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The utopia of the technological revolution

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Today we live in a technological world and in a digital society. Technology is everywhere and we may face very complex problems because of we have the support of a high-level technological infrastructure (Etzkowitz & Leydesdorff, 1997; Fidalgo-Blanco, Sein-Echaluce, & García-Peñalvo, 2015; García-Peñalvo, 2016a).

Thus, it is true that at the present, when we talk about technology, we talk about the revolution. Nobody is oblivious to that social revolution that comes from the hand of technology. The advances occur so quickly, that we are training the generation of the future with knowledge and practices of the past in a present in which many people are already overwhelmed by the context of the informatics and communications.

Nevertheless, researchers related to the technological areas try to advance and create more knowledge in their specific areas and all of them have in mind a utopia, because of from the philosophical part of their work, a revolution that does not pursue a utopia is useless.

Perhaps, the utopia that researchers are looking for will be about advance, equity, social development, social inclusion, however many times this utopia collides with reality when we find ourselves new problems associated with these new advances or old problems that are disguised as new trends and that we have to face and resolve in some way. We cannot ignore them.

To tackle these digital society related issues, first, we have to break the strict existing paradigms and customs to allow that the knowledge of some areas be permeated and others in order to solve the problems we are facing (García-Peñalvo, 2014).

On the other hand, until not too long ago, you could even talk about a technological neutrality, really the technology is neither good nor bad, simply the use of technology is what will make that technology positive or negative. Right now, this asseveration already begins to not be true. Artificial intelligence, Internet of Things, robots, autonomous systems, etc. (Roblek, Meško, & Krapež, 2016) surround us and it is no longer the person who is directly managing that technology. Today, for example, we have autonomous cars, this is marvellous inside a lab, but what may happen when these

autonomous cars are in the roads and accidents may occur (and they have occurred with fatal consequences), then moral and ethics issues arise.

The lessons behind these happenings is that we still need the persons, we need researchers thinking for resolving the new challenges and defining which is the ethical context for the right use of the technology, where it is not enough to be a user of technology, persons have to know that technology that surrounds us, regardless of whether we are engineers or not (Balanskat & Engelhardt, 2015; García-Peñalvo & Mendes, 2018).

This special important for the educational of current primary and secondary students, which will the professionals of the near future (Llorens Largo, García-Peñalvo, Molero Prieto, & Vendrell Vidal, 2017). 21st century citizens will require computational thinking skills (García-Peñalvo, 2016b, 2018; García-Peñalvo, Reimann, Tuul, Rees, & Jormanainen, 2016) to understand the world in which they live and the artefacts they will find in their daily life. But, computational thinking is not an end in itself, it is only one item more in a toolbox plenty of options that should be chosen and combined (Tedre, 2017), for example, related to the above mentioned ethical issues the computational thinking skills should be always complemented with critical thinking capabilities (Buckley, 2012) with the aim that technology will be defined and used in the right way and ethically.

In this sense, WYRED project (García-Peñalvo, 2016c, 2017; García-Peñalvo & Kearney, 2016) is precisely working on to give the voice to the young people to reflect how they live the digital society and how they would like to change it. To do that, moreover than having significant and interesting debates, we propose also they develop research projects, playing a main role, using a citizen science approach. The results of these WYRED debates and research projects should be transmitted to the decision-makers in the responsible institutions and governments to know what really is happening in the construction and growth of the digital society from the experiences and reflections of its most important supporters for the near future, the young people.

Somehow, the problems that we are going to face every day are tremendously ambitious, tremendously attractive, but also dangerous. The technology is going to be there, but let's not forget that the important thing about technology is that it serves us, therefore researchers have to be there with our critical thinking to know it and to manage it, because otherwise we will become only in a mass controlled by that minority that controls technology.

To close this reflection about technological revolution to achieve the desired utopia in which the human factor is mandatory, I like to use a quote from one the most important scientific and philosopher, which unfortunately has recently abandoned us, Stephen Hawking “Success in creating effective AI, could be the biggest event in the history of our civilization. Or the worst. We just don't know. So we cannot know if we will be infinitely helped by AI, or ignored by it and side-lined, or conceivably destroyed by it” (Hawking, 2016).

This JITR issue is comprises ten research papers.

No-Gutiérrez et al., in their paper entitled “Evaluating Intercultural Sensibility in Compulsory Secondary Education. The case of Salamanca (Spain)”, study the level of intercultural sensitivity in students in the level of Secondary Compulsory Education of two schools in the region of Salamanca (Spain). The sample consisted of 220 people from two different schools, one public and one private. One of the main objectives is to see if there are significant differences in the answers given depending on the variables gender, ownership of the school and nationality (differentiating between native and foreign). On a first review, it was discovered, in general, there were not significant differences on the answers depending on type of school, gender or nationality.

The paper “Operation Patterns in Recommendation Systems”, by Cordón-García et al., analyzes different recommendation systems and examine how they are used within digital environments to establish classifications for books. Following a bibliographical review of recommendation systems, the performance of a number of book recommendation systems is tested. The systems tested are grouped according to whether recommendations are done by specialists, are based on social networking or use more complex statistical stylometry to help each reader find the reading materials best suited to them. Results indicate that progress in technology implementation is favoring the findability of books by combining the strengths of the various systems. The principal social implication of this research is that recommendation systems enable the reader’s optimized use of books, as well as allow the development of content appropriation systems.

Kouah and Kitouni, in their paper entitled “Multi-Layer Agent based Architecture for Internet of Things Systems”, provide an agent-based architecture for developing Internet of Things systems. The proposed architecture is multi-layer and generic. It encompasses four layers: Physical Component Management, Local Management - Coordination, Global Management-Coordination and Specialized Operative Management Layers. The first one can be seen as a smart layer that ensures connection and communication between things and the system. The second one constitutes the intelligent core of the system which acts locally to ensure coordination and further internal functioning. The third layer ensures coordination between the local system and the externals ones. The last layer supports additional behaviors which are domain dependent.

In the paper “Humanitarian Logistics. A Review and Scientometric Analysis”, Kumar and Kushwaha review the literature on humanitarian logistics for providing thorough outlook into the field. In this study, authors conducted a scientometric analysis of the literature published in 1998–2015 to empirically explore the important areas and key contributors of humanitarian logistics research and providing new outlook towards publication patterns, authorship pattern, major subject areas, research impact, and research productivity.

Kumar Ghosh and Das propose a hybrid scheduling algorithm in their entitled paper “Job Scheduling in Computational Grid Using a Hybrid Algorithm Based on Particle Swarm

Optimization and Extremal Optimization". This algorithm intelligently combines the exploration ability of Particle Swarm Optimization (PSO) with the exploitation ability of Extremal Optimization (EO). The hybrid PSO-EO reduces the schedule makespan, processing cost, and job failure rate and improves resource utilization. The proposed hybrid algorithm is compared with the standard PSO, population-based EO (PEO) and standard GA methods on all these parameters.

In the paper "Semantic Health Mediation and Access Control Manager for Interoperability among Healthcare systems", Alamri proposes a semantic-mediation architecture to support semantic interoperability among healthcare organizations. It provides an intermediate semantic layer to exploit clinical information based on richer ontological representations to create a "model of meaning" for enabling semantic mediation. The proposed model also provides secure mechanisms to allow interoperable sharing of patient data between healthcare organizations.

The paper "Automatic Detection of Career Recommendation using Fuzzy Approach", by Krishnamurthi and Goyal, proposes a recommendation of career on the basis of candidate personality attributes. In this paper Holland's theory is used to detect candidate's personality. Weights are assigned to each personality traits to calculate the scores are calibrated manually with help of research work done in this domain before and the feedback.

Al Sariera and Rangarajan, in their paper "Extraction of Blood Vessels in Retina", present a method to extract retinal vascular tree automatically. The proposed method consists of four steps; smoothing image using low pass spatial filter to reduce spurious noise in the image; extracting candidate borders of the vessels based on a local window property; tracking process, starting with a candidate pixel and following in the optimum direction with monitoring the connectivity of the vessel twin border; constructing the whole tree of retinal blood vessels by connecting the vessel segments based on their spatial locations, widths and directions.

The paper "Domain Knowledge Embedding Regularization Neural Networks for Workload Prediction and Analysis in Cloud Computing", by Li et al., proposes a neural network-based-method termed Domain Knowledge Embedding Regularization Neural Networks for large-scale workload prediction. Based on analyzing the statistical properties of a real large-scale workload, domain knowledge, which provide extended information about workload changes, are embedded into artificial neural networks for linear regression to improve prediction accuracy. Furthermore, the regularization with noisy is combined to improve the generalization ability of artificial neural networks.

Finally, in the last paper, entitled "Meta-heuristics based Load Balancing Optimization in Cloud Environment on Underflow and Overflow Conditions", Kaur et al. try to answer the question about which load- balancing (overflow or underflow) management will better improves the performance and QoS.

References

Balanskat, A., & Engelhardt, K. (2015). *Computing our future. Computer programming and coding Priorities, school curricula and initiatives across Europe*. Brussels, Belgium: European Schoolnet. Retrieved from https://goo.gl/i5aQiv

Buckley, S. (2012). The Role of Computational Thinking and Critical Thinking in Problem Solving in a Learning Environment. *Proceedings of the 11th European Conference on E-Learning*, 63-70.

Etzkowitz, H., & Leydesdorff, L. (1997). *Universities and the Global Knowledge Economy. A triple of a Triple Helix of University-Industry-Government Relations*. London: Pinter.

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

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

García-Peñalvo, F. J. (2016a). The Third Mission. *Education in the Knowledge Society, 17*(1), 7-18. doi:10.14201/eks2016171718

García-Peñalvo, F. J. (2016b). What computational thinking is. *Journal of Information Technology Research, 9*(3), v-viii.

García-Peñalvo, F. J. (2016c). 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, 9*(4), vi-x.

García-Peñalvo, F. J. (2017). WYRED Project. *Education in the Knowledge Society, 18*(3), 7-14. doi:10.14201/eks2017183714

García-Peñalvo, F. J. (2018). Computational thinking. *IEEE Revista Iberoamericana de Tecnologías del Aprendizaje (IEEE RITA), 13*(1), 17-19. doi:10.1109/RITA.2018.2809939

García-Peñalvo, F. J., & Kearney, N. A. (2016). Networked youth research for empowerment in digital society. The WYRED project. 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. 3-9). New York, NY, USA: ACM.

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: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.

Hawking, S. (2016). AI will 'transform or destroy' society. Retrieved from https://goo.gl/hG4QGA

Llorens Largo, F., García-Peñalvo, F. J., Molero Prieto, X., & Vendrell Vidal, E. (2017). La enseñanza de la informática, la programación y el pensamiento computacional en los estudios preuniversitarios. *Education in the Knowledge Society, 18*(2), 7-17. doi:10.14201/eks2017182717

Roblek, V., Meško, M., & Krapež, A. (2016). A complex view of Industry 4.0. *SAGE Open, 6*(2) doi:10.1177/2158244016653987

Tedre, M. (2017). *Many paths to computational thinking*. Paper presented at the TACCLE 3 Final Conference, Brussels, Belgium.