

# A General Framework for Learning Analytic in a Smart Classroom

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**Abstract.** In this paper, we propose the utilization of the “Learning Analytics” paradigm in a Smart Classroom, a classroom that integrates artificial intelligence technology on the educational process. Learning Analytics can extract knowledge from the Smart Classroom platform, to better understand students and his/her learning processes. In this way, a Smart Classroom can understand and optimize the learning process and the teaching environments proposed. The smart classroom can adapt its components to improve students’ performance, among other aspects. Particularly, this paper proposes a framework about how the Learning Analytics paradigm can be used in a Smart Classroom, in order to provide knowledge about the activities taking place within it. The framework is defined like a closed cycle of Learning Analytics tasks, which generate metrics used like feedback to optimize the pedagogical model proposed by the smart Classroom. The metrics evaluate the learning process and pedagogical practice provided by the smart Classroom. So, our main contribution is about how the Learning Analytics paradigm can be used in a Smart Classroom in order to improve the students’ performance.

**Keywords:** Learning analytics · Smart classroom · Ambient intelligence · Data mining

## 1 Introduction

Ambient Intelligence (AmI) is an environment where the advances in information technology, mainly in ubiquitous and pervasive computing, allow the interaction with all computation devices as a whole. This idea is being used in the educational domain, and it is used in spaces where ubiquitous technology helps the learning process in an unobtrusive manner. A smart classroom is an expression of this, where a traditional classroom is redefined, with the integration of sensor technology, communication technology, artificial intelligence, among others, into the classroom. But, a smart classroom can generate enormous volumes of data about the educational process, which must be exploited by it, in order to improve the educational experiences of its users (students, teachers, etc.).