



# Title of the PhD thesis: Design of dynamic, adaptive and contextual dashboards

## Context of the PhD thesis

The HUBBLE project (HUMAN OBSERVATORY BASED ON ANALYSIS OF E-LEARNING TRACES) is funded by the French Agency of Research (ANR). It aims at proposing the creation of an observatory for building and sharing analysis processes of massive e-learning traces. HUBBLE will enable the participants (teachers, students, learning designers, managers, etc.) to analyze and explain learning and teaching phenomena with technology enhanced learning environments. The analysis processes will guide the decision-making of the participants involving in the learning and teaching setting. Thus, they have to be usable and integrated in the latter. On top of that, they will also be used by e-learning researchers in order to produce concepts, models and indicators.

HUBBLE makes use of the existing platforms to allow the design, sharing and management of analysis processes based on the traces available in the observatory. HUBBLE will also consider ethical questions regarding traces and their analysis.

The HUBBLE project aims at promoting collaborative research activities between research teams in Computer Sciences and also in Human and Social Sciences, thus developing a national observatory. The research activity is based on case studies proposed by partners. These case studies will be used to design and implement the analysis processes, which will be later on shared throughout the observatory.

Beyond the experimental or technological results, the HUBBLE project fosters and strengthens a national community around Learning Analytics with an objective to increase its visibility inside the European and international research communities.

Project partners are MeTAH team of LIG (Grenoble), LINA (Nantes), SILEX team of LIRIS (Lyon), IEIAH team of LIUM (Laval), OpenClassrooms (Paris), French Institute of Education (IFé, ENS de Lyon), STEF (Paris) and LabSTICC (team IHSEV) of Telecom Bretagne.

## Thesis description

The dynamic dashboards aim at visualizing indicators given by the analysis process of massive learning traces covered by the project, as well as the interaction means among participants and/or with other resources produced or found during learning activities. These dynamic dashboards are generated according to the participants, their roles (teacher, learner, tutor, learning manager, designer, head, etc.), their past and current activity. In other words, these dashboards have to be adaptive and based on learning context. Therefore, there is a need to have relevant information organized contextually along with the dashboards being generated on the fly at the relevant moment throughout the learning process. In this regard, it is necessary to specify the links between indicators, their possible representations (according to the environment) and their targets (teacher, learner, tutor, etc.). There is also a need to produce templates of dashboards for specific learning situations that will be further reused (capitalization of observational situation). One of the main particularities of the research effort in this thesis covers the fact that indicators will be trans-learning situations and trans-learning environments. For instance, it is pertinent for a learner to monitor his progress or to have a



reflective analysis of his learning process thanks to the indicators, computed across different MOOCs and learning environments where he has involved. The research objective of this thesis is to propose a formal and declarative model, allowing the implementation of the dashboard (editor, compositor, generator of dashboards). To do so, it will be significant to work in collaboration with the other tasks of the HUBBLE project (analysis scenarios, indicators, etc.), and also to consider existing works of all partners. The work organization of this thesis will be iterative. Intermediate experimentation will be conducted during the project lifetime in order to validate the proposals.

### **Research teams**

The thesis is co-managed by the LIUM (Computer Sciences Laboratory of Le Mans University) located in Laval (France) and the LabSTICC of Telecom Bretagne located in Brest (France). The selected candidate will integrate the IEIAH (Engineering of Technology Enhanced Learning Environments) team of the LIUM and the Computer Sciences department of Telecom Bretagne. He will be directed by S. Iksal (LIUM) and S. Garlatti (Telecom Bretagne). He will have to share his time between the 2 laboratories.

### **Learning requirements**

Master or Engineer in Computer Sciences

### **Laboratories**

LIUM, IUT de Laval, 52 rue des Docteurs Calmette et Guérin, 53020 Laval France

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### **PhD Directors**

S. Iksal, S. Garlatti

### **PhD Supervisors**

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### **Bibliography**

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