

# Artificial Intelligence in E-Learning Systems

**A**

**Roberto Marmo**

*University of Pavia, Italy*

## INTRODUCTION

Education is one of the most essential sectors of society. It is linked with all of the other sectors and its impact on them is substantial. E-learning - or electronic learning - has been referred to as technology-enhanced learning, it describes a set of technology-mediated methods that can be applied to support student learning and can include elements of assessment, tutoring, and instruction.

With the traditional training approach, there is a single learning path, and the instructor/course creator defines the same order of content for all students equally, content is generic, and content is not adapted in relation to the interests of each person. With the traditional training approach, students can get bored, teachers have difficulty in analyzing the individual learning path, teachers have fewer resources to create teaching material.

As more and more students gain learning experience with computers, it is possible to record data on their progress and it is necessary to engage the student with learning materials.

The adaptive educational systems within e-learning platforms are built in response to the fact that the learning process is different for every learner. In order to provide adaptive e-learning services and study materials, that are tailor-made for adaptive learning, this type of educational approach seeks to combine the ability to comprehend and detect a person's specific needs in the context of learning with the expertise required to use appropriate learning pedagogy and enhance the learning process. Thus, it is critical to create accurate student profiles and models based upon analysis of their affective states, knowledge level, and their individual personality traits and skills. In this sense, it is necessary to give the system dynamic self-learning capabilities from the behaviors exhibited by the teachers and students to create the appropriate pedagogy and automatically adjust the e-learning environments to suit the pedagogies.

Artificial Intelligence changes the nature of industries, transport, health, finance etc. included education, so the prospect of personalized e-learning is quickly becoming a reality, allowing to determine how individual students understand the material and to develop more personalized curricula, while helping teachers identify problem areas of students, helping to provide the right content to the right student at the right time, to customize content based on each student's existing knowledge, to create eLearning courses in less time. Therefore, Artificial Intelligence has the power to optimize both learning and teaching, helping the education sector evolve to better benefit students and teachers alike. It is important to admit the current limits of technology and admit that AI is not (yet) ready to replace teachers but is presenting the real possibility to augment them.

The aim of this contribution is to describe some technologies and methodologies to execute personalized e-learning using Artificial Intelligence as specific approach, it also discusses background, knowledge, challenges, and critical factors necessary for successful implementation. The impact of the development of Artificial Intelligence on the role of educators is detailed.

DOI: 10.4018/978-1-7998-9220-5.ch091

## **Background**

Humans are lifelong learners. From our first breaths to our last, we are constantly learning: we learn about the world around us, we learn about each other, we gather new knowledge. To help us in this never-ending task, e-learning can be viewed as a system of electronic learning whereby instructions are devised or formatted to support learning and then delivered to the intended beneficiaries through digital devices that normally come in the form of computers or mobile devices.

The traditional model presents some common difficulties, including:

- too much content and way too long, this overwhelms people very easily;
- lack of personalized experiences, courses are often too generic and do not adapt to the specific needs of each student;
- don't really track the program's effectiveness, result estimation involves time-consuming data collection and entry processes;
- the student prefer to self-manage the learning experiences.

Artificial Intelligence is useful to improve the student experience of learning, and allows educators to analyze the performance and to create enhanced multimedia content in less time. Artificial Intelligence-based eLearning platform is a machine/system that possesses the ability to perform different tasks requiring human intelligence. It has the ability to offer solutions to human-related problems, like speech recognition, translations, decision making, and much more.

## **E-Learning Approach**

E-learning may be designed in two forms where one form of e-learning is designed as an instructor-led type of learning known as synchronous e-learning, while the other is designed in a format that is a self-paced individual study, known as asynchronous e-learning. In asynchronous e-learning, when the learners take up a course study that utilizes spoken or printed texts that come in the form of illustrations, photos, animation, or video as learning materials, and with which evaluations are made, the learners are then given the opportunity to control the time and place as well as the pace at which they want to undertake their own learning. The other e-learning format, known as synchronous e-learning, is real-time instructor-led training that is designed for instructions on the learning to be delivered or facilitated by an instructor to take place in a real time. In adaptive educational systems, the learner characteristics are monitored, and the instructional milieu is appropriately adjusted to offer support and to make improvements to the learning process.

People can now access educational materials with just a click on their phones and laptop. Today, students do not need to leave the warmth of their beds on winter mornings to be physically present in class. All they need is a computer and a smooth internet connection, and they are good to go.

There are abundant e-learning systems and methods (known as Learning Management Systems) that can be utilized to deliver online courses.

## **Educational Data Mining**

Educational Data Mining is an emerging interdisciplinary research area that deals with the development of methods to explore data originating in an educational context. It uses computational approaches to

13 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:

[www.igi-global.com/chapter/artificial-intelligence-in-e-learning-systems/317567](http://www.igi-global.com/chapter/artificial-intelligence-in-e-learning-systems/317567)

## Related Content

---

### MHLM Majority Voting Based Hybrid Learning Model for Multi-Document Summarization

Suneetha S. and Venugopal Reddy A. (2019). *International Journal of Artificial Intelligence and Machine Learning* (pp. 67-81).

[www.irma-international.org/article/mhlm-majority-voting-based-hybrid-learning-model-for-multi-document-summarization/233890](http://www.irma-international.org/article/mhlm-majority-voting-based-hybrid-learning-model-for-multi-document-summarization/233890)

### Intelligent System for Credit Risk Management in Financial Institutions

Philip Sarfo-Manu, Gifty Siaw and Peter Appiahene (2019). *International Journal of Artificial Intelligence and Machine Learning* (pp. 57-67).

[www.irma-international.org/article/intelligent-system-for-credit-risk-management-in-financial-institutions/238128](http://www.irma-international.org/article/intelligent-system-for-credit-risk-management-in-financial-institutions/238128)

### An Investigative Study on Internet of Things in Healthcare

N. A. Natraj, Sriya Mitra and Giri Gundu Hallur (2023). *Handbook of Research on Machine Learning-Enabled IoT for Smart Applications Across Industries* (pp. 116-126).

[www.irma-international.org/chapter/an-investigative-study-on-internet-of-things-in-healthcare/325993](http://www.irma-international.org/chapter/an-investigative-study-on-internet-of-things-in-healthcare/325993)

### Smart Blockchain: A Formidable Combination of Analytics and Blockchain – A Survey

Gutha Jaya Krishna, Vadlamani Ravi, Bheemidi Vikram Reddy and Mohammad Zaheeruddin (2020). *Smart Systems Design, Applications, and Challenges* (pp. 43-62).

[www.irma-international.org/chapter/smart-blockchain/249108](http://www.irma-international.org/chapter/smart-blockchain/249108)

### Redefining Management With Advent of Artificial Intelligence in the Current Business World

Rohit Bhagat and Vinay Chauhan (2023). *Meta-Learning Frameworks for Imaging Applications* (pp. 186-197).

[www.irma-international.org/chapter/redefining-management-with-advent-of-artificial-intelligence-in-the-current-business-world/331484](http://www.irma-international.org/chapter/redefining-management-with-advent-of-artificial-intelligence-in-the-current-business-world/331484)