Chapter 38
AI and Individualized Education in Phys Ed and Sport

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ABSTRACT

The development of AI technologies in recent years has opened the doors to a wide array of application domains. One field of study in particular has great potential to use this knowledge: physical education and sport. New devices and software have made their way into the field of physical activity, motivating the investigation of AI-driven technologies as a tool in developing a new type of educational system. The general scope of this chapter is to analyze the use of AI individualized education in one major field of study: physical education and sport. The use of AI technologies in training future teachers is also discussed and analyzed. The implementation of AI software in sport is brought to attention, along with relevant case studies. Limitations and hurdles in constructing intelligent support systems for training were identified. Accessibility of an AI-driven educational system was detailed, pointing out barriers with regard to culture, social environment, and age differences.

INTRODUCTION AND CONTEXT

Ever since the industrial revolution of the 18th century, the different educational systems around Europe tried to prepare the population for the new jobs and abilities that the industries required. This was achieved by molding both the body and the mind toward the desired form that best suited effectiveness in the workplace. Over the centuries these desired models of behaviour may have changed but the base objective of the educational system has remained the same: to adapt the individual for the greater (societal) good.

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The technological era we live in has allowed the development of artificial intelligence (AI) and, subsequently, its spread into many fields of study. Different industries have explored the use of AI to improve either the effectiveness or safety of production. Even though AI-driven modules, applications, or agents may be used to undertake difficult or complex tasks previously performed by humans, the educational system is still concerned with adapting humans for future jobs. But we have at our disposal the means to adapt the workplace for humans with the use and implementation of AI-based technologies.

To achieve this we must start at the roots, where humans as individuals begin their journey toward becoming useful for society: the educational system. Through AI implementation within the educational system, not only are we able to create a flexible and permanently adapting environment for development, but we can also turn the educational molding of the future worker from a relatively rigid domain toward abilities that allow them to be more flexible at the end of the process.

Even though the educational system is still conceptually rooted in an aging dogma, the modern era has infused its process with a series of principles. These principles are not new, their beginnings can be found in Greek or Roman schools. Nevertheless, they grew in importance due to the need of making the educational process less reliant on subjective progress but more consistent through objective evolution. One of these principles is the individualization of the educational process. It can offer a unique way of molding the teaching process for each individual subject, with the sole purpose of obtaining optimal results. It has the power to transform the form of the educational process so drastically that it may seem a totally different endeavor, but at its core it remains the same. Through individualization it is possible to: make education more effective, to obtain optimum outcomes, to adapt the process to the needs of the individuals, and to reach particularized final objectives of development.

We believe that AI-driven technology can be successfully used in achieving the individualization of the educational process. The flexibility, constant adaptation, and the step by step growth of an intelligent system may be used in the educational process effectively due to the fact that some of these characteristics can be found among the principles of education itself.

The general scope of this chapter is to analyze the use of AI toward individualized education in one major field of study: physical education and sport. We have chosen this field because it offers high diversity in the outcomes of the educational process: forming teachers of physical education, trainers, coaches, researchers, managers of sport related entities, and injury prevention or recovery personnel.

This chapter is primarily a position paper, derived out of two decades of combined experience in teaching in the fields of phys ed & sport and in systems engineering, and designing intelligent systems with applications in both fields. The paradigms of education at the beginning of the new millennium are often found lacking, through the entirety of the new generation's formative years. It is our duty to identify these shortcomings, to fix them for the future of our society; and what better way to start if not by making use of the 'new and shiny' array of tools made available through machine intelligence? This is a first step, a small one, but important nonetheless.

Throughout the chapter we will cover the reasons why AI can be used for the individualization of education concerning four aspects: physical education, sport, general physical performance, and accessibility. Our main objective is to analyze the particularities of these educational processes, to identify areas where improvement is paramount, and to determine opportunities where AI integration can solve some of these problems.

We are going to address several aspects of AI and individualized education in sports. These aspects mostly address problems and issues we've identified through our direct involvement in the educational system regarding physical education and sport. The aspects we'll be covering are: