

# The graphic design in W-STEM

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## Abstract

A first draft of the graphical design for the Capacity-Building in Higher Education project W-STEM (ref. 598923-EPP-1-2018-1-ES-EPPKA2-CBHE-JP) [1, 2] presented in the kick-off meeting in Salamanca (Spain) on 25-27 March 2019.

## Keywords

CBHE, EU, gender, STEM, W-STEM

## Overview

As coordinator partner, GRIAL research group [3, 4] has a significant experience in leading and participating in European Projects such as VALS (Virtual Alliances for Learning Society) [5-16], TACCLE 3 – Coding [17-24], WYRED (netWorked Youth Research for Empowerment in the Digital society) [25-33] or ROBOSTEAM [34, 35], for example. In other projects, different contributions have been done related to the graphical design.

## Gender resources

A first set of gender related resources in STEM is selected [36-53].

## Dissemination policy

W-STEM wants to be present in the society and the consortium would like the outcomes of this project will have a real effect [54] in the Latin-American society, but also in the European Programme countries.

## Open access policy

W-STEM project is fully compliant with open access policy [55-64] for accessing and sharing the knowledge and the outcomes generated in this project.

## Link to the presentation

<https://goo.gl/UgR9wP>

## DOI

10.5281/zenodo.2616751

## References

- [1] F. J. García-Peñalvo, "Women and STEM disciplines in Latin America. The W-STEM European Project," *Journal of Information Technology Research*, vol. 12, no. 4, 2019.
- [2] F. J. García-Peñalvo, "W-STEM Project Overview," presented in W-STEM Erasmus+ project Kick-Off, Salamanca, Spain, March 25-27, 2019, 2019. Available from: <https://goo.gl/19vjtx>. doi: 10.5281/zenodo.2605431.
- [3] F. J. García-Peñalvo. (2016). *Presentation of the GRIAL research group and its main research lines and projects on March 2016*. Available from: <https://goo.gl/dSZYv7>.

- [4] GRIAL Group, "GRIAL Research Group Scientific Production Report (2011-2017). Version 2.0," GRIAL Research Group, University of Salamanca, Salamanca, Spain, Technical Report, GRIAL-TR-2018-004, 2018. Available from: <https://goo.gl/kiUFn9>. doi: 10.5281/zenodo.1217097.
- [5] F. J. García-Peñalvo, "VALS Project – One year after," presented in Thematic Cluster Meeting “Knowledge Alliances” in Brussels at November 7th, 2014, 2014. Available from: <http://hdl.handle.net/10366/125221>.
- [6] F. J. García-Peñalvo *et al.*, "VALS: Virtual Alliances for Learning Society," in *Proceedings of the TEEM'13 Track on Knowledge Society Related Projects*, F. J. García-Peñalvo, A. García-Holgado and J. Cruz-Benito, Eds. pp. 19-26, Salamanca, Spain: Grupo GRIAL, 2013.
- [7] F. J. García-Peñalvo and J. Cruz-Benito, "Proyecto Europeo VALS y Semester of Code: Prácticas Virtuales en Empresas y Fundaciones relacionadas con el Software Libre a nivel Europeo (Versión póster)," presented in Seminario Bienal "La Universidad Digital". Taller de Buenas Prácticas: Presentación de Experiencias, Madrid, 11 de junio, 2015. Available from: <http://repositorio.grial.eu/handle/grial/409>.
- [8] F. J. García-Peñalvo and J. Cruz-Benito. (2015). *Informe de Buena Práctica - Proyecto Europeo VALS y Semester of Code: Prácticas Virtuales en Empresas y Fundaciones relacionadas con el Software Libre a nivel Europeo*. Available from: <http://repositorio.grial.eu/handle/grial/410>.
- [9] F. J. García-Peñalvo and J. Cruz-Benito. (2015). *Proyecto Europeo VALS y Semester of Code: Prácticas Virtuales en Empresas y Fundaciones relacionadas con el Software Libre a nivel Europeo*. Available from: <http://repositorio.grial.eu/handle/grial/412>.
- [10] F. J. García-Peñalvo and J. Cruz-Benito, "Proyecto Europeo VALS y Semester of Code: Prácticas Virtuales en Empresas y Fundaciones relacionadas con el Software Libre a nivel Europeo," in *Buenas Prácticas sobre la Universidad Digital* M. Martín-González, Ed. pp. 60-67, Madrid: Cátedra UNESCO de Gestión y Política Universitaria, 2016.
- [11] F. J. García-Peñalvo *et al.*, "Developing Win-Win Solutions for Virtual Placements in Informatics: The VALS Case," in *Proceedings of the Second International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'14)*, F. J. García-Peñalvo, Ed. ACM International Conference Proceeding Series (ICPS), pp. 733-738, New York, USA: ACM, 2014. doi: <http://dx.doi.org/10.1145/2669711.2669982>.
- [12] F. J. García-Peñalvo, J. Cruz-Benito, M. Á. Conde and D. Griffiths, "Virtual placements for informatics students in open source business across Europe," in *2014 IEEE Frontiers in Education Conference Proceedings (October 22-25, 2014 Madrid, Spain)* pp. 2551-2555, USA: IEEE, 2014. doi: 10.1109/FIE.2014.7044411.
- [13] F. J. García-Peñalvo, J. Cruz-Benito, M. Á. Conde and D. Griffiths, "Semester of Code: Piloting Virtual Placements for Informatics across Europe," in *Proceedings of Global Engineering Education Conference, EDUCON 2015. Tallinn, Estonia, 18-20 March 2015* pp. 567-576, USA: IEEE, 2015. doi: 10.1109/EDUCON.2015.7096026.
- [14] F. J. García-Peñalvo, J. Cruz-Benito, D. Griffiths and A. P. Achilleos, "Tecnología al servicio de un proceso de gestión de prácticas virtuales en empresas: Propuesta y primeros resultados del Semester of Code," *IEEE VAEP-RITA*, vol. 3, no. 1, pp. 52-59, 2015.
- [15] F. J. García-Peñalvo, J. Cruz-Benito, D. Griffiths and A. P. Achilleos, "Virtual placements management process supported by technology: Proposal and firsts results of the Semester of Code," *IEEE Revista Iberoamericana de Tecnologías del Aprendizaje (IEEE RITA)*, vol. 11, no. 1, pp. 47-54, 2016. doi: 10.1109/RITA.2016.2518461.
- [16] F. J. García-Peñalvo *et al.*, "Understanding the barriers to virtual student placements in the Semester of Code," *Education in the Knowledge Society*, vol. 17, no. 1, pp. 147-173, 2016. doi: 10.14201/eks2016171147173.
- [17] F. J. García-Peñalvo, "A brief introduction to TACCLE 3 – Coding European Project," in *2016 International Symposium on Computers in Education (SIIE 16)*, F. J. García-Peñalvo and J. A. Mendes, Eds., USA: IEEE, 2016. doi: 10.1109/SIIE.2016.7751876.

- [18] F. J. García-Peñalvo *et al.*, "Evaluation of existing resources (study/analysis)," TACCLE3 Consortium, Belgium, 2016. doi: 10.5281/zenodo.163112.
- [19] F. J. García-Peñalvo and J. A. Mendes, "Exploring the computational thinking effects in pre-university education," *Computers in Human Behavior*, vol. 80, pp. 407-411, 2018. doi: 10.1016/j.chb.2017.12.005.
- [20] F. J. García-Peñalvo, D. Reimann and C. Maday, "Introducing Coding and Computational Thinking in the Schools: The TACCLE 3 – Coding Project Experience," in *Computational Thinking in the STEM Disciplines. Foundations and Research Highlights*, M. S. Khine, Ed. pp. 213-226, Cham, Switzerland: Springer, 2018. doi: 10.1007/978-3-319-93566-9\_11.
- [21] F. J. García-Peñalvo, D. Reimann, M. Tuul, A. Rees and I. Jormanainen, "An overview of the most relevant literature on coding and computational thinking with emphasis on the relevant issues for teachers," TACCLE3 Consortium, Belgium, 2016. doi: 10.5281/zenodo.165123.
- [22] J. Hughes. (2016). *Best apps for teaching programming*. Available from: <http://www.taccle3.eu/english/2016/05/10/best-apps-for-teaching-programming/>.
- [23] TACCLE 3 Consortium. (2017). *TACCLE 3: Coding Erasmus + Project website*. Available from: <https://goo.gl/f4QZUA>.
- [24] F. J. García-Peñalvo, A. M. Rees, J. Hughes, I. Jormanainen, T. Toivonen and J. Vermeersch, "A survey of resources for introducing coding into schools," in *Proceedings of the Fourth International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'16) (Salamanca, Spain, November 2-4, 2016)*, F. J. García-Peñalvo, Ed. pp. 19-26, New York, NY, USA: ACM, 2016. doi: 10.1145/3012430.3012491.
- [25] A. García-Holgado and F. J. García-Peñalvo, "WYRED Platform, the ecosystem for the young people," presented in HCI International 2018, Las Vegas, NV, USA, July 15-20, 2018, 2018. Available from: <https://youtu.be/TRDjN5boky8>. doi: 10.5281/zenodo.1322032.
- [26] F. J. García-Peñalvo, "The WYRED project: A technological platform for a generative research and dialogue about youth perspectives and interests in digital society," *Journal of Information Technology Research*, vol. 9, no. 4, pp. vi-x, 2016.
- [27] F. J. García-Peñalvo, "WYRED una plataforma para dar la voz a los jóvenes sobre la influencia de la tecnología en la sociedad actual. Un enfoque de ciencia ciudadana," presented in II Congreso Internacional de Tendencias en Innovación Educativa (CITIE 2018), Arequipa (Perú), 26-30 de noviembre de 2018, 2018.
- [28] F. J. García-Peñalvo and J. Durán-Escudero, "Interaction design principles in WYRED platform," in *Learning and Collaboration Technologies. Technology in Education. 4th International Conference, LCT 2017. Held as Part of HCI International 2017, Vancouver, BC, Canada, July 9–14, 2017. Proceedings, Part II*, P. Zaphiris and A. Ioannou, Eds. Lecture Notes in Computer Science, no. 10296, pp. 371-381, Switzerland: Springer International Publishing, 2017. doi: 10.1007/978-3-319-58515-4\_29.
- [29] F. J. García-Peñalvo and A. García-Holgado, "WYRED, a platform to give young people the voice on the influence of technology in today's society. A citizen science approach," in *Proceedings of the II Congreso Internacional de Tendencias e Innovación Educativa – CITIE 2018 (Arequipa, Perú, November 26-30, 2018)*, K. O. Villalba-Condori, F. J. García-Peñalvo, J. Lavonen and M. Zapata-Ros, Eds. CEUR Workshop Proceedings Series, no. 2302, pp. 128-141, Aachen, Germany: CEUR-WS.org, 2019.
- [30] F. J. García-Peñalvo, A. García-Holgado, A. Vázquez-Ingelmo and A. M. Seoane-Pardo, "Usability test of WYRED Platform," in *Learning and Collaboration Technologies. Design, Development and Technological Innovation. 5th International Conference, LCT 2018, Held as Part of HCI International 2018, Las Vegas, NV, USA, July 15-20, 2018. Proceedings, Part I*, P. Zaphiris and A. Ioannou, Eds. Lecture Notes in Computer Science, no. 10924, pp. 73-84, Cham, Switzerland: Springer, 2018. doi: 10.1007/978-3-319-91743-6\_5.

- [31] F. J. García-Peñalvo and N. A. Kearney, "Networked youth research for empowerment in digital society. The WYRED project," in *Proceedings of the Fourth International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'16) (Salamanca, Spain, November 2-4, 2016)*, F. J. García-Peñalvo, Ed. ACM International Conference Proceeding Series (ICPS), pp. 3-9, New York, NY, USA: ACM, 2016. doi: 10.1145/3012430.3012489.
- [32] D. Griffiths *et al.*, "Children and Young People Today: Initial Insights from the WYRED Project," WYRED Consortium, European Union, 2017. Available from: <https://goo.gl/6unxmD>. doi: 10.5281/zenodo.996356.
- [33] F. J. García-Peñalvo, A. Vázquez-Ingelmo, A. García-Holgado and A. M. Seoane-Pardo, "Analyzing the usability of the WYRED Platform with undergraduate students to improve its features," *Universal Access in the Information Society*, vol. In press, 2019.
- [34] F. J. García-Peñalvo, "O3 RoboSTEAM Environment – First overview and discussions," presented in RoboSTEAM Erasmus+ project Kick-Off, Bragança, Portugal, February 15-16, 2019, 2019. Available from: <https://goo.gl/hro7tc>. doi: 10.5281/zenodo.2571497.
- [35] RoboSTEAM Consortium, "RoboSTEAM Project," presented in RoboSTEAM Erasmus+ project Kick-Off, Bragança, Portugal, February 15-16, 2019, 2019. Available from: <https://goo.gl/Ni43mK>. doi: 10.5281/zenodo.2575066.
- [36] A. Abreu, "National Assessment of Gender, Science, Technology and Innovation - Brazil Qualitative Report, Gender Equality and the Knowledge Society," National Assessments on Gender and STI, Brazil, 2012. Available from: [http://wisat.org/data/documents/Brazil\\_Qual\\_GE-KS.pdf](http://wisat.org/data/documents/Brazil_Qual_GE-KS.pdf).
- [37] L. Briz, J. A. Juanes and F. J. García-Peñalvo, "The Role of Gender in Technology Acceptance for Medical Education," in *Encyclopedia of E-Health and Telemedicine*, vol. II, M. M. Cruz-Cunha, I. M. Miranda, R. Martinho and R. Rijo, Eds. pp. 1013-1027, Hershey, PA: Medical Information Science, 2016. doi: 10.4018/978-1-4666-9978-6.ch079.
- [38] A. García-Holgado, F. J. García-Peñalvo, J. J. Mena Marcos and C. González, "Introducción de la Perspectiva de Género en la docencia de Ingeniería del Software," in *La innovación docente como misión del profesorado. Actas del IV Congreso Internacional sobre Aprendizaje, Innovación y Competitividad. CINAIC 2017 (4-6 de Octubre de 2017, Zaragoza, España)*, M. L. Sein-Echaluce Lacleta, Á. Fidalgo-Blanco and F. J. García-Peñalvo, Eds. pp. 627-631, Zaragoza, España: Servicio de Publicaciones Universidad de Zaragoza, 2017. doi: 10.26754/CINAIC.2017.000001\_134.
- [39] A. García-Holgado, F. J. García-Peñalvo, J. J. Mena Marcos and C. González, "Inclusión de la perspectiva de género en la asignatura de Ingeniería de Software I," in "Memorias de Innovación Docente," núm. ID2016/084, Universidad de Salamanca, Salamanca, España, 2017. Available from: <https://goo.gl/PzZeAN>.
- [40] A. García-Holgado, J. J. Mena Marcos, F. J. García-Peñalvo and C. González, "Inclusion of gender perspective in Computer Engineering careers. Elaboration of a questionnaire to assess the gender gap in Tertiary Education," in *2018 IEEE Global Engineering Education Conference (EDUCON), (17-20 April 2018, Santa Cruz de Tenerife, Canary Islands, Spain)* pp. 1553-1560, USA: IEEE, 2018. doi: 10.1109/EDUCON.2018.8363417.
- [41] J. C. Sánchez-Prieto, S. Olmos-Migueláñez and F. J. García-Peñalvo, "Influence of gender on the acceptance of mLearning among pre-service secondary teachers," presented in ECER 2018: Inclusion and Exclusion, Resources for Educational Research?, Bolzano, Italy, 4-7 September 2018, 2018.
- [42] SESTEM, "Supporting Gender Equality in Science Technology and Mathematics related choices of careers," 2011. Available from: <http://www.openeducationeuropa.eu/en/project/sestem>.
- [43] SESTEM, "The European Scenery on gender and STEM," 2011. Available from: <http://sestem.iacm.forth.gr/>.
- [44] UNESCO, *Gender and Education for All: The Leap to Equality*. Paris: UNESCO, 2007.



- [45] UNESCO, *Science, Technology, and Gender: An International Report*. Paris: UNESCO, 2010.
- [46] S. Verdugo-Castro, M. C. Sánchez-Gómez and A. García- Holgado, "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)*, Salamanca, Spain, 2018: ACM
- [47] World Economic Forum, *The Global Gender Gap Report 2013*. Cologny, Geneva, Switzerland: World Economic Forum, 2013.
- [48] A. García-Holgado, F. J. García-Peñalvo, J. J. Mena Marcos and C. S. González, "Pretest y postest para evaluar la introducción de la perspectiva de género en la docencia de asignaturas de Ingeniería Informática," Grupo GRIAL, Universidad de Salamanca, Salamanca, España, Technical Report, GRIAL-TR-2017-005, 2017. Available from: <https://goo.gl/R7Ybr7>. doi: 10.5281/zenodo.825768.
- [49] A. García-Holgado, J. J. Mena Marcos, C. S. González and F. J. García-Peñalvo, "Perspectiva de Género en Ingeniería Informática: Cuestionario GENCE," Grupo GRIAL, Universidad de Salamanca, Salamanca, España, Technical Report, GRIAL-TR-2019-001, 2019. Available from: <https://goo.gl/pH8qzi>. doi: 10.5281/zenodo.2550690.
- [50] A. García-Holgado, J. J. Mena Marcos, C. S. González, F. J. García-Peñalvo and L. Yang, "计算机工程中的性别视角: GENCE 问卷调查," Grupo GRIAL, Universidad de Salamanca, Salamanca, España, Technical Report, GRIAL-TR-2019-002, 2019. Available from: <https://goo.gl/17Mfwb>. doi: 10.5281/zenodo.2554998.
- [51] M. S. Ramírez-Montoya Ed. "Handbook of Research on Driving STEM Learning With Educational Technologies," *Advances in Educational Technologies and Instructional Design (AETID)*. Hershey PA, USA: IGI Global, 2017.
- [52] A. Bello, "Situation of women in science in the world: An overall picture," presented in W-STEM Erasmus+ project Kick-Off, Salamanca, Spain, March 25-27, 2019, 2019. Available from: <https://goo.gl/KVTW1t>. doi: 10.5281/zenodo.2615009.
- [53] A. Bello, "SAGA STI Policy Survey," presented in W-STEM Erasmus+ project Kick-Off, Salamanca, Spain, March 25-27, 2019, 2019. Available from: <https://goo.gl/KhtGmF>. doi: 10.5281/zenodo.2615109.
- [54] F. J. García-Peñalvo, "La tercera misión," *Education in the Knowledge Society*, vol. 17, no. 1, pp. 7-18, 2016. doi: 10.14201/eks2016171718.
- [55] S. Bartling and S. Friesike Eds., "Opening Science. The Evolving Guide on How the Internet is Changing Research, Collaboration and Scholarly Publishing." Heidelberg: Springer International Publishing, 2014. doi: 10.1007/978-3-319-00026-8.
- [56] B.-C. Björk, "Gold, green, and black open access," *Learned Publishing*, vol. 30, pp. 173–175, 2017. doi: 10.1002/leap.1096.
- [57] European Commission, *Open innovation, open science, open to the world. A vision for Europe*. Brussels: Directorate-General for Research and Innovation, European Commission, 2016. Available from: <https://goo.gl/V1GgWN>. doi: 10.2777/061652.
- [58] F. J. García-Peñalvo, "Open Access Myths and Realities," *Education in the Knowledge Society*, vol. 18, no. 1, pp. 7-20, 2017. doi: 10.14201/eks2017181720.
- [59] F. J. García-Peñalvo, C. García de Figuerola and J. A. Merlo-Vega, "Open knowledge management in higher education," *Online Information Review*, vol. 34, no. 4, pp. 517-519, 2010.
- [60] F. J. García-Peñalvo, C. García de Figuerola and J. A. Merlo-Vega, "Open knowledge: Challenges and facts," *Online Information Review*, vol. 34, no. 4, pp. 520-539, 2010. doi: 10.1108/14684521011072963.
- [61] M. S. Ramírez-Montoya and F. J. García-Peñalvo, "Movimiento Educativo Abierto," *Virtualis*, vol. 6, no. 12, pp. 1-13, 2015.
- [62] M. S. Ramírez-Montoya, F. J. García-Peñalvo and R. McGreal, "Shared Science and Knowledge. Open Access, Technology and Education," *Comunicar*, vol. 26, no. 54, pp. 1-5, 2018.

- [63] M. S. Ramírez-Montoya, "Acceso abierto y su repercusión en la Sociedad del Conocimiento: Reflexiones de casos prácticos en Latinoamérica," *Education in the Knowledge Society (EKS)*, vol. 16, no. 1, pp. 103-118, 2015. doi: 10.14201/eks2015161103118.
- [64] M. S. Ramírez-Montoya and F. J. García-Peñalvo, "Co-creation and open innovation: Systematic literature review," *Comunicar*, vol. 26, no. 54, pp. 9-18, 2018. doi: 10.3916/C54-2018-01.