

Technological ecosystems in health sector: Rural-Path ecosystem

Alicia García Holgado

GRupo de investigación en InterAcción y eLearning (GRIAL)
Instituto de Ciencias de la Educación
Departamento de Informática y Automática
Universidad de Salamanca, España

aliciagh@usal.es
<http://grial.usal.es>

Abstract

This presentation was made in the Rural-Path working meeting held in Zamora (Spain) in June 2nd-3rd, 2016. The main goal of this work was discussing the future application of a H2020 project regarding a platform of psychological applications of technology for health of older adults in rural areas. All these application should be integrated into a technological ecosystem with adaptive [1-4] and mobile [5, 6] capabilities.

The presentation is organized as follows:

1. First, GRIAL research group is presented in order to explain its role in the Rural-Path proposal, taking in to account its experience and research lines [7, 8].
2. Second, the concept of technological ecosystem is introduced [9, 10], evolving it from the natural ecosystem notion [11, 12] to the software and digital ecosystems [13-18].
3. Third, based on GRIAL experience in defining architectures for technological ecosystems [19-28], some examples of implemented and deployed technological ecosystems are introduced [29-36].
4. Finally, the proposal of an ecosystem for health applications is presented [37], discussing different aspects such as usability or mobile acceptation [38-40].

Keywords

Technological ecosystems; Health applications; SocialNet; Rural Path

Link to the presentation

<http://www.slideshare.net/grialusal/ruralpath-ecosystem>

Date

2 June 2016

References

- [1] D. Hauger and M. Köck, "State of the Art of Adaptivity in E-Learning Platforms," presented at the 15th Workshop on Adaptivity and User Modeling in Interactive Systems in Lernen - Wissen - Adaption (LWA 2007), Halle/Saale, Germany, 2007.
- [2] A. J. Berlanga and F. J. García-Péñalvo, "Learning Technology Specifications: Semantic Objects for Adaptive Learning Environments," *International Journal of Learning Technology*, vol. 1, pp. 458-472, 2005.

- [3] A. J. Berlanga and F. J. García-Peña, "Learning Design in Adaptive Educational Hypermedia Systems," *Journal of Universal Computer Science*, vol. 14, pp. 3627-3647, 2008.
- [4] A. J. Berlanga and F. J. García-Peña, "Towards adaptive learning designs," in *Adaptive Hypermedia and Adaptive Web-Based Systems. 3rd International Conference, AH 2004, Proceedings (Eindhoven, The Netherlands, August 23-26, 2004)*, P. DeBra and W. Nejdl, Eds., ed Berlin: Springer Verlag, 2004, pp. 372-375.
- [5] J. C. Sánchez Prieto, S. Olmos Migueláñez, and F. J. García-Peña, "Mobile Learning: Tendencies and Lines of Research," in *Proceedings of the First International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'13) (Salamanca, Spain, November 14-15, 2013)*, F. J. García-Peña, Ed., ed New York, NY, USA: ACM, 2013, pp. 473-480.
- [6] J. C. Sánchez Prieto, S. Olmos Migueláñez, and F. J. García-Peña, "Understanding mobile learning: devices, pedagogical implications and research lines," *Education in the Knowledge Society*, vol. 15, pp. 20-42, 2014.
- [7] F. J. García-Peña. (2016). *Presentation of the GRIAL research group and its main research lines and projects on March 2016*. Available: <http://hdl.handle.net/10366/127737>
- [8] F. J. García-Peña, M. J. Rodríguez-Conde, A. M. Seoane-Pardo, M. Á. Conde-González, V. Zangrado, and A. García-Holgado, "GRIAL (GRupo de investigación en InterAcción y eLearning), USAL," *IE Comunicaciones. Revista Iberoamericana de Informática Educativa*, pp. 85-94, 2012.
- [9] F. J. García-Peña, "Technological Ecosystems," *IEEE Revista Iberoamericana de Tecnologías del Aprendizaje*, vol. 11, pp. 31-32, 2016.
- [10] F. J. García-Peña, "Ecosistemas Tecnológicos," *IEEE VAEP-RITA*, vol. 3, pp. 36-37, 2015.
- [11] S. T. A. Pickett and M. L. Cadenasso, "The Ecosystem as a Multidimensional Concept: Meaning, Model, and Metaphor," *Ecosystems*, vol. 5, pp. 1-10, 2002.
- [12] D. Dhungana, I. Groher, E. Schludermann, and S. Biffl, "Software ecosystems vs. natural ecosystems: learning from the ingenious mind of nature," in *ECSA '10 Proceedings of the Fourth European Conference on Software Architecture: Companion Volume*, ed New York, NY, USA: ACM, 2010, pp. 96-102.
- [13] P. Dini, M. Darking, N. Rathbone, M. Vidal, P. Hernández, P. Ferronato, et al., "The digital ecosystems research vision: 2010 and beyond," European Commission2005.
- [14] European Commission, "Digital Ecosystems: The New Global Commons for SMEs and local growth," 2006.
- [15] O. Barbosa and C. Alves, "A Systematic Mapping Study on Software Ecosystems," in *IWSECO-2011 Software Ecosystems 2011. Proceedings of the Third International Workshop on Software Ecosystems. Brussels, Belgium, June 7th, 2011.*, S. Jansen, J. Bosch, P. Campbell, and F. Ahmed, Eds., ed Aachen, Germany: CEUR Workshop Proceedings, 2011, pp. 15-26.

- [16] J. Bosch, "Architecture challenges for software ecosystems," in *ECSA'10 Proceedings of the Fourth European Conference on Software Architecture: Companion Volume*, ed New York, NY, USA: ACM, 2010, pp. 93-95.
- [17] K. Manikas and K. M. Hansen, "Software ecosystems – A systematic literature review," *Journal of Systems and Software*, vol. 86, pp. 1294-1306, 2013.
- [18] E. Yu and S. Deng, "Understanding Software Ecosystems: A Strategic Modeling Approach," in *IWSECO-2011 Software Ecosystems 2011. Proceedings of the Third International Workshop on Software Ecosystems. Brussels, Belgium, June 7th, 2011.*, S. Jansen, J. Bosch, P. Campbell, and F. Ahmed, Eds., ed Aachen, Germany: CEUR Workshop Proceedings, 2011, pp. 65-76.
- [19] A. García-Holgado and F. J. García-Péñalvo, "The evolution of the technological ecosystems: An architectural proposal to enhancing learning processes," in *Proceedings of the First International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'13) (Salamanca, Spain, November 14-15, 2013)*, F. J. García-Péñalvo, Ed., ed New York, NY, USA: ACM, 2013, pp. 565-571.
- [20] A. García-Holgado and F. J. García-Péñalvo, "Análisis de integración de soluciones basadas en software como servicio para la implantación de ecosistemas tecnológicos corporativos," in *Avances en Informática y Automática. Séptimo Workshop*, J. Cruz-Benito, A. García-Holgado, S. García-Sánchez, D. Hernández-Alfageme, M. Navarro-Cáceres, and R. Vega-Ruiz, Eds., ed Salamanca: Departamento de Informática y Automática de la Universidad de Salamanca, 2013, pp. 55-72.
- [21] A. García-Holgado and F. J. García-Péñalvo, "Patrón arquitectónico para la definición de ecosistemas de eLearning basados en desarrollos open source," in *Actas del XVI Simposio Internacional de Informática Educativa (SIIE'14). Acceso masivo y universal para un aprendizaje a lo largo de la vida (Logroño, La Rioja, España, 12-14 de noviembre, 2014)*, J. L. Sierra Rodríguez, J. M. Dodero Beardo, and D. Burgos, Eds., ed, 2014, pp. 137-142.
- [22] A. García-Holgado and F. J. García-Péñalvo, "Architectural pattern for the definition of eLearning ecosystems based on Open Source developments," in *Proceedings of 2014 International Symposium on Computers in Education (SIIE), Logrono, La Rioja, Spain, 12-14 Nov. 2014*, J. L. Sierra-Rodríguez, J. M. Dodero-Beardo, and D. Burgos, Eds., ed USA: Institute of Electrical and Electronics Engineers, 2014, pp. 93-98.
- [23] A. García-Holgado and F. J. García-Péñalvo, "Architectural pattern to improve the definition and implementation of eLearning ecosystems," *Science of Computer Programming*, vol. In Press, 2016.
- [24] F. J. García-Péñalvo, Á. Hernández-García, M. Á. Conde-González, Á. Fidalgo-Blanco, M. L. Sein-Echaluce Lacleta, M. Alier-Forment, et al., "Learning services-based technological ecosystems," in *Proceedings of the Third International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'15) (Porto, Portugal, October 7-9, 2015)*, G. R. Alves and M. C. Felgueiras, Eds., ed New York, USA: ACM, 2015, pp. 467-472.

- [25] F. J. García-Peñalvo, Á. Hernández-García, M. Á. Conde-González, Á. Fidalgo-Blanco, M. L. Sein-Echaluce Lacleta, M. Alier-Forment, et al., "Mirando hacia el futuro: Ecosistemas tecnológicos de aprendizaje basados en servicios," in *La Sociedad del Aprendizaje. Actas del III Congreso Internacional sobre Aprendizaje, Innovación y Competitividad. CINAIC 2015 (14-16 de Octubre de 2015, Madrid, España)*, Á. Fidalgo Blanco, M. L. Sein-Echaluce Lacleta, and F. J. García-Peñalvo, Eds., ed Madrid, Spain: Fundación General de la Universidad Politécnica de Madrid, 2015, pp. 553-558.
- [26] M. J. Casany, M. Alier, M. Á. Conde, and F. J. García-Peñalvo, "SOA initiatives for eLearning. A Moodle case," in *23rd International Conference on Advanced Information Networking and Applications, AINA 2009, Workshops Proceedings. The International Symposium on Mining and Web (MAW 2009)*, ed Los Alamitos, California, USA: IEEE Computer Society, 2009, pp. 750-755.
- [27] M. Á. Conde González, F. J. García-Peñalvo, M. J. Casany Guerrero, and M. Alier Forment, "Back and Forth: From the LMS to the Mobile Device. A SOA Approach," in *Proceedings of the IADIS International Conference Mobile Learning 2009 (Barcelona, Spain, February 26-28, 2009)*, I. Arnedillo Sánchez and P. Isaías, Eds., ed Portugal: IADIS Press, 2009, pp. 114-120.
- [28] M. Á. Conde, F. J. García-Peñalvo, M. J. Casany, and M. Alier, "Adapting LMS architecture to the SOA: an Architectural Approach," in *Proceedings of the Fourth International Conference on Internet and Web Applications and Services – ICIW 2009 (Venice/Mestre, Italy, 24-28 May 2009)*, H. Sasaki, G. O. Bellot, M. Ehmann, and O. Dini, Eds., ed Los Alamitos, California, USA: IEEE Computer Society, 2009, pp. 322-327.
- [29] A. García-Holgado, J. Cruz-Benito, and F. J. García-Peñalvo, "Análisis comparativo de la gestión del conocimiento en la administración pública española," in *La Sociedad del Aprendizaje. Actas del III Congreso Internacional sobre Aprendizaje, Innovación y Competitividad. CINAIC 2015 (14-16 de Octubre de 2015, Madrid, España)*, Á. Fidalgo Blanco, M. L. Sein-Echaluce Lacleta, and F. J. García-Peñalvo, Eds., ed Madrid, Spain: Fundación General de la Universidad Politécnica de Madrid, 2015, pp. 602-607.
- [30] A. García-Holgado, J. Cruz-Benito, and F. J. García-Peñalvo, "Analysis of Knowledge Management Experiences in Spanish Public Administration," in *Proceedings of the Third International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'15) (Porto, Portugal, October 7-9, 2015)* G. R. Alves and M. C. Felgueiras, Eds., ed New York, NY, USA: ACM, 2015, pp. 189-193.
- [31] A. García-Holgado and F. J. García-Peñalvo, "Knowledge Management Ecosystem based on Drupal Platform for Promoting the Collaboration between Public Administrations," in *Proceedings of the Second International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'14) (Salamanca, Spain, October 1-3, 2014)*, F. J. García-Peñalvo, Ed., ed New York, NY, USA: ACM, 2014, pp. 619-624.
- [32] A. García-Holgado and F. J. García-Peñalvo, "Estudio sobre la Evolución de las Soluciones Tecnológicas para Dar Soporte a la Gestión de la

- Información," GRIAL Research Group, University of Salamanca, Salamanca, Spain GRIAL-TR-2015-001, 2015.
- [33] A. García-Holgado, F. J. García-Peñalvo, Á. Hernández-García, and F. Llorens-Largo, "Analysis and Improvement of Knowledge Management Processes in Organizations Using the Business Process Model Notation," in *New Information and Communication Technologies for Knowledge Management in Organizations. 5th Global Innovation and Knowledge Academy Conference, GIKA 2015, Valencia, Spain, July 14-16, 2015, Proceedings*, D. Palacios-Marqués, D. Ribeiro Soriano, and K. H. Huarng, Eds., ed Switzerland: Springer International Publishing, 2015, pp. 93-101.
- [34] J. Cruz-Benito, O. Borrás-Gené, F. J. García-Peñalvo, Á. Fidalgo-Blanco, and R. Therón, "Extending MOOC ecosystems using web services and software architectures," in *Proceedings of the XVI International Conference on Human Computer Interaction. Vilanova i la Geltrú, Spain — September 07 - 09, 2015*, ed New York, USA: ACM, 2015, p. Art. 52.
- [35] F. Michavila, M. Martín-González, J. M. Martínez, F. J. García-Peñalvo, and J. Cruz-Benito, "Analyzing the employability and employment factors of graduate students in Spain: The OEEU Information System," in *Proceedings of the Third International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'15) (Porto, Portugal, October 7-9, 2015)*, G. R. Alves and M. C. Felgueiras, Eds., ed New York, USA: ACM, 2015, pp. 277-283.
- [36] F. Michavila, J. M. Martínez, M. Martín-González, F. J. García-Peñalvo, and J. Cruz-Benito, *Barómetro de Empleabilidad y Empleo de los Universitarios en España, 2015 (Primer informe de resultados)*. Madrid: Observatorio de Empleabilidad y Empleo Universitarios, 2016.
- [37] F. J. García-Peñalvo, M. Franco Martín, A. García-Holgado, J. M. Toribio Guzmán, J. Largo Antón, and M. C. Sánchez Gómez, "Psychiatric patients tracking through a private Social Network for relatives," *Journal of Medical Systems*, vol. In press, 2016.
- [38] L. Briz-Ponce, J. A. Juanes-Méndez, F. J. García-Peñalvo, and A. Pereira, "Effects of Mobile Learning in Medical Education: A Counterfactual Evaluation," *Journal of Medical Systems*, vol. 40, p. Paper 136, 2016.
- [39] J. C. Sánchez Prieto, S. Olmos Migueláñez, and F. J. García-Peñalvo, "Mobile Learning Adoption from Informal into Formal: An Extended TAM Model to Measure Mobile Acceptance among Teachers," in *Proceedings of the Second International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'14)*, F. J. García-Peñalvo, Ed., ed New York, USA: ACM, 2014, pp. 595-602.
- [40] J. C. Sánchez Prieto, S. Olmos Migueláñez, and F. J. García-Peñalvo, "Informal Tools in Formal Contexts: Development of a Model to Assess the Acceptance of Mobile Technologies among Teachers," *Computers in Human Behavior*, vol. 55A, pp. 519-528, 2016.