

***Digital Gender Gap at the High School Level:  
The Case of Computer Technicians in Mexico***

Iris Cristina Peláez-Sánchez, Tecnológico de Monterrey, Mexico  
Carlos Enrique George-Reyes, Tecnológico de Monterrey, Mexico  
Leonardo David Glasserman-Morales, Tecnológico de Monterrey, Mexico

The European Conference on Language Learning 2023  
Official Conference Proceedings

**Abstract**

The gender gap has generated inequalities in women due to barriers that limit their progress and participation in various areas of their lives. Barriers and inequalities that bound women within the digital world have been identified, generating a fracture called the digital gender gap or gender digital divide. This phenomenon can be maximized or decreased depending on diverse factors such as access to education or development of digital skills. In this regard, a lack of aspirations to select scientific and technical paths among young people has been observed due to this digital fracture. The complexity has been evidenced in young women underestimating their digital abilities and having a technophobia that directly limits their interaction within the digital world. This study presents the results of the digital media literacy level of 124 participants (men=73, women=44, and non-binary students=7) in a technical high school in Mexico related to their educational experience and their perception of activities and school spaces. Men with a positive perception exhibit a higher level of media literacy ( $M=75.26$ ,  $SD=11.675$ ) compared to those with a negative perception ( $M=67.05$ ,  $SD=15.309$ ). On the other hand, women with a positive perception have a higher level of media literacy ( $M=77.78$ ,  $SD=10.744$ ) than women with a negative perception ( $M=64.25$ ,  $SD=13.134$ ). These results highlight the importance of promoting activities and school spaces that foster communicative and media skills, especially among women, with the aim of closing the gender gap in the digital realm.

Keywords: Digital Gender Gap, Media Literacy, Digital Literacy, High School, Learning Process

**iafor**

The International Academic Forum  
[www.iafor.org](http://www.iafor.org)

## Introduction

The gender gap refers to the situation where women have fewer opportunities than men to develop themselves equally in various areas (Davies, 2011). It is a complex phenomenon that involves various social conditions and psychological mechanisms that reinforce it, such as sexism or implicit stereotypes within social interaction (Pesce & Etchezahar, 2019). Additionally, violence against women, the employment and wage gap between sexes, the inactive population by sex, and traditional gender roles incentivize this situation (Mouronte, 2022). It has been identified that this phenomenon creates inequalities for women in education, work, and society (Olarate, 2017).

In education, it has been recognized that the disparity between genders affects students' learning (Skelton & Francis, 2011). Additionally, gender stereotypes impact how students' progress throughout their school life (Vantieghem et al., 2014). As a result, it is crucial to acknowledge the significant role that gender plays in the educational gap, especially in the years following basic education (Vantieghem & van Houtte, 2018).

On the other hand, the digital divide is a term used to describe the unequal access, use, and utilization of Information and Communication Technologies (ICT) across different groups in society (Hamburg & Lütgen, 2019). This divide has led to inequalities that directly impact social structure and wealth distribution (Olarate, 2017; Rodríguez & Jiménez, 2020). Several types of digital divides have been identified: a) generational, b) disability-based, c) based on usage or location, d) based on educational level, and e) based on gender (Arias et al., 2018; Colom, 2020; Galperín, 2017). It was recognized that women are particularly affected by this situation due to gender roles and stereotypes established by Western society (Acosta et al., 2020).

From this context, digital gender gap or gender digital divide refers to the inequality women experience in accessing, using, and benefiting from ICT compared to men. Structural and cultural barriers, such as societal roles and expectations, contribute to this issue (Berrío et al., 2017; de Andrés et al., 2020). This inequality can limit women's opportunities in various areas, including social, political, economic, and cultural spheres, due to their underrepresentation in the digital world (Bala & Singhal, 2018).

Women may encounter barriers or inequalities compared to men due to numerous factors such as nationality, social class, race, education, qualifications, age, and social position. These factors can amplify or diminish this phenomenon (de Andrés et al., 2020). Studies have identified three main components of the digital gender gap: 1) access to and use of ICT and the internet, 2) development of necessary skills to participate in digital design and production, and 3) advancement of women towards leadership roles and decision-making in the digital sector (Pedraza, 2021). Furthermore, factors such as technophobia and gender stereotypes that encourage different uses of ICT between males and females have been identified as contributors to the gender digital gap in current generations (Masanet et al., 2021).

Numerous studies have identified significant discrepancies and digital inequalities that affects women in several scenarios, including education (Alozie & Akpan, 2017; Anguita, 2018; Balayy Singhal, 2018; Bikos et al., 2018), the workforce (Berrío et al., 2017), entrepreneurship and business (Acosta et al., 2020; Alozie & Akpan, 2017; Balagopal, 2020), and society at large (Arias et al., 2018; Basco et al., 2018; Bradić & Banović, 2018; Cussó et al., 2017; de Andrés et al., 2020). Women experience disparities and disadvantages relative to

their male counterparts, in addition to internal factors that impact women's engagement with ICT (Alozie & Akpan, 2017).

For example, studies have found that women face symbolic and structural gender violence in the digital world. This can occur when negative sexist patterns are reproduced online (Berrío et al., 2017; de Andrés et al., 2020; Domínguez & Portela, 2020). Additionally, the lack of digital skills and competencies can harm women's lives and development (Mallawaarachchi, 2019). It can also limit their participation in the workforce (Watson et al., 2018) and lead to lower wages (Basco et al., 2020; Del-Valle, 2020).

The digital divide between genders also affects women in education because of the lack of content that includes a gender perspective (Alozie & Akpan, 2017; Pedraza, 2021; Pérez et al., 2021; Wong & Kemp, 2018). This results in girls and young women losing interest in the digital world and not aspiring to technology-related professions (Berrío et al., 2017; Gebhardt et al., 2019; Martínez & Castaño, 2017). On the other hand, society continues to limit the inclusion of women in the digital world due to various gender-specific issues, such as unequal access to technology and discrimination in hiring and promotions (Kerras et al., 2020).

The United Nations (UN) (2021) has identified a concerning situation regarding gender equality. Less than 45% of countries support women's access to employment in the industrial sector, and only 8% of executive positions are held by women in the 95 countries within the organization (UN Women, 2021). This global and national problem must be addressed through efforts to increase women's participation (WEF, 2022). In Latin America, gender gaps persist, creating inequalities between women and men in employment, social life, and education (Marchionni et al., 2018).

It is evident in the educational field that young women underestimate their digital capabilities and needs more confidence in using ICT, directly impacting their utilization of technology (Masanet et al., 2021) and their ability to learn through technology (Pedraza, 2021). Male students, on the other hand, tend to have more positive attitudes toward computers and greater interest and enjoyment in using ICT from primary or secondary levels (Gebhardt et al., 2019). Furthermore, there are differences in digital skills, content, evaluation, and use of ICTs between men and women in universities (Rodríguez, 2018). In fact, the digital divide starts early in education and is further magnified in high school and university due to obstacles like the absence of gender-inclusive materials (Palomares et al., 2021). Women also face exclusion in technological education and STEM fields due to multiple factors like expensive technologies, financial and institutional constraints, limited traditional knowledge, and restricted access to educational institutions (Bala & Singhal, 2018; Perifanou & Economides, 2020).

Therefore, it is important to examine the factors affecting women's digital skills and competencies in the educational sector. Therefore, Technical and Vocational Education and Training (TVET) are particularly relevant in this context, as they have historically been dominated by men, resulting in disparities in areas such as employment, society, and education (Bloj, 2017). Nevertheless, recent policy initiatives and programs have been introduced in Latin American countries to encourage greater participation by women in technical and professional fields (UNESCO, 2022).

According to Muñoz Rojas (2019), educational spaces not only equip students with necessary job skills, but also promote social equity and inclusion. TVET is crucial in bridging the gap between education and employment, and in addressing extreme inequalities (UNESCO, 2016). Furthermore, TVET programs should focus on preparing students with the skills and competencies required to enter the job market and improve their employability (UNESCO, 2022).

In this context, it is essential to emphasize the significance of digital literacy and the development of digital skills in light of the challenges posed by incorporating technology in employment, production relocation, worker protection, and economic and social inequalities (UN, 2022). In this regard, TVET should focus on guiding the development of specific skills and knowledge for future professional technicians in the job market (Álvarez et al., 2021). Furthermore, they should equip students to use digital technologies critically and effectively for communication, problem-solving, information retrieval, and everyday tasks in various contexts (Martínez et al., 2021).

Digital literacy is a key element for future professionals who must possess digital and technological skills to adapt to constant changes and new demands of Industry 4.0 (Coldwell & Cooper, 2019). Future professionals must know how to effectively manage and use digital technologies (Rosalina et al., 2021). In this context, media literacy has become an integral skill in the digital age, where media plays a significant role in the daily lives of young people (Hobbs, 2022). It is a crucial dimension of digital literacy, as it contributes to developing other essential competencies in the workplace (Jalik, 2018). According to Ozdamar et al. (2015), media literacy is divided into three dimensions: Access to Digital Information (ADI), b) Interpretation of Digital Information (IDI), and c) Production and Socialization of Digital Communication (PSDC).

Regarding the aforementioned, this study aimed to analyze the media literacy levels of TVET students and their educational experience, as it is recognized that educational environments are spaces for knowledge transmission where students need to be prepared to face the challenges and demands of the current world (Tejera & Cardoso, 2015). Additionally, educational environments and school activities play an essential role in the comprehensive development of students, facilitating the acquisition of knowledge and skills (Espinoza & Rodríguez, 2017). Moreover, these educational spaces can promote active student participation in their learning process (Alvis et al., 2019). At this point, a specific analysis was conducted regarding the relationship between the media literacy level and students' positive and negative perceptions of the learning spaces and activities promoting participation and communication. It is worth mentioning that this study is part of a main research effort that focused on analyzing the development of communicative literacy through education 4.0.

## **Methodology**

This research used a quantitative approach to collect data through a questionnaire examining how male and female students perceive their educational experience in Technical and Vocational Education (TVE) and their media literacy level. The study focused on media literacy determined by Ozdamar et al. (2015) and students' learning experience in a) activities promoted by the school to participate and b) learning spaces to communicate at school to answer the questions: 1) Are there significant differences in media literacy level between male and female students' positive and negative perception of school activities that promote participation? 2) Are there significant differences in media literacy levels between male and

female students' positive and negative perceptions of school communicative learning spaces for sharing experiences?

This research conducted a case study in Mexico City (Mexico), focusing on a specific group of TVET students. The study population consisted of students enrolled in the morning shift's first, third, and fifth semesters at a public TVE institution in the city's southern area. The sample was chosen using intentional and convenience sampling methods. Participants were selected based on their accessibility and availability within the institutional setting. It is important to note that student participation in the study was voluntary, and the students and their guardians provided informed consent before participating.

The school's consent was adequately recorded to ensure that everyone involved was fully informed and agreed to conduct the study in the school environment. Participants were guaranteed that the information collected would remain confidential and only be used for research purposes without disclosing the identity of the school or any individual student.

The data collection instrument was based on adapting the e-complexity instrument of Vázquez et al. (2022). It had 18 questions that were divided into three dimensions: ADI ( $\alpha = .820$ ), IDI ( $\alpha = .849$ ), and PSDC ( $\alpha = .735$ ). We evaluated the reliability of the instrument by Cronbach's Alpha coefficient and got a value of  $p = .917$ , which indicates that it was internally consistent (Viladrich et al., 2017). Additionally, the survey included two questions that asked students about students' perceptions of a) activities that promote their participation and b) communicative learning spaces for sharing experiences.

## Results

The first step in analyzing the data was to describe the study sample, which consisted of 124 participants. The sample consisted of 73 males (58.9%), 44 females (35.5%), and seven non-binary students (5.6%). The participants ranged from 15 to 21 years, with 17.7% being 15 and 1.6% being 21. The most common age among participants was 16, with 38.7% falling in this age group. In terms of semesters, the first semester had 24 participants (19.4%), the third semester had 57 participants (46%), and the fifth semester had 43 participants (34.7%).

During the descriptive analysis, we identified the number of participants in each group based on their positive and negative perceptions of a) school activities that promote their participation and b) communicative learning spaces for sharing experiences at school. Regarding students' perception of school activities that promote their participation, 52 males (71.2%) perceive that there are school activities that promote their participation. In contrast, 21 (28.8%) have a negative perception as they do not recognize activities promoting participation. Out of the 44 female participants, 36 (81.8%) have a positive perception of school activities that promote their participation, while eight participants (18.2%) do not perceive such activities. Lastly, out of the seven non-binary participants, 6 (85.7%) perceive participatory activities in class, while only 1 participant (14.3%) does not perceive them at their school (See Table 1).

**Table 1.** Study sample by negative and positive perceptions of their formative process

	At my school, there are activities that promote students' participation.				At my school, we have communicative learning spaces for sharing experiences.				Total	
	No		Yes		No		Yes		N	%
Gender	N	%	N	%	N	%	N	%	N	%
Male	21	28.8	52	71.2	20	27.4	53	72.6	73	58.9
Female	8	18.2	36	81.8	15	34.1	29	65.9	44	35.5
Non-binary	1	14.3	6	85.7	2	28.6	5	71.4	7	5.6
Total	30	24.2	94	75.8	37	29.8	87	70.2	124	100

Regarding the perception of communicative learning spaces at school for sharing experiences, 53 male participants (72.6%) positively perceived these spaces at their school. In contrast, 20 students (27.4%) negatively perceive these communicative learning spaces. The group of female participants shows a similar trend, where 29 women (65.9%) positively perceive these communicative learning spaces, while 15 (34.1%) do not perceive these spaces at their school. As for the seven non-binary participants, five (71.4%) have a positive perception of these spaces, and two students (28.6%) do not perceive these spaces at their school (See Table 1).

The media literacy level was analyzed among groups with positive and negative perceptions of school activities to enhance participation and school learning spaces for sharing experiences and communication. The findings for the male group are concerning, as students who perceive that their school conducts activities that promote their participation ( $M=67.05$ ,  $SD=15.227$ ) have the same level of media literacy as students who do not perceive participatory activities in their school. Further analysis is required for this group, as the interaction and participation in school are not reflected in their media literacy level. However, the female group shows that participatory school activities impact their media literacy level, as females who perceived these activities during their school education had a higher media literacy level ( $M=77.78$ ,  $SD=10.744$ ) compared to females who did not perceive participatory activities in their school ( $M=64.25$ ,  $SD=13.134$ ). A similar case is observed for non-binary students, where students with a positive perception of participatory activities had a higher media literacy level ( $M=74.67$ ,  $SD=5.785$ ) than students with a negative perception of school activities ( $M=62.00$ ) (see Table 2).

**Table 2.** Descriptive Statistics of Students' Formative Process and Media Literacy

Questions about student's perception of their formative process		Media literacy					
		Male		Female		Non-binary	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>M</i>	<i>SD</i>	<i>M</i>
At my school, there are activities that promote students' participation.	No	63.95	15.227	64.25	13.134	62.00	N/A
	Yes	63.95	15.227	77.78	10.744	74.67	5.785
At my school, we have communicative learning spaces for sharing experiences.	No	67.05	15.309	70.40	13.394	70.00	11.314
	Yes	75.26	11.675	77.86	10.993	74.00	6.205

On the other hand, it can be observed that the media literacy level is higher in male students who perceived communicative learning spaces at their school ( $M=75.26$ ,  $SD=11.675$ ) compared to those who did not perceive these communicative spaces in their school ( $M=67.05$ ,  $SD=15.309$ ). For female students, the trend is similar, as females with a positive perception of communicative spaces in their school had a higher media literacy level ( $M=77.86$ ,  $SD=10.993$ ) than females who did not identify communicative school spaces ( $M=70.40$ ,  $SD=13.394$ ). It is important to note that non-binary students had a similar media literacy level ( $M=70.00$ ,  $SD=11.314$ ) to females with a negative perception of these spaces. It is crucial to acknowledge that when comparing male and female groups with positive perceptions of these communicative learning spaces, females have a higher media literacy level across all groups (See Table 2).

Finally, the Mann-Whitney U test was used to determine if significant differences existed between groups of men and women. Since the data did not pass the normality test ( $D = 0.44$ ,  $p = 0.00$ ), this test was the possible option to check if there are significance differences. Results showed that both groups had significant differences in their perception of school activities and media literacy during their educational process (men:  $z = -2.113$ ,  $p = 0.035$ ; women:  $z = -2.680$ ,  $p = .007$ ). Additionally, significant differences were found in school spaces for educational purposes and media literacy for both groups (men:  $z = -2.291$ ,  $p = .022$ ; women:  $z = -2.291$ ,  $p = .022$ ).

## **Discussion**

The study shows the importance of students' perception of educational spaces in developing their skills and promoting participation. From this context, the study's results indicate that a positive perception of learning spaces and communicative activities can reinforce skill development in students, as student groups with a positive perception of these activities and school communicative spaces demonstrate a higher level of media literacy than students who perceive that the school does not encourage such activities and participation. Based on these findings, one can support the significance of educational spaces in promoting student participation, directly impacting their learning, as mentioned by Alvis et al. (2019).

From this standpoint, the results suggest that school activities promoting female student participation can help reduce the gender digital gap, as female students with higher levels of media literacy perceived the proposed school activities as positive for their involvement. It is worth mentioning that promoting female student participation in school not only directly relates to their higher level of digital literacy compared to male and female students who did not perceive these participatory activities and communicative spaces in school, but it can also encourage their engagement (Watson et al., 2018) and access to leadership roles and decision-making in the digital and work sectors (Pedraza, 2021).

Finally, it was found that both male and female students exhibited similar levels of media literacy overall. However, female students with a positive perception of school activities showed a higher level of media literacy than those with a negative perception. A similar case was observed with male students with a positive perception compared to those with a negative perception. In this scenario, it is essential to recognize that the students' formative process directly influences their digital skills development, as Espinoza & Rodríguez (2017) mentioned. Thus, these findings suggest that school experiences and perceptions can influence students' communicative and digital skill development and promote spaces of social equity and inclusion for women, as stated by Muñoz Rojas (2019).

## **Conclusions**

In conclusion, these results highlight the importance of fostering a school environment that promotes communication activities and spaces where both men and women feel confident to participate and develop their communicative skills. Likewise, it is acknowledged that this study presents the results from a specific scenario of technical and vocational students in Mexico. However, this sample needs to represent the country's complete landscape of technical and vocational education. These spaces have traditionally been associated with men and continue to perpetuate the exclusion of women in STEM fields due to various factors, such as a lack of conventional knowledge and limited access to educational institutions. For instance, the representation of female students in the study indicates a lower presence of women in that technical and vocational school.

Although this study provides valuable insights into media literacy and gender differences among technical and vocational education students, there are limitations, such as the sample size. Therefore, generalizing the results to other educational institutions and regions in the country should be done cautiously. Expanding the sample size in future research is advisable to obtain a more representative and generalizable understanding of the relationship between gender and digital media literacy.

## **Acknowledgements**

The Center for Educational Leadership Innovation (CILED) and the Publication Support Fund at Tecnológico de Monterrey are sincerely thanked for their valuable support in disseminating this research project. Their collaboration has played a crucial role in the success of the study, enabling it to reach a wide audience of professionals and researchers in the field of education. The opportunity and trust extended by these organizations are greatly appreciated, and it is hoped that this partnership will continue to foster development and innovation in educational leadership.

## References

- Acosta, S. C., & Pedraza, E. M. (2020). La brecha digital de género como factor limitante del desarrollo femenino. *Boletín Científico INVESTIGIUM de la Escuela Superior de Tizayuca*, 5(10), 22–27. <https://doi.org/10.29057/est.v5i10.5281>
- Alozie, N. O., & Akpan, P. (2017). The Digital Gender Divide: Confronting Obstacles to Women's Development in Africa. *Development Policy Review*, 35(2), 137–160. <https://doi.org/10.1111/dpr.12204>
- Alvarez, J., Labraña, J., & Brunner, J. J. (2021). La educación superior técnico profesional frente a nuevos desafíos: La Cuarta Revolución Industrial y la Pandemia por COVID-19. *Revista Educación, Política y Sociedad*, 6(1), 11-38. <https://doi.org/10.15366/rebs2021.6.1.001>
- Alvis, J., Aldana, E., & Solar, H. (2019). Ambientes de aprendizaje: un articulador para el desarrollo de competencias matemáticas. *Revista Espacios*, 40(21), 8-20.
- Arias, E., Lirio, J., Alfonso, D., & Herranz, I. (2018). Acceso y uso de las TIC de las mujeres mayores de la Europa comunitaria. *Prisma Social: revista de investigación social*, 21, 282–315.
- Bala, S., & Singhal, P. (2018). Gender digital divide in India: a case of inter-regional analysis of Uttar Pradesh. *Journal of Information, Communication and Ethics in Society*, 16(2), 173–192. <https://doi.org/10.1108/JICES-07-2017-0046>
- Balagopal, B. (2020). Gender Digital Divide and Technology-Enabled Inclusive Strategies. In *Handbook of Research on New Dimensions of Gender Mainstreaming and Women Empowerment* (pp. 126–141). IGI Global. <https://doi.org/10.4018/978-1-7998-2819-8.ch008>
- Basco, A. I., Beliz, G., Coatz, D., & Garneró, P. (2018). *Industria 4.0*. Banco Interamericano de Desarrollo.
- Berrío, C., Marín, P., Ferreira, E., & Das-Chagas, E. (2017). Desafíos de la Inclusión Digital: antecedentes, problemáticas y medición de la Brecha Digital de Género. *Psicología, Conocimiento y Sociedad*, 7(2), 121–151. [http://www.scielo.edu.uy/scielo.php?script=sci\\_arttext&pid=S1688-70262017000200121](http://www.scielo.edu.uy/scielo.php?script=sci_arttext&pid=S1688-70262017000200121)
- Bloj, C. (2017). Trayectoria de mujeres. Educación técnico-profesional y trabajo en la Argentina. Naciones Unidas, CEPAL: Santiago.
- Bradić, A., & Banović, J. (2018). Assessment of Digital Skills in Serbia with Focus on Gender Gap. *Journal of Women's Entrepreneurship and Education (JWEE)*, 1–2, 54–67. <https://doi.org/10.28934/jwee18.12.pp54-67>
- Coldwell, J., & Cooper, T. (2019). Digital Literacy Meets Industry 4.0. In *Education for Employability (Volume 2)* (pp. 37–50). BRILL. [https://doi.org/10.1163/9789004418707\\_004](https://doi.org/10.1163/9789004418707_004)

- Colom, C. (2020). Las brechas digitales que deben preocuparnos y ocuparnos. *EKONOMIAZ. Revista vasca de Economía*, 98, 350–353.
- Cussó, R., Carrera, X., & Bosch, X. (2017). Are Boys and Girls Still Digitally Differentiated? The Case of Catalanian Teenagers. *Journal of Information Technology Education: Research*, 16, 411–435.
- Davies, S. A. (2011). *Gender gap: causes, experiences and effects*. Nova Science Publishers.
- de Andrés, S., Collado, R., & García, J. I. (2020). Brechas digitales de género. Una revisión del concepto. *Etic@net. Revista científica electrónica de Educación y Comunicación en la Sociedad del Conocimiento*, 20(1), 34–58.  
<https://doi.org/10.30827/eticanet.v20i1.15521>
- Del-Valle Gómez, G. (2020). La brecha digital de género en la experiencia vital de las mujeres mayores. Barcelona Societat. *Revista de investigación y análisis social*, 1–17.  
<http://w3.bcn.cat/fitxers/observatorisocial/barcelonasocietat17.532.pdf#page=40>
- Domínguez, J., & Portela, I. (2020). Violencia a través de las TIC: comportamientos diferenciados por género. *RIED. Revista Iberoamericana de Educación a Distancia*, 23(2), 273–281. <https://doi.org/10.5944/ried.23.2.25916>
- Espinoza Núñez, L. A., & Rodríguez Zamora, R. (2017). La generación de ambientes de aprendizaje: un análisis de la percepción juvenil. *RIDE. Revista Iberoamericana para la Investigación y el Desarrollo Educativo*, 7(14), 110–132.
- Galperin, H. (2017). Sociedad digital: brechas y retos para la inclusión digital en América Latina y el Caribe. In *Policy Papers Unesco*.
- Gebhardt, E., Thomson, S., Ainley, J., & Hillman, K. (2019). Gender Differences in Computer and Information Literacy: An In-Depth Analysis of Data from ICILS. In *International Association for the Evaluation of Educational Achievement*.
- Hamburg, I., & Lütgen, G. (2019). Digital Divide, Digital Inclusion and Inclusive Education. *Advances in Social Sciences Research Journal*, 6(4), 193–206.  
<https://doi.org/10.14738/assrj.6457>
- Hobbs, R. (2022). Media literacy. In *The Routledge international handbook of children, adolescents, and media* (pp. 475–482). Routledge.
- Jalik Naji, M. (2018). Industria 4.0, competencia digital y el nuevo Sistema de Formación Profesional para el empleo. *Revista Internacional y Comparada de Relaciones Laborales y Derecho del Empleo*, 6(1), 2282–2313.
- Kerras, H., Sánchez, J. L., López, E. I., & de-Miguel, M. D. (2020). The impact of the gender digital divide on sustainable development: Comparative analysis between the european union and the maghreb. *Sustainability (Switzerland)*, 12(8), 1–30.  
<https://doi.org/10.3390/SU12083347>

- Marchionni, M., Gasparini, L., & Edo, M. (2018). Brechas de genero en America Latina. Un estado de situacion. CAF-Banco de Desarrollo de América Latina.
- Martínez, J. L., & Castaño, C. (2017). La brecha digital de género y la escasez de mujeres en las profesiones TIC. *Panorama Social*, 25, 49–65. [https://www.funcas.es/wp-content/uploads/Migracion/Articulos/FUNCAS\\_PS/025art05.pdf](https://www.funcas.es/wp-content/uploads/Migracion/Articulos/FUNCAS_PS/025art05.pdf)
- Martínez, M. C., Sádaba, C., & Serrano, J. (2021). Meta-marco de la alfabetización digital: análisis comparado de marcos de competencias del Siglo XXI. *RLCS Revista Latina de Comunicación Social*, 2021(79), 76–110. <https://doi.org/10.4185/RLCS-2021-1508>
- Masanet, M.-J., Pires, F., & Gómez, L. (2021). Riesgos de la brecha digital de género entre los y las adolescentes. *Profesional de la Informacion*, 30(1), 1–15. <https://doi.org/10.3145/epi.2021.ene.12>
- Mouronte, M. L. (2022). An overview of the gender gap In the European region. *Human Review. International Humanities Review / Revista Internacional de Humanidades*, 11. <https://doi.org/10.37467/revhuman.v11.4124>
- Muñoz, C. (2019). Educación técnico-profesional y autonomía económica de las mujeres jóvenes en América Latina y el Caribe.
- Olarte, S. (2017). Brecha digital, pobreza y exclusión social. *Temas laborales: Revista andaluza de trabajo y bienestar social*, 138, 285–313. <https://dialnet.unirioja.es/servlet/articulo?codigo=6552396>
- ONU Mujeres. (2021). El progreso en el cumplimiento de los objetivos de desarrollo sostenible. *Panorama de Género 2021*.
- ONU. (2022). Industria 4.0 para el desarrollo inclusivo. Consejo Económico y Social. [https://unctad.org/system/files/official-document/ecn162022d2\\_es.pdf](https://unctad.org/system/files/official-document/ecn162022d2_es.pdf)
- Ozdamar, N., Ozata, F. Z., Banar, K., & Royle, K. (2015). Examining digital literacy competences and learning habits of open and distance learners. *Contemporary Educational Technology*, 6(1), 74-90.
- Palomares, A., Cebrián, A., García, E., & López, E. (2021). Digital gender gap in university education in Spain. Study of a case for paired samples. *Technological Forecasting and Social Change*, 173. <https://doi.org/10.1016/j.techfore.2021.121096>
- Pedraza, C. I. (2021). La brecha digital de género como vértice de las desigualdades de las mujeres en el contexto de la pandemia por Covid-19. *LOGOS Revista de Filosofía*, 136(136), 9–22. <https://doi.org/10.26457/lrf.v136i136.2873>
- Pérez, S., Muñoz, A., Stefanoni, M. E., & Carbonari, D. (2021). Realidad virtual, aprendizaje inmersivo y realidad aumentada: Casos de Estudio en Carreras de Ingeniería. *XXIII Workshop de Investigadores en Ciencias de la Computación*, 963–968.

- Perifanou, M., & Economides, A. A. (2020). Gender Digital Divide in Europe. *International Journal of Business, Humanities and Technology (IJBHT)*, 10(4), 7–14. <https://doi.org/10.30845/ijbht.v10n4p2>
- Pesce, A., & Etchezahar, E. (2019). Los efectos del sexismo, los estereotipos implícitos y el lenguaje inclusivo en la brecha de género. In *Anuario de Investigaciones (Vol. 26)*. Universidad de Buenos Aires, Argentina. <https://www.redalyc.org/articulo.oa?id=369163433015>
- Rodríguez, D. L. (2018). Brecha Digital de Género Entre Estudiantes de la Pucese. *Rev. Hallazgos*21, 3(3).
- Rodríguez, M. R., & Jiménez, R. (2020). Inclusión digital de las mujeres en las políticas españolas de la sociedad de la información. *Athenea Digital. Revista de pensamiento e investigación social*, 20(2), 1–26.
- Rosalina, D., Yuliari, K., Setianingsih, D., & Zati, M. R. (2021). Factors Influencing the Digital Literacy Competency of College Students in the Industrial Revolution Era 4.0. *International Journal of Economics, Business and Applications*, 6(2), 81. <https://doi.org/10.31258/ijeba.6.2.81-92>
- Skelton, C., & Francis, B. (2011). Successful boys and literacy: Are “literate boys” challenging or repackaging hegemonic masculinity? *Curriculum Inquiry*, 41(4), 456–479. <https://doi.org/10.1111/j.1467-873X.2011.00559.x>
- Tejera Concepción, J. F., & Cardoso Sarduy, M. A. (2015). Tratamiento de las habilidades comunicativas en el contexto universitario. *Revista Universidad y Sociedad*, 7(2), 168-172. [http://scielo.sld.cu/scielo.php?script=sci\\_arttext&pid=S2218-36202015000200024&lng=es&tlng=en](http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2218-36202015000200024&lng=es&tlng=en)
- UNESCO (2016). *Estrategia para la Enseñanza y Formación Técnica y Profesional 2016-2021*, Paris, Francia, United Nations Educational, Scientific and Cultural Organization.
- UNESCO. (2022). *Educación y formación técnica y profesional*. SITEAL. Educación y Formación Técnica y Profesional. <https://siteal.iiep.unesco.org/eje/pdf/1072>
- Vantieghem, W., & van Houtte, M. (2018). Differences in Study Motivation Within and Between Genders: An Examination by Gender Typicality Among Early Adolescents. *Youth and Society*, 50(3), 377–404. <https://doi.org/10.1177/0044118X15602268>
- Vantieghem, W., Vermeersch, H., & van Houtte, M. (2014). Why “Gender” disappeared from the gender gap: (re-)introducing gender identity theory to educational gender gap research. In *Social Psychology of Education (Vol. 17, Number 3, pp. 357–381)*. Kluwer Academic Publishers. <https://doi.org/10.1007/s11218-014-9248-8>
- Vázquez, J., Cruz, M. & Carlos, M. (2022). Social Entrepreneurship and Complex Thinking: A Bibliometric Study. *Sustainability* 14: 13187. <https://doi.org/10.3390/su142013187>

Viladrich, C., Angulo, A., & Doval, E. (2017). A journey around alpha and omega to estimate internal consistency reliability. *Annals of psychology*, 33(3), 755-782.

Watson, T., Corliss, M., & Le, M. (2018). Digitalisation and women's workforce participation in the Indo-Pacific. *Australian Journal of Labour Economics*, 21(1), 45–74.

Wong, B., & Kemp, P. E. J. (2018). Technical boys and creative girls: the career aspirations of digitally skilled youths. *Cambridge Journal of Education*, 48(3), 301–316.  
<https://doi.org/10.1080/0305764X.2017.1325443>

**Contact email:** [Cristina.pelaez.sanchez@gmail.com](mailto:Cristina.pelaez.sanchez@gmail.com)