

Engineering and Architecture

Guides to
mainstreaming gender
in university teaching

Multimedia Engineering

Susanna Tesconi

MULTIMEDIA ENGINEERING
GUIDES TO MAINSTREAMING GENDER
IN UNIVERSITY TEACHING

Susanna Tesconi

THIS COLLECTION OF GUIDES HAS BEEN DEVELOPED BY THE GENDER EQUALITY WORKING GROUP OF THE VIVES NETWORK OF UNIVERSITIES

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FOREWORD

What is the gender perspective and what relevance does it have in teaching undergraduate and graduate programmes? When applied to a university setting, the gender perspective or gender mainstreaming is a comprehensive policy to promote gender equality and diversity in research, teaching and university management—all areas affected by different gender biases. As a cross-cutting strategy, it involves all policies taking into account the characteristics, needs and interests of both women and men, and distinguishing biological aspects (sex) from culturally and historically constructed social representations (norms, roles, stereotypes) of femininity and masculinity (gender) based on sexual difference.

The Xarxa Vives d'Universitats (XVU, Vives Network of Universities) encourages a cohesive university community and reinforces the projection and the impact of academe in society by promoting the definition of common strategies, especially in the gender perspective scope of action. It should be highlighted that policies that do not take into account these different roles and diverse needs and are, therefore, gender-blind do not help to transform the unequal structure of gender relations. This also applies to university teaching, where we offer students a compendium of knowledge to understand the world and intervene in their future professional practice, providing sources of reference and academic authority and seeking to promote critical thinking.

Knowledge transfer in the classroom that is sensitive to sex and gender offers different benefits, both for teachers and for students. On the one hand, deepening the understanding of the needs and behaviours of the population as a whole avoids partial or biased interpretations—both theoretically and empirically—that occur when using man as a universal reference or when not taking into account the diversity of the female or male subject. In this way, incorporating gender perspective improves teaching quality and the social relevance of (re) produced knowledge, technologies and innovations.

On the other, providing students with new tools to identify stereotypes, social norms and gender roles helps to develop their critical thinking and skill acquisition that will enable them to avoid gender blindness in their future professional practice. Furthermore, the gender perspective allows teachers to pay attention to gender dynamics that occur in the learning environment and to adopt measures that ensure that the diversity of their students is addressed.

The document you are holding is the result of the biannual 2016-2017 work plan of the XVU Gender Equality Working Group, focused on gender perspective in university teaching and research. At an initial stage, the report entitled *La perspectiva de gènere en docència i recerca a les universitats de la Xarxa Vives: Situació actual i reptes de futur (2017)* [Gender Perspective in Teaching

and Research at Universities in the Vives Network: Current Status and Future Challenges], coordinated by Tània Verge Mestre (Pompeu Fabra University) and Teresa Cabruja Ubach (University of Girona), found that the effective incorporation of gender perspective in university teaching remained a pending challenge, despite the regulatory framework in force at European, national and regional levels of the XVU.

One of the main challenges identified in this report in order to overcome the lack of gender sensitivity in curricula on undergraduate and postgraduate programmes was the need to train teachers in this skill. In this vein, it pointed out the need for educational resources that help teachers provide gender-sensitive learning.

For this reason, the XVU Gender Equality Working Group decided to produce the collection *Guides for University teaching with a gender perspective*. This was coordinated in the first phase by Teresa Cabruja Ubach (University of Girona), M. José Rodríguez Jaume (University of Alacant) and Tània Verge Mestre (Pompeu Fabra University), and in the second and third phase by M. José Rodríguez Jaume (University of Alacant) and Maria Olivella Quintana (Universitat Oberta de Catalunya).

A total of 22 guides have been produced to date. Eleven were produced in the first phase, six in the second and five in the third, and were written by teachers who are experts in applying the gender perspective in their discipline at various universities:

ARTS AND HUMANITIES:

ANTHROPOLOGY: Jordi Roca Girona (Universitat Rovira i Virgili)

PHILOLOGY AND LINGUISTICS: Montserrat Ribas Bisbal (Pompeu Fabra University)

PHILOSOPHY: Sonia Reverter-Bañón (Universitat Jaume I)

HISTORY: Mónica Moreno Seco (University of Alacant)

ART HISTORY: M. Lluïsa Faxedas Brujats (University of Girona)

SOCIAL AND LEGAL SCIENCES:

COMMUNICATION: Maria Forga Martel (University of Vic - Central University of Catalonia)

LAW AND CRIMINOLOGY: M. Concepción Torres Díaz (University of Alacant)

SOCIOLOGY, ECONOMICS AND POLITICAL SCIENCE: Rosa M. Ortiz Monera and Anna M. Morero Beltrán (University of Barcelona)

EDUCATION AND PEDAGOGY: Montserrat Rifà Valls (Universitat Autònoma de Barcelona)

SCIENCES:

PHYSICS: Encina Calvo Iglesias (University of Santiago de Compostela)

MATHEMATICS: Irene Epifanio López (Universitat Jaume I)

LIFE SCIENCES:

BIOLOGY: Sandra Saura Mas (Universitat Autònoma de Barcelona)

NURSING: M. Assumpta Rigol Cuadra and Dolors Rodríguez Martín (University of Barcelona)

MEDICINE: M. Teresa Ruiz Cantero (University of Alacant)

Dietetics and Nutrition: Purificación García Segovia (Universitat Politècnica de València)

PSYCHOLOGY: Esperanza Bosch Fiol and Salud Mantero Heredia (University of the Balearic Islands)

ENGINEERING AND ARCHITECTURE:

ARCHITECTURE: María-Elia Gutiérrez-Mozo, Ana Gilsanz-Díaz, Carlos Barberá-Pastor and José Parra-Martínez (University of Alacant)

COMPUTER SCIENCES: Paloma Moreda Pozo (University of Alacant)

INDUSTRIAL ENGINEERING: Elisabet Mas de les Valls Ortiz and Marta Peña Carrera (Universitat Politècnica de Catalunya)

MULTIMEDIA ENGINEERING: Susanna Tesconi (Universitat Oberta de Catalunya)

ELECTRONIC TELECOMMUNICATIONS ENGINEERING: Sònia Estradé Albiol (University of Barcelona)

In addition, a methodological guide on online teaching with a gender perspective has also been added to the collection, in response to the changes in teaching that universities had to adopt as a result of the COVID-19 pandemic during the 2019/2020 academic year.

METHODOLOGY:

ONLINE TEACHING WITH A GENDER PERSPECTIVE: Míriam Arenas Conejo and Iolanda García Gonzalez (Universitat Oberta de Catalunya).

Learning to incorporate the gender perspective in subjects merely implies a reflection on the different elements that constitute the teaching-learning process

based on sex and gender as key analytical variables. In order to review your subjects from this perspective, the guides to mainstreaming gender in university teaching provide recommendations and instructions that cover all the following elements: objectives, learning outcomes, content, examples and language used, selected sources, teaching methods and assessment, and management of the learning environment. After all, incorporating the principle of gender equality is not just a matter of social justice but also teaching quality.

M. José Rodríguez Jaume and Maria Olivella Quintana, coordinators

01. INTRODUCTION

In this guide, Susanna Tesconi, of the Universitat Oberta de Catalunya's Faculty of Computer Science, Multimedia and Telecommunications, provides strategies for including the gender perspective in the field of multimedia engineering. As part of the so-called STEAM (science, technology, engineering, the arts, and mathematics) group of qualifications, multimedia engineering is, much like every other technical and engineering subject, characterized by the scant presence of women as either students or professionals. Due to the limited presence of women in this sector, academic and professional contributions are influenced by androcentric viewpoints that perpetuate sexist stereotypes and exclusionary dynamics in the conceptualization, design and production of interactive and multimedia products and systems. The ubiquity of social networks, multimedia apps and interactive digital content platforms in society and their impact on users' lives force us, as both academics and professionals, to employ strategies that, through the university education provided to multimedia designers, provide tools to create environments, products and systems that are inclusive and respectful of human rights and diversity.

Gender blindness in this sector means not only that technology production environments perpetuate wide-ranging dynamics of subjective discrimination, but also that the products created cannot leverage the wealth implicit in diversity and, accordingly, its impact on improving society.

This guide, firstly, situates the field of multimedia and its practices with regard to the effects of a non-gender-sensitive approach. Secondly, it provides general guidelines for implementing the gender perspective into teaching the discipline and offers some specific proposals for this implementation based on reflections around the user experience design courses of the bachelor's degree in Digital Interaction and Multimedia Techniques and the master's degree in User Experience (UX) and Interaction Design offered by the Universitat Oberta de Catalunya (UOC). Lastly, it suggests strategies, tips and resources for supporting students in conceiving, designing and carrying out research work with a gender perspective in the field of multimedia engineering.

02. GENDER BLINDNESS AND ITS IMPLICATIONS

Multimedia engineering suffers from some of the same problems and inequalities found in the technology production industry in general, as evinced by the *Libro Blanco de las mujeres en el ámbito tecnológico* (White paper on women in the field of technology) (Sillero & Hernández, 2019):

- There is a significant gap in women's access to STEM careers. Gender roles and stereotypes reinforce prejudices about their skills, interests and motivations, affecting professional career choices.
- Women are under-represented in positions of leadership and, in the case of entrepreneurs, have greater difficulties in securing funding, especially for tech start-ups.
- Issues such as the "glass ceiling"; the repercussions of motherhood and caring, which put a brake on the inclusion and promotion of women; and the pay gap are all part of the world of work for women.
- A sense of hostility felt by many women professionals, of disparagement of their knowledge and skills or of a lack of authority.
- All-to-common cases of sexual assault in the world of technology, specifically in the start-up ecosystem.
- The video games industry suffers from all these inequalities, but to a far greater extent.
- As the tech industry grows, it is becoming the main vehicle for cultural and knowledge transmission. This means it plays a very significant role in influencing people's conceptions (their perception of the world around them) and, increasingly, their behaviour, both online and offline.
- Algorithms and artificial intelligence reproduce discriminatory gender biases, with a negative knock-on effect on equality of opportunity.

The lack of women (and diversity in general) in device and app development teams has a direct impact on the results of technological innovation and society at large, as it is based on what Criado Pérez (2019) calls a "one size fits all men" focus. Some examples:

- At 5.5 inches long, the average-sized smartphone is too big for most women's hands, and often can't fit into our pockets.
- Voice recognition software is configured on the basis of male voice recordings: Google's version is 70% more likely to understand men. One woman reported that her car's voice-activated controls only reacted to her husband, even when he was sitting in the passenger seat.
- Women are more likely to feel nauseous when wearing VR headsets.
- Fitness monitors underestimate the number of steps taken while doing housework by up to 74%.

In addition to algorithmic discrimination, we also need to take into account how any interface, as a designed environment allowing users to converse and interact with interactive systems, is full of meanings, aesthetics and policies that reflect a specific view of the world and its power relationships. Good examples of this are voice assistants like Alexa and Siri, which speak with a woman's voice in order to be perceived as unassuming and supportive.

To counteract this trend, we can get help from the concepts of access to and participation in the 'net and self-inclusion in the creation of technology provided by the critical reflections of cyberfeminism, which can be summed up in a few core themes (Sádaba & Barranquero-Carretero, 2019):

- Cyberspace's and engineering's hegemonic models spring from a heteropatriarchal model.
- Women's empowerment is fostered by appropriating access and contributions to and the use, design and development of ICT.
- The greater the presence of women in ICT, the greater the authority of women in contemporary society.
- ICT provide the opportunity of defying male authority and gender dominance-based relationships to create more egalitarian practices.

The training and education provided to multimedia designers need to incorporate the critical contributions of cyberfeminism and include within their syllabuses reflective tools that help students identify the gender-related social impact of their designs and the effects of their decisions on the user experience.

03. GENERAL APPROACHES FOR INCORPORATING THE GENDER PERSPECTIVE IN TEACHING

The multimedia engineering profession, as in all technical and engineering degrees, is markedly male-dominated, and this has a knock-on effect on the choice of content; ways of working; cultural and methodological benchmarks, and even the propagation of the idea that women are strangers to the world of technology, which is completely untrue.

1. To incorporate a gender perspective into the teaching of multimedia engineering, it is crucial to, firstly, highlight women's contributions to the development of multimedia engineering and creative technologies, bearing in mind that multimedia is a field that is very much interdisciplinary, standing as it does at the intersection between art, design and technology. Indeed, many contributions made by women spring from university and professional contexts outside the strict field of multimedia engineering, such as artistic production, speculative design and philosophy, even if they do have a significant technological component. Examples include all the women digital artists who have pioneered research into and the development of artificial life systems and interactive environments, such as Christa Sommerer and Natalie Jeremijenko. What's more, many key reflections about multimedia and creative technologies have come from the world of cyberfeminism, for example, the work of authors like Donna Haraway, Sadie Plant, Remedios Zafra, Ana de Miguel and Montserrat Boix.
2. The interdisciplinary nature of multimedia also calls on us to rethink cross-cutting aspects of curricula and syllabuses, because good multimedia design should meet not only a project's technological requirements, but also ensure the proper creative, aesthetic, social and ethical development of its products, given their impact on society and their potential for magnifying gender, racial and class inequalities. It is crucial that any training/education provided takes due account of the importance of incorporating non-hegemonic thought dynamics and draws from a variety of sources of knowledge (epistemological pluralism) with regard to both content and methodologies.

That's why there's a need to make students aware of initiatives from both the professional world and from the world of activism in which women are promoting different forms of self-inclusion and difference in the technology industry. These initiatives leverage self-organization to suggest alternatives to the hegemonic heteropatriarchal model and promote women's empowerment in accessing, using, researching and developing ICT. Good examples of this are provided by Women in Games¹ and Fem Devs² (in the gaming industry) and Ladies that UX³ (in the field of user experience design). In the world of activism and the field of participatory research, there is the collective work of Donestech⁴ and of Colectic⁵, two organizations working to ensure that technology is a tool for social inclusion and equality. What's more, both of these offer technological and methodological tools for working with students on a more horizontal, non-hierarchical basis, encouraging collective knowledge creation and culminating in the depatriarchalization of the technology industry through active learning experiences and participatory research. They consist of design and technology and strategy implementation activities for improving the inclusion of women in ICT and for fighting against male violence on the 'net. In short, they are educational experiences for working towards social improvement through reflections on technology and suggestions for bettering its inclusivity.

3. Providing students with the chance to carry out internships in such environments or to engage in events aimed at reflecting on these topics is an effective strategy for creating awareness around recurring power dynamics, sexist stereotypes and gender-related mandates in technology creation and implementation processes. What's more, creating education experiences in real-world contexts enables more significant and situated experiential learnings with great potential for changing students' belief systems, broadening their values and improving their understanding of their professional duties and their impact on society.
4. Changing the underlying discourses, practices and values in technology design and development processes and in the programmes educating the professionals who conceptualize them and carry them out is a key factor

1 <https://womeningameses.com/>

2 <https://femdevs.es/>

3 <https://www.ladiesthatux.com/>

4 <https://www.donestech.net/>

5 <https://colectic.coop/>

in redefining the traditional relationships between gender and technology production. The introduction of a gender perspective into engineering education has great potential to transform both design processes and the research carried out around them.

5. A strategy of non-gender-blind teaching in multimedia engineering entails educating students from a people-centred design perspective, and making recognition of diversity one of the cornerstones of each process. It also means approaching interface design in such a way as not to perpetuate dynamics of exclusion and the dissemination of androcentric imaginaries.
6. Non-gender-blind multimedia teaching must also provide tools for critical analysis that help students recognize algorithmic biases and non-diversity-respectful data processing. In other words, it must make professionals responsible and prepare them for collaboratively designing a more inclusive shared future, one in which technology is designed as a means for both achieving sustainable development goals and for addressing contemporary environmental and ecological challenges, planetary health, techno-scientific development, social and political issues, democratic participation, and the eradication of male violence and social inequalities.

04. APPROACHES FOR INTRODUCING THE GENDER PERSPECTIVE IN MULTIMEDIA ENGINEERING

This section provides some specific examples of competencies, content, and teaching and assessment methods for implementing a gender perspective into teaching. These examples come from the interaction and user experience module (set of courses) on the UOC's bachelor's degree in Digital Interaction and Multimedia Techniques and the Interfaces course on its master's degree in User Experience (UX) and Interaction Design⁶.

4.1 Learning competencies and outcomes

As part of the European Higher Education Area (EHEA), the UOC has, like other universities, adopted a model based on learning competencies and outcomes. As one of the actions included in the UOC Equality Plan⁷, and specifically with regard to the strategic area of teaching, with the goal of guiding and formulating education programmes to cover the requirements for training in global ethical commitment, a *Guide to cross-disciplinary competencies* has been produced, incorporating at both bachelor's and masters' degree level the cross-disciplinary competency of "global ethical commitment", which is given specific form in a series of learning outcomes. In this regard, it might also be well worthwhile consulting the *General framework for incorporating the gender perspective in higher education teaching* produced by the Catalan University Quality Assurance Agency (AQU Catalunya).⁸

6 <https://estudis.uoc.edu/ca/masters-universitaris/disseny-interaccio-experiencia-usuari/presentacio>

7 <https://www.uoc.edu/portal/en/compromis-social/equitat/igualtat/pla-igualtat/docencia/index.html>

8 General framework for incorporating the gender perspective in higher education teaching https://www.aqu.cat/doc/doc_21331700_1.pdf

Bachelor's degree in Digital Interaction and Multimedia Techniques	
Cross-disciplinary competency	Learning outcomes
Behave honestly, ethically and sustainably, exercising social responsibility and respect for human rights and diversity, in both academic and professional practice.	<ol style="list-style-type: none"> 1. Recognize, understand and respect functional, social, cultural, economic, political, linguistic and gender diversity. 2. Recognize, understand and analyse the causes and effects of sex- and gender-based inequalities. 3. Identify the features of professional practice that gives priority to the quality of the results achieved, applying criteria based on sustainability and social responsibility. 4. Understand and act in accordance with the ethical principles that guide professional practice. / Understand and act in accordance with the ethical principles that guide professional practice and in accordance with the professional code of conduct.

University master's degree in User Experience (UX) and Interaction Design	
Cross-disciplinary competency	Learning outcomes
<p>Act honestly, ethically, sustainably, socially responsibly and respectfully in terms of human rights and diversity, both in academic and professional practices, and produce solutions to drive improvements in these practices.</p>	<ol style="list-style-type: none"> 1. Include the analysis of functional, social, cultural, economic, political, linguistic and gender diversity in academic and professional practice. 2. Analyse the causes and effects of sex- and gender-based inequalities and formulate actions to counteract them. 3. Design and assess academic or professional projects, applying criteria grounded on the principles of quality, sustainability and social responsibility. 4. Critically assess the application of the guiding principles of professional practice in complex situations.
Specific competencies	Learning outcomes
<p>Understand the social, cultural and political changes brought about by digital technologies and, in this context, think critically about the impact of interaction design on people's lives.</p>	<ol style="list-style-type: none"> 1. Draw connections between usability and interaction and the implications for people's daily lives. 2. Reflect on the impact and responsibility associated with professional practice in interaction design.

<p>Define interfaces with an awareness of the emotional impact they have on people and ensure that their design is respectful of social, cultural and gender differences.</p>	<ol style="list-style-type: none"> 1. Justify the decisions made during the creative process, taking into account users' psychological, social and physical aspects. 2. Properly implement authentication processes and other security features. 3. Apply inclusive design principles to optimize interfaces. 4. Hold a contextual interview with two users of different genders or cultures. 5. Evaluate the proposed design based on the seven principles of inclusive design.
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4.2 Course/module content

UOC bachelor's degree in Digital Interaction and Multimedia Techniques

180 ECTS credits

Subject 5: Interaction and user experience

- Interaction Design (compulsory, 6 credits)
- Interface Design (compulsory, 6 credits)
- Tangible Interaction (compulsory, 6 credits)
- User Experience Design (optional, 6 credits)

Example 1. Implementing inclusive design from a gender perspective

Potential examples of content are designed to be implemented across all courses included in the subject, but can be used in different ways for each one, to encompass everything from the most theoretical to the most practical aspects of design.

As previously stated, both user experience and interface design, not to mention interaction design, are of great importance to multimedia and computer engineering, particularly due to the impact their products and services can have on users' lives. This is why it is so important for students to be aware, firstly, of their responsibility and, secondly, to have tools to ensure that their user experience and interaction designs are inclusive and take into account the gender perspective.

Inclusive design is a design philosophy, a methodological framework for developing accessible products for a larger number of people. Normally when we refer to inclusive design, we think of digital products for people with a disability. We almost never consider inclusivity from a gender perspective. Its principles can be applied to all stages of research with users, conceptualization, design and implementation of interactions, interfaces and experiences.

Topics:

Principles of inclusive design from a gender perspective.

Inclusive design for UX evaluation with users.

Experience design for transsexual and transgender people.

Information architecture and taxonomies that avoid classification by gender.

Analysis of gender issues in the most popular dating apps.

Analysis and reflection on non-inclusiveness in the design of social networking applications.

Guidelines for conducting user experience evaluation tests that are not blind to gender.

Heuristic assessment with a gender perspective.

Application of the Persona method according to the gender perspective.

Example 2. Inclusive interface design

This example can be applied to the compulsory, 6-credit Interface Design course on the bachelor's degree in Digital Interaction and Multimedia Techniques, and to the optional, 6-credit Interfaces course on the master's degree in User Experience

(UX) and Interaction Design, by adapting the level of reflection and the ability to conceptualize and formalize required in each case.

Interface design is where the guiding principles of interaction and, consequently, the user's final experience take shape. As mentioned in section 2 of this guide, interfaces are never neutral; they are always nourished by cultural, political, ethical and aesthetic factors that come from the world around us, including sexist stereotypes, gender biases and all of a society's non-inclusive aspects. It is crucial that students are able to recognize and identify these elements in interfaces, and have the tools to design inclusive interfaces. For this reason, before they design, students must be equipped with a box of tools for interpreting reality that enables them to identify these elements in existing interfaces, so that they are then able to act consciously in the design and formalization phase, and not simply uncritically repeat the graphic, visual, tactile and vocal elements that perpetuate sexist imaginaries and dynamics.

Topics:

Analysis and conceptualization of metaphors for interfaces that do not perpetuate sexist, racist and colonial stereotypes.

Wearable interfaces – the use of the body in interaction with devices from a gender perspective.

Analysis of the most common voice interfaces on the market from a gender perspective: Alexa, Siri and Cortana, the stereotype of the secretary.

Identification of non-inclusive elements in an interface and their redesign based on equality.

Prototyping and wireframing interfaces for digital applications aimed at victims of gender violence.

Use of inclusive language and the incorporation of inclusive language into interfaces.

Guidelines for evaluating an interface's inclusiveness from a gender perspective.

Evaluating a digital product's usability is a key factor in optimizing its proper functioning and ensuring a satisfactory user experience. In recent years, this sub-field of human-computer interaction has vastly expanded in terms of the range of its methodologies, incorporating research on people's behaviour and

expanding its range of tools with methodologies from other disciplinary fields, including psychology, anthropology and the cognitive sciences. The success of digital products such as streaming platforms (Netflix, HBO, etc.) and social media apps largely depends on the satisfaction derived from the user experience, loyalty strategies and the increase in engagement, which are all aspects that need to be investigated continuously by experts and through the perspective of users' behaviour. UX research has become so popular in the last ten years for this reason. This has had the positive effect of generating a great deal of employment, and has consequently also created the need for universities to provide appropriate training.

Any research methodology or process may be affected by gender bias and the selection of unrepresentative samples. This problem also applies to UX research, which needs to review its methodologies in order to ensure gender-sensitive and diversity-sensitive research in general. From the gender perspective in UX research, it is advisable to use gender-disaggregated data sets as a starting point in any design process. This way the needs detected and the solutions proposed are no longer conceived according to a type of user based by default on men, which Criado Pérez (2019) calls the "one-size-fits-all-men" approach. It is very important to provide students with examples of the negative effects of this approach. Smartphones, which average 5.5 inches in length, are too big for most women's hands and they are often too big for our pockets. Voice recognition software is trained using male voice recordings: Google's version is 70% more likely to understand men. One woman reported that her car's voice-activated controls only reacted to her husband, even when he was sitting in the passenger seat. Women are more likely to feel sick while wearing a VR headset.

Topics:

Adaptation of the main methods of evaluating the user experience to make them more gender inclusive

- Experience evaluation methods without users
 - Heuristics
 - Affinity diagrams
 - Cognitive walkthroughs
 - Scenarios

- User journeys
- User profiles
- Experience evaluation methods with users
 - Tests with users
 - Focus groups
 - Tree testing
 - Questionnaires
 - Interviews

4.3. Course assessment

The assessment process is a key component of teaching and learning dynamics. It enables students to receive the support and feedback they need to systematize and continue their learning. When we talk about assessment, we are often not referring so much to these formative aspects of assessment, but instead to the tasks involved in marking students' work, i.e. the assessment that takes place at the end of the semester and is given as a mark. Both these aspects are necessary and important, but in order to improve student learning, continuous or formative assessment has the most impact.

The courses that we have presented as examples are practical and highly activity-focused. In other words, students acquire theoretical knowledge that they apply in practice by creating a project that they document and use to reflect on both the techniques acquired and the learning process itself. Students must document their work process with evidence and reflections, and present these in a portfolio which in turn serves as proof of their skills for their future search for employment.

When working with applied, project-based courses like these, it is very important to avoid assessment methods that do not take key aspects of the student's work into account, such as the evolution of the project from its conceptualization until the end result, and the progression of learning.

The final assessment is the result of all the continuous assessment activities carried out by the student and an analysis of the evidence they have presented. The results and artefacts they deliver are taken into account, but the core of the assessment is the process and the student's evolution throughout the course.

This makes it possible to overcome the barriers imposed by standardized assessment methods such as tests and examinations, which reward mnemonic abilities and the acquisition of concepts rather than more situated learning. Assessing students by having them present evidence and documentation of processes also empowers them to give meaning to their work, while enabling individualization of the preferred assessment process and the creation of more inclusive practices. When students' experiences and processes are taken into account, they can be assessed according to broader indicators that go beyond instrumental learning and can provide guidelines on their growth as a learner. Individualized assessment has the potential to be assessment that is sensitive to gender and to other forms of inequality, provided that teachers do not maintain gender biases.

4.4 Forms of organizing teaching dynamics

The courses presented are designed according to an asynchronous model of online teaching, like all the programmes offered by the UOC, but the examples can also be used in a context of on-site teaching involving theoretical classes and thematic workshops that support students in their process of creation and documentation.

In the specific case of online teaching, the activities are presented in the virtual classroom in text or video format, and take the form of challenges based on examples from the real world and professional life. The challenge breakdown provides students with all the guidelines they need to carry it out autonomously and at their own pace. The challenge is also linked to all the learning resources needed to complete it.

Organizational guidelines and recommendations are provided for performing the continuous assessment activities through the teaching support offered using the communication tools in the virtual classroom. Discussion and group work activities to reflect on the most critical aspects of the course and to develop the soft skills of collaboration and creativity are also organized. In addition, the dialogue between students and teachers should be constant and open, doubts and solutions should be shared, and everyone should contribute to the generation of knowledge in the classroom, overcome hierarchical conceptions and establish respectful relationships in which knowledge between experts and beginners

flows freely. Questioning hierarchies within teaching-learning dynamics is also a way to create classrooms that are inclusive and open to diversity.

It is vital that those who provide support in the classroom closely monitor the communication dynamics between students in the classroom's public channels in order to quickly identify situations involving exclusion, verbal violence, or the dissemination of messages or comments that are not respectful of diversity. This facilitator must ensure that the general climate favours a calm exchange of diverse ideas, without creating implicit or explicit forms of exclusion.

A great deal of attention and thoroughness is required when observing group work dynamics, in order to identify possible cases of violence or situations in which traditional leadership roles are proposed.

In external internships in companies or institutions, it is advisable to choose institutions that have active protocols against gender violence in place or that have an inclusive work culture that is respectful of diversity.

Finally, students should be made aware of the gender policies of the university itself, and their participation in them should be encouraged. The goal is for students to know what these policies are and where to locate them if need be, but they should also understand that they are part of an institution that cares about ensuring an inclusive environment.

4.5 Teaching methods

As mentioned above, to educate gender-sensitive multimedia professionals who are able to create products that do not perpetuate sexist stereotypes and inequality, the activities we offer must be closely associated with real life, with the contradictions present in the world of technology production and with the products available on the market, but also with the most critical alternatives, such as platform cooperativism, the ethical and cooperative alternative to platform capitalism.⁹

For this reason, all teaching methods and pedagogies that begin with an analysis of the situation in the technological sector, so as to act on it, will help to achieve the goal of educating conscious citizens capable of fighting against inequality. This is true of project-based learning, service learning, case study learning and

⁹ <http://lab.cccb.org/es/la-experiencia-de-usuario-en-el-cooperativismo-de-plataforma/>

cyberfeminist pedagogy.¹⁰ This last method is particularly useful for those working in virtual learning environments like the UOC (Biglia & Jiménez, 2012).

In addition, as pointed out in the *Guia d'Educació i Pedagogia* (Guide to Education and Pedagogy)¹¹ in this collection, along the lines of Martínez (2015), we can extract strategies that work to empower people through critical education from decolonial feminist pedagogies:

- Inclusion of differences.
- Rendering forms of inequality and the impositions of patriarchy visible.
- Knowledge of different women's spaces, knowledge and experiences from various perspectives to facilitate individual and collective processes of empowerment.
- Active community participation in equity.
- Horizontal, cross-cutting intervention approaches.
- Creation of the capacity for self-criticism and individual and collective awareness.
- Dissemination and explanation of history, culture, knowledge, and so on from a feminist and intercultural point of view, discovering the value of hidden knowledge and not only of dominant and globalizing knowledge.
- Emphasis on fostering the network of women for a social model based on the common good, mutual support for people, solidarity networks and the civic fabric.

Apart from their association with reality, all these methodologies enable students to develop key competencies when interpreting the complexity of the technological world and its current dynamics of production. In service learning for multimedia programming and user experience design professionals in particular, it is an opportunity to integrate knowledge and technical skills with people's needs, so that they acquire the entire range of interdisciplinary competencies

10 Biglia, Barbara and Jiménez, Edurne (2012). Los desafíos de la pedagogía cyberfeminista: un estudio de caso [The challenges of cyberfeminist pedagogy: a case study]. *Athenea Digital*, 12(3), 71-93. Available at: <http://psicologiasocial.uab.es/athenea/index.php/atheneaDigital/article/view/Biglia>

11 <https://www3.vives.org/publicaciones/arxius/educacio.pdf>

they need to create technology that is more humane, more inclusive and more sustainable.

In project-based learning, the focus shifts more towards the methodologies used in the professional sphere, such as Agile and Scrum, giving students a set of tools that will enable them to become more effective members of work teams after they enter the workplace.

Inquiry-based methodologies, such as case studies and action research, have the benefits of the two methodologies above plus all the empowerment that a research process brings to learning, such as the ability to collect and analyse data thoroughly and systematically, the ability to draw shared and situated insights, and the ability to organize and explain the results for dissemination. In addition, undertaking simple research activities throughout the programme helps ensure that students are already equipped with research tools when the time comes for them to produce their bachelor's or master's degree final project. This reduces the feeling of vertigo that students usually experience at this stage.

05. SPECIFIC TEACHING RESOURCES FOR INCORPORATING THE GENDER PERSPECTIVE

The teaching resources normally used in engineering are textual, oral and visual, and are in some cases interactive materials, such as examples of applications, software, artefacts and immersive environments and platforms.

It is vitally important that textual resources are written in gender-sensitive language, communicating in a way that reflects sexual and gender differences so that everyone feels equally represented. The following recommendations are made with this in mind:

- Use plural nouns such as learners, students and teachers, and abstract terms that do not perpetuate the historical inequalities commonly found in technology production environments.
- Avoid phrases with sexist stereotypes.
- Think of the structure of speech in a way that does not convey the feeling that one sex is prioritized over the other.
- Include terms that refer to transsexual, transgender and non-binary people.

In visual communication and when creating graphics, take great care when choosing images so that they are as equally representative as possible of diversity in all its complexity (gender, ethnicity, religion, age, class, geographical origin, etc.). More information on this subject can be found on the Gendered Innovation website.¹²

Images that are reminiscent of sexist, colonial or harmful depictions of sexual difference or which reproduce gender stereotypes must be avoided. Likewise, women must not be portrayed as excessively sexual beings. Where necessary, e.g. in the context of video games, problematize and work in class on the hypersexualization with which female characters are usually portrayed.

Be very careful when choosing interactive materials based on the imaginaries they evoke. Avoid traditionally masculinized aesthetics, as well as war or sports metaphors that simply recall sexist environments. Avoid stereotyped representations.

¹² <http://genderedinnovations.stanford.edu/methods/language.html>

In audiovisual project documentation, it is advisable to choose various contents prepared by different authors, striking some degree of balance between the different proposals. Where possible, attempt to surprise students by offering examples that are unusual and where women have stood out.

For programming materials, use examples of code and applications where the authorship of women or subjects who are not normally visible in the sector can be highlighted.

When analysing technology that is integrated in everyday life, such as the success or failure of a digital content delivery platform or the impact of a particular UX design, it is important to present the data broken down by sex and conduct gender-sensitive analyses. It is essential that students integrate this practice into their daily routine, so that their sensitivity to gender becomes a mainstream feature of their professional and research work.

It is also a good idea to provide materials that highlight initiatives for self-inclusion carried out by diverse subjects in the technology sector and projects that democratize access to technology for all the subjects that have long been excluded.

Particular care should be taken when inviting experts from the professional world, and in terms of positive action, female speakers should be preferred, so that students can connect with different professional experiences that go beyond male hegemony in the technology sector.

06. TEACHING GENDER-SENSITIVE RESEARCH

The bachelor's or master's degree final project is the zenith of students' development, at which all the learning matured throughout the programme is integrated with personal experience and methodological research tools in order to produce original knowledge based on experimentation, a review of the literature, and data collection and analysis. At the same time, it can also be a difficult experience in some cases, when students are faced with a much more complex and complicated task than they usually undertake, without having the necessary fluidity to perform it.

In order for students to be ready to define and carry out their bachelor's or master's degree final project, it is important that they have been able to gradually learn and put into practice some research tools throughout their studies, by carrying out small research projects that enable them to acquire specific techniques and methodologies, such as systematic review, creating data collection tools, academic writing techniques, organizing references, etc. The bachelor's or master's degree final project should not be the first research work that students do.

Moreover, in the case of multimedia, as it is an interdisciplinary field, these contents, processes and techniques come from very different fields, such as programming, design and art. This diversity is also reflected in the variety of research methodologies available, which can range from hardware and software development to the production of immersive interactive environments, video game development, studies of user experiences, and the production of methodological frameworks for the implementation of specific technologies. All this methodological complexity must be taken into account when preparing students for the challenge of the bachelor's or master's degree final project.

When it comes to undertaking gender-sensitive research in the field of multimedia engineering, in teaching it is important to work on the discipline's contents and processes across all courses, encouraging students' acquisition of conceptual and practical tools for identifying sexist stereotypes, gender biases and forms of exclusion in all areas of work, including code, algorithms, interfaces, applications, and digital and media platforms and environments. Having previously honed this gender sensitivity will help students to identify and select research ideas and propose research hypotheses that can provide the starting point for pursuing research proposals and formulating research questions, or the rationale if it is design-based research.

Based on the defined research questions, we will work on the methodological design of the research, selecting the appropriate methodologies and determining the necessary tools for the collection and analysis of the data. The choice of methodology is another key point when conducting gender-sensitive research, and in this respect it is advisable to choose flexible and participatory methodologies that enable a holistic approach to be incorporated into the research process, and to take into account the complexity of the social context and the value system that come into play when researching or developing technological artefacts. This applies to research on participatory action, participatory design and all the methodologies aimed at generating change and innovation through collective action, for example. Integrating participatory approaches with the use of methodologies such as feminist ethnography and self-ethnography is recommended in more analytical and reflective work, such as studies on the impact of video games and platforms on user behaviour.

Methodological resources in the format of checklists or toolkits may be useful in research aimed at creating products, provided that they are used reflexively and critically without succumbing to a step-by-step dynamic. Useful options include the Gender in Design Toolkit and Ethical Explorer: Tech Risks Zone.

In both research and teaching, gender sensitivity implies the internalization of and commitment to a series of values and purposes that differentiate it from other approaches that are more oriented towards industrial production. These are:

1. Attention to social aspects and the impact of technology production.

Gender does not act in isolation, but interacts with other social aspects which may be amplified or limited in their effects. For this reason, it is crucial to recognize and take into account people's diversity according to age, class, ethnicity, sexual orientation and functional capacity.

Examples:

- Designing inclusive technologies for older women.
- Redesigning the UX of a dating app with an LGBTIA perspective.

2. Comprehensive view of technology and its interactions. This involves developing a vision of technology production as the result of constant interaction between various ethical, aesthetic, cultural, economic and political factors.

Examples:

- Conceptualization and design of interfaces for people with disabilities.
- Production of methodological frameworks for the inclusive implementation of virtual reality in educational settings.

3. Interdisciplinarity. This involves designing and analysing technology from epistemologically diverse perspectives and nourishing the culture of the technology sector with principles, values and concepts from other disciplinary fields.

Examples:

- Designing a display of data of victims of gender violence.
- Creating interactive installations that foster an understanding of the dynamics of sex discrimination.

4. Relevance of the context. This entails taking into account that technological development depends on historical, cultural and socio-economic factors that define the production of technology in a series of gender relations.

Examples:

- Analysis of the historical evolution of voice interfaces in the history of multimedia.
- Interactive display of the impact of women in the world of computing.

5. Critical attitude. Adopting a critical attitude involves challenging the research questions and approaches commonly used in technology development, interaction design, and interactive experiences and media.

Examples:

- Analysis and redefinition of the principles of people-centred design in terms of gender.
- Development of a methodological framework for the inclusive design of mobile applications that respect the differences between transgender, transgender and non-binary people.

6. Focus on change. This involves explicitly targeting the visibility of inequalities and discrimination present in the technology production system in order to change their modes of production and their impact on people's lives.

Examples:

- Conceptualization of a virtual reality environment that enables the user to experience dynamics of discrimination in order to generate understanding, awareness and empathy on the subject.
- Design of applications to facilitate caring for senior citizens.

7. Attention to emerging issues. This involves considering research issues around emerging aspects of technology production or reformulating classic issues from a gender perspective.

Examples:

- Design of applications to fight against cyberbullying.
- Conceptualization of an immersive environment that enables the user to experience the practices of discrimination generated by AI algorithms.

07. TEACHING RESOURCES

COLLECTION OF WEBSITES ON TEACHING MATERIALS, RESEARCH PROJECTS AND/OR RESEARCH GROUPS INVOLVING GENDER OR THE GENDER PERSPECTIVE

Bekka Ricks (Mozilla Foundation)

<https://beccaricks.space/Imagining-Feminist-Interfaces>

Toolkit for Integrating Gender-Sensitive Approach into Research and Teaching

https://eige.europa.eu/sites/default/files/garcia_working_paper_6_toolkit_integrating_gender_research_teaching.pdf

Donestech

<https://www.donestech.net/>

Colectic

<https://colectic.coop/>

GenTIC Researching Gender in the Network Society (UOC)

<https://gender-ict.net/>

Gendered Innovations (Stanford University)

<https://genderedinnovations.stanford.edu/>

https://genderedinnovations.stanford.edu/methods/engineering_checklist.html

Women in Games Spain

<https://womeningameses.com/>

Women Who Code - Empowering Women in Technology

<https://www.womenwhocode.com/>

FemDevs

<https://femdevs.es/>

Ladies that UX

<https://www.ladiesthatux.com/>

Observatory for Equality - Universitat Autònoma de Barcelona

<https://www.uab.cat/web/the-observatory-/gender-perspective-in-teaching-and-research-1345703858761.html>

ADALab

<http://www.adalab.es/>

Grupo Trevenque

<https://solucionesweb.trevenque.es/mujeres-referentes-en-diseno-y-desarrollo-web/>

The Feminist Principles of the Internet

<https://feministinternet.org/en/about>

Engendered Research

<https://www.engenderedresearch.com/>

Feminist Internet

<https://feministinternet.org/en/principle/consent>

7.1 References

- ANTA, José Luis and PEINADO, Matilde (2010). "Ciberfeminismo y educación. Un debate teórico". In *Investigaciones multidisciplinares en género: II Congreso Universitario Nacional Investigación y Género* (p. 21-36).
- BIGLIA, Barbara and JIMÉNEZ, Edurne (2012). "Los desafíos de la pedagogía cyberfeminista: un estudio de caso". *Athenea Digital*, 12(3), 71-93.
- BIGLIA, Barbara and VERGÉS-BOSCH, Núria (2016). "Questioning the gender perspective in research". *Revista d'Innovació i Recerca en Educació*, 9(2), 12.
- BÜHRER, Susanne; REIDL, Sybille; SCHMIDT, Evanthia K.; PALMEN, Rachel; STRIEBING, Clemens and GROO, Dora (2019). "Evaluation Framework for Promoting Gender Equality in Research and Innovation: How does gender equality influence research and innovation outcomes and what implications can be derived for suitable evaluation approaches?". *fteval Journal for Research and Technology Policy Evaluation*, 47, 140-145. doi:10.22163/fteval.2019.332
- ESPINO, Elisenda Eva and GONZÁLEZ, Carina Soledad (2015). "Estudio sobre diferencias de género en las competencias y las estrategias educativas para el

- desarrollo del pensamiento computacional". *Revista de Educación a Distancia*, (46).
- EUROPEAN INSTITUTE FOR GENDER EQUALITY (EIGE) (2016), *Gender in education and training*. Publications Office of the European Union, Publications Office of the European Union, Luxembourg.
- GARCÍA HOLGADO, Alicia; MENA, Juanjo; GONZÁLEZ-GONZÁLEZ, Carina Soledad and GARCÍA PEÑALVO, Francisco J. (2019). "Perspectiva de género en Ingeniería Informática: cuestionario GENGE". *Guidance to facilitate the implementation of targets to promote gender equality in research and innovation*, Publications Office of the European Union, Luxembourg.
- GONZÁLEZ, Marta I. and JIMENO, Natalia F. (2016). "Ciencia, tecnología y género. Enfoques y problemas actuales". *Revista Iberoamericana de Ciencia, Tecnología y Sociedad-CTS*, 11(31), 51-60.
- GONZÁLEZ RAMOS, Ana M.; VERGÉS BOSCH, Núria and MARTÍNEZ GARCÍA, José Saturnino (2017). "Las mujeres en el mercado de trabajo de las tecnologías". *Reis. Revista Española de Investigaciones Sociológicas*, 159, 73-90.
- HUYER, Sofia and SIKOSKA, Tatjana (2003). *Overcoming the gender digital divide: understanding ICTs and their potential for the empowerment of women*. Santo Domingo: INSTRAW.
- MCQUILLAN, Hellen (2010). "Technicians, Tacticians and Tattlers: Women as Innovators and Change Agents in Community Technology Projects". Special Double Issue. *Gender in Community Informatics* 5 (3) & 6(1).
- MORLEY, Chantal and COLLET, Isabelle (2017). "Femmes et métiers de l'informatique: un monde pour elles aussi". *Cahiers du genre*, (1), 183-202.
- NIELSEN, Mathias W., BLOCH, Carter W. and SCHIEBINGER, Londa (2018). "Making gender diversity work for scientific discovery and innovation". *Nature human behaviour*, 2(10), 726-734.
- PEREZ, Caroline C. (2019). *Invisible women: Exposing data bias in a world designed for men*. New York: Random House.
- SÁDABA, Igor and BARRANQUERO CARRETERO, Alejandro (2019). *Las redes sociales del ciberfeminismo en España: identidad y repertorios de acción*.
- SÁINZ, Milagros (2019). "La bretxa de gènere en la tria d'estudis STEM i TIC". *Nota d'Economia*, 105, 64-76. Generalitat de Catalunya. Departament de la

Vicepresidència i d'Economia i Hisenda. Recuperat de <http://economia.gencat.cat/ca/ambits-actuacio/economia-catalana/estudis-publicacions/nota-economia/numero-105/>

SCHMIDT, Evantia K. and GRAVERSEN, Ebbe K. (2020). "Developing a conceptual evaluation framework for gender equality interventions in research and innovation". *Evaluation and Program Planning*, 79, 101750.

TRBOVC, Jovana M. and HOFMAN, Ana (2015). *Toolkit for integrating gender-sensitive approach into research and teaching*. Garcia Working Papers 6. Universitat de Trento.

VERGÉS BOSCH, Núria (2012). "De la exclusión a la autoinclusión de las mujeres en las TIC. Motivaciones, posibilitadores y mecanismos de autoinclusión". *Athenea digital*, 12(3), 129-150.

VERGÉS BOSCH, Núria (2019) "Gender and ICT: Are we making progress in CyberFeministisation?", *Revista ideas, Feminisme(s)*, 47, 1-8.

7.2 Links to gender-specific course plans/syllabuses

<https://best.berkeley.edu/designing-technology-for-girls-and-women/>

08. FURTHER READING

- BEUTHEL, Janne M. (July 2020). "Wearing the Invisible: Wearable Manifestations of Embodied Experiences". In *Companion Publication of the 2020 ACM Designing Interactive Systems Conference* (p. 485-489).
- BAKER, Camille and SICCHIO, Kate (2015). "Stitch, bitch, make/perform: wearables and performance". *Electronic Visualisation and the Arts (EVA 2015)*, 247-251.
- HUTCHINSON, Les and NOVOTNY, Maria (2018). "Teaching a critical digital literacy of wearables: A feminist surveillance as care pedagogy". *Computers and Composition*, 50, 105-120.
- KNIGHT, Kim B. (2018). "Wearable Interfaces, Networked Bodies, and Feminist Sleeper Agents". *The Routledge Companion to Media Studies and Digital Humanities*, 204-213.
- MONTEIRO, Stephen (2017). *The fabric of interface: Mobile media, design, and gender*. MIT Press.
- SILLERO, Sara M. and HERNÁNDEZ, Clara G. (2019). *Libro Blanco de las mujeres en el ámbito tecnológico*. Secretaría de Estado para el Avance Digital, Ministerio de Economía y Empresa. Recuperat a <https://www.mineco.gob.es/stfls/mineco/ministerio/ficheros/libreria/LibroBlancoFINAL.pdf>
- WISSINGER, Elizabeth (2017). "Wearable tech, bodies, and gender". *Sociology Compass*, 11(11), e12514

The absence of women and diversity in general in teams that develop devices and applications has direct consequences on the results of technological innovation and on society, as it is based on what Criado Pérez (2019) calls the approach of “one size for men”.

The Guide for mainstreaming gender in university teaching of Multimedia Engineering offers proposals, examples of good practices, teaching resources and consultation tools to incorporate the gender perspective in the training of developers, allowing students to identify the social impact of their designs on gender and the effects of their decisions on the experience of users.



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