



Artificial Intelligence and its implications in Basic Education

Inteligencia artificial y sus implicaciones en la Educación Básica

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ABSTRACT

The new challenges of the information society demand from the Ecuadorian education a great change in its rigid canons of academic training at all times arise the formats based on artificial intelligence promise to be a very substantial improvement in education for all levels, with a qualitative progress without precedents: To provide the student with an accurate active personalization of their learning according to their requirements, managing to integrate various forms of human interaction possible within the coexistence of their family and social school context framing the information and communication technologies that are perfect allies of daily learning. The challenge of

today's school is focused on constituting more adaptive people and with greater emotional domain that within the globalized world require expertise to not be influenced by others is why contextualizing this new millennium gravitates on the pressing need to organize, plan, design, develop and implement digital skills in order to form better people able to understand and develop the technological environment according to their priorities, By implementing the universalization of a digital language supported by programs developed under dimensions of artificial intelligence in education will allow to better understand the profile of students and their shortcomings, it is possible to create plans to organize effective and innovative educational activities that allow students to learn in a practical and theoretical way at the same time contributing to the classroom work where children put into play their acquired skills.

RESUMEN

Los nuevos retos de la sociedad de la información demandan de la educación ecuatoriana un gran cambio en sus rígidos cánones de formación académica en todos los momentos surgen los formatos basados en inteligencia artificial prometen ser una muy sustancial mejora en la educación para todos los diversos niveles, con un progreso cualitativo sin antecedentes: Proporcionar al estudiante una certera personalización activa de su aprendizaje a medida de sus requerimientos, logrando integrar diversas formas de interacción humana posible dentro del convivir de su contexto escolar familiar y social enmarcando las tecnologías de la información y comunicación que son aliados perfectos del aprender diario. El desafío de la escuela de hoy se concentra en constituir personas más adaptativas y con mayor dominio emotivo que dentro de mundo globalizado requieren experticias para no dejarse influenciar de otros es por ello que contextualizando a este nuevo milenio se gravita en la apremiante necesidad de organizar, planificar, diseñar, desarrollar e implementar competencias digitales a fin de formar mejores personas capaces de entender y desarrollar el entorno tecnológico en función a sus prioridades, dentro de su cotidianidad implementando la universalización de un lenguaje digital sustentado en programas desarrollados bajo dimensiones de inteligencia artificial en la educación permitirá comprender mejor el perfil de los estudiantes y sus insuficiencias es posible crear planes organizar actividades educativas eficaces e innovadoras que permitan a los estudiantes aprender de manera práctica y teórica al mismo tiempo contribuyendo

al trabajo aúlico donde los niños ponen en juego sus competencias adquirida.

Keywords / Palabras clave

Artificial intelligence; educational activities; student profile; classroom work.

Inteligencia artificial; actividades educativas; perfil estudiantil; trabajo aúlico.

Introduction

Schools can use artificial intelligence to collect massive amounts of student data and analyze it in seconds in order to make more convenient and faster decisions based on up-to-date and real information. Artificial intelligence is a means to automate tasks and processes, allowing educators to focus on more important activities, such as teaching and interacting with students. This is reflected in the efficiency of the classroom and reduces the workload of educators. It is possible to design virtual tutors that can grade quizzes, identify the most common mistakes made by students and even provide feedback on their performance in real time, which greatly facilitates the work of teachers and their intervention in academic events with their students.

In the current context of a world of second by second evolution, we find ourselves immersed in a society that is increasingly moving towards the process of massive and productive technification that requires every so often, and with enormous advances, all the sectors that structure it are, to a certain extent, submitting in some chaos or adapting in others to the advances of technology and, according to their level of development reached, adapting to such inevitable tendency. The area of education (which is sensitive to the changes in society as it advances along with it) is also going through this inevitable trend of adaptation to the new communities of technological interaction; a process that is oriented to new trends and profiles in relation to the new proposals in the sector. However, the crucial question is: to what extent is technology capable of revolutionizing the universe of education, especially in the field of basic education?

The structural assumption of such a novel and at the same time vertiginous parameter, requires the development and increasingly impacting applications, so much so that the discrepancies and fears that arise in relation to the application of artificial intelligence (AI),

should be a key point in the discussions of transcendence in relation to the novel proposals in basic education and at the same time the quantifications that allow a better administration of this important mechanism should be awarded, as well as the applicability of effective policies, more and more adequate to vitalize in a balanced way the possibilities of AI, according to the needs of the most representative institutions of society (such as universities) and therefore, the citizens are the beneficiaries of these successful measures.

From the earliest levels such as infants to the highest standards, one of the key mechanisms by which AI will impact education will be through applications related to individualized learning and its characteristics. This process is nothing new, since at the level of information and communication technologies, the development and implementation of simulators and tutorial programs, as well as various interactive game software developed under an increasingly user-friendly interface, is the driving force behind its development. These systems implements try to adapt to the diverse needs of students for which the development of new technologies makes the purposes more viable.

In relation to the process of personalized education, the application of AI can, in a certain way, be considered as a viable solution, since the automated assistance in relation to the help of students (regardless of the level) allows a new and attractive perspective in relation to the dynamism of learning, since the virtual interaction, regulated by the parameters of AI, facilitates learning, since the support mechanisms will be available when necessary, regardless of the time and space of the user. The above leads us to rethink the teaching and learning process whose impacts in relation to the trend of an adaptive education panorama will have a great impact on conventional learning, and as new and better applications based on AI are developed, it will be more than likely that the new curricula can be sensitive and versatile to the accelerated adaptation in relation to the new and parsimonious ways of understanding the educational task in the present century.

According to Saavedra (2016), the last decade has seen a path of enormous changes, many of them directly imperceptible to the majority, but whose transcript covers and will continue to cover a myriad of activities, since technological advances are unprecedented in history, as they have driven knowledge management in a timely manner at the highest levels of decision-making, not only in government but also in the private business sector. The intelligence

function as an element of public policy at national and strategic levels is undergoing important changes within today's global and interdependent society. (p. 79) In a general sense, Artificial Intelligence aims to emulate the various capabilities of human brain intelligence. For this purpose, different systems and machines are used to automate the performance of various teaching tasks.

Currently, the implementation of artificial intelligence in education can offer several benefits in the teaching and learning process, since, among its various utilities, it allows a more personalized monitoring of students' motivation and academic performance.

Artificial Intelligence (AI) in education allows the automation and simplification of learning processes. Through it, it is possible to reduce time and improve results for the youngest students.

It is possible to apply different types of AI and manage them in the classroom for improvement, both face-to-face and remotely, a matter that had to be carried out during the global pandemic confinement of COVID-19 and was done with all the vagaries of time and space.

Although the use of this technology has not yet been developed to its full potential, there are several ways to take advantage of it. Thus, some of the uses of Artificial Intelligence in education are the following:

Teachers can use Artificial Intelligence in education to design curricula. To do this, they can use AI software that searches the Internet for content related to a particular subject matter that is most relevant.

The AI can also automatically create courses, making this task easier for the teacher because he/she will only have to correct the information and verify that it is correct.

On the other hand, these algorithms can also create questions and exercises about the content that is collected.

Through Artificial Intelligence it is possible to design virtual tutors that can grade quizzes, identify the most common mistakes made by students and even provide feedback on their performance in real time, which greatly facilitates the work of teachers.

These functions allow students to realize what their strengths and weaknesses are when learning, which in turn will help them improve their learning processes and academic performance.

In addition, as it is a virtual tutor, this software allows students to solve their doubts 24 hours a day and from anywhere.

Materials and Methods

Artificial Intelligence also makes it possible to develop educational content based on different learning styles and rhythms.

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In this way, students will be able to count on educational resources that are more adapted to the way they assimilate information, since different kinds of audiovisual materials can be offered to facilitate the internalization of knowledge, depending on the different representation systems (visual, kinesthetic and auditory).

Teachers can take online training courses to update their knowledge about their educational work, and update their skills in the use of digital tools that facilitate social inclusion.

These professionals will be able to access various courses that will allow them to learn about innovative teaching and learning methodologies and strategies, being able to apply them to their classrooms to improve the academic motivation of students, whether they apply e-learning or face-to-face education.

Through data analysis, Artificial Intelligence can predict the likelihood of school dropout rates and track students who are most at risk of dropping out of school.

In this sense, teachers can take advantage of this type of information to design learning strategies that allow them to work individually with students. They can also improve students' motivation to learn in order to discourage them from dropping out of school, which is usually a behavioral pattern among those who have fewer economic resources.

Although Artificial Intelligence may generate controversy in the ethical sense, it can be used to produce significant changes in the quality of education and improve the performance of teachers in their teaching tasks.

Results

AI is a major topic in itself, as it manages to overwhelm many aspects of current trends; but, the average population understanding of it is the minimum. On this aspect, Mialhe and Lannquist (2018) mentioned that the enormous mass of citizens of the so-called "world village" are in a not very privileged situation with respect to AI technologies and are notoriously unaware of the possible effects and therefore the risks to which they would be exposed in the face of this ineluctable advance that is being gestated at increasingly accelerated steps. The above can not only be understood from the social-economic risk, or possible debacles by "machine independence" as some possible apocalyptic futurists tend to lucubrate, i.e. dystopian points of view on what is related to AI; but the impacts of AI technologies do not require a future to impact in various ways in this globalized world, since one of the consequences and dynamic axes of this process is based on these technologies that optimize many and diverse activities: in the world of real-time interactivity, the consequences of the possible alterations that are the product of the application of AI will pose new and transcendental challenges (Diéguez, 2017); making it clear that the impacts caused by the industrial revolutions and others of the twentieth century are minimal in relation to what is emerging based on AI, which poses enormous crossroads and associated problems due to the scope and speed of those possible impacts. (Mialhe and Lannquist, 2018).

The employability criteria of AI is very diverse and is currently used primarily by branches such as computer science and robotics (Vázquez, Jara, Riofrio, & Teruel, 2018); but that is not all, since its possibilities extend to multiple areas such as social sciences and its potentialities as support in business sciences where the boom of real-time estimation of values and the enormous amount of data to process requires the implementation of AI-based systems (Mialhe, 2018). Nor can it go unmentioned that the current development of artificial neural networks and processing systems based on genetic algorithms are increasingly more widespread technologies and are rigorously used in the field of research and dynamics of stock markets (Badaró, Ibañez, Agüero, 2013).

Regarding the economic part and its enormous implications of global index, there is the strong intentionality of the so-called leading

companies in the development of AI, whose clear tendency is to position themselves in the world market; But under a subtle but very convenient scheme of unrestricted access to the data generated in the digital world, to the development of a computing power that allows them to make the most of the data generated at every moment of time and, at the same time, to the management of highly qualified talents to make this purpose possible; that is, the programmers and technicians at the forefront in the design and implementation of machine learning algorithms and all the technologies that can be derived from these applications. This aspect has been referred to as the "fourth industrial revolution" (Corvalán, 2017) or the "fifth domain" (Saavedra, 2016). The above is evidenced by Mialhe and Lannquist (2018) where the most powerful corporations in the market "collect more consumer data, hire more talented professionals, and have resources to build dedicated, large-scale hardware and cloud supercomputing capabilities." (p. 224). This matter of prolix development derives in a positioning of such companies with respect to their direct competition, which evidences the changes manifested.

According to Saavedra (2016), as proposed from the perception of strategic intelligence, the changes are and will be more than evident under the formula of a fertile amalgam between robotic, digital and computational technology supported by AI, which will be the catalyst of the most fertile changes in the history of mankind. In all this aspect there is a crucial aspect that becomes the regulation mechanism, the limits of effective scope, in which the population is not vulnerable in relation to a bad practice or application of the enormous data generated from human groups and their trends, which as information in the cloud can be processed and determine or guide consumption patterns or as we have already seen cases of political trends, which is why the application of regulations according to local policies is urgent, and why not say the global ones, since in the digital environment the limits are not yet defined.

Human intelligence is the sum of those cognitive abilities that give human beings a relative autonomy, which can be categorized as "intelligence profiles" or "multiple intelligences", according to Corvalán (2017). Now, other researchers such as Barrio (2018) from the anthropological perspective give another perspective to such intricate aspect, assuming differences between artificial and human intelligences, since according to this researcher the computer (regardless of its capacity or power) is limited in the management of what he calls "signifiers" (logical programming language) with a

memory capacity superior to human intelligence; But unlike the latter, it is not capable of interpreting the meanings; therefore, the operational or calculating intelligence of a computer is limited to the handling of information, but it does not have the capacity to understand what it processes.

Among the diversity of aspects related to the idea of "intelligence", we have that the transversal axis is the capacity to process information from the surrounding world and that is oriented to the solution of problems. In essence, the brain, specifically the cerebral cortex, controls the capacity to process information coming from the environment and from the organism itself, which must be used immediately to evaluate and choose the mechanisms of action, on a decision plane and the selection of options that seem the most useful or possible.

Mariño and Primorac (2016) delve a little deeper into the issue by stating that AI is conceived as part of Computer Science that allows to provide "a diversity of methods, techniques and tools to model and solve problems by simulating the behavior of cognitive subjects". (p. 232). From another perspective, AI can be understood in the terms exposed by Herrera and Muñoz (2017) who in this regard conceives it as a science that is oriented to the search for a deep understanding of intelligence, taking into account the delimitation of it, its possibilities and characterizing it as a challenge of enormous complexity. But to go into the context of AI we must go back to its beginnings, that is to say, we must refer to Alan Turing, as one of the pioneers in this aspect when he designed the famous "Turing machine" that under a scheme of data processing in a binary system was able to process any type of possible calculation, and in the last years of his life he set himself the task of developing the challenge that was called "the test of the Turing machine", situation by which it was possible that the machine had the possible attribution of thought with a condition: That the observer cannot clearly distinguish its behavior with that of a human being, i.e. a kind of mimetic independence; thus the implicit and explicit paradigm of AI is established and therefore it is worth noting since its genesis the great pioneers of this branch of knowledge such as McCulloch, Turing, von Neumann, Wiener and Pitts, Gardner, among others (Ramos, 2014).

Is it possible to attribute human faculties to a machine? The possible answer to such a diatribe is centered in the field of cognitive science, from which historically the beginnings of the same in 1956 in a

Congress on the theory of information held by the Massachusetts Institute of Technology (MIT), where the figure of Noam Chomsky stands out who, in establishing the parameters of what we know as language, referred to a whole system systematically structured under a formal scheme, similar to mathematics, he referred to a whole system systematically structured under a formal scheme, similar to that of mathematics, which to some extent was justifying (with a certain presumption of scientific rigor) the attribution of human faculties to a machine, a process conceived as a form of mechanical thought in a computer. From the analysis of such proposals, two ways of understanding AI were born: (1) weak AI, which is only restricted to the use of computers for the study of the cognitive possibilities of human beings; while (2) strong AI was oriented to link the nexus between AI and human intelligence and to see how to link them more and more (Ramos, 2014).

It is classic to understand that the university strategically has been dedicated to conservation and integration of the so-called cultural heritage of knowledge, ideas and values generated by the development of humanity in the various fields of scientific, technical and humanistic endeavor; virtue by which, as appropriate to the context, it has remained strategically conservative, since in essence it could not be questioned for it, because the university understood mediatically as a representative institution in the whole orb, has the regime of autonomy, which empowers it to maintain such apostolate. To shed more light on the matter Morín (2018) exposed the meanings of conservation in the university mission in two opposing profiles:

Vital conservation, which is aimed at preserving and safeguarding, as a function of the development process that sustains the future, based on the foundations of a conserved and transmitted past under the canons of the academic cloisters; since, in its understanding, the future, understood as such, cannot materialize if it is not umbilically linked to a safeguarded past.

Sterile conservation, an aspect that would not be so negative if, historically referenced, the university for a long time and due to its origins, has been maintained under an ankylosed and very conservative dogma since in its cloisters rigidity and ostracism have been the guiding parameters of much of the time of its existence, as what happened in the oldest universities known; and that even without taking into account the iron clerical adoptions that have cemented the foundations of many of them in the old continent. This point has also

been discussed, as for example in the Peruvian case on university reform, which at the time was vitally urgent, as the "Amauta" José Carlos Mariátegui (1980) stated when he mentioned that the university was conceived as "the Bastille of reaction". Artificial intelligence (AI) has the potential to address some of the greatest challenges facing education today, to develop innovative teaching and learning practices and, ultimately, to accelerate progress towards the achievement of SDG 4. However, these rapid technological advances inevitably entail numerous risks and challenges, which policy debates and regulatory frameworks are still struggling to overcome. UNESCO is committed to assisting Member States in harnessing the potential of AI technologies to achieve the 2030 Education Agenda, while ensuring that the use of AI technologies in the educational context is governed by the principles of equity. UNESCO's mission is an intrinsic call for a human-centered approach to AI that aims to reorient the debate to include the role of AI in addressing current inequalities in access to knowledge, research and diversity of cultural expressions, and to ensure that AI does not accentuate technological differences between and within countries. The promise of "AI for all" must enable everyone to take advantage of the technological revolution underway and access its benefits, particularly in terms of innovation and knowledge.

In addition, within the framework of the Beijing Consensus UNESCO produced a publication with a view to publication with a view to improving the state of preparedness of educational policy-makers in the field of artificial intelligence.. The document, entitled "Artificial Intelligence and Education: Guidance for Policy-makers," can be used by specialists and practitioners in the policy-making and educational communities. The document aims to create a common understanding of the opportunities and challenges of AI in education, as well as its implications in terms of core competencies needed in the AI era.

Within the framework of its projects, UNESCO argues that the deployment of AI technologies in education should aim at enhancing human capabilities and protecting human rights for effective human-machine collaboration in life, learning and work, as well as for sustainable development. Together with its partners, international organizations and the key values that form the pillars of its mandate, UNESCO aims to strengthen its leadership in the field of AI in education, as a global laboratory of ideas, standard-setter, technical advisor and capacity development agency.

"We must renew this commitment as we approach a time when artificial intelligence - the convergence of emerging technologies - will transform every aspect of our lives (...)," said Ms. Stefania Giannini, UNESCO Assistant Director-General for Education, during the International Conference on Artificial Intelligence and Education, held in Beijing, May 2019. "We must steer this revolution in the right direction to improve livelihoods, reduce inequalities and promote fair and inclusive globalization."

The project on artificial intelligence and the futures of learning is supported by the Recommendation on the Ethics of Artificial Intelligence to be adopted during the 41st session of UNESCO's General Conference, and will follow up on the recommendations contained in the forthcoming global report entitled "Reimagining our futures together: A new social contract for education," to be published in November 2021. The project will be launched under the framework of the Beijing Consensus on Artificial Intelligence in Education and the UNESCO Strategy on Technological Innovation in Education (2021-2025).

- The project has three independent but complementary parts:
- A report proposing recommendations for tomorrow's AI-based learning;
- A guide to the ethical principles of using AI in education;
- A framework of guidance on AI competencies on the part of learners.
- Teaching artificial intelligence in schools

The link between AI and education consists of three areas: learning with AI (e.g., using AI tools in classrooms), learning about AI (its technologies and techniques), and preparing for AI (e.g., enabling all citizens to understand the potential impact of AI on human life). The 'Teaching Artificial Intelligence in School' project currently focuses on two components. It aims to contribute to the integration of human and technical aspects of AI in training programs aimed at young people. The first stage consists of guiding the development of the capacities of curriculum developers and specialized trainers selected by national institutions, with the aim of empowering young people.

The project will be developed on the basis of the following three main lines of work:

Development of an AI competency framework for schools;

creation and management of an online repository that will host selected AI educational resources, national AI curricula and other training in essential digital skills;

organization of workshops to integrate AI training into national or institutional curricula in selected countries.

To achieve these objectives, UNESCO is advised by the International Advisory Board. This is a group of specialists (in the fields of AI, education, learning sciences and ethics) appointed by UNESCO and charged with developing an AI competency framework for primary schools, as well as reviewing preparatory drafts of workshops and repertoires. The advisory board will provide its services on a voluntary basis.

Conclusions

The generational confrontational dilemma today is more evident than at any other time. If the sixties, seventies and eighties were marked by a great number of events that at the time generated diverse repercussions, today this confrontation is based on a confrontation whose horizons go beyond what has been perceived until today, since the generational gaps go beyond the time scale because it is of a more radical character that surpasses those conceptual boundaries, The gap is technological, it is virtual, it is digital, it is completely new in human development that maintains a very significant dialectic of bringing us closer and at the same time distancing civilizations in the face of the overwhelming pace of new technologies based on AI, which have configured two opposing sides generationally. (Sobel and Shiraev, 2016). On this point, Gisbert and Esteve (2016) compile information related to this topic and refer us to the treatment of the students of this new era or generation who are referred to as "digital natives", those privileged who live with the changing technologies and the new formats of data transmission and the new platforms of interactivity, where these students, due to their continuity in front of the technologies, process and are more akin to a digital language; On the other hand, those who are not circumscribed within such parameters can be classified as "digital immigrants", a marquee in which could be placed all those who are close and adapted to the use of new technologies, where a feasible distinction can even be made according

to the characteristics of this process, since digital migrants could be categorized as: (1) early (those who are not in the early stages of the process), and (2) early (those who are in the early stages of the process): (1) early (those who certain circumstances, favorable or unfavorable, or perhaps spurred by the imperative needs of the context had to grasp the new technologies), or (2) late (all those who in the course of their lives have been approached to the use of new technologies or among other things by the striking that in the long run it turned out to be, which is where perhaps a bulk of the population of migrants to the digital dimension is located). The curious thing about this qualitative separation focuses on the use of each group's own codes, since the natives will show off their greater versatility with respect to the technological world, as well as access to more and better interactivity tools; while the migrants will always be behind the former with respect to the technological vanguard.

On the aspect discussed above, it reverts in a very dizzying strident course within the educational aspect, since today's students are not conceived under the standard format and with the biases of the generation that preceded it, so the challenge of the new practices must be structured based on the new demands of the interconnected world, digital platforms, Smart support systems and the availability of mass data transmission, quality and in real time. Therefore, the context urgently and mercilessly calls for a very decisive renewal, and why not say it, a complete transformation of the stereotypical standards of university educational models and position them with a range of digital empowerment that is what this new generation requires; But most of the people in charge of this task, i.e. teachers, are migrants to the new technological world, who in many cases are fighting a titanic battle to try to educate a new generation that is immersed in a model far removed from those, which is why the following question arises: Are the various programs and curricula of the different faculties taking into account these stained-glass windows of needs? Have the possibilities and the impact of the implementation of the massification of a digital language in higher education been evaluated? Are the efforts that are being developed and those that are being executed adequate to the changing world of new technologies? Will the coming changes be fully assumed by both strata (migrants and natives)? And if the process continues (as is inevitable), will the digital divide in academic environments have repercussions on the structure of the university; and if so, will the impact generated lead to increasingly radical changes?

Educational institutions, as well as the personnel that represent them, are ready for the qualitative leap in the use of AI-based systems, because no matter how affordable they are, the situation is not in how to acquire or use them, but in how to develop them and adapt them to the diverse realities of multivariable environments. Such is the case of the reality of developing countries whose acute needs to overcome would be affected by the so-called digital-technological gap, so there is an urgent need for the development of AI technologies and systems in line with the requirements of the various needs of public or private universities. But it should be noted that more dedication and individualized preparation will be needed in the face of this trend of frontal change.

Often, and to a certain extent, due to the passion that users have for the use of this or that technology, they feel redeemed towards a certain aspect and fail to foresee the backgrounds to which it could lead, so that we do not have to put an apocalyptic quota on the processes, but often the development of such changing events (such as the development of increasingly powerful and more affordable systems), inevitably leads us to neglect core aspects of new technologies such as their extension of applicability to other activities beyond the academic or commercial world, which in some way will affect society, including its impact being global in scope.

The various platforms and trends that promise the future of AI development in education are extremely attractive to us, and in some cases even unattainable for some realities; but even so, it is unlikely that computer-based learning systems will be fully capable of replacing human teaching in schools. In the particular case of Latin America, is the implementation and investment in AI timely? The answer is yes, as Pounder and Liu (2018) argue that such technologies are key to solving long-term growth in the region in order to catalyze competitiveness and productivity aspects with a view to a real potential transition with new and better opportunities in the global market.

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