Chapter 25

Toward the 4th Agenda 2030 Goal:
AI Support to Executive Functions for Inclusions

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ABSTRACT

The 2030 Agenda settles inclusion as a crucial goal. The index for inclusion underlines a set of resources to guide educational agencies through a process of inclusive development. One interesting model to achieve it is the Universal Design of Learning (UDL) framework, whose roots lie in the field of architecture and cognitive neuroscience. It provides options to enhance the executive functions also with the support of assistive technologies: studies have recently contributed to investigate how AI-innovated Educational Management Information Systems (EMIS), apps, and learning assessments can offer to the teachers the opportunities to differentiate and individualize learning, to diagnose factors of exclusion in education, and predict dropout, dyslexia, or autism disorder. After a discussion on the state of research and on the preparatory concepts, the chapter presents examples of AI-supported tools, and how they can scaffold executive functions; it wants also to urge a future-oriented vision regarding AI and to re-think the role of education in society.

INTRODUCTION

This paper assumes as a starting point that, according to UNESCO the 2030 Agenda (2015), inclusion is settled as a crucial goal in social, civil, and educational contexts, as an overarching principle whose golden rules can give visible size and form to its sparkling friend, equity. Both must be ensured to every person everywhere and a primary role in this is played by education (that is a fundamental and enabling human right and a public good), and, in consequence, by schools (goal 4).

The Index for Inclusion (Booth, 2011) underlines a set of resources to guide schools through a process of inclusive development; they are expected to go beyond the idea of special educational needs, to focus more to the contexts limitations rather than the individual ones, and to move forward, becoming capable to welcome any child, thanks to the support of flexible policies and practices.

Among the numerous models present in the educational landscape it can be interesting to consider the ones having an alliance with the cognitive neurosciences, also assisted by the analysis of storaged data. And this is exactly the case of the Universal Design of Learning (UDL) framework, a compelling alternative to a standardized model of education, originated in the Eighties in the USA in the Centre for Applied Special Technology (CAST, 2020). In particular, to achieve inclusion, UDL provides options to the executive functions, which allow humans to pay attention, to overcome impulsive and short-term reactions at their environment, to plan effective strategies for reaching goals, and to modify strategies as needed: in short, they allow learners to take advantage of their environment. It can be observed that an alliance between UDL principles and AI can be disruptive to enhance inclusive learning environments.

So, it is not surprising if the 2020 edition of MLW (Mobile Learning Week) the United Nations' flagship event on Information and Communication Technology (ICT) in education, held from 2 to 6 March 2020 in Paris under the theme Artificial Intelligence and Inclusion, has been designed to steer the use of Artificial Intelligence (AI) towards the direction of inclusion and equity in and through education core values underpinning the Sustainable Development Goals (SDGs) and digital opportunities for all (UNESCO, 2019 bis). Also the Stanford's AI Index 2019 Report remarks that Artificial Intelligence has applicability across all 17 of the Nations Sustainable Development Goals (2019). And on the other hand, many studies (Laanpere et al., 2014; Luckin et al., 2016; Mayer-Schönberger & Cukier, 2014; Montebello, 2018 e 2019; Kirkland, 2018; Tuomi, 2018) has recently contributed to investigate the ways in which AI can help improve learning opportunities for students and management system.

An interesting attempt to capture the dynamic portrait of Artificial Intelligence, one of the most influential forces in the world today, is the Tortoise's Global AI Index (2019): it analyzes how 54 countries are driving and adapting to AI's accelerating development and still concerns can not be denied: among the others, is pointed out the fact that AI biases are increasing, and potentially threatening equity and inclusion.

But, if AI has the means to disrupt inequity in schools, or make it much worse, we have to be aware that AI systems are only as good as the data, and algorithms that are put into them: bad data can contain implicit racial, gender, or ideological biases. So, it must be remarked the need by one hand to mitigate human biases in AI, on the other to increase among educators and policymakers the awareness of AI technologies and their potential impact and to develop a future-oriented vision regarding AI, to re-think the role of education in society.

Yet, the whole issue of the negative impact that digital technologies have on human behaviour and cognition is not denied, but deliberately omitted here: in fact, despite the critical issues, no doubt emerges about its huge impact in supporting teachers in offering differentiated and individualized learning, learners can be tutored and supported also outside the classroom and AI-innovated Educational Management Information Systems (EMIS) and AI supported learning apps can be used to precisely diagnose factors of exclusion in education and predict dropout, dyslexia, or autism disorder (Pedro, 2019).

Before moving onto the discussion, we point out that examples of AI-innovated Educational Management Information Systems (EMIS) and apps supporting executive functions like attention, memory, and planning will be presented.

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