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Learning Analytics Summer Institute Spain 2018

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Preface to the Conference Proceedings

The pervasive and extended use Information and Communication Technologies (ICTs) in Education is already a reality. Students and instructors can choose a wide range of technologies and tools in order to improve their teaching and learning. A common characteristic of ICT-supported learning is that student and teacher interactions in digital spaces leave a trail of data that allows collection and identification of learning evidence. The analysis of such evidence may lead to a better understanding of the teaching-learning process, facilitating educational decision-making, and to the improvement of educational processes and student achievement. Learning analytics groups together different techniques aiming to extract, collect and analyze educational data, gaining increasing relevance as a tool to support and improve learning in recent years. The different aspects of learning analytics have been covered so far in many scholarly works and academic conferences [1-10].

Learning analytics covers a wide range of analysis techniques and methods over different sources of data (content repositories, interactive systems, multimedia) and technologies (learning management systems, educational and serious games, virtual learning environments, mobile devices), including data mining and visualization, among others. The different techniques and methods focus on different key aspects of learning, such as detection of at-risk students, reduction of attrition rates, adaptive learning, or support to instructional design [8, 11-16].

The sixth¹ edition of the Learning Analytics Summer Institute Spain, LASI Spain 18² was held in León on June 18th and 19th, 2018. The conference was organized by University of León, in collaboration with the SNOLA (Spanish Network of Learning Analytics) research network of excellence. The LASI worldwide events, sponsored by SoLAR (Society for Learning Analytics Research), have become in the past years an awareness-raising, capacity-building, international network of events, where researchers and practitioners can meet and share their work, and envision the future of learning analytics. The programme of LASI Spain 18 comprised a great variety of activities that gathered representatives of academia and industry, including keynotes by international experts on learning analytics in Europe, academic paper presentation sessions, discussion panels and workshops.

The different activities gave attendants the opportunity to review the state of learning analytics in a global context, and also to showcase innovative pieces of research on the field that contribute new advances and knowledge to this field, mainly—but not only—from Spanish research groups.

The keynotes of LASI Spain 18 provided a broad but comprehensive overview of trending topics on learning analytics. More precisely, the keynotes of the conference were as follows:

- In “*Learning Analytics based tools for improving assessment and intervention in academic contexts*”, Rebeca Cerezo (University of Oviedo) discussed about the application of learning analytics tools in different educational contexts.
- In “*Modeling Education with Learning Analytics: Problems and Opportunities*”, David Griffiths (University of Bolton) provided an overview of the different issues we should consider when adopting learning analytics policies.

In addition to the academic keynotes, LASI Spain 18 has held four different sessions: 1) The Academic Session, which included the presentation of the scientific contributions included in these proceedings; 2) one session on “Application of Learning Analytics”; 3) one panel that gathered together different contributions from the Industry; and 4) two Workshops on Learning Analytics.

The presentation of scientific contributions to the Academic Session includes the twelve contributions included in these proceedings. The contributions share some common topics. Three studies present innovative learning analytics applications: “*Automatic Group Formation in MOOCs Based on Homogeneous Engagement Criteria*”

¹ The previous editions of LASI Spain, as LASI-local event, include the following:

- LASI Spain 2013 in Madrid: <http://www.emadridnet.org/index.php/es/eventos2/312-seminario-emadrid-learning-analytics-summer-institutue>
- LASI Spain 2014 in Madrid: <https://canal.uned.es/serial/index/id/1303>
- LASI Spain 2015 in Bilbao: <https://blogs.deusto.es/lasi2015Bilbao>
- LASI Spain 2016 in Bilbao: <http://lasi16.snola.es>
- LASI Spain 2017 in Madrid: <http://lasi17.snola.es>

² <https://lasi18.snola.es>

(Luisa Sanz-Martínez, Alejandra Martínez-Monés, Miguel L. Bote-Lorenzo, and Yannis Dimitriadis) proposes methods to achieve higher effectiveness in group formation in MOOCs; *“Learning Analytics to Assess Students’ Behaviour With Scratch Through Clickstream”* (Daniel Amo, Marc Alier, Francisco J. García-Peñalvo, David Fonseca, and María J. Casañ) analyses the behavior of students using Scratch for learning; *“Towards a Methodology and a Toolkit to Analyse Data for Novices in Computer Programming”* (Tatiana Person, Iván Ruiz-Rube, and Juan M. Doderó) presents a toolkit for learning analytics; and *“Learning Analytics and Recommender Systems Toward Remote Experimentation”* (Alexandre L. Gonçalves, Gustavo R. Alves, Lucas M. Carlos, Juarez B. da Silva, and João B. da M. Alves) shows how to provide students with recommendations about which remote labs can better suit their needs. The remaining group of contributions pivot around the idea of using learning analytics to facilitate decision making, including competence-based learning in *“Supporting Competence-based Learning in Blended Learning Environments”* (Mikel Villamañe, Ainhoa Álvarez, Mikel Larrañaga, Jessica Caballero, and Oscar Hernández-Rivas) and *“Design of an Extraction, Transform and Load Process for Calculation of Teamwork Indicators in Moodle”* (Ángel Hernández-García, Emiliano Acquila-Natale, Santiago Iglesias-Pradas, and Julián Chaparro-Peláez), assessment of student performance in *“Learning Analytics to Improve the Effectiveness of Continuous Assessment”* (Martín Liz-Domínguez, Martín Llamas-Nistal, Manuel Caeiro-Rodríguez, and Fernando Mikic-Fonte), *“SPEET: Visual Data Analysis of Engineering Students Performance from Academic Data”* (Manuel Domínguez, Ramón Vilanova, Miguel Á. Prada, José Vicario, Marian Barbu, Maria J. Varanda, Michal Podpora, Umberto Spagnolini, Paulo Alves, and Anna Paganoni) and *“Model for Evaluating Student Performance through their Interaction with Version Control Systems”* (Angel M. Guerrero-Higueras, Vicente Matellán-Olivera, Gonzalo Esteban-Costales, Camino Fernández-Llamas, Francisco J. Rodríguez-Sedano, and Miguel Á. Conde), or data visualization, such as the visualization of resource used described in *“Visualization Index for Educational Resources by Learning Analytics”* (Noemí DeCastro-García, and Ángel L. Muñoz-Castañeda), or dashboards with information about employability in *“Generation of Customized Dashboards Through Software Product Line Paradigms to Analyse University Employment and Employability Data”* (Andrea Vaquez-Ingelmo, Francisco J. García-Peñalvo and Roberto Therón). The presentation of these contributions took place during the two days of the conference.

The session on Application of Learning Analytics was also distributed in the two days of the conference. The session included the participation of several experts in the field, who shared their expertise and concerns, as well as the main problems they have faced when applying learning analytics and the benefits derived from the use of such applications. The researchers involved in this discussion were Manuel Caeiro (University of Vigo), Mikel Villamañe (University of the Basque Country), Alejandra Martínez (University of Valladolid), Pedro J. Muñoz (Carlos III University of Madrid) and Miguel Ángel Conde (University of León).

The Industry panel of LASI 2018 offered a different perspective on uses and applications of learning analytics from the business side. Four experts from the industry shared their expertise about the application of learning analytics in businesses: Nora M.

Villanueva from Gradient presented *Applying Learning Analytics to enhance learning experiences in secondary education and corporate environments*"; Camino Antón from SAP Business One discussed the use of learning analytics in large companies in *“Learning Analytics – Challenges and Opportunities in business”*; Agustín Cuenca from ASPGems showed examples of application of learning analytics in *“NeuroK: what we measure and why”*; and Luis A. Oliva from Brambles shared his views and experience in learning analytics in *“Companies learning requirements and learning analytics”*.

Finally, the conference included the celebration of two workshops that put conference participants in direct contact with learning analytics technologies: ElasticSearch and Kibana in *“Data Analysis with ElasticSearch and Kibana”*, by Antonio Robles and Llanos Tovarra (National Distance University of Madrid), and the ETL and data mining application RapidMiner in *“RapidMiner”*, by second one, by Ángel Hernández-García (Universidad Politécnica de Madrid).

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