor's Degree	Master's Degree
Communicative competence for ICT professionals	Strategic management of Information Technologies
Administration and management of organizations	Advanced ICT project management
Project management	Usability engineering
Human-computer interaction	Advanced artificial intelligence
Degree's Final Froject	Simulation
	Information security management systems.
	Master's Final Project

All the courses selected were to incorporate the EGEC in a first version in teaching starting in September 2022. In other words, although that was the key date, an incremental implementation of the EGEC was advocated, with successive refinements in the following courses.

III. FIRST RESULTS

This section analyzes, for the 12 selected courses (Table III), the status of the incorporation of the EGEC (Phase II), as well as the evidence on the sensitization of the introduction of the gender perspective (Phase I). The period analyzed includes the two semesters of the 2022-2023 academic year (i.e., September 22 to January 23 and February 23 to June 23).

To better contextualize the approach to data collection and the results obtained, there are some particularities of the UOC that are important to remember beforehand. The first is that the UOC is an online university based on asynchronous and mainly written communication. That is why it is possible to carry out an external and a posteriori analysis of faculty members' messages, which, due to their written permanence, acquire special relevance in their potential ongoing impact on students. And the second is that among teaching functions at the UOC, faculty members are divided into two main groups with two distinct roles: a) the *faculty responsible for the course* (comparable in some ways to the *tenured faculty*) who lead its design and are accountable for it to the students and the faculty staff; and b) the *teaching faculty*, who are in charge of the groups, directly guiding their learning, resolving doubts, assessing their submissions and providing feedback to them.

The results reported below were obtained in two ways: firstly, by analyzing the teaching guides and the faculty members' messages (faculty responsible for the course and teaching faculty) in the classroom spaces (forums for students' doubts and faculty members' notices); and secondly, either by means of a survey or a semi-structured interview with the faculty responsible for the courses (the choice of survey or interview was left to them and is explained by the current context of mostly teleworking).

The survey or interview questions revolved around: a) the use of inclusive language in documents and communications; b) whether stereotypes in roles and images have been avoided; c) the treatment of bibliographies with full names; d) the explicit inclusion of expected learning outcomes; e) the dissemination of guides linked to EGEC; and f) specific experiences in exercises or subject orientation.

The total number of faculty responsible for the courses asked to respond to our questions (by survey or interview) was twenty-two people (four women and eighteen men), who are responsible for the thirty-nine subfields of the two Final Project courses, and the remaining ten courses (Table III). Nineteen responses were collected corresponding to Final Project, and eight corresponding to the rest. These twenty-seven responses were obtained from three women and fourteen men. With this distribution it was not possible to analyze the results segregated by gender. When collecting information, it was decided to send an initial invitation and a subsequent reminder, it being voluntary for the faculty responsible for the courses to participate in the survey or interview. Although we had institutional support, it seemed to us that opting for a strategy that forced the response did not fit with the philosophy of the implementation process, which aims at a gradual and natural transition, away from impositions to avoid rejection reactions. This voluntariness in the response, added to the usual work overload of the teaching staff, may have been the cause of the responses that have been delayed, and also of those that have not arrived.

A. Aggregate results

The results in Table IV indicate that there is a clear sensitivity to using inclusive language in the activity statements. This is consistent when dealing with formal documents. However, in direct communications, both formal and informal, practically a third of the responses obtained indicate that the faculty responsible for the course does not know if the teaching faculty has used inclusive language, which points to a lower concern in this regard. In these direct communications, in the same sense, formal communications are where greater sensitivity is detected.

TABLE IV
ANSWERS ON INCLUSIVE LANGUAGE, STEREOTYPES, EXPECTED LEARNING OUTCOMES AND BIBLIOGRAPHIES

Concept	Almost always	Sometimes	Never	I do not know
Use of inclusive language in statements	87,50%	12,50%	0,00%	0,00%
Use of inclusive language in formal communications	30,43%	39,13%	0,00%	30,43%
Use of inclusive language in informal communications	26,09%	43,48%	0,00%	30,43%
Non-inclusion of stereotyped images in statements	75,00%	12,50%	0,00%	12,50%
Diversity in roles of responsibility for the statements	75,00%	12,50%	0,00%	12,50%
Details of name and surname in references	26,09%	34,78%	8,70%	30,43%
Detail of expected learning outcomes in statements	12,50%	12,50%	62,50%	12,50%

As for the inclusion of women in roles of responsibility in the scenarios of the statements, the implication in this respect is very high (almost 90%). The same situation is repeated in terms of avoiding the use of stereotyped images.

However, the practice of including the full name of the authors in the bibliography is only taken into account in approximately 60% of the responses. The fact that more than 30% are unaware of it indicates that it is a practice that is not yet particularly internalized.

Finally, regarding the expected learning outcomes, only one out of four responses assures that they are explicitly included in the statements. That is not a good result since, as previously indicated, assigning the PARs to activities should lead to their reformulation in order to work on them effectively.

In addition to the results included in this Table IV, the teaching guides of the courses were analyzed with respect to the use of inclusive language, the explicit mention of the EGEC and the incorporation of the sentence on the commitment to respect diversity (see section IV and Table I, Phase I). The analysis shows that the use of flexible inclusive language in the teaching guides has not been implemented, despite being one of the easiest practices to implement. Only 15% have incorporated it. Coherently with this, the same minimal percentage explicitly incorporates the mention of the

EGEC and the phrase of commitment to diversity. This fact is relevant because the teaching guides are the most formal document of the course and in which its rules are set. If they do not use inclusive language or make explicit reference to the EGEC, arguments to foster its use among the students are lost.

Regarding the dissemination and use of the different documents developed for the incorporation of the EGEC in the courses, Table V summarizes the information obtained both for the Final Project courses, whose dynamics are more singular, and for the rest of the courses.

TABLE V
DISSEMINATION AND USE OF EGEC DOCUMENTS

Document	Yes	No	I do not know
Guidelines for the use of inclusive language	60,87%	26,09%	13,04%
Final Project Teacher's Guide to EGEC	60,00%	33,33%	6,67%
Guide for Final Project students on EGEC	46,67%	53,33%	0,00%
Final Project memory template including EGEC	80,00%	20,00%	0,00%
Final Project evaluation rubric including EGEC	60,00%	33,33%	6,67%

The dissemination of guidelines on the use of inclusive language is close to two-thirds, which is consistent with the uses shown in Table IV.

With specific reference to the Final Project, the template of the report provided to students, which includes the work of the EGEC, has achieved a good diffusion (80%). This contrasts with the use of the evaluation rubric (which includes an item on the evaluation of this section with respect to the EGEC and another item on the use of inclusive language), which remains at 60%. We believe that this contrasts because the rubric is a widely used tool to facilitate the monitoring, evaluation and reporting of the Final Project to the students. It would be expected to detect the inconsistency of not including in the rubric one of the sections of the report, since the rest are duly included. The same inconsistency occurs with the guide that includes indications for the Final Project faculty on how to ensure the EGEC, which obtains the same percentage. Worse still is the guide that includes indications for the students. It would be expected that these indications would be required by both faculty and students so that both groups would know how to incorporate the EGEC in Final Project courses.

Finally, faculty members were asked to indicate the reasons why they did not use inclusive language when they did not do so. Table VI shows the frequencies of the reasons mentioned in the interviews and surveys (several could be indicated). Not remembering the need to apply it clearly stands out, and also the difficulty of fixing the drafts when the people on the team have not included it in the first versions of the documents.

TABLE VI
CAUSES FOR NOT USING INCLUSIVE LANGUAGE (WHEN NOT USED)

Motive	Frequency
I don't remember to do it	11
I always try to use it	8
People on my team don't do it and it is difficult to rectify it afterwards	6
I find it costly and/or cannot devote time to it.	2
I do not believe in the use of inclusive language	2

From these data it is also possible to extract that eight people declare themselves motivated to always try to use it, compared to two who do not believe in the use of inclusive language (which are the same people who also respond that they find it costly and/or cannot dedicate time to it).

B. Reported experiences

In the interviews or surveys conducted with the faculty staff of the ten regular courses (those that are not Final Project, because these already include new sections in the rubric and the report), a specific example of an activity in which the incorporation of the EGEC, and specifically, the gender perspective, had been included was requested. In five of the courses the response was to admit that they had not yet redesigned the activities in this sense (in three cases because they had prioritized other topics, in another because the texts were in English and the problem of inclusive language is not so evident there, and in another case because there was an interim situation in the direction of the course due to changes in the faculty responsible for it). The experiences reported in the other five courses are summarized below.

"Project Management" is a consolidated course with different versions in up to seven different Bachelor's and Master's degree programs, therefore this can have a multiplying effect on the implementation of the gender perspective in these programs. Among the actions for the redesign of its activities, the following stand out:

- The presence of women in the conception of the Project Management field has been made explicit, on the basis that it is clearly scarce (taking as an example the signatories of the *Agile Manifesto* or those responsible for *PMBoK*).
- Female characters have been assigned the most responsible roles in the scenarios used during the course (*project manager, scrum master*, CIO, CFO...).
- There have been some team management questions linked to situations of discrimination (gender, racial and sexual orientation) or of great parity imbalance in the composition of project teams.
- As an additional criterion in the evaluation of the quality of some of the students' writing (which are key in this course [6]), the use of this inclusive language is evaluated.

As for the dynamics of the course, the number of female professors at the head of classrooms has been increased (with positive discrimination in their favor on equal merit of the candidates). It is planned to give them priority as future authors of the learning resources to be used, since at present the authors are all men.

Finally, it is expected that the learning resources will be revised to incorporate the gender perspective and inclusive

language, although this change is not yet planned.

In "Advanced Project Management", which is a Master's level course that expands on the previous one, the redesign focuses on ensuring the presence of women in roles of responsibility in the cases: the director of operations, the director of finance, the head of new technologies and the head of projects are women, in a numerically equal scenario.

"Communicative Competence for ICT Professionals", on the other hand, is also a long-standing course that has versions in practically all the undergraduate programs offered in EIMT. Since it is a course focused on writing, exercises have been incorporated that explicitly address the incorporation of inclusive language and the gender perspective in texts. For example, detecting the correct wording in topics such as bibliographies (including middle names and proper names or the feminization of positions when using languages with grammatical gender such as Spanish or Catalan.

On the other hand, in one of the cases used, centered on an NGO, the highest responsible role, that of president, is held by a woman. And so is the project coordinator of the supplier company with which the NGO interacts.

In the course "Advanced Artificial Intelligence", ethical questions and gender perspective have been incorporated in some of the practical exercises. Specifically, one question provides a *dataset* of portraits classified by gender (male/female) and by ethnicity (there are 6 categories) and asks to evaluate the model trained with these data and analyze whether any bias emerges, gender or in any of the six ethnic categories). Another style question consists of analyzing whether biases are generated when, from a database that has the data labeled according to gender (male/female), a model is trained with all the data (male and female), but is tested only on one of the genders (only male or only female).

Finally, in "Strategic management of systems and IT", one of the exercises asks you to locate three recent interviews on the Internet with a CIO explaining the digital transformation of your organization, and of these three interviews, at least one must be with a woman. And, in a broader sense, in other exercise, a presentation must be made to the Management Staff and one of the sections refers to alignment with the SDGs.

IV. DISCUSSION

We are convinced that the path presented (summarized in Figure 1) achieves the objective of operationalizing the strategic decision to generalize the gender perspective in teaching. While we were carrying out this journey, we confirmed a set of facilitating factors for its success:

- The importance of having well-defined institutional initiatives, with resources to be promoted, and well specified in objectives, plans and actions (definition of competence, preparation of documentation, design and implementation of the mandatory training course on the EGEC). Although these initiatives have involved a certain amount of bureaucracy, their economical cost has been

minimal. Moreover, we believe that it has contributed in part to the success of the implementation, i.e., if a non-directed process had been chosen, it would not have reached so many academic programs and courses.

- To have set a date for the formal assignment of the EGEC to the courses, but also a gradual and consensual introduction to facilitate its adoption among the faculty staff, and with an iterative refinement in successive courses.
- The clear presence of gender issues in our daily lives (media, political movements, audiovisual production...). This constant exposure facilitates a natural sensitization on the course among a large part of the faculty members. These currents are also present in other topics such as sustainability. The joint treatment of these issues can generate positive synergies.
- Awareness among all faculty members of the low percentage of women in our programs.

However, after two semesters of implementation of the strategy at the subject level, it is clear that the transformation is not yet mature. This is demonstrated, for example, by the fact that only half of the courses involved have explicitly reported any redesign of activities or teaching management. But also that in up to a third of written communications within the courses, as well as in the vast majority of teaching guides, inclusive language is not used. Also the majority absence of explicit mention in these guides of the EGEC and of the phrase on respect for diversity, the fact that the guides themselves have not been revised to use inclusive language, and that only half of the cases take into account the full details of proper names and two surnames in bibliographic or similar mentions.

Although these numbers can be improved, it is true that the latter are more formal and easier to solve and will continue to be emphasized in the future. It is also true that this transformation has been planned as a gradual process and has been explained to the faculty members, so it is to be expected that with time the numbers will improve. This optimism is also helped by the fact that only two of the faculty members show reluctance to the use of inclusive language, which is possibly an aspect that is still under discussion at the linguistic and social level, and that no one in the team has shown any reluctance to the incorporation of the gender perspective in particular, nor to the EGEC in general.

On the other hand, also as a pending point, there is still the discussion on how far to go in the evaluation of the EGEC. In the path outlined, the association of learning outcomes to activities is the last point proposed: it is understood that this association implies the work of the competency and, to some extent, its assessment. However, after the surveys and interviews with faculty members, it has been detected that the explicit inclusion of learning outcomes is still a minority, and much work remains to be done to standardize their inclusion, not only those referring to the EGEC. Furthermore, no evaluation experiences have been found and explained, neither

in our reference university context, nor within the UOC itself, despite the fact that the same process is already in operation in all its faculties. The only exception to this is the incorporation of two items in the evaluation rubric of the Final Projects (items, as mentioned above, on the section of the report dedicated to EGEC and on the use of inclusive language).

Regarding the doubts generated by the EGEC assessment process, it is worth asking whether the requirement for this assessment should be equivalent to that of the other transversal competencies. Taking communicative competence as an example, this, in most cases, is explicitly evaluated in those programs that have a specific subject in this regard. But, apart from this, the most frequent situation is that in the rest of the courses it is implicitly and simply accepted that the grade can be lowered in the delivery of papers if they are poorly written.

Along the same lines, does the generation of assessment rubrics for EGEC make sense? Do we do it with the other competencies? Do we already have enough training as teachers to assess based on these rubrics?

Similarly, how far can the student be evaluated if we have not given them resources in this regard? We can dare to give marks for the transversal knowledge in which we know they have been trained in previous stages (written communication, mathematics, programming...) but can we do the same for learning that is still dependent on the social and educational context?

Finally, in a more concrete aspect, what is more effective to work on gender issues in the scenarios of the activities? To present some in which the problem is very explicit? Or to present some in which the problem is more subtle and must be detected so that precisely this capacity of detection will then be valued?

In addition to these doubts, some criticisms and limitations of the process have also become evident to us:

• The current real situation in most computer engineering faculty members continues to be that of a highly masculinized faculty environment. Introducing this gender perspective should not be the sole responsibility of women. If it were, it would be contradictory, and in addition women could be overburdened with additional work precisely because they are women.

• It is somewhat perplexing that in the case of the UOC the concept of "gender" does not appear explicitly in the definition of the EGEC ("to facilitate the drafting of the competence", as it was justified). And even more so when it is promoted by the Equality Unit and under the protection of SDG 5.

• Some of the proposed changes are relatively easy (inclusive language, full display of names...) and have a positive impact on the awareness and visibility of gender issues. However, some of them may end up being only aesthetic. What is really important is to generate profound changes in the behavior of faculty members and students. This is done by going beyond purely formal changes: with teaching-learning activities where the issue is worked on in

a natural way, as is already being done with other relatively recent questions such as sustainability.

• It will be complex to evaluate to what extent these types of measures contribute to improving the percentages of women in STEM. Therefore, their success will have to be evaluated in due time and with other parameters, assuming that this is a structural and cultural issue that affects not only the entire educational system but society as a whole.

V. CONCLUSIONS AND FUTURE WORK

In our opinion, the analysis of the results of the path designed and implemented shows its transforming usefulness, but also the aspects on which we must continue to focus and, above all, important doubts about how and how far to advance in the evaluation of the EGEC. Future work, therefore, is twofold.

The first is to continue driving the transformation by monitoring the implementation of the changes. The simple fact of asking faculty members about how they are working with the indications, the difficulties experienced and the solutions provided in terms of activity design, reminds them that the transformation must be addressed and, to some extent, contributes to this being the case.

The second is to establish the scope of the assessment of this competence, i.e., to decide where this assessment is imperative and with which specific practices it can be carried out. The aim will be to give some initial indications at these initial moments, and that, from then on, the accumulated experience will also standardize this assessment.

We believe that this experience can serve as a reference to other courses, degrees, faculties and universities to address a similar and essential process of incorporating, at least, a competence on gender perspective in their courses. And even of other competencies of greater scope in ethical aspects and globally responsible behavior.

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