ERCIM
European Research Consortium
for Informatics and Mathematics

Scientific Report

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Nationality	Greek
Name of the *Host Organisation*	Norwegian University of Science and Technology (NTNU)
First Name / family name of the *Scientific Coordinator*	Michail N. Giannakos
Period of the fellowship	01/10/2018 to 30/09/2019

I – SCIENTIFIC ACTIVITY DURING YOUR FELLOWSHIP

During the period of my fellowship program, research was conducted for the development and validation of the educational data literacy competence profiles for online and blended education and training professionals. The developed framework consists of 6 competence dimensions and 17 competence statements and it has been validated through the engagement of 210 experts around the world, representing both Academia and Industry perspectives. The outcome of these efforts will be published in a SpringerBrief Monograph (approved and forthcoming). Furthermore, part of the research activities included the development of educational material to become available through a MOOC that aims to the development of the basic literacy competences on educational data analytics of online and blended teaching and learning. In particular, the material introduces the basics of methods and tools for analysing and interpreting online learners' data to facilitate their personalised support. It focuses on organising, analysing, presenting and interpreting learner-generated data within their learning context, as well as on ethical concerns and policies for protecting learner-generated data from mistreatment and misuse.

Further to that, an experimental study was designed and conducted at the Computer Science Department at NTNU with undergraduate students, in order to investigate differences in learning behaviours, including effort and engagement patterns and performance in an adaptive self-adaptive assessment activity, using students' multiple data channels, tracked during their interaction with a system, i.e., clickstreams, physiological data (Eye-tracking, EEG, blood volume pressure, heart rate, electrodermal activity, facial features) and questionnaire data. Additional activities were planned on this basis, including publications and delivery of an online service for the students.

Apart from the abovementioned activity, during the Fellowship I had the opportunity to give an invited talk at the Computer-Human Interaction in Learning and Instruction (CHILI) lab at Swiss Federal Institute of Technology Lausanne (Ecole polytechnique fédérale de Lausanne – EPFL). The topic of the talk was "Towards Efficient Autonomous Learning Decisions", and I presented my ongoing research work, my current project on educational data literacy, and we also discussed on the potential of future collaborations.

The following list of publications reflects the scientific activity conducted during this Fellowship.

II – PUBLICATION(S) DURING YOUR FELLOWSHIP

Books
1. Sampson, D., Papamitsiou, Z., Ifenthaler, D., and Giannakos, M. (2019). *Educational Data Analytics Literacy*, in (Eds.) M. Spector, M. Bishop and D. Ifenthaler, Educational Communications and Technology: Issues and Innovations Series, Springer Nature Switzerland (forthcoming - **SpringerBrief Monograph**).

Journals
1. **Papamitsiou, Z.,** & Economides, A.A. (2019). Exploring autonomous learning capacity from a self-regulated learning perspective using learning analytics, *British Journal of Educational Technology*, DOI: https://doi.org/10.1111/bjet.12747
2. Sharma, K., **Papamitsiou, Z.** and Giannakos, M. N. (2019). Building pipelines for educational data using AI and multimodal analytics: A "grey-box" approach, *British Journal of Educational Technology*, DOI: https://doi.org/10.1111/bjet.12854
3. Nouri, J., Ebner, M., Ifenthaler, D., Saqr, M., Malmberg, J., Khalil, M., Bruun, J., Viberg, O., Conde, M. A., **Papamitsiou, Z.,** and Berthelsen, U. D. (2019). Efforts in Europe for Data-Driven Improvement of Education–A Review of Learning Analytics Research in Seven Countries, *International Journal of Learning Analytics and Artificial Intelligence for Education*, 1(1), pp. 8-27.

4. **Papamitsiou, Z.,** Pappas, I. O., Sharma, K., and Giannakos, M. N. (2019). Utilizing multimodal data through an fsQCA approach to explain engagement in adaptive learning, *IEEE Transactions on Learning Technologies* (*forthcoming*)

5. **Papamitsiou, Z.,** & Economides, A. A. (2019). The impact of on-demand metacognitive help on effortful behaviour and performance: A longitudinal study using task-related visual analytics, *Computers and Education* (*forthcoming*)

6. Giannakos, M. N., **Papamitsiou, Z.,** Hourcade, J. P., Read, J., and Markopoulos, P. (2019). Mapping Child-Computer Interaction Research through Co-word Analysis (*submitted to International Journal of Child-Computer Interaction – under revision*)

7. **Papamitsiou, Z.,** Economides, A.A, and Giannakos, M. N. (2019). Taking control of the self-assessment: a learning analytics approach on the impact of learners' autonomy on performance, response-time and effort (*submitted to Computers and Education - under revision*)

International Conferences

1. **Papamitsiou, Z.**, Economides, A. A., and Giannakos, M. N. (2019). Fostering learners' performance with on-demand metacognitive feedback, *14th European Conference for Technology-Enhanced Learning (EC-TEL)*, Delft, The Netherlands, DOI: https://doi.org/10.1007/978-3-030-29736-7_32 (**Best paper award nominee**)

2. Sharma, K., **Papamitsiou, Z.**, and Giannakos, M. N. (2019). Modelling Learners' Behaviour: A Novel Approach using GARCH with Multimodal data, *14th European Conference for Technology-Enhanced Learning (EC-TEL)*, Delft, The Netherlands, DOI: https://doi.org/10.1007/978-3-030-29736-7_34

3. **Papamitsiou, Z.**, Giannakos, M. N., and Ochoa, X. (2020). From childhood to maturity: Are we there yet? Mapping the intellectual progress in learning analytics during the past decade, *10th International Learning Analytics and Knowledge Conference (LAK)*(submitted)

4. Sharma, K., **Papamitsiou, Z.,** Olsen, J., and Giannakos, M. N (2020). Predicting learners' effortful behaviour in adaptive assessment using multimodal data, *10th International Learning Analytics and Knowledge Conference (LAK)* (submitted)

III – ATTENDED SEMINARS, WORKHOPS, CONFERENCES

1. Learning Analytics Research Symposium, 21-22 November 2018, Copenhagen, Denmark.
2. 3rd ACM Summer School on Data Science, 11-17 July 2019, Athens, Greece.
3. 14th European Conference for Technology-Enhanced Learning (EC-TEL), 16-19 September 2019, Delft, The Netherlands.
4. Marie Curie Individual Fellowships Seminar, 22-24 May 2019, Trondheim, Norway.

5. NTNU Postdoc Career Conference: Life Outside Academia, 30 August 2019, Trondheim, Norway.
6. Invited talk at the Computer-Human Interaction in Learning and Instruction (CHILI) lab at Swiss Federal Institute of Technology Lausanne (Ecole Polytechnique Fédérale de Lausanne – EPFL), 11 March 2019, Lausanne, Switzerland.
7. Invited talk at the Division of Media Technology and Interaction Design at KTH Royal Institute of Technology, 28 March 2019, Stockholm, Sweden.

IV – RESEARCH EXCHANGE PROGRAMME (REP)

RISE Research Institutes Of Sweden and the Division of Media Technology and Interaction Design at KTH Royal Institute of Technology, Stockholm, 25 - 29th of March 2019, Sweden

During my visit at RISE and KTH, I met with Prof. Kristina Höök and I gave an invited talk to her group, presenting my previous and current work and my research interests. In our personal meeting with Prof. Höök, we dedicated our time to examine the potential for a collaboration on the intersection of interaction design and autonomous and self-regulated learning, focusing on designs that actuate self-knowledge for improving autonomous learning decisions. During my REP, I also had several meetings with the other members of the group and a fruitful meeting with Dr. Anna Ståhl. The group-members presented to me their current research projects and demonstrated their progress in research activities, and we had insightful discussions for identifying common ground for joint research and possible future collaboration. Finally, I also visited Dr. Sverker Janson, director of the Computer Systems Laboratory at RISE SICS, at Kista Multicore Center, whose interests in digital learning have a significant overlap with my expertise, and our discussion gave me reflective feedback on my future research plans.