Prieto, Olmos-Migueláñez, & García-Peñalvo, 2014), ubiquitous learning (Conde González, Muñoz Martín, & García-Peñalvo, 2008; Joo-Nagata, Martínez Abad, García-Bermejo Giner, & García-Peñalvo, 2017; Yang, 2006) and Massive Open On-line Courses (MOOC) (García-Peñalvo, 2015d; García-Peñalvo, Fidalgo-Blanco, & Sein-Echaluce, 2018; López Meneses, Vázquez-Cano, & Román Graván, 2015; Martínez Abad, Rodríguez Conde, & García-Peñalvo, 2014; Martínez-Núñez, Borrás-Gene, & Fidalgo-Blanco, 2016).

A technological ecosystem is a metaphor to express a needed evolution of the traditional information systems (García-Peñalvo, 2016b, 2018a). These are solutions based on the composition of different software components and services that share a set of semantically defined data flows. The result is a complex ecosystem that provides a set of services that each component separately does not offer and is able to evolve as a whole in a better way when its components does or when some components are dropped out or when new components are included. Moreover, the technologi[illegible]cosystem is thought to offer a better user experience in the way that use[illegible] part or components of the ecosystem.

The internal structure of the technologica[illegible]plex than a traditional information system (García-[illegible]2017a, 2017b), this implies that these soluti[illegible]count in those cases in which the knowledge ma[illegible]Sein-Echaluce, & García-Peñalvo, 2014, 2015; P[illegible], Nelson-Santana, Delgado Rodríguez, & Occo[illegible]on-making processes are based on heterogene[illegible] architectures (García-Peñalvo et al., 2015).

The technologica[illegible]s from the Biology field and it has been transferre[illegible] because it reflects so well the evolutionary [illegible]e several authors that use the definition of na[illegible]port their own technological ecosystem definition system[illegible]ng, 2007; Dhungana, Groher, Schludermann, & B[illegible]ns, Claes, Grosjean, & Serebrenik, 2014; Yu & Deng, 2011). This way[illegible]nological ecosystem may be defined through a mapping with the main e[illegible]ents that appear in every natural ecosystem (García-Holgado & García-Peñalvo, 2014, 2016), i.e., the organisms or biotic factors, the physical environment in which they inhabit or abiotic factors and the relationships between organisms and organisms with the environment. Specifically, within a technological ecosystem there are a set of persons and software components that represent the role of the biotic factors; a set of elements that allow that ecosystem runs (hardware, communications, etc.), these are the abiotic factors; and a set of data flows that mean the relationships among the software components and among these components and the involved users (Cruz-Benito et al., 2018).

This JITR issue is comprises ten research papers.

Chen et al. (2018) model a multilevel object template set that can be stratified by different updating time spans in order to solve visual tracking problems by linearly representing objects with a few templates.

Balasaraswathi and Kalpana (2018) present a technique that performs classification on huge data using PSO.

Krishna Kumar Mohbey (2018) uses utility as the preference of the accessed mobile web services. In particular, the proposed approach obtains more accurate and filtered mobile web service sequences. The experimental results show that the proposed approach has a good performance in terms of execution efficiency and memory utilization.

Kumar and Kumar (2018) investigate the initial center selection process for the categorical data and after that present a new support based initial center selection algorithm. The proposed algorithm measures the weight of unique data points of an attribute with the help of support and then integrates these weights along the rows, to get the support of every row. Further, a data object having the largest support is chosen as an initial center followed by finding other centers that are at the greatest distance from the initially selected center.

Chandani and Gupta (2018) have the objective to make requirement analysis phase exhaustive by estimating risk at requirement level using requirement defect information and execution flow dependency as early as possible to inhibit them from being incorporated in design and implementation. The proposed approach works as a two-fold process which computes risk involved with each requirement twice. The whole process is divided into a three-layered framework to finalize requirements with clear vision and scope of a project.

Vidyarthi and Jha (2018) apply a hybrid heuristic using College Admission Problem and Analytical Hierarchical Process for stable matching of the users' job with cloud's virtual machine.

Suruchi Chawla (Chawla, 2018) proposes a method that uses hybrid of genetic algorithm and trust for generating the optimal ranking of trusted clicked URLs for web page recommendations.

Gupta and Gupta (2018) present a systematic approach to prioritize requirements and estimate risk associated with each requirement. It first aims at providing a short training to both developers and stakeholders to bridge the gap of understanding and comprehending requirements so that a refined priority value for each requirement can be obtained. Secondly, it presents a requirement risk and re-prioritization estimation model to make sure that a right decision has been taken by stakeholder and developers.

Kumar and Sarkar (2018) have designed a hybrid prediction model for medical domain data sets by combining the decision tree based classifier (mainly C4.5) and the decision table based classifier.

Finally, Kim and Kim (2018) present a method of developing a text warehouse that provides a machine-learning-based text classification service.

References

Balasaraswathi, M., & Kalpana, B. (2018). Fast and Effective Classification using Parallel and Multi-start PSO. *Journal of Information Technology Research, 18*(2).

Berlanga, A. J., & García-Peñalvo, F. J. (2005a). IMS LD reusable elements for adaptive learning designs. *Journal of Interactive Media in Education, 11*.

Berlanga, A. J., & García-Peñalvo, F. J. (2005b). Learning Technology Specifications: Semantic Objects for Adaptive Learning Environments. *International Journal of Learning Technology, 1*(4), 458-472. doi: 10.1504/IJLT.2005.007155

Bers, M. U., Flannery, L., Kazakoff, E. R., & Sullivan, A. (2014). Computational thinking and tinkering: Exploration of an early childhood robotics curriculum. *Computers and Education, 72*, 145-157. doi:10.1016/j.compedu.2013.10.020

Bogdanova, A. M., & Ackovska, N. (2010). Data Driven Intelligent Systems. In M. Gusev (Ed.), *Proceedings of the ICT Innovations 2010 (Ohrid, Macedonia, September 12-15, 2010)* (pp. 1-9): ICT ACT.

Casany, M. J., Alier, M., Mayol, E., Piguillem, J., Galanis, N., García-Peñalvo, F. J., & Conde, M. Á. (2012). Moodbile: A Framework to Integrate m-Learning Applications with the LMS. *Journal of Research and Practice in Information Technology (JRPIT), 44*(2), 129-149.

Catts, R., & Lau, J. (2008). *Towards Information Literacy Indicators*. Paris: UNESCO.

Chandani, P., & Gupta, C. (2018). An Exhaustive Requirement Analysis Approach to Estimate Risk Using Requirement Defect and Execution Flow Dependency for Software Development. *Journal of Information Technology Research, 18*(2).

Chawla, S. (2018). Web Page Recommender System using hybrid of Genetic Algorithm and Trust for Personalized Web Search. *Journal of Information Technology Research, 18*(2).

Chen, B., Peng, M., Liu, L., & Lu, T. (2018). Visual Tracking with Multilevel Sparse Representation and Metric Learning. *Journal of Information Technology Research, 18*(2).

Chen, W., & Chang, E. (2007). Exploring a Digital Ecosystem Conceptual Model and Its Simulation Prototype *Proceedings of IEEE International Symposium on Industrial Electronics, 2007 (ISIE 2007)* (pp. 2933 - 2938). USA: IEEE.

Conde González, M. Á., Muñoz Martín, C., & García-Peñalvo, F. J. (2008). M-learning, towards U-learning. In I. Arnedillo Sánchez & P. Isaías (Eds.), *Proceedings of the IADIS International Conference Mobile Learning 2008. (April 11-13, 2008, Algarve, Portugal).* (pp. 196-200). Portugal: IADIS Press.

Cruz-Benito, J., Therón, R., & García-Peñalvo, F. J. (2016). Software Architectures Supporting Human-Computer Interaction Analysis: A Literature Review. In P. Zaphiris & I. Ioannou (Eds.), *Learning and Collaboration Technologies. Third International Conference, LCT 2016, Held as Part of HCI International 2016, Toronto, ON, Canada, July 17-22, 2016, Proceedings* (pp. 125-136). Switzerland: Springer International Publishing.

Cruz-Benito, J., Vázquez-Ingelmo, A., Sánchez-Prieto, J. C., Therón, R., García-Peñalvo, F. J., & Martín-González, M. (2018). Enabling adaptability in web forms based on user characteristics detection through A/B testing and machine learning. *IEEE Access, In Press*. doi:10.1109/ACCESS.2017.2782678

Day, R., & Payne, L. (1987). Computer-managed instruction: An alternative teaching strategy. *Journal of Nursing Education, 26*(1), 30-36. doi:10.3928/0148-4834-19870101-08

Dhungana, D., Groher, I., Schludermann, E., & Biffl, S. (2010). Software ecosystems vs. natural ecosystems: learning from the ingenious mind of nature *ECSA '10 Proceedings of the Fourth European Conference on Software Architecture: Companion Volume* (pp. 96-102). New York, NY, USA: ACM.

Dillenbourg, P. (1999a). *Collaborative Learning: Cognitive and Computational Approaches* (2nd ed.). New York, NY: Elsevier Science.

Dillenbourg, P. (1999b). What do you mean by collaborative learning? In P. Dillenbourg (Ed.), *Collaborative-learning: Cognitive and Computational Approaches*. Oxford: Elsevier.

diSessa, A. A. (2000). *Changing minds: Computers, learning, and literacy*. Cambridge: MIT Press.

Driscoll, M. (1997). Defining Internet-based and Web-based training. *Performance Improvement, 36*(4), 5-9. doi:10.1002/pfi.4140360403

Fidalgo-Blanco, Á., Sein-Echaluce, M. L., & García-Peñalvo, F. J. (2014). Knowledge Spirals in Higher Education Teaching Innovation. *International Journal of Knowledge Management, 10*(4), 16-37. doi:10.4018/ijkm.2014100102

Fidalgo-Blanco, Á., Sein-Echaluce, M. L., & García-Peñalvo, F. J. (2015). Epistemological and ontological spirals: From individual experience in educational innovation to the organisational knowledge in the university sector. *Program: Electronic library and information systems, 49*(3), 266-288. doi:10.1108/PROG-06-2014-0033

Frechette, J. (2006). Cyber-censorship or cyber-literacy? Envisioning cyber-learning through media education. In D. Buckingham & R. Willett (Eds.), *Digital Generations: Children, Young People, and the New Media*. New York, NY: Routledge.

García-Holgado, A., & García-Peñalvo, F. J. (2014). Architectural pattern for the definition of eLearning ecosystems based on Open Source developments. In J. L. Sierra-Rodríguez, J. M. Dodero-Beardo, & D. Burgos (Eds.), *Proceedings of 2014 International Symposium on Computers in Education (SIIE), Logrono, La Rioja, Spain, 12-14 Nov. 2014* (pp. 93-98). USA: Institute of Electrical and Electronics Engineers.

García-Holgado, A., & García-Peñalvo, F. J. (2016). Architectural pattern to improve the definition and implementation of eLearning ecosystems. *Science of Computer Programming, 129*, 20-34. doi:10.1016/j.scico.2016.03.010

García-Holgado, A., & García-Peñalvo, F. J. (2017a). A metamodel proposal for developing learning ecosystems. In P. Zaphiris & A. Ioannou (Eds.), *Learning and Collaboration Technologies. Novel Learning Ecosystems. 4th International Conference, LCT 2017. Held as Part of HCI International 2017, Vancouver, BC, Canada, July 9–14, 2017. Proceedings, Part I* (pp. 100-109). Switzerland: Springer International Publishing.

García-Holgado, A., & García-Peñalvo, F. J. (2017b). Preliminary validation of the metamodel for developing learning ecosystems. In J. M. Dodero, M. S. Ibarra Sáiz, & I. Ruiz Rube (Eds.), *Fifth International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'17) (Cádiz, Spain, October 18-20, 2017)* (pp. Article 91). New York, NY, USA: ACM.

García-Peñalvo, F. J. (2008a). Docencia. In J. Laviña Orueta & L. Mengual Pavón (Eds.), *Libro Blanco de la Universidad Digital 2010* (pp. 29-61). Barcelona, España: Ariel.

García-Peñalvo, F. J. (2014). Managing the Knowledge Society Construction. *International Journal of Knowledge Management, 10*(4), iv-vii.

García-Peñalvo, F. J. (2015a). Cómo entender el concepto de presencialidad en los procesos educativos en el siglo XXI. *Education in the Knowledge Society (EKS), 16*(2), 6-12. doi: http://dx.doi.org/10.14201/eks2015162612

García-Peñalvo, F. J. (2015b). Engineering contributions to a Knowledge Society multicultural perspective. *IEEE Revista Iberoamericana de Tecnologías del Aprendizaje (IEEE RITA), 10*(1), 17-18. doi:10.1109/RITA.2015.2391371

García-Peñalvo, F. J. (2015c). Information Technology Research. *Journal of Information Technology Research, 8*(1), iv-v.

García-Peñalvo, F. J. (2015d). Massive Open Online Courses as Data Sources for Making Decisions in Learning Processes. *Journal of Information Technology Research, 8*(4), iv-vii.

García-Peñalvo, F. J. (2016a). A brief introduction to TACCLE 3 – Coding European Project. In F. J. García-Peñalvo & J. A. Mendes (Eds.), *2016 International Symposium on Computers in Education (SIIE 16)*. USA: IEEE.

García-Peñalvo, F. J. (2016b). Technological Ecosystems. *IEEE Revista Iberoamericana de Tecnologias del Aprendizaje, 11*(1), 31-32. doi:10.1109/RITA.2016.2518458

García-Peñalvo, F. J. (2016c). What Computational Thinking Is. *Journal of Information Technology Research, 9*(3), v-viii.

García-Peñalvo, F. J. (2018a). Technological Ecosystems for Enhancing the Interoperability and Data Flows. *Journal of Information Technology Research, 11*(1), vi-x.

García-Peñalvo, F. J. (Ed.) (2008b). *Advances in E-Learning: Experiences and Methodologies*. Hershey, PA, USA: Information Science Reference (formerly Idea Group Reference).

García-Peñalvo, F. J. (Ed.) (2013). *Multiculturalism in Technology-Based Education: Case Studies on ICT-Supported Approaches*. Hershey, PA, USA: IGI Global.

García-Peñalvo, F. J. (Ed.) (2018b). *Global Implications of Emerging Technology Trends*. Hershey PA, USA: IGI Global.

García-Peñalvo, F. J., & Cruz-Benito, J. (2016). Computational thinking in pre-university education. In F. J. García-Peñalvo (Ed.), *Proceedings of the Fourth International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'16) (Salamanca, Spain, November 2-4, 2016)* (pp. 13-17). New York, NY, USA: ACM.

García-Peñalvo, F. J., Fidalgo-Blanco, Á., & Sein-Echaluce, M. L. (2018). An adaptive hybrid MOOC model: Disrupting the MOOC concept in higher education. *Telematics and Informatics, In Press*. doi:10.1016/j.tele.2017.09.012

García-Peñalvo, F. J., & García Carrasco, J. (2002). Los espacios virtuales educativos en el ámbito de Internet: Un refuerzo a la formación tradicional. *Education in the Knowledge Society, 3*.

García-Peñalvo, F. J., & García Carrasco, J. (2005). Educational hypermedia resources facilitator. *Computers & Education, 44*(3), 301-325. doi:10.1016/j.compedu.2004.02.004

García-Peñalvo, F. J., Hernández-García, Á., Conde-González, M. Á., Fidalgo-Blanco, Á., Sein-Echaluce Lacleta, M. L., Alier-Forment, M., . . . Iglesias-Pradas, S. (2015). Learning services-based technological ecosystems. In G. R. Alves & M. C. Felgueiras (Eds.), *Proceedings of the Third International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'15) (Porto, Portugal, October 7-9, 2015)* (pp. 467-472). New York, USA: ACM.

García-Peñalvo, F. J., Hughes, J., Rees, A., Jormanainen, I., Toivonen, T., Reimann, D., . . . Virnes, M. (2016). *Evaluation of existing resources (study/analysis)*. Belgium: TACCLE3 Consortium. doi:10.5281/zenodo.163112

García-Peñalvo, F. J., & Mendes, J. A. (2018). Exploring the computational thinking effects in pre-university education. *Computers in Human Behavior, 80*, 407-411. doi:https://doi.org/10.1016/j.chb.2017.12.005

García-Peñalvo, F. J., Reimann, D., Tuul, M., Rees, A., & Jormanainen, I. (2016). *An overview of the most relevant literature on coding and computational thinking with emphasis on the relevant issues for teachers*. Belgium: TACCLE3 Consortium. doi: 10.5281/zenodo.165123

García-Peñalvo, F. J., & Seoane-Pardo, A. M. (2015). An updated review of the concept of eLearning. Tenth anniversary. *Education in the Knowledge Society, 16*(1), 119-144. doi:http://dx.doi.org/10.14201/eks2015161119144

Goodyear, P. (2005). Educational design and networked learning: Patterns, pattern languages and design practice. *Australasian Journal of Educational Technology, 21*(1), 82-101. doi:10.14742/ajet.1344

Gros, B., & García-Peñalvo, F. J. (2016). Future trends in the design strategies and technological affordances of e-learning. In M. Spector, B. B. Lockee, & M. D. Childress (Eds.), *Learning, Design, and Technology. An International Compendium of Theory, Research, Practice, and Policy* (pp. 1-23). Switzerland: Springer International Publishing.

Gupta, A., & Gupta, C. (2018). A Collaborative Approach for Improvisation and Refinement of Requirement Prioritization Process. *Journal of Information Technology Research, 18*(2).

Herold, B. (2016). Technology in Education: An Overview. *Education Week*.

Hill, J. R. (2006). Flexible Learning Environments: Leveraging the Affordances of Flexible Delivery and Flexible Learning. *Innovative Higher Education, 31*(3), 187-197. doi:10.1007/s10755-006-9016-6

Joo-Nagata, J., Martínez Abad, F., García-Bermejo Giner, J., & García-Peñalvo, F. J. (2017). Augmented reality and pedestrian navigation through its implementation in m-learning and e-learning: Evaluation of an educational program in Chile. *Computers & Education, 111*, 1-17. doi:10.1016/j.compedu.2017.04.003

Kazakoff, E., & Bers, M. (2012). Programming in a robotics context in the kindergarten classroom: the impact on sequencing skills. *Journal of Educational Multimedia and Hypermedia, 21*(4), 371–391.

Kim, H., & Kim, J. (2018). Multidimensional Text Warehousing for Automated Text Classification. *Journal of Information Technology Research, 18*(2).

Kirkwood, A., & Price, L. (2014). Technology-enhanced learning and teaching in higher education: what is 'enhanced' and how do we know? A critical literature review. *Learning, Media and Technology, 39*(1), 6–36.

Kulik, C. C., & Kulik, J. A. (1991). Effectiveness of computer-based instruction: An updated analysis. *Computers in Human Behavior, 7*(1-2), 75-94. doi:10.1016/0747-5632(91)90030-5

Kumar, A., & Kumar, S. (2018). A Support Based Initialization Algorithm for Categorical Data Clustering. *Journal of Information Technology Research, 18*(2).
Kumar, A., & Sarkar, B. K. (2018). A Hybrid Predictive Model Integrating C4.5 and Decision Table Classifiers for Medical Data Sets. *Journal of Information Technology Research, 18*(2).
Lazaro, H. (2014). What is EdTech an why should it matter to you? Retrieved from https://goo.gl/7sPm62
Lee, A. Y. L., & So, C. Y. K. (2014). Media Literacy and Information Literacy: Similarities and Differences. *Comunicar, 21*(42), 137-145. doi:10.3916/C42-2014-13
López Meneses, E., Vázquez-Cano, E., & Román Graván, P. (2015). Análisis e implicaciones del impacto del movimiento MOOC en la comunidad científica: JCR y Scopus (2010-13). *Comunicar, 44*, 73-80. doi:http://dx.doi.org/10.3916/C44-2015-08
Lye, S. Y., & Koh, J. H. L. (2014). Review on teaching and learning of computational thinking through programming: What is next for K-12? *Computers in Human Behavior, 41*, 51-61. doi:10.1016/j.chb.2014.09.012
Martínez Abad, F., Rodríguez Conde, M. J., & García-Peñalvo, F. J. (2014). Evaluación del impacto del término “MOOC” vs “eLearning” en la literatura científica y de divulgación. *Profesorado. Revista de currículum y formación del profesorado, 18*(1), 185-201.
Martínez-Núñez, M., Borrás-Gene, O., & Fidalgo-Blanco, Á. (2016). Virtual Learning Communities in Google Plus, implications and sustainability in MOOCs. *Journal of Information Technology Research, 9*(3), 18-36. doi:10.4018/JITR.2016070102
Mens, T., Claes, M., Grosjean, P., & Serebrenik, A. (2014). Studying evolving software ecosystems based on ecological models. In T. Mens, A. Serebrenik, & A. Cleve (Eds.), *Evolving Software Systems* (pp. 297-326). Berlin, Heidelberg: Springer.
Moeller, S., Joseph, A., Lau, J., & Carbo, T. (2011). *Towards Media and Information Literacy Indicators. Background Document of the Expert Meeting, 4-6 November 2010, Bangkok (Thailand)*. Paris: UNESCO.
Mohbey, K. K. (2018). Utility based frequent pattern extraction from mobile web services sequence. *Journal of Information Technology Research, 18*(2).
Molenda, M. (1997). Historical and philosophical foundations of instructional design: A North American view. In R. D. Tennyson, F. Schott, N. M. Seel, & S. Dijkstra (Eds.), *Instructional design. International perspectives: Theory, Research, and Models* (Vol. 1, pp. 41-54). Mahwah, New Jersey: Lawrence Erlbaum Associates.
National Research Council Committee on Information Technology Literacy. (1999). *Being Fluent with Information Technology*. Washington, DC: National Academy Press.
Oblinger, D. G., & Maruyama, M. K. (1996). *Distributed learning*. Boulder, Colorado: CAUSE. Retrieved from https://goo.gl/5Qw24y
Pinto-Llorente, A. M., Casillas-Martín, S., Cabezas-González, M., & García-Peñalvo, F. J. (2017). Building, coding and programming 3D models via a visual programming environment. *Quality & Quantity, In Press*. doi:10.1007/s11135-017-0509-4
Prensky, M. (2008). Programming Is the New Literacy. Retrieved from http://www.edutopia.org/literacy-computer-programming
Ramírez-Montoya, M. S., & García-Peñalvo, F. J. (2017). La integración efectiva del dispositivo móvil en la educación y en el aprendizaje. *Revista Iberoamericana de Educación a Distancia, 20*(2), 29-47. doi:10.5944/ried.20.2.18884
Richey, R. C. (2008). Reflections on the 2008 AECT Definitions of the Field. *TechTrends, 52*(1), 24–25. doi:10.1007/s11528-008-0108-2
Robinson, R., Molenda, M., & Rezabek, L. (2008). Facilitating Learning. In A. Januszewski & M. Molenda (Eds.), *Educational Technology: A Definition with Commentary* (pp. 15-48). New York: Routledge.
Román-González, M. (2014). Aprender a programar ‘apps’ como enriquecimiento curricular en alumnado de alta capacidad. *Bordón. Revista de Pedagogía, 66*(4), 135-155. doi:http://dx.doi.org/10.13042/Bordon.2014.66401
Rubio Royo, E., Cranfield McKay, S., Nelson-Santana, J. C., Delgado Rodríguez, R. N., & Occon-Carreras, A. A. (2018). Web Knowledge Turbine as a Proposal for Personal and Professional Self-organisation in Complex Times. *Journal of Information Technology Research, 11*(1), 70-90. doi:10.4018/JITR.2018010105
Sánchez-Prieto, J. C., Olmos-Migueláñez, S., & García-Peñalvo, F. J. (2014). Understanding mobile learning: devices, pedagogical implications and research lines. *Education in the Knowledge Society, 15*(1), 20-42.

Selwyn, N. (2011). *Education and Technology: Key Issues and Debates*. London: Continuum International Publishing Group.
Seoane Pardo, A. M., & García-Peñalvo, F. J. (2014). Pedagogical Patterns and Online Teaching. In F. J. García-Peñalvo & A. M. Seoane Pardo (Eds.), *Online Tutor 2.0: Methodologies and Case Studies for Successful Learning* (pp. 298-316). Hershey, PA: IGI Global.
Spector, J. M. (2015). *Foundations of educational technology: Integrative approaches and interdisciplinary perspectives*. New York: Routledge.
Steil, J. J., Röthling, F., Haschke, R., & Ritter, H. (2004). Situated robot learning for multi-modal instruction and imitation of grasping. *Robotics and Autonomous Systems, 47*(2), 129-141. doi:https://doi.org/10.1016/j.robot.2004.03.007
Suppes, P., & Morningstar, M. (1969). Computer-Assisted Instruction. *Science, 166*(3903), 343-350. doi:10.1126/science.166.3903.343
TACCLE 3 Consortium. (2017). TACCLE 3: Coding Erasmus + Project website. Retrieved from http://www.taccle3.eu/
Vee, A. (2013). Understanding Computer Programming as a Literacy. *LiCS. Literacy in Composition Studies, 1*(2), 42-64.
Vidyarthi, D. P., & Jha, D. N. (2018). A Hybrid Heuristic for QoS Aware Matching of User's Job and Virtual Machines in Cloud Environment: A Hybrid Heuristic for QoS Aware Matching in Cloud Environment. *Journal of Information Technology Research, 18*(2).
Villalba Condori, K. O. (2018). Teaching Formation to develop Computational thinking. In F. J. García-Peñalvo (Ed.), *Global Implications of Emerging Technology Trends* (pp. 59-72). Hershey PA, USA: IGI Global.
Villalba Condori, K. O., Castro Cuba, S., Deco, C., Bender, C., & García-Peñalvo, F. J. (2017). A Recommender System of Open Educational Resources based on the Purpose of Learning. In A. Díaz, A. Casali, M. Chacón Rivas, & A. Silva Sprock (Eds.), *Proceedings of 2017 Twelfth Latin American Conference on Learning Technologies - LACLO 2017 (9-12 October 2017, La Plata, Argentina)* (pp. 104-107). EEUU: IEEE.
Walther, J. B. (1996). Computer-Mediated Communication: Impersonal, Interpersonal, and Hyperpersonal Interaction. *Communicaion Research, 23*(1). doi:10.1177/009365096023001001
Williams, T. C., & Zahed, H. (1996). Computer-based training versus traditional lecture: Effect on learning and retention. *Journal of Business and Psychology, 11*(2), 297-310. doi:10.1007/BF02193865
Wilson, S., Liber, O., Johnson, M., Beauvoir, P., Sharples, P., & Milligan, C. (2007). Personal Learning Environments: Challenging the dominant design of educational systems *Journal of e-Learning and Knowledge Society, 3*(3), 27-38.
Wing, J. M. (2006). Computational Thinking. *Communications of the ACM, 49*(3), 33-35. doi:10.1145/1118178.1118215
Yang, S. J. H. (2006). Context Aware Ubiquitous Learning Environments for Peer-to-Peer Collaborative Learning. *Educational Technology & Society, 9*(1), 188-201.
Yu, E., & Deng, S. (2011). Understanding Software Ecosystems: A Strategic Modeling Approach. In S. Jansen, J. Bosch, P. Campbell, & F. Ahmed (Eds.), *IWSECO-2011 Software Ecosystems 2011. Proceedings of the Third International Workshop on Software Ecosystems. Brussels, Belgium, June 7th, 2011.* (pp. 65-76). Aachen, Germany: CEUR Workshop Proceedings.