

1 Article

## 2 Education for Sustainable Leadership: Raising 3 Women's Capacities

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8 **Abstract:** Education is an imperative key to driving sustainability and gender equity. In addition to  
9 addressing well-known female deficiencies in leadership training, it is really important to develop  
10 initiatives in sustainable leadership education for women to acquire skills, competencies and tools  
11 on leadership and to increase their self-perceptions. The purpose of this study is to assess a  
12 Women's Leadership Program for university students. The sample consisted of 50 students  
13 enrolled in the program. A mixed-method approach was applied. Quantitative methods with a  
14 survey were conducted to evaluate the training and the achievement of leadership skills. In the  
15 data analysis, a descriptive statistics variance analysis, using a Welch statistic and T2 Dunnett test,  
16 was applied. Qualitative research methods were conducted through three focus groups to evaluate  
17 personal changes in their own-perceptions and self-confidence. Results suggest that the female  
18 students in the program reached a level of leadership knowledge with practical tools for their  
19 future. The program inspired them and confirmed changes in their personal capacities or  
20 self-confidence, including reflection about facing challenges in the work environment. The findings  
21 support the effectiveness of the specific education in breaking two barriers shown by the literature  
22 for women to getting a managerial position: lack of training and female self-confidence.

23 **Keywords:** education for sustainable leadership; gender equality; competencies; higher education;  
24 women managers  
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### 26 1. Introduction

27 Education is crucial for the achievement of sustainable development and is extraordinarily  
28 important to women's empowerment [1]. In 2015, the 2030 Agenda for Sustainable Development  
29 was adopted by the United Nations (UN) General Assembly and incorporated, as part of the 17  
30 Sustainable Development Goals (SDGs) the goal to "*ensure inclusive and equitable quality education and*  
31 *promote lifelong learning opportunities for all*" [2]. In Education for Sustainable Development Goals  
32 (ESDG): Learning Objectives, UNESCO aims to promote gender equality in education as one of the  
33 behavioural learning objectives (on ESDG 4) and recommends that education for sustainable  
34 development should be included in all curricula of formal education: primary, secondary and  
35 higher education [3].

36 In this context, the 2030 Agenda for Sustainable Development focuses on the need to acquire a  
37 set of key transversal competencies applicable to different contexts and purposes, along with  
38 professional careers [4]. The EU, since the implementation of the Bologna European Credit Transfer  
39 and Accumulation System and Tunning project, has encouraged improvement of the acquisition of  
40 professional competences and changing the learning approaches and outcomes emphasizing the  
41 importance of lifelong learning for professional and personal development in a global and unstable  
42 world. Most of the competences suggested by UNESCO [2] are related to the competences  
43 appropriate for a leader, such as critical thinking, collaboration, strategic, integrated  
44 problem-solving, anticipatory competency, normative, systems thinking competency, and even  
45 self-awareness competency. Education is absolutely critical for assuring the acquisition of these

46 competences, especially for women who need to improve their capability to gain manager  
47 positions.

48 Literature has recognized that there can be no sustainability without gender equality [5-7] and  
49 it has been a long-established priority for the international and national organization. Women's  
50 empowerment is essential for expanding economic growth, promoting social development and  
51 achieving sustainable development. As part of the 17 SDGs for achieving gender equality (SDG 5),  
52 the empowerment of women and girls [2] is one of the main aims, and one of the main behavioural  
53 learning objectives is for females to be able to take the measure of their surroundings to empower  
54 themselves or others who are discriminated against because of their gender. [8-10] In addition,  
55 sustainability and gender mainstreaming are considered as a basic instrument for policymaking to  
56 reduce inequalities. Other stakeholders, such as civil organizations and movements (#Metoo, Time's  
57 Up, YesAllWomen, massive marches on International Women's Day (IWD)) are seeking a more  
58 equitable society to improve world sustainability. Literature suggests that women leaders enable  
59 more sustainable development in corporations and are associated with greater control over  
60 Corporate Social Responsibility [11]. Also, from the point of view of the Boards of Directors, gender  
61 diversity [12] and increased numbers of women in upper-management positions allow businesses to  
62 shift from short-term profit maximization to a broader focus on longer-term goals, and make them  
63 more environmentally conscious, behave more ethically, have greater transparency, integrate the  
64 interests of multiple stakeholders and pursue innovate initiatives [13-17].

65 Nevertheless, some differences persist in women's access to management positions in all  
66 economic sectors, as evidenced by the so-called "Glass Ceiling" [18-21]. According to the World  
67 Economic Forum (2018), women hold just 34% of managerial positions and less than 7% in the four  
68 worst-performing countries (Egypt, Saudi Arabia, Yemen and Pakistan) and, on average, globally,  
69 just 18% of ministers and 24% of parliamentarians are women. Data from UN [2] shows this number  
70 as 27% holding management positions. This situation contrasts with gender parity in education,  
71 where women have a greater presence in the universities, and where they exceed, for some degrees,  
72 more than half of the students [22]. Also, regarding leadership capacity, there is no doubt that  
73 experience in leadership, solving problems, communication abilities and self-confidence are  
74 essential for professional promotion. The problem is that even with having parity in education,  
75 female seem to lack some of these competencies that allow them to access to management positions.

76 Several studies conducted throughout the world have tried to identify the barriers that limit  
77 women's access to decision-making positions. Generic issues have been identified; for example,  
78 insufficient critical mass in managerial positions or discriminatory stereotypes, such as considering  
79 effective leadership associated with male attributes; structural and institutional obstacles, lifestyle  
80 choices, incompatibility between work-life balance. Human capital theories have explained these  
81 barriers to access to women's management positions as being because of a lack of specific training  
82 and experience, stereotypes and lack of self-confidence [23-25]. Disadvantages in education translate  
83 into a lack of access to skills and limited opportunities in the labour market. Hence, education  
84 becomes a fundamental key in its employment and subsequent professional development.  
85 Leadership education might link to occupational practice and consists of providing professionals  
86 with tools suited to resolving issues likely to arise in the course of practising their respective  
87 manager positions. At the same time, a specific program that focuses on a gendered perspective  
88 enables female students to furnish a suitable response to situations women encounter in professional  
89 practice.

90 On the other hand, [26-27] some suggest that gender stereotypes are what causes anchor biases  
91 about women's abilities as leaders. Stereotypes and social role theory [28] explain that men and  
92 women are allocated different roles in society due to their gender and these include different  
93 managerial discourse. The "think manager, think male" phenomenon [29] associates leadership  
94 with masculine characteristics and impedes women's career progression [30-31]. Women are  
95 expected to behave like women, but traditional female behaviour conflicts with the desirable  
96 abilities of a leader. For example, communication has been considered a central leadership  
97 competency [32-35]. Social norms and stereotypes shape feminine communication as more indirect

98 and emotional, whereas masculine communication is more direct and instrumental. The female  
99 style of communication is not considered suitable for leadership, because women's linguistic style is  
100 perceived as uncertain, nervous, and showing a lack of authority [32].

101 Gender roles affect individuals' perceptions of their own abilities, self-esteem, career ambitions  
102 and self-imposed barriers [36]. Related to gender stereotypes, leadership is associated with men's  
103 qualities as managers, including self-confidence, assertiveness, competitiveness, ambition and  
104 emotional stability [37], while women are perceived as less competent. This external perception  
105 affects female self-abilities, confidence and self-perception. Guillén, Mayo and Karelaiia [38]  
106 highlighted that self-confidence and ambition is based on others' perceptions and the extent to  
107 which a woman sees herself as capable of leader performance external standards. So, the  
108 environment and society's roles predict the extent to which men and women are seen as capable  
109 and promotable in their organizations. This lack of self-confidence and institutional confidence in  
110 them could explain why women do not put themselves forward for management positions.

111 In conclusion, women stereotypes, along with a lack of self-confidence in applying for  
112 leadership positions and a lack of leadership education [39, 24, 25] require concrete actions within  
113 public administration, places of employment, academic institutions and with women themselves  
114 [40]. Actions supported in education could create females' own social capital, promotion and help  
115 them communicate their value for the organization.

116 In this context and in response to the lack of women's leadership competences, Rey Juan  
117 Carlos University launched a specific training program for female university students in  
118 collaboration with the Women' CEO Association (WCA). The objective was to ensure the  
119 acquisition of skills, competencies and tools for leadership and to increase their self-perceptions and  
120 motivations.

121 The main objective of this paper is to show the results of this case study, analysing its impact  
122 on female students. The paper is structured as follows: section 2 describes the research background,  
123 the design, methods and sample; section 3 outlines the main research findings; section 4 presents  
124 the discussion and finally section 5 provides the main conclusions.

## 125 **2. Materials and Methods**

### 126 *2.1. The Research Background*

127 The research focuses on the results of the Women Leadership Program (WLP), which took  
128 place during two years, 2017 and 2018. The main objective of the WLP was that the female students  
129 enrolled in the program acquired skills, competences and tools related to management and  
130 leadership. As a second goal, the course attempted to improve student motivations, self-esteem and  
131 self-perceptions to empower female about their own value. Also, it explained the difficulties the  
132 women would face in the labour market or with the balance of their personal life, with case studies  
133 offered through managers' practical experiences and advice on how to overcome barriers. The  
134 applications for enrolment in the WLP were four times the number of places offered; therefore, a  
135 selection process was necessary. The final groups constituted a heterogeneous team in terms of their  
136 academic profiles, including students pursuing Business, Social Sciences or Engineering degrees. It  
137 was intended that the program give access to leadership training not only to students in Business,  
138 but also to those with more technical profiles, such as women in Architecture, Medicine or  
139 Engineering, so that in the second year the WLP ensured that half of students enrolled were from  
140 these technical degrees.

141 The WLP included theoretical classes (a total of 24 hours), a case study, several appointments to  
142 companies, a visit to the European Parliament (Brussels), and a coaching system. In the 2018 edition,  
143 also students were given an individualized test on their own leadership style and competencies,  
144 thanks to the collaboration of a Coaching Human Resources Company, Psicotec.

145 Currently a good leader must know how to communicate, work as a team, negotiate, coordinate  
146 and motivate a team in an increasingly changing and globalized environment [41]; therefore the  
147 theoretical modules were designed according to these needs. The topics covered areas such as:

148 • Personal Branding  
149 • Communicate efficiently  
150 • Social Media and Networking  
151 • Oral and Public Speaking  
152 • Negotiate Efficiently  
153 • Leadership Style and Techniques  
154 • Business Management  
155 All modules included specific reflections on the situation of women in the work environment.  
156 The 21 professors, men and women, were experienced managers from different economic sectors,  
157 who were very committed.

### 158 2.1. *Methods and Sample*

159 The evaluation of the impact on the acquisition of student competencies was a fundamental  
160 aspect of the WLP. A multi-source program evaluation design based on the students' perception was  
161 used for the analysis.

162 The evaluation included two issues: a) the performance assessment of the WLP itself and the  
163 training received; b) the results in terms of skills and confidence acquired by the students  
164 themselves. A mixed-method approach was applied.

#### 165 • Quantitative survey

166 For the assessment of the WLP itself and the training received, a quantitative survey was  
167 developed at the end of each theoretical module by a self-administered survey. The questionnaire  
168 included a ten-point Likert scale with nine questions about the theoretical and practical subjects, the  
169 documentation and the professors, in addition to their previous knowledge about the topics, how  
170 the module contributes to their future or their capability and finally, a global evaluation.

171 The final survey sample was a total of 50 students, 25 for each year. None declined to answer the  
172 questionnaire. Most of them added some positive comments at the end of the questionnaire. On  
173 average, they were 21.6 years and they were in the last year of their Bachelor's degree in Business,  
174 Social Sciences, Law, Engineering and Architecture. Some of them were combining their university  
175 classes with their mandatory business practices.

#### 176 • Qualitative Study.

177 Secondly, for the valuation of the results in the acquisition of skill and self-confidence, a  
178 qualitative methodology was conducted. At the end of each year, focus groups were held with the  
179 students to learn about their perception of the program, the lessons they learned from it and the  
180 personal change they experienced. Three focus groups were conducted with eight participants on  
181 each one. A total of 24 students participated in qualitative study. The interview schedule comprised  
182 open questions. Also, four individual informal interviews were carried out with a selected group of  
183 students. The main objective of this qualitative approach was a deep comprehension the students'  
184 perception about whether the program favoured individual changes in their behaviour or the way  
185 they think about or perceive themselves. It was fundamental to evaluate the real impact on  
186 improving self-confidence in university students who stand on the threshold of the labour market.

### 187 2.3. *Analysis*

188 The analysis of the quantitative data was done with a classical descriptive analysis with the  
189 evaluation of the mean, standard deviation, percentages, etc. using the SPSS v.25 software.  
190 Additionally, a stochastic treatment of the data was carried out. The stochastic analysis relating to  
191 the inter-group comparisons was conducted using a variance analysis (ANOVA). To test  
192 homoscedasticity, we used a Levene test. The variance analysis was done using a Welch statistic,

193 because the heteroscedasticity of the sample. This test uses a modified F-statistic to analyse  
194 significant effects and it is commonly used to deal with heteroscedastic samples [42]. Moreover, to  
195 identify inter-group differences, we used a T2 Dunnett test.

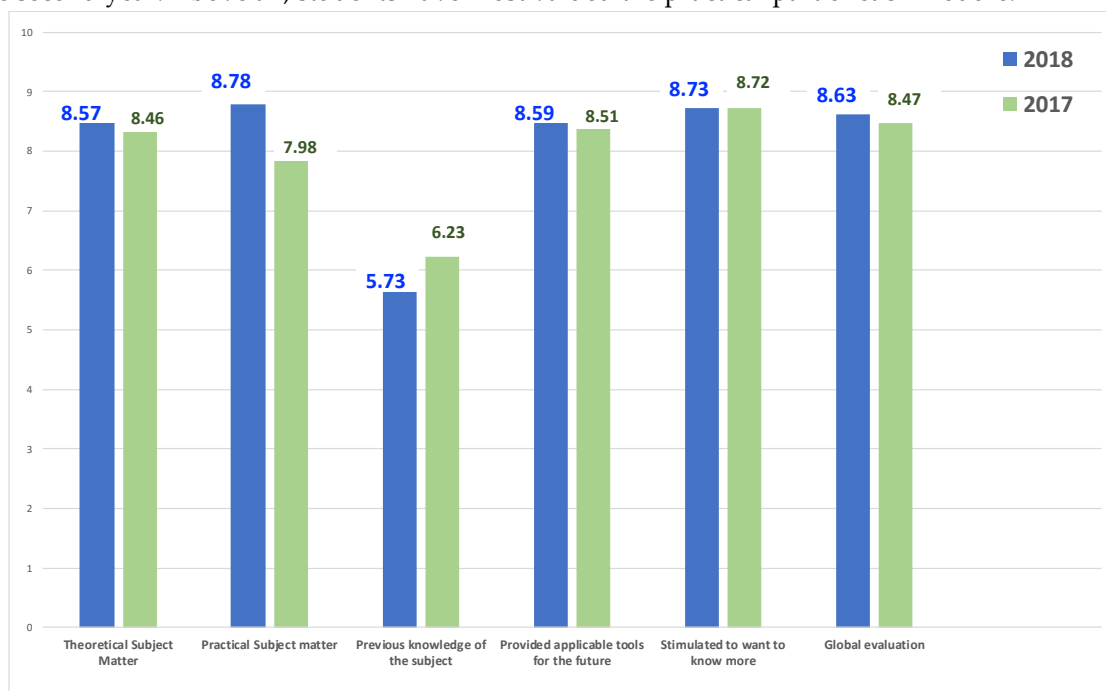
196 The qualitative data were recorded with participants' consent and were later transcribed. The  
197 analysis was done as conventional content analysis (inductive analysis), in order to capture relevant  
198 information [43]. The analysis identified two categories: *Program Category* related to the course  
199 performance and, *How the program changed capacities and self-confidence* categories, considering  
200 changes at the individual and personal level.

### 201 3. Results

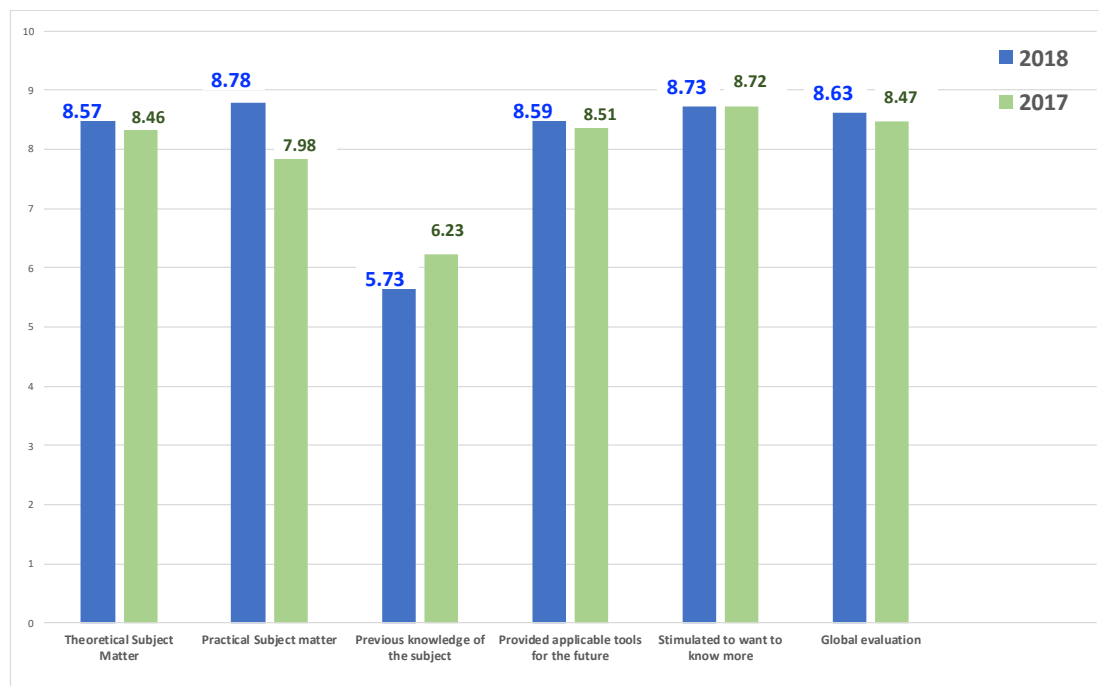
202 The results of the quantitative and qualitative research are presented below.

#### 203 3.1. Quantitative Data

204 Regarding the evaluation of theoretical classes, the general opinion of all students is that the  
205 course has been extraordinary. As can be seen in Figure 1, on a scale of 1 to 10, the average overall  
206 rating is 8.47 in 2017 and 8.63 in 2018. The global opinion is excellent, improving from year to year,  
207 not only because of the content, but also because of the teachers, the organization and the  
208 coordination itself. A more detailed assessment shows that, in all the items analysed (theoretical,  
209 practical, documentation, etc.) (Figure 1), satisfaction has been outstanding and that it increased in  
210 the second year. Above all, students have most valued the practical part of each module.



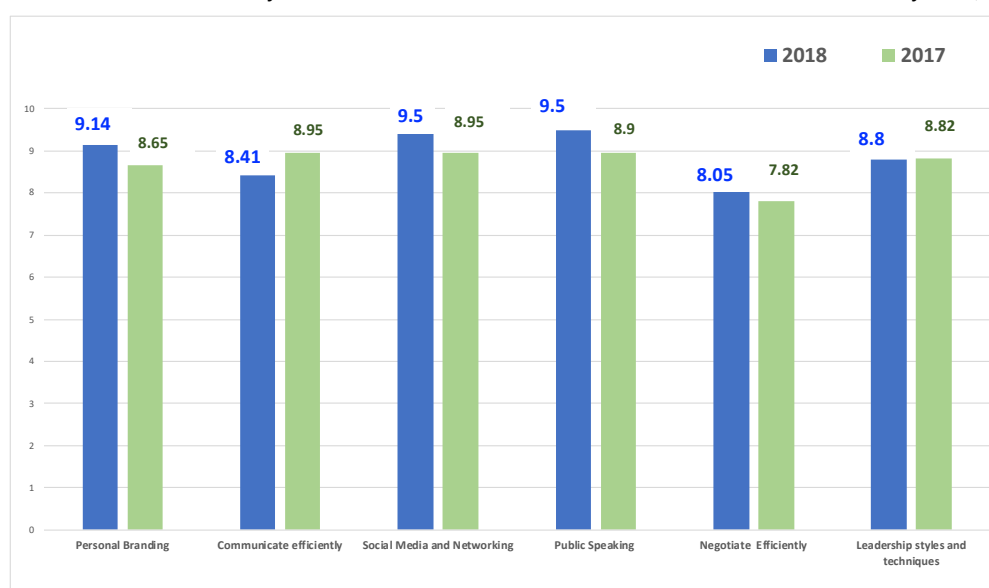
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212 **Figure 1.** Detailed assessments comparison between 2017-2018 (on average).

213 The assessments related to how the program has contributed to the participants' own capacities  
 214 are specially interesting. As can be seen in Figure 1, their previous knowledge about the subjects was  
 215 very low 6.2 and much lower in 2018 (5.73). Regarding the degree to which the topics have provided  
 216 them with applicable tools for the future, the evaluation is high with 8.6 and 8.5 respectively each  
 217 year. In addition, the topics discussed have introduced them to a desire to gain more depth of  
 218 knowledge about the topic (8.7 both years).

219 Regarding the evaluation of the specific program's subjects, all subjects received excellent  
 220 scores. In Figure 2, those with outstanding valuations are collected. Among them, *Personal Branding*,  
 221 *Social Media and Networking* and *Communicate Efficiently* are the topics with the best valuation  
 222 attending their theoretical, practical content and the documentation received (Figure 2.). However,  
 223 there are differences from one year to the next, with better scores found in the second year (Figure 2).



224 **Figure 2.** Subject comparative evaluation between 2017 and 2018 (on average).

225 One of the program's organizers' main concerns was to know which, of all the topics, had had a  
 226 better evaluation in terms of its contents and, above all, which were considered to have contributed  
 227 the most in terms of the student skills development. For this, an ANOVA analysis was performed  
 228 with the best rated subjects. Descriptive results about subject evaluation by contents and skills  
 229 provided are shown in Table 1. As shown, *Personal Branding* and *Social Media and Networking* are the  
 230 ones that received the best results in relation to their theoretical contents, with averages of 9.05 and  
 231 8.97 respectively. Regarding students' previous knowledge of the topic, *Negotiate Efficiently* and  
 232 *Personal Branding* were the least known subjects. As regards to the way the topic provided applicable  
 233 tools for the future, *Personal Branding* and *Public Speaking* are the subjects that gave them the most  
 234 skills capacities. Finally, *Personal Branding* and *Social Media and Networking*, are the topics the most  
 235 stimulated them the desire to know more about it.

236 **Table 1.** Descriptive results between subject evaluation by contents and skills provided.

Subject Evaluation		Mean	Standard Deviation
Theoretical Subject Matter	Personal Branding	9.05	1.068
	Communicate Efficiently	8.18	1.66
	Social Media and Networking	8.97	1.088
	Public Speaking	8.64	1.515
	Negotiate Efficiently	8	1.7
Skills Provided		Mean	Standard Deviation
Previous knowledge of the subject	Personal Branding	5.79	1.567
	Communicate Efficiently	5.91	1.736
	Social Media and Networking	6.36	1.857
	Public Speaking	5.92	1.903
	Negotiate Efficiently	5.84	1.993
Provided applicable tools for the future	Personal Branding	9.07	1.009
	Communicate Efficiently	8.09	1.626
	Social Media and Networking	8.92	1.085
	Public Speaking	9.03	1.464
	Negotiate Efficiently	8.22	1.436
Stimulated to want to know more	Personal Branding	9.21	1.206
	Communicate Efficiently	8.41	1.821
	Social Media and Networking	9.18	1.121
	Public Speaking	8.89	1.41
	Negotiate Efficiently	8.56	1.382

237 Nevertheless, descriptive analysis only provides an initial examination. To validate the  
 238 robustness of these descriptive analyses, a stochastic analysis was made. The variance analysis  
 239 allowed for identification of significant differences between the subject evaluation and skills  
 240 provided through all the specific subjects of the training program groups ( $p < 0.05$ ). Moreover, a post  
 241 hoc test offered more in-depth information about the inter-group differences. Particularly, ANOVA  
 242 analysis were applied, combining each factor with each variable.

243 From these results, it was possible to conclude that only "*Theoretical Subject Matter*" and "*Provide*  
 244 *applicable tools for the future*" have a significant influence on the evaluation of each subject, as the rest  
 245 of the tests are rejected at a level of significance of less than five per cent (Table 2)

246 **Table 2.** Results of ANOVA analysis by group.

	Welch	G1	G2	Sig.
Theoretical Subject Matter	2.829	5	103.748	0.02
Provide applicable tools for the future	3.814	5	108.329	0.003

247 After that, we made a post hoc analysis using T2 Dunnett test for "*Theoretical Subject Matter*"  
 248 and "*Provide applicable tools for the future*" through all the specific subjects of the training program  
 249 groups to identify paired mean differences between groups (Table 3).

250 **Table 3.** T2-Tamhane results to identify inter-group differences regarding economic activity.

Theoretical Subject Matter	Groups	Mean Differences	Standard Error	Sig
Personal Branding	Communicate efficiently	.936*	0.301	0.004
<b>Provided applicable tools for the future</b>	<b>Groups</b>	Mean Differences	Standard Error	Sig
Personal Branding	Communicate efficiently	.979*	0.289	0.017

\*Statistically significant at 95%.

252 Results related to “*Theoretical Subject Matter*” showed only differences between the subject  
 253 *Personal Branding* and *Communicate Efficiently* (Table 3), with a lower evaluation of the second topic.  
 254 Regarding which subject has “*provided an applicable tool for the future*” the significant differences are  
 255 between the same topics. In conclusion, the subject “*Personal Branding*” was the topic that has  
 256 contributed the most tools for the future and had the highest theoretical performance (Table 3).

### 257 3.2. Qualitative Results

258 The qualitative analysis has identified two main evaluation categories: one about the course  
 259 performance and one related to how the WLP changed the abilities and self-confidence of the  
 260 students. Regarding the first one, results were coincident with quantitative data. In this section,  
 261 only students’ self-performance or confidence changes will be analysed.

262 In general, the program has had a very significant effect on students. They consider that they  
 263 learned many tricks to communicate, lead and apply skills for the future of work. A good proof of  
 264 this is that they would recommend it to other students. Specifically, they consider that:

- 265 1. Meeting with people in the real business world has been a key part of the WLP. Participants  
 266 have valued the diversity of the speakers/professors and found them “*very interactive, very*  
 267 *exciting, very inspiring*” (Focus group 1). In this sense they valued the opportunity *to meet great*  
 268 *professionals, to analyse very important issues for them, which are not usually taught, and realize the*  
 269 *importance of certain issues for further professional development* (Focus group 1). Students agree that  
 270 the course has been very useful for them, particularly as regards the specific reflections on the  
 271 situation of women in the work environment and the challenges that they might face.
- 272 2. They agreed that they have more tools and guidelines when it comes to personal branding or  
 273 public speaking, interacting with people and communicating with more security. For example,  
 274 they have learned how to create more impact in their entrances and closing of professional  
 275 presentations.
- 276 3. They know what kind of leaders they are and, therefore, they know the points that they need to  
 277 strengthen or improve when delegating, due to the individual tests they have taken.
- 278 4. The WLP has helped them to know themselves better about the professional field because they  
 279 have seen themselves in new situations that, if were not for the course, they would not have  
 280 faced.
- 281 5. The WLP has helped them to manage their feeling of overwhelm.

282 The WLP organizers have a special interest in developing self-confidence, motivation and  
 283 ambition in students, teaching them practical advice, skills and tools from real managers’  
 284 experiences. In this regard, students recognize that the program has offered them “*every Wednesday a*  
 285 *motivation to move forward*” (Focus group 2). They were tired of hearing that “*there is no future for them,*  
 286 *that scholars and women find it difficult to grow up in employment, etc*”. (Focus group 2). The course has  
 287 provided them with constant motivation, which many students needed to hear at this time in their  
 288 lives. They all came out more empowered, and with a broader vision of the future by constantly  
 289 being in contact with women who are a clear example of success and who gave them a shot of  
 290 positivity: “*Yes, you can!*” (Focus group 2). Some students even commented that this motivation has



291 given the courage to demand certain labour issues in their current external practices or in their  
292 current jobs.

293 Also, in capital letters, everyone thinks that it has given them a key to “BELIEVE IN  
294 THEMSELVES and SELF-CONFIDENCE” (Focus group 3). There has been a change in attitude  
295 towards their skills and aptitudes. In the interviews with the students and during the development  
296 of the program, many of them have stated that they have gained motivation and self-confidence:

297 *“It has served a lot on a personal level of self-esteem, motivation, trust, decision that you can get things  
298 done if you work and others”.* (Focus group 2).

299 *“Program has provided tools to empower you as a woman, as a leader”* (Focus group 3).

300 *“Trust more in myself and in my qualities. Set a goal and know where I want to go and go on, go on, go  
301 on...”* (Focus group 1).

302 And this confidence began from the same selection process that they liked, not only because of  
303 what they learned during it (how a selection interview is done and overcome), but also because it  
304 motivated them to know that they had been chosen from among large number of requests.

305 Finally, the students also stated that the course has opened their eyes to a reality that they will  
306 have to face as women in the workplace but also in their family balance

307 *“On a personal level it has helped a lot. It has opened my eyes to what is there. When I went to work ... now  
308 I have seen details that have made me alert. Nor do I have to be waiting and demonstrate, demonstrate,  
309 demonstrate. You, yourself know what you’re worth, and you have to demand according to your merits  
310 according to what you’re worth. I am more alert”* (Focus group 1).

311 *“Program wakes you up. I did not know that I will face problems between my family and my professional  
312 career...”* (Focus group 3).

#### 313 4. Discussion and Conclusion

314 The Sustainable Development Goals consider education as a priority for sustainable  
315 development, driving an inclusive and equitable opportunity for all. In this sense, education plays a  
316 critical role in assuring gender equality, particularly for improving women gaining managerial or  
317 leadership positions. The literature has highlighted deficiencies in women’s lack of training in  
318 leadership abilities, skills, tools and self-esteem [24,25] creating barriers for females to gain  
319 leadership positions. The present paper examines students’ subjective outcome assessments of the  
320 “Women Leadership Program” carried out as a collaboration between The Rey Juan University  
321 (Spain) and The Women CEO Association of (WCA) for two years.

322 The quantitative study indicated that students had a strongly positive evaluation of the  
323 program. The female students involved expressed great appreciation of all subject areas, but  
324 especially, the ones *Personal Branding, Social Media and Networking* and *Communicate Efficiently*. Most  
325 of the students have shown their previous ignorance about the subjects, especially in 2018. Also,  
326 female learners indicated that they have reached a level of knowledge, and were given specific tools  
327 that have allowed them to gain new capabilities in the topics learned. Thus, this program might have  
328 broken one of the main barriers, highlighted by the literature, to get a manager position: that is a lack  
329 of skills or training in leadership capacities such as communication, networking, negotiating,  
330 coordinating, being task-oriented or building networks [23,33,34,35,44].

331 A second conclusion arises from the increased results obtained on the second year. The  
332 program’s organizers had placed a special emphasis on involving female students from Engineering  
333 or applied science degrees, as the literature has shown that this group has even worse possibilities  
334 for gaining managerial positions in ICT sectors or occupations [45]. In the survey data from 2018, in  
335 which there were more students from engineer degrees, confirmed that there was a low score on the

336 item related to their previous knowledge of the subjects than in 2017. Associated with the acquisition  
337 of skills, the overall 2018 subject evaluation received higher scores than 2017, and the global program  
338 evaluation was a little more positive. Students seem to have a better perception of the program's best  
339 use for real life. Based on these results, the program might have a strong influence on the  
340 improvement of female Engineering students' leadership skills, especially for those who are  
341 technically gifted but who are too narrowly trained in the area of social, interpersonal or managerial  
342 tools [46-47]. In fact, the Engineering students highlighted as one of the strong outcomes of the  
343 program, that they most appreciated gaining a practical orientation and interacting with a  
344 multidisciplinary group of teachers/professors and students who gave them a more real-life vision  
345 than regular university classes.

346 The focus group discussions analysis allowed for the study of changes on personal capacities  
347 or self-confidence. Literature has shown that women have a poor personal perception of leadership  
348 capacity, and low self-esteem and career ambition [48], which brings on a self-imposed barrier,  
349 reducing women's ambition for promotion [36,49]. The qualitative results highlighted that the  
350 program had an extraordinary influence on female students. The participants confirmed not only an  
351 improvement on specific tools or skills, but also a positive change in their attitudes and their  
352 self-confidence. Now, they believe in themselves. The program has been inspiring for them and gave  
353 them the courage to demand certain labour issues. Also, students highlighted that it was particularly  
354 useful for them to reflect on the situation of women in the work environment and the challenges that  
355 they might face. They confirmed that the program has opened their eyes to the reality that they had  
356 never thought about before.

357 Hence, the present study confirms a positive effect on two barriers shown by the literature to  
358 women gaining a managerial position: a lack of training and self-confidence. The results  
359 corroborate that education for female university students could be a helpful action to improve  
360 women's positions in organizations [50].

361 Nevertheless, the study has several limitations that open new research possibilities for the  
362 future. First, the present study is a case study that might be replicated considering other contexts.  
363 Second, as the present findings were based on a small sample, there is a need to replicate the study  
364 in the future with large samples by a longitudinal approach with program students in the next  
365 academic year. Third, findings could be validated by studying the situation of these students after  
366 their incorporation to labour market.

367 In conclusion, sustainability is a theme that extends to all realms of life, including education  
368 and gender equity. The present study stressed the relevance of education for women students to  
369 build their leadership strengths, skills, tools and capabilities and also to reinforce their  
370 self-confidence. A strong commitment to developing leadership education for women could create a  
371 crucial scenario to break down the current barriers females face in getting management positions.  
372 Universities are well placed to facilitate education that builds a more sustainable and  
373 gender-equitable legacy for the next generations.

374

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