

Poster “Gender gap in the STEM sector in pre and university studies of Europe associated with ethnic factors” in TEEM 2018

Sonia Verdugo-Castro

GRIAL Research Group,

Research Institute for Educational Sciences, University of Salamanca 37008, Salamanca, Spain
soniavercas@usal.es

Abstract

The TEEM 2018 Conference was held in Salamanca (Spain) from October 24 to October 26, 2018. The Doctoral Consortium track was organized as a poster session. This is the poster corresponding to the paper “Gender gap in the STEM sector in pre and university studies of Europe associated with ethnic factors”.

The ground-breaking current project builds on the latent gender gap in the education sector in the areas of Science, Technology, Engineering and Mathematics (STEM). The objective of the paper is to present the thesis Project, which addresses the study of the causality of this gap, associating the possible relationship with gender roles and stereotypes assumed, together with cultural factors, such as the origin of the person. This paper describes the research project to study this situation and establish new fieldwork, using a mixed methodology, taking into account the specific variables and dimensions. In this fieldwork, we want young people between the ages of 16 and 30 to tell their story. From the evaluation of the current situation through the sequential mixed exploratory research method and from the longitudinal cohort to be carried out with the target population, palliative measures can be derived to reduce the gender gap. The project will be carried out in three phases: preparation, research, and evaluation, each of which will be carried out using different techniques and instruments. The data collected will help to identify the relationship between the gender gap and ethnic and racial factors. Finally, it can be concluded that in order to generate and achieve equal representation, one must first know the motivation and interests of people, which lead to different decisions being made and being able to work on them.

Keywords

Gender gap, ethnicity, gender roles, inclusive digital society

Link to the poster

<https://goo.gl/vbHy2q>

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References

- [1] A. Rossi and M. Barajas. 2015. Gender imbalances in STEM career choice. *ENSEÑANZA DE LAS CIENCIAS. Investigaciones didácticas*.
- [2] A. Bandura et al. 2001. Self-efficacy Beliefs as Shapers of Children's Aspirations and Career Trajectories. *Child Development*. 72, 1 (2001), 187–206. DOI:<https://doi.org/http://dx.doi.org/10.1111/1467-8624.00273>.
- [3] M.M. Bleeker and J. Jacobs. 2004. Achievement in Math and Science: do Mothers' Beliefs Matter 12 Years later? 96, 1 (2004), 97–109. DOI:<https://doi.org/http://dx.doi.org/10.1037/0022-0663.96.1.97>.
- [4] B. Davies. 2003. *Shards of Glass. Children Reading & Writing beyond Gendered Identities*. Hampton Press.
- [5] M. López. 1995. *La elección de una carrera típicamente femenina o masculina desde una perspectiva psicosocial: análisis de las influencias de género*.
- [6] E. Renold. 2001. Learning the «Hard» Way: Boys, Hegemonic Masculinity and the Negotiation of Learner Identities in the Primary School. *British Journal of Sociology of Education*. 22, 3 (2001), 369–385. DOI:<https://doi.org/http://dx.doi.org/10.1080/01425690120067980>.
- [7] B. Francis. 1998. Oppositional Positions: Children's Construction of Gender in Talk and Role Plays Based on Adult Occupation. *Educational Research*. 40, 1 (1998), 31–43.
- [8] C. Skelton. 2001. *Schooling the boys. Masculinities and Primary Education*. Open University Press.
- [9] C. González-González et al. 2018. Gender and Engineering: Developing Actions to Encourage Women in Tech. *2018 IEEE Global Engineering Education Conference (EDUCON)*. 2088–2093.
- [10] Facts and figures of the Spanish university system.: 2018. www.mecd.gob.es/dms/mecd/educacion-mecd/areas-educacion/universidades/estadisticas-informes/datos-cifras/Datos-y-Cifras-del-SUE-Curso-2014-2015.pdf.
- [11] O. Dele-Ajayi et al. 2018. Exploring Digital Careers, Stereotypes and Diversity with Young People through Game Design and Implementation. *2018 IEEE Global Engineering Education Conference (EDUCON)*. 718–725.
- [12] S. Cheryan et al. 2013. Enduring influence of stereotypical computer science role models on women's academic aspirations. *Psychology of Women Quarterly*. 37, 1 (2013), 72–79.
- [13] S. Cheryan et al. 2015. Cultural stereotypes as gatekeepers: increasing girls' interest in computer science and engineering by diversifying

- stereotypes. *Frontiers in psychology*. 6, (2015).
- [14] R. Garris and R. Ahlers. 2002. Games, motivation, and learning: A research and practice model. *Simulation & gaming*. 33, 4 (2002), 441–467.
 - [15] N. Pancratz and I. Diethelm. 2018. Including Part-Whole-Thinking in a Girls' Engineering Course through the Use of littleBits. A Practical Report on Including Part-Whole-Thinking into the Content of Computer Science Education. *2018 IEEE Global Engineering Education Conference (EDUCON)*. 1140–1144.
 - [16] L. Zimmermann and G. Sprung. 2008. Technology is Female: How Girls Can Be Motivated to Learn Programming and Take up Technical Studies through Adaptations of the Curriculum, Changes in Didactics, and Optimized Interface Design. *In Proceedings of ICEE 08*.
 - [17] R. Strachan et al. 2018. Women in Engineering: Addressing the Gender Gap, Exploring Trust and our Unconscious Bias. *2018 IEEE Global Engineering Education Conference (EDUCON)*. 2094–2099.
 - [18] A. García-Holgado et al. 2018. Inclusion of gender perspective in Computer Engineering careers. Elaboration of a questionnaire to assess the gender gap in Tertiary Education. *2018 IEEE Global Engineering Education Conference (EDUCON)*. 1553–1560.
 - [19] Jefatura del Estado. 2007. LEY ORGÁNICA 3/2007, de 22 de marzo, para la igualdad efectiva de mujeres y hombres. Boletín Oficial del Estado.
 - [20] 2017. Diagnóstico Previo. Plan de Igualdad de Oportunidades entre Mujeres y Hombres de la UVA 2016-2020. Universidad de Valladolid.
 - [21] 2014. II Informe de situación sobre la presencia equilibrada de mujeres y hombres en la Universidad de Salamanca 2007-2013. Universidad de Salamanca.
 - [22] Elsevier Foundation. 2017. *Gender in the Global Research Landscape*. Elsevier.
 - [23] B. Biglia and J. Bonet i Martí. 2017. DIY: Towards feminist methodological practices in social research. 13, (2017).
 - [24] P. Paderewski et al. 2015. Acercando las mujeres a la ingeniería: iniciativas y estrategias que favorecen su inclusión. *XVI Congreso Internacional de Interacción Persona-Ordenador | Workshop Engineering Technology (II)*. 319–326.
 - [25] A. Peixoto et al. 2018. Diversity and Inclusion in Engineering Education: Looking Through the Gender Question. *2018 IEEE Global Engineering Education Conference (EDUCON)*. 2077–2081.
 - [26] M.C. Rodríguez et al. 2014. Rendimiento en la PAU y elección de estudios Científico-Tecnológicos en razón de género. *REOP-Revista Española de Orientación y Psicopedagogía*. 25, 1 (2014), 111–127.
 - [27] Rochester Institute of Technology: 2018. <https://www.rit.edu/kgcoe/women/highlight/encouraging-more-girls-choose-career-engineering>.
 - [28] Universidad de Michigan: 2018. <http://www.wise.umich.edu>.
 - [29] IGNITE. Inspiring Girls Now In Technology: 2018. <http://www.igniteworldwide.org/>
 - [30] Technovation Challenge.: 2018. <http://technovationchallenge.org/>.
 - [31] Proyecto europeo ICT-Go-Girls! <http://www.ictgogirls.eu/> Informe de la política de la Comisión Europea respecto a la igualdad de género.: 2018. <http://ec.europa.eu/research/swafs/index.cfm?pg=policy&lib=gender>.
 - [32] FESTA (Female Empowerment in Science and Technology Academia): 2018. <http://www.festa-europa.eu/>.
 - [33] Genis-Lab (The Gender in Science and Technology Lab): 2018. <http://www.genislab-fp7.eu/>.
 - [34] Proyecto HELENA (Higher Education Leading to Engineering and Scientific Careers): 2018. <http://www.fp7-helena.org>.
 - [35] Proyecto TWIST (Towards Women in Science and Technologies): 2018. <http://www.the-twist-project.eu/>.
 - [36] Proyecto WISAT (Women in Global Science and Technologies):. 2018. <http://wisat.org/>.
 - [37] C. González-González et al. 2018. Gender and Engineering: Developing Actions to Encourage Women in Tech. *2018 IEEE Global Engineering Education Conference (EDUCON)*. 2088–2093.
 - [38] 2011. *Ethical guidelines for educational research*. BERA British Educational Research Association.
 - [39] M. Torres, K. Paz and F. Salazar. 2006. Tamaño de una muestra para una investigación de mercado. *Universidad Rafael Landívar: Boletín electrónico [en línea]*. 2018. http://www.tec.url.edu.gt/boletin/URL_02_BAS02.pdf.
 - [40] M.C. Sánchez-Gómez et al. 2012. *El proceso de la investigación cualitativa. Manual de procedimiento: ejemplificación con una tesis doctoral*. Editorial Edintras.
 - [41] G. King et al. 1994. Designing Social Inquiry. Scientific Inference in Qualitative Research.
 - [42] M.C. Delgado. 2014. *Viajando a Ítaca por mares cuantitativos: manual de ruta para investigar en grado y postgrado*. Amaru.
 - [43] M.C. Sánchez-Gómez and M.V. Martín-Cilleros. 2017. Implementation of focus group in health research. *Computer Supported Qualitative Research*. Springer Cham. 49–61.
 - [44] M.V. Martín-Cilleros et al. 2017. Assessment of a technological education design to prevent school dropout. *RISTI-Revista Ibérica de Sistemas e Tecnologías de Informação*. (2017), 61–67.
 - [45] F. J. García-Peñalvo. 2014. Formación en la sociedad del conocimiento, un programa de doctorado con una perspectiva interdisciplinar. *Education in the Knowledge Society* 15, 1, 4-9.
 - [46] F. J. García-Peñalvo, M. S. Ramírez-Montoya, and A. García-Holgado. 2017. TEEM 2017 Doctoral Consortium Track. In Fifth International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'17) (Cádiz, Spain, October 18-20, 2017) J.M. Dodero, M.S. Ibarra Sáiz and I. Ruiz Rube Eds. ACM, New York, NY, USA, Article 93. DOI:10.1145/3144826.3145440.
 - [47] F. J. García-Peñalvo. 2017. Education in the Knowledge Society PhD Programme. 2017 Kick-off Meeting. In Proceedings of the Seminarios del Programa de Doctorado en Formación en la Sociedad del Conocimiento (16 de noviembre de 2017) (Salamanca, España2017). Instituto Universitario de Ciencias de la Educación
 - [48] F. J. García-Peñalvo, A. García-Holgado, and M. S. Ramírez-Montoya. 2018. The PhD Corner: TEEM 2018 Doctoral Consortium. In *TEEM'18 Proceedings of the Sixth International Conference on Technological Ecosystems for Enhancing Multiculturality (Salamanca, Spain, October 24th-26th, 2018)*, F.J. García-Peñalvo Ed. ACM, New York, NY, USA, 979-983. DOI:10.1145/3284179.3284343.
 - [49] F. J. García-Peñalvo. 2018. Edición 2018-2019 del Kick-off del Programa de Doctorado "Formación en la Sociedad del Conocimiento". In *Proceedings of the Seminarios del Programa de Doctorado en Formación en la Sociedad del Conocimiento (23 de octubre de 2018)* (Salamanca, España2018). Instituto Universitario de Ciencias de la Educación.
 - [50] F. J. García-Peñalvo (Ed.). 2018. *TEEM'18 Proceedings of the Sixth International Conference on Technological Ecosystems for Enhancing Multiculturality* (Salamanca, Spain, October 24th-26th, 2018). ACM, New York, USA.
 - [51] S. Verdugo-Castro, M. C. Sánchez-Gómez, and A. García-Holgado. 2018. Gender gap in the STEM sector in pre and university studies of Europe associated with ethnic factors. In *Sixth International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM 2018)* ACM, Salamanca, Spain.