


# Chapter 37


## Big Data and Digital Tools Applied to the Teaching: Learning in Graduate Programs in Mexico

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### ABSTRACT

*This chapter will focus on the characterization of big data and digital tools applied in postgraduate programs in Mexico. The new economic order demands from academic organizations more efficient ways in their production and transfer of teaching-learning in graduate programs in Mexico. In this chapter, an approach to big data technology and its influence on education explaining the main educational methods and new professional options derived from big data analytics is given. It discusses the technical, legal, and ethical aspects for the adoption and use of big data technology in educational institutions.*

### INTRODUCTION

The use of Big Data Technology in education has already begun to provide great benefits in terms of improving educational management, the development of new methods for teaching and learning, the creation of new careers and professional options for students, as well as in the exploitation and use of digital collections generated by educational institutions.

Thus, the Big Data Analytics is the current key resource to analyze, visualize, understand, and improve education. For this reason, this article is aimed at those responsible for guiding the course of this (academics, researchers, teachers and the general public), and it is intended to give an insight into the

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current degree of advancement of this technology in education, as well as the facilities that exist for its instrumentation in educational institutions (Boyd, D., & Crawford, K., 2012).

The Big Data Technology allows the collection, storage, and preparation of large volumes of data to analyze or visualize the relationship between them. This includes data that are being generated in real time and that come from social networks, sensors, devices of various kinds or audio and video sources. In this way, it is possible to identify and predict in detail the causes or effects of complex events or processes (Lohr, S., 2012).

In the educational field, this technology has certainly started to offer great benefits. For example, in the improvement of educational management, the development of new methods for teaching and learning, the creation of new careers and professional opportunities, as well as the generation and storage of digital collections that constitute the product of years of academic, teaching and research activity (Gibson, D., & Ifenthaler, D., 2017).

Currently, it has transcended to a state in which new methods based on technology are needed to track students, improve their tutorials, obtain objective data from their evaluations, predict academic risks or simply understand the behavior of the students and the scholar groups. In this continuous change, teachers are more aware of the need to update themselves technologically in order to offer a more effective education adapted to the needs of the current school population.

For this reason, the method of observation in the classroom is no longer the most effective way to improve the educational process, but the big data analytics is the current key resource to understand and improve it. In the same way, digital collections, generated on a regular basis by educational institutions, must be integrated into the lake of data and thus improve its dissemination and exploitation, not only in the analytical processes of big data, but throughout society (Carrasco M., Sánchez C. & Carro A., 2015).

## **BIG DATA**

Big Data (large data, large volumes of data or big data as recommended by the Fundeú BBVA Foundation) is the confluence of a multitude of technological trends that had been maturing since the first decade of the 21st century, and which were consolidated during the years 2011 to 2013, when they exploded and burst with great force in organizations and companies in particular, and in society in general: mobility, social networks, increase in broadband and reduction in the cost of internet connection, social media, internet of things, geo-location, and very significantly cloud computing.

On the other hand, Massive Data or Data Intelligence is a concept that refers to the treatment and analysis of huge repositories of data so disproportionately large that it is impossible to handle them with conventional database and analytical tools (Chen, H., Chiang, R. H., & Storey, V., 2012).

In fact, this technology deals with all activities related to systems that manipulate large data sets. The most common difficulties linked to the management of the latter are focused on the collection and storage, search, sharing, analysis and visualization of information. The tendency to manipulate huge amounts of data is due to the need, in many cases, of using such information in the creation of statistical reports and predictive models that can be used in many areas of human endeavor.

Furthermore, Big Data has been translated into personalized teaching and has focused on the constant improvement of learning methods, using one of the most important technological trends for analysis and information processes.

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