



The future of Artificial Intelligence in education in Latin America

PROFUTURO / OEI



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OEI



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Explanatory note: In this document, care was taken to avoid sexist and discriminatory language. In cases where the masculine gender is used as a term for groups of people of both genders, please note this clarification.



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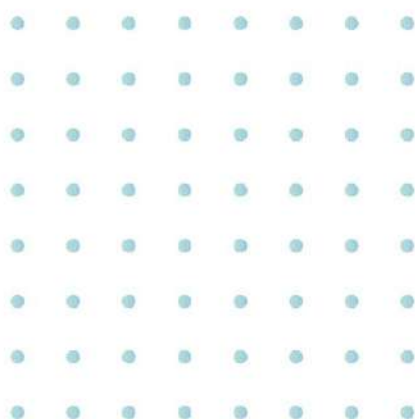
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Presentation

The future of Artificial Intelligence in education in Latin America.



Magdalena Brier.

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Secretary General of the OEI.

The digital transformation that our society has undergone over the last few decades is confronting us with evolving dynamics and educational that are becoming increasingly well-known and studied. We have made strides in deepening new pedagogical methodologies, in the involvement of technology and digitalisation processes in teaching, as well as in the construction of hybrid and flexible models or in more contextualised pedagogical competences. However, within this transformation, disruptions arise, such as those generated by artificial intelligence whose implications in the field of education remain largely unknown despite their near-invisible integration into our daily lives.

Moreover, since the beginning of the COVID-19 pandemic, our Ibero-American region has been

confronted with unprecedented social and educational needs.

The prolonged closure of schools –extending to more than two years in some cases- has created new disparities and deepened existing ones, placing a responsibility on us to create more inclusive, resilient, and equitable educational environments.

In this context, various stakeholders have mobilised to join forces in this arduous task and undertake new challenges aimed at enhancing the quality of education in our region, aligning with Sustainable Development Goal 17, which emphasises the importance of partnerships. It is with great pleasure that ProFuturo and the OEI present this study, addressing a central question: **What is the future of Artificial Intelligence in education in Latin America?**





What is the future of Artificial Intelligence in education in Latin America?

Artificial intelligence, previously only thought and imagined by the world of cinema or science fiction, is among us and is already a reality. In the field of education, it can have many possibilities, but it also entails risks and limits, which need to be known and studied in order to propose concrete actions that contribute to the full development of people and their learning.

This initiative bears the stamp of an institutional relationship that began many years ago between the OEI, the Telefónica Foundation and the “la Caixa” Foundation and which has been continued with the ProFuturo Foundation. It reflects the decades-long commitment of our institutions to promote the educational transformation of our Ibero-American countries.

The OEI and ProFuturo share the mission of working to reduce educational gaps

and inequalities in our region, so both institutions recognise the potential of inter-institutional work and the wealth that lies in enabling public-private dialogue. This report and its findings are proof of that.

We thank the authors and coordinating teams of this study for bringing us closer to interpreting the educational realities around artificial intelligence and for accompanying us to reach this starting point. Thanks to this study, different possible scenarios for the future are proposed, i.e. a roadmap for the future is drawn up. In addition, it outlines a route to accompany educational actors, starting with the region’s public policy makers, on a complex issue that deserves an interdisciplinary and intersectoral approach.



Synthesis

The role of artificial intelligence (AI) in education remains largely unknown: **How is it currently developing and how is it expected to evolve between now and 2030 in Latin America?**

Within this paper, we examine this question based on a survey involving three groups of stakeholders in the region: academics in the field of AI and education, representatives from the private technology and education ecosystem, and government officials working in the technology and education departments of national Ministries of Education.



The survey is structured around five dimensions:

- 01 Present and future relevance of AI within education systems.
- 02 The role of relevant institutions and stakeholders in the development of AI in education.
- 03 Future educational scenarios in Latin America.
- 04 Recommendations for the development of AI in education in Latin America.
- 05 Outstanding case studies of AI and education initiatives.

The survey findings reveal a consensus among all stakeholders that AI's significance in education will amplify in the future, with a stronger emphasis expected in university and tertiary education. Although perceptions regarding the present and future do not significantly differ among the surveyed stakeholder groups, government officials tend to hold a more optimistic view about the future relevance and positive consequences of AI in education in its ability to reduce educational inequalities within and between countries. In contrast, academics express the most pessimism among the experts surveyed regarding these dimensions and the future role of AI in Latin American education.

While AI in education can fulfil a number of different roles, there are no clear differences in respondents' perceptions between these potential roles.

The issues that seem to have the most potential for growth between now and 2030 appear to be the uses of AI for post-school learning and for learners with special needs.

Regarding forthcoming priorities in public policy recommendations, the focus remains on internet connectivity in schools and teacher capacity building, issues that even seem to predate the introduction of AI in education. The rate of growth of AI in education is viewed as a steadily rising trend that won't cause significant disruption within the next eight years. This perception suggests an evolving field that, even among specialised groups, is still under construction and at a stage of uncertainty about its potential impact in the near future.

1

Introduction

The dynamics of educational change and technological impact on education are accelerating. The ability to predict the future is becoming an increasingly decisive condition for the improvement of education systems.

This document aims to generate new knowledge to help Latin American countries to plan actions in education while taking into account technological progress and anticipating its potential to guarantee informed and strategic decision-making.

The ability to predict the future is increasingly associated with the possibility of controlling or shaping -at least in part- the directions and meanings of changes in education. There is some history of systematic and consistent studies on future trends in education, which have been carried out for years and map consensus on the impact of technology on education systems (HolonIQ, 2020; OECD, 2020; Marczak et al., 2016).

Fundación Telefónica (2012) has developed previous studies combining future educational scenarios.

Various international organisations have recently focused on the promotion of artificial intelligence (AI) for the development of Latin American countries and, in particular, to generate better public management tools (Estevadeordal et al., 2018; IDB, 2020; OECD/CAF, 2022). However, recent developments in artificial intelligence and their potential impact on countries in Latin America have not been mapped in the field of education¹ and can be part of an enriched vision for discussions with decision-makers.

¹ There are more general precedents such as the study by the Inter-American Development Bank (IDB, 2020).

Artificial intelligence can be defined as “computational systems that were designed to interact with the world using capabilities that we normally think of as human” (Luckin et al., 2016). AI research has mainly focused on the following components of intelligence: learning, reasoning, problem-solving, perception, and language use. There are two types of AI: data-driven AI through machine learning and AI based on an explicit machine-processed representation of domain knowledge. The current success of AI is mainly due to advances in data-driven AI (Pedró et al., 2019).

Its impact on the world of education is becoming increasingly relevant in a multiplicity of developments from the field of data analytics to facial recognition of students’ expressions (IDB, 2020). We are experiencing a revolution in *Big Data, Machine Learning, Learning Analytics* and other forms of digital intervention using artificial intelligence in the field of education.

These developments hold great promise. AI has the potential to personalise learning, facilitating the creation of individual learning paths offering immediate feedback and constant adaptations to the pace of each learner. It can also be a way to enhance teaching, generating automatic feedback for teachers, decreasing correction time and managing refined data on the learning of large groups of students. At a systemic level, AI can provide new management tools capable of early identification of learning difficulties or potential school dropouts.

There is some consensus that the AI-driven technological revolution will significantly impact the education sector, as well as several other spheres of human activities (IDB, 2020). What remains a matter of debate is the pace and depth of this transformation (Tuomi, 2018).



We are experiencing a revolution in *big data, machine learning, learning analytics, and other forms of digital intervention using artificial intelligence in the field of education*

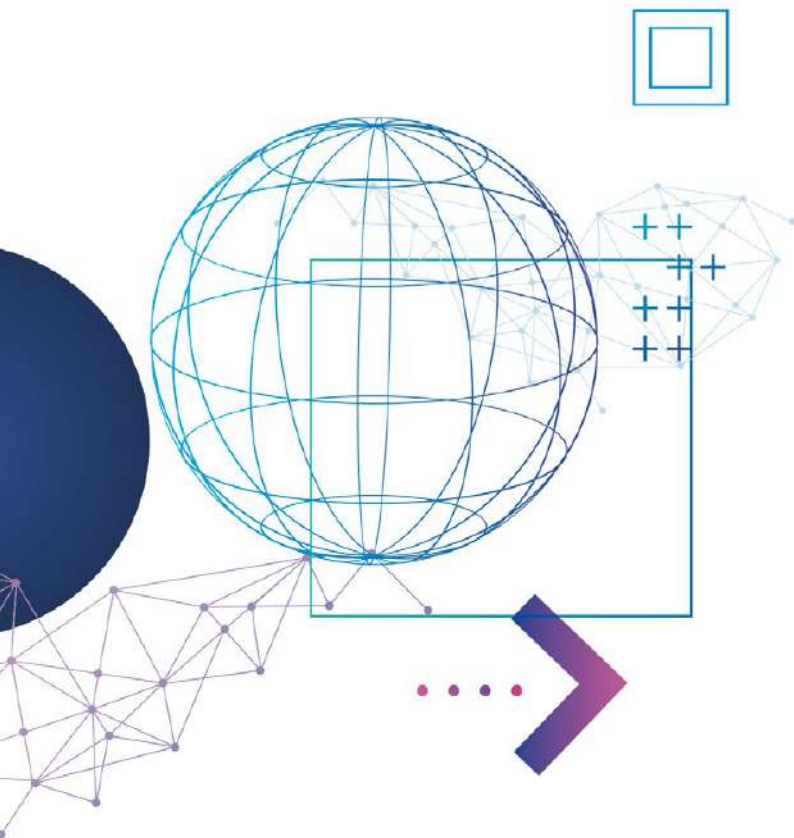


Some studies have highlighted the importance of ethical considerations in the development of AI.

It is important to respect the privacy of students' and teachers' digital consumption; to take care of the responsible use of screen time and to generate protocols so that AI does not promote biases that marginalise the voices of different cultural groups that represent the diversity of communities in the region (Mancilla-Caceres and Estrada-Villalta, 2022)."

The COVID-19 pandemic accelerated the global integration of technology in education (Mathrani, Sarvesh & Umer, 2021; Tadesse & Muluye, 2020). Latin America experienced a dramatic process of disruption of face-to-face classes, longer than any other region in the world (Atilas et al., 2021; Jaramillo, 2020). This allowed the introduction of new technologies to replace traditional schooling, but at the cost of a very unequal distribution based on the social and economic conditions of the population.

The educational crisis triggered by the demands new solutions to address many challenges. The achievement of SDG4 -targeted for 2030- is increasingly far from being met in critical dimensions such as access, equity and quality of education (OREALC-UNESCO, ECLAC and UNICEF, 2022). Already the diagnosis of the ERCE tests (Regional Comparative and Explanatory Study), which were implemented in 15 countries in the region in 2019, showed a stagnation in learning that the pandemic probably led to critical situations, as already indicated by some studies (Patrinos, Vegas & Rau, 2022).



The introduction of AI in education can be a way to accelerate, personalise and distribute educational opportunities more efficiently.

Some studies focused on AI's development in Latin American education highlight significant growth, particularly in *machine learning*². This growth enables continuous learning through the fluid use of educational data (Sanchez-Pi *et al.*, 2021). *Deep learning*³ techniques are enabling exponential speed progress in image recognition and language processing, allowing for innovative educational development fields. Some authors even point out that by 2021, a “point of no return” in the development of AI and *machine learning* development have been reached, attaining a level of autonomy with an unstoppable exponential scale of growth (Clark *et al.*, 2021).

² The field of machine learning seeks to answer the question: “How can we build computer systems that automatically improve with experience, and what are the fundamental laws that govern all learning processes?” (Mitchell, 2006).

³ Deep learning is an approach to AI based on computers learning from experience and understanding the world in terms of a hierarchy of concepts, with each concept defined in terms of its relationship to simpler concepts.

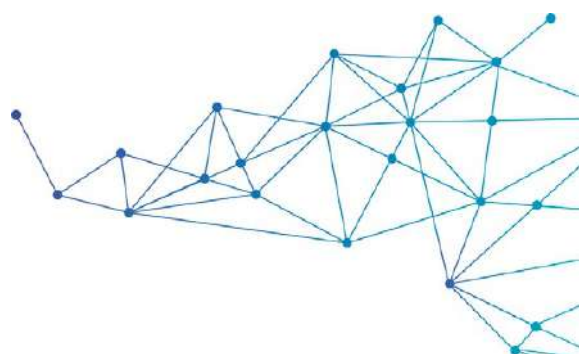
By gathering knowledge from experience, this approach avoids the need for human operators to formally specify all the knowledge a computer needs (Goodfellow, 2016).

This could lead to a revolution similar to that of electricity in the past (Sanchez-Pi *et al.*, 2021).

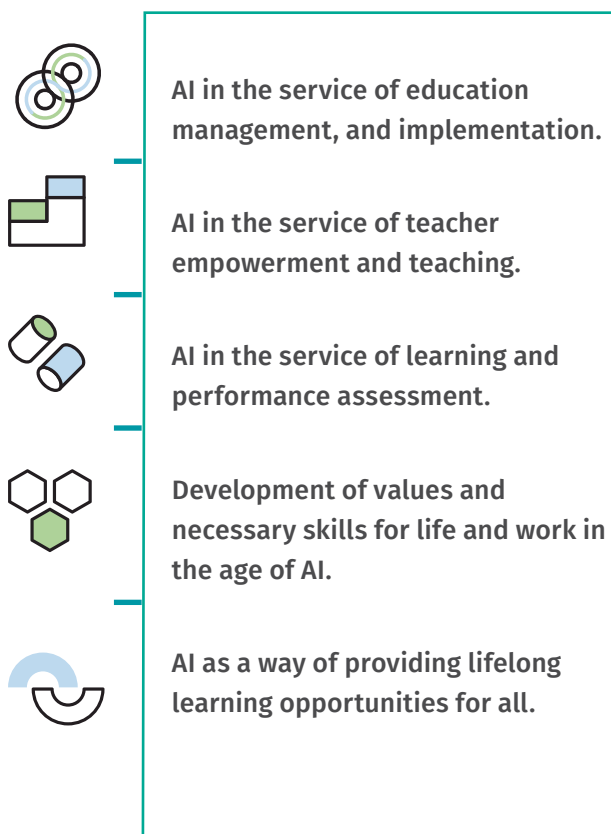
However, these technological avenues of transformation carry multiple risks. Some studies have highlighted the importance of ethical considerations in the development of AI. It is important to respect the privacy of students’ and teachers’ digital consumption; to take care of the responsible use of screen time and to generate protocols so that AI does not promote biases that marginalise the voices of different cultural groups that represent the diversity of communities in the region (Mancilla-Caceres & Estrada-Villalta, 2022).

Other work has prompted a focus on young people in Latin America and their complex relationship with technology. From the perspective of the digital humanities, it is possible to open our gaze so as not to think in terms of paths preordained by AI, with sociological perspectives on cultural consumption and the effects that new technologies generate in the lives of young people (Brossi, Dodds and Passeron, 2019). What is gained on the side of accelerated learning may jeopardise socialisation, peer interaction or increase inequalities based on inequitable access to technologies in a region with such deep inequalities as Latin America.

To harness the promise and take seriously the risks of introducing AI in education, the Beijing Consensus on Artificial Intelligence in Education and the Unesco Strategy on Technological Innovation in Education (2021-2025) were launched.



The Consensus presents strategic recommendations on AI in education in five areas:



The Consensus also sets out recommendations on how to promote equitable and inclusive use of AI in education, respecting gender equity and supporting gender equality and ensuring ethical, transparent and verifiable use of education data and algorithms.

With this vision in mind, the joint project developed by Fundación ProFuturo and the Organisation of Ibero-American States (OEI) set out to map current and future trends in the development of AI in Education in Latin America. A survey identified the current situation and the projections of different groups of experts on the future development of this issue for the year 2030, when the cycle of the Sustainable Development Goals will be completed.

The survey was conducted among three groups of stakeholders within Latin America's digital education and new technologies ecosystem:

Group 1

Specialists in educational technology and artificial intelligence in Latin America.

Group 2

Private sector (*startups* and companies specialising in education and technology).

Group 3

Decision-makers in education in Latin America (referents of educational technology areas of the Ministries of Education).

This report comprises four sections, the first of which is this introduction. The second section describes the study's methodology, detailing the survey, participant selection, and the resultant sample. The third section presents the findings aligned with the survey dimensions. Lastly, the conclusions aim to open a reflection on the future of education systems in Latin America.

2 Methodology

The survey on the future of artificial intelligence and education in Latin America aims to capture the insights of different stakeholders regarding AI's current and future impact in education, along with perceptions on the relevance that different actors and institutions will have in this process, and recommendations for potential courses of action in public policy.

It is composed of five dimensions, consisting of a series of multiple-choice and, in the case of the last one, open-ended questions. The dimensions are as follows:

- 1. Relevance of AI in the education system in 2022 (current) and 2030 (future).** In this dimension, respondents provide their perception of the relevance of AI in education, rating it on a scale from 1 (least important) to 5 (most important): a) Across each educational level (initial, primary, secondary and tertiary and university) and b) based on different roles or potential applications of AI in education (supporting students' learning; transforming learning environments; increasing students' motivation; learning beyond school; increasing learning opportunities for students with special needs; supporting teaching; supporting school management; remediation and assessment of learning and student monitoring).
- 2. The role of relevant institutions and actors in the development of AI in education.** Participants are asked to assess the level of involvement (leadership, major role, minor role, indifference, or resistance) of different relevant institutions and actors (nation-states; international markets; domestic markets; emerging markets; international philanthropic entities and agencies, as well as universities and the education system) both in 2022 and in 2030.
- 3. Future educational scenarios in Latin America.** In this segment, respondents choose between different future scenarios concerning: a) the changes that the COVID-19 pandemic will bring about in the education system, b) the changes that AI will bring about in the education system, c) the impact on inequalities within countries that AI in education will bring about, d) the impact on inequalities between countries that AI in education will bring about, and e) the pace of AI integration in education.

4. Conditions and competencies for the development of AI in education in Latin America.

We asked respondents to rate on a scale of 1 (least important) to 5 (most important) different recommendations for Latin American governments in relation to the development of AI in education, (ensure internet connectivity; distribute devices; develop teaching capacities to use technologies and AI in a pedagogical sense; develop a high quality digital learning data infrastructure; incentivise the market to create innovative solutions with high quality and varied technology and AI for education; develop ethical protocols to control data and privacy of students; develop high technical capacities to develop AI in the countries of the region and increase technological sovereignty; train students in digital skills to use and develop AI in the future; train students in critical thinking skills for consumption and use of digital media with AI; reduce the gender gap in access to technology and AI development).

5. Good practices in AI and education.

We asked respondents to mention a maximum of three cases of good practice in AI and education for both the public and private sectors. In this case, the questions were open-ended. This section also included a space for respondents to add any comments about the survey, both on the topics covered and not covered.

The sample of each of the actors was formed according to specific criteria. In the case of academics, specialists in educational technology and artificial intelligence in Latin America who had published at least one article in an academic journal considered Q1 in the SCIMAGO⁴, rankings in the last five years were selected. For members of the private education and technology ecosystem, key players in the private education and technology sector in Latin America were sought through lists of key companies. In the case of public officials, we contacted each of the national Ministries of Education in the region with a request to appoint a representative to be part of the offices dedicated to the introduction and use of technology in education. This group was the education policy makers in the governments of the region. For this group, the procedure for identifying participants was somewhat more complex. In the first instance, the ministers of education in the region were asked to identify key referents, who were asked to complete the survey. Due to the sensitivity of the information, the OEI was in charge of the contact and follow-up with the referents of this third group.

The survey was conducted remotely and completed online. This modality allows a large number of respondents to be reached and, in turn, gives them the freedom to respond on their own schedule, at a pace of their choosing. However, this method of data collection also has some disadvantages. For example, online surveys can be overlooked, especially due to the large number of respondents that are nowadays sent by different means and agents. When the participant does not know the sender of the survey, the situation is even more disadvantageous. Due to a slow start in our response rate, we implemented the practice of sending reminders to participants to complete the survey.

⁴ The SCImago Journal Rank (SJR) ranks academic journals in quartiles according to the number and relevance of citations they have. Q1 is the first quartile, i.e. it groups the most relevant journals.

In total, we sent the survey to 141 potential participants, of which 63 were members of the academic group, 57 represented the private technology and education ecosystem, and 21 belonged to the group of education policy makers. Our final sample comprises 67 people: 25 from the academic group, 21 from the private technology and education sector, and 21 from the public sector. This resulted in a response rate of 42.68%.

The sample represents participants from 17 countries, although there are three with a higher number of respondents: Argentina (17), Colombia (10) and Chile (9). In turn, the group of academics contains eight Argentinian and seven Chilean members, a total of 60% of the group. We understand that the higher number of academics from these two countries responds to two main factors: in the case of Argentina, it may have been easier to identify colleagues of the members of the identification team; in the case of Chile, it is important to note that the last few years have seen an increasing number of publications in Q1 journals by Chilean academics. In the group of private ecosystem members, eight are Argentinian and four are Colombian, together making up more than 50% of the group. In the case of civil servants, we obtained individual responses from all countries with the exception of Costa Rica, Panama, Peru and Uruguay, where we had two responses each.



We sent the survey to

141 potential participants

63 academics

57 representatives from the private ecosystem

21 individuals from the group of education policy makers

Final sample consisting of

67 people

25 academics

21 representatives from the private technology and education ecosystem

21 civil servants

42.68%

Response rate

17 países represented

3 Results of the query

This section presents the key findings of the survey.

Each question starts with a brief synthesis which is developed in the following paragraphs and supported by graphs with the corresponding statistical information.

Dimension 1

The relevance of artificial intelligence today and in the future

Dimension 2

The role of institutions and actors in the development of AI

Dimension 3

Educational scenarios in Latin America

Dimension 4

Conditions and competencies for AI development in Latin America

Dimension 5

Best practices



Dimension 1

The relevance of artificial intelligence today and in the future.

Respondents perceive that AI has and will have a greater impact on higher education than on basic education in Latin America.

Starting with the first dimension of the survey, we clearly observe that at all levels of education respondents perceive that AI will play a greater role in the future at all levels of education. This coincides with a general trend in the belief that technologies will play a greater role in education in the future.

In turn, we see a clear difference in terms of the present and future relevance that respondents assign on average to AI in education as a function of educational level. As can be seen in Figure 1, respondents give AI a higher current relevance in tertiary and university education. This is in line with previous studies on the development of AI in higher education in Latin America (Ocaña-Fernández et al., 2019).

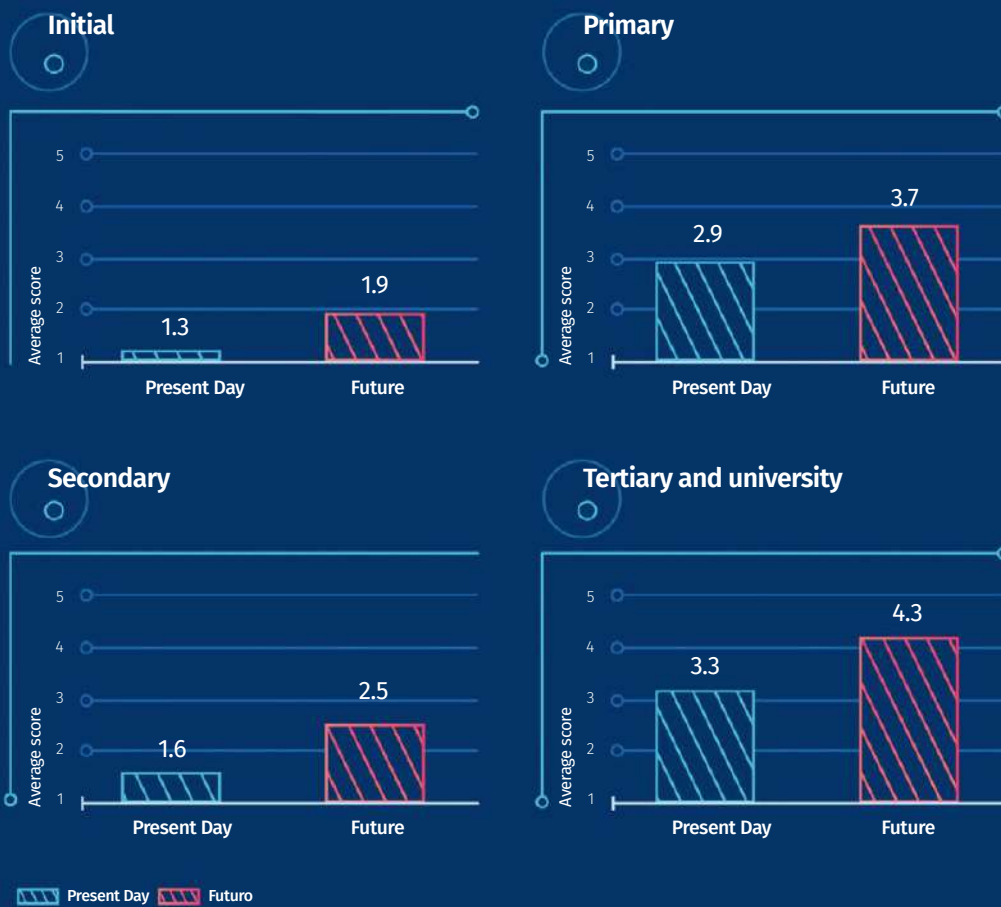
In contrast, it is at the entry level, where respondents perceive less present and

future relevance for AI. We interpret this data in terms of current trends in higher and university education, where increasing digitisation and the expansion of remote education are generating a greater amount of data that could fuel uses of AI. In contrast, partly because of its fundamental characteristics and objectives, at the entry level the penetration of the technology has been lower and it seems that this type of information is considerably less available, which could explain this difference in respondents' answers.

Another notable trend with respect to this graph is the difference between primary and secondary level. In the respondents' view, it seems that the role of AI is and will be considerably more relevant in primary education than in secondary education. This trend is difficult to explain, as in principle the uses of AI and the availability of data are not qualitatively or quantitatively different at the two levels. We believe that this trend could be explained by the increased availability of technology and education programmes for the primary level in the region⁵. Another possible explanation is related to the characteristics of each level of education, with the primary level being perceived as more permeable to change, while the secondary level is perceived as more resistant to innovations such as those that AI could provide.

⁵ It should be noted that this trend is also reflected in the case of Argentinean respondents, a country where education and technology policies have mostly focused on the secondary level.

Figure 1.
Present and future relevance of AI in terms of educational level.

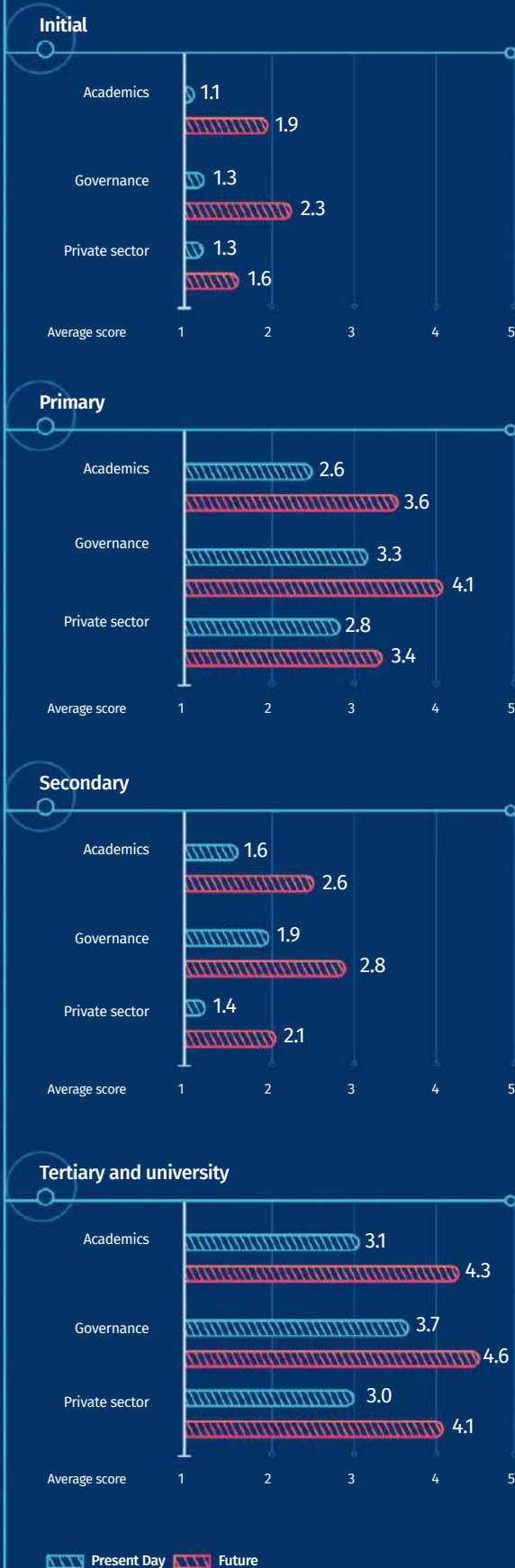


Note: Respondents answered the question "Please rate how much AI is currently impacting the following levels of education and how much it will impact in 2030 on a scale of 1 to 5 in Latin America (1. Nothing - 5. A Lot)".

With regard to the differences between the groups, in general terms we do not observe clear trends. As can be seen in Figure 2, it appears that civil servants tend to assign greater relevance to both present and future relevance to AI for all levels of education. In turn, it is academics who present the greatest difference between the current and future relevance of AI in education for all levels, with the exception of the initial level.

The group of academics consulted balances a more critical perception of the present with a more promising future. The group representing the private sector, meanwhile, proves to be the most "pessimistic" about the future. In fact, it is notable that it is the only group that states that at one of the levels (initial) AI will have practically no more relevance in the future than it has at present.

Figure 2.
Present and future relevance of AI in terms of educational attainment by group.



Note: Respondents answered the question "Please rate how much AI is currently impacting the following levels of education and how much it will impact in 2030 on a scale of 1 to 5 in Latin America (1. Nothing - 5. A Lot)".

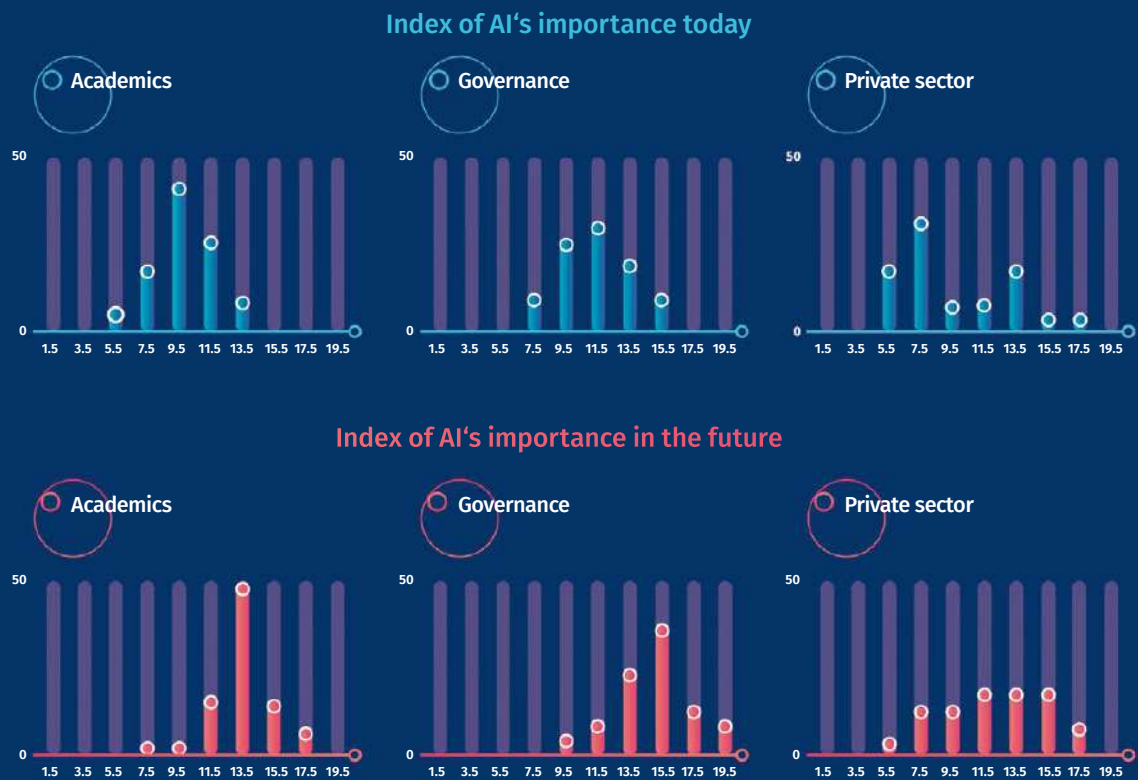
Interestingly, there is some variability within groups concerning their perception of the present and future relevance of AI in education. To analyse this variability, an AI relevance index was devised, aggregating the values (ranging from 1 to 5) assigned by each respondent to each of the levels in the present and in the future⁶. This index ranges from 4 (minimum) to 20 (maximum). The analysis of this index (Figure 3) reveals a notable consistency of perspectives within the group of academics regarding the present and future significance of AI in education. Conversely, the other two groups, exhibit greater diversity in perceptions, particularly noticeable among representatives of the private technology and education ecosystem.

These differences may be due to the composition of the groups, as the private sector stakeholders consulted may have different levels of experience, training and involvement in the issues addressed in this survey. In the public sector, it is more difficult to establish any hypothesis about the heterogeneity of responses, given that the consulted referents occupy similar positions in agencies or areas of Ministries of Education related to educational technology, although this could be due to the greater diversity of countries represented in the group of education policy makers.

⁶ We explored the alternative of calculating this index using the principal component analysis method. The resulting indices of both methods had a correlation of 0.99, so we opted for the first method, which is easier to interpret.

Figure 3.

Distribution of responses on the present and future relevance of AI according to educational level by group.



Note: Respondents answered the question “Please rate the extent to which AI is currently impacting the following levels of education and how much impact it will have in 2030 on a scale of 1 to 5 in Latin America (1. Nothing - 5. A Lot)”. The AI relevance index arises from the sum of the score assigned by each respondent to each level.

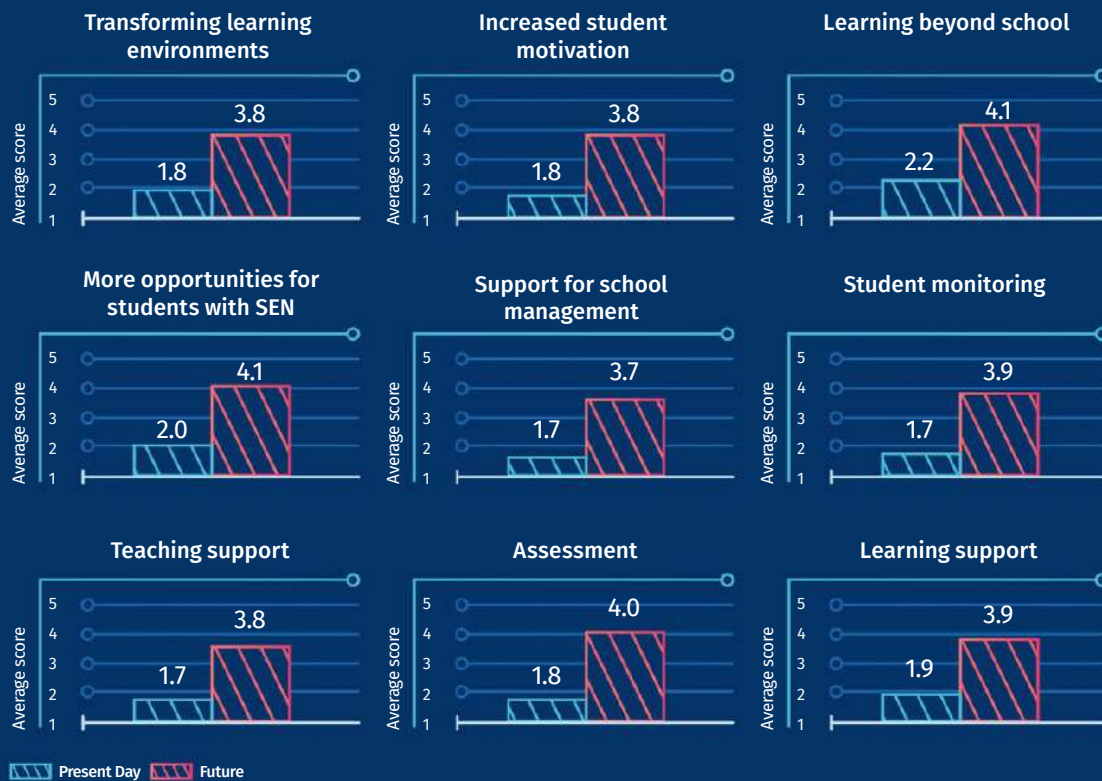
According to the respondents, in the future, AI's impact on education will increase in a number of areas, with a greater focus on learning beyond the school and the opportunities for students with special needs.

In the second question of the first dimension of the survey (Relevance of AI now and in the future), we asked about the different roles that AI can play in education. In the results of this question (Figure 4), we observe that there do not seem to be major differences in terms of the relevance that respondents assign on average to AI for different functions. For all cases, a trend towards greater relevance of AI in the future is confirmed, but all respondents assign similar relevance to each of them, both now and in the future. The two functions that are slightly different from the rest in terms of higher relevance are learning beyond school and opportunities for students with SEN, while school management is of lower relevance.

This trend could be revealing an interesting feature of the field of AI in education.

Figure 4.

Present and future relevance of AI according to the role they can play in education.



Note: Respondents answered the question “Rate the relevance of AI in education today and in 2030 in the following dimensions on a scale of 1 to 5 in compulsory education in Latin America (1. Nothing - 5. A Lot)”. The dimensions were: supporting student learning; transforming learning environments; increasing student motivation; student learning beyond school; increasing learning opportunities for students with special needs; supporting teaching; supporting school management; remediation and assessment of learning and monitoring of students.

Given its recent emergence, stakeholders in the field are not yet able to offer a differentiated perspective on what would be the greatest contribution that AI could offer to education.

Even with the public consulted in this survey -who have in-depth, direct knowledge from different perspectives (research, management and product development)- the future of AI in education remains uncertain: all indications are that its impact will grow, but it is unclear to what extent and in which subject areas.

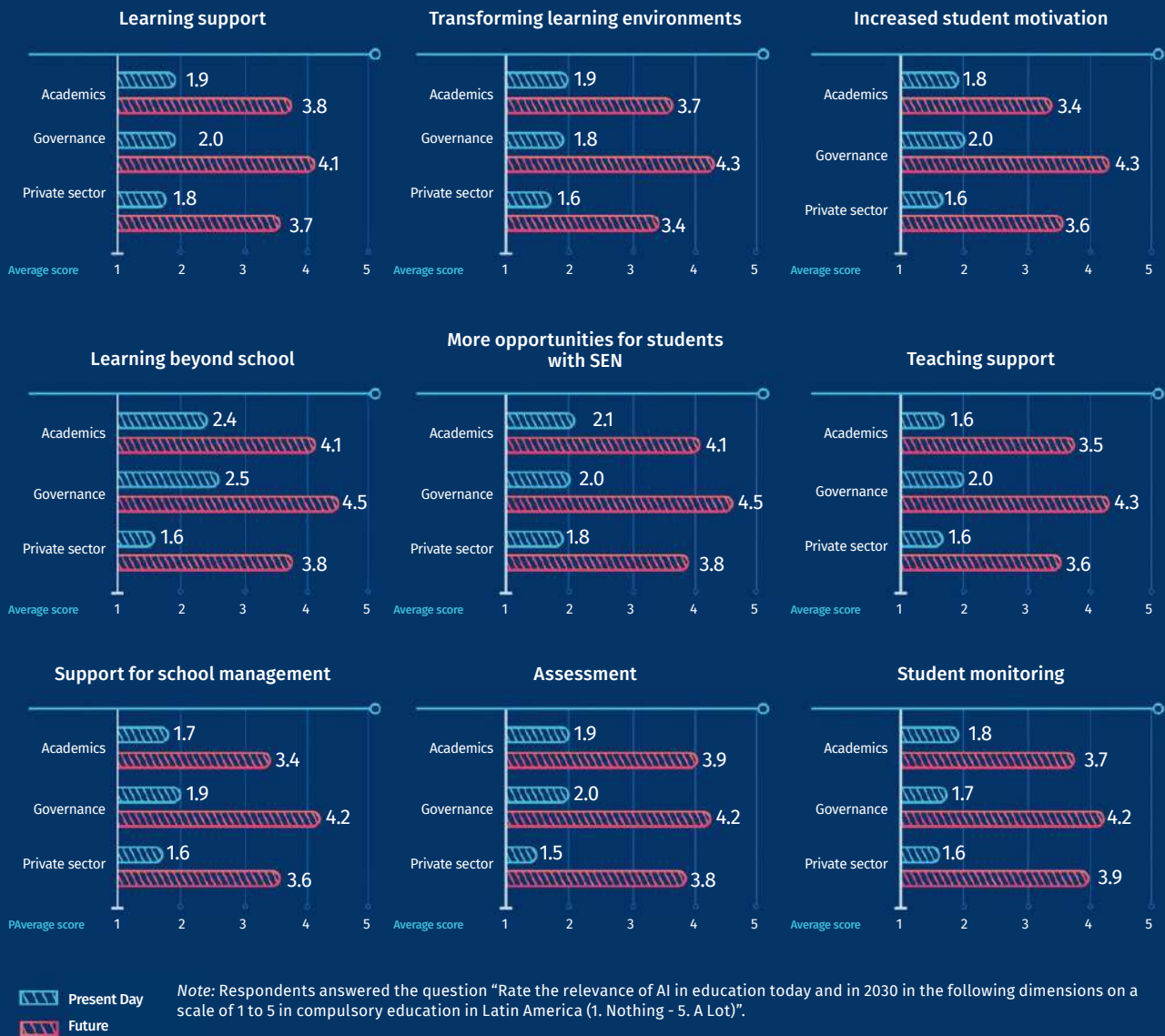
Analysing the disparities among the different groups of respondents could potentially shed more light on this hypothesis. It's reasonable to anticipate that academics, being specialists

in the field, should be able to offer a more differentiated perspective compared to civil servants and private sector respondents. Figure 5 illustrates different perspectives across each group. Among academics, it seems clear that learning beyond school is the most relevant function at present and also in the future. In turn, in his perspective, support for students with special needs -although not as relevant at present- will become one of the main functions of AI in education.

The group of civil servants provides varying assessments across functions, exhibiting more pronounced differences in their evaluations concerning the present than in their projections for the future.

Figure 5.

Present and future relevance of AI in terms of the role they can play in group-based education.



Currently, in agreement with the perceptions of academics, learning beyond school clearly appears as the most important function. However, looking ahead, this group offers less differentiation in assessing the relevance of the different potential roles of AI in education, i.e. the scores assigned to each role are similar. Despite these subtle distinctions, the most important future roles identified by this group align with those highlighted by academics: learning beyond school and increased opportunities for students with Special Educational Needs (SEN).

Representatives from the private technology and education ecosystem exhibit the least disparity among their assessments, both now and in the future. Unlike the other two groups, the most relevant function that this group anticipates, albeit with marginal differences compared to the rest, is the monitoring of students. This group, in turn, assigns relatively less importance to the transformation of learning environments compared to other functions that AI could fulfil in education.

Dimension 2

The role of institutions and actors in the development of AI.

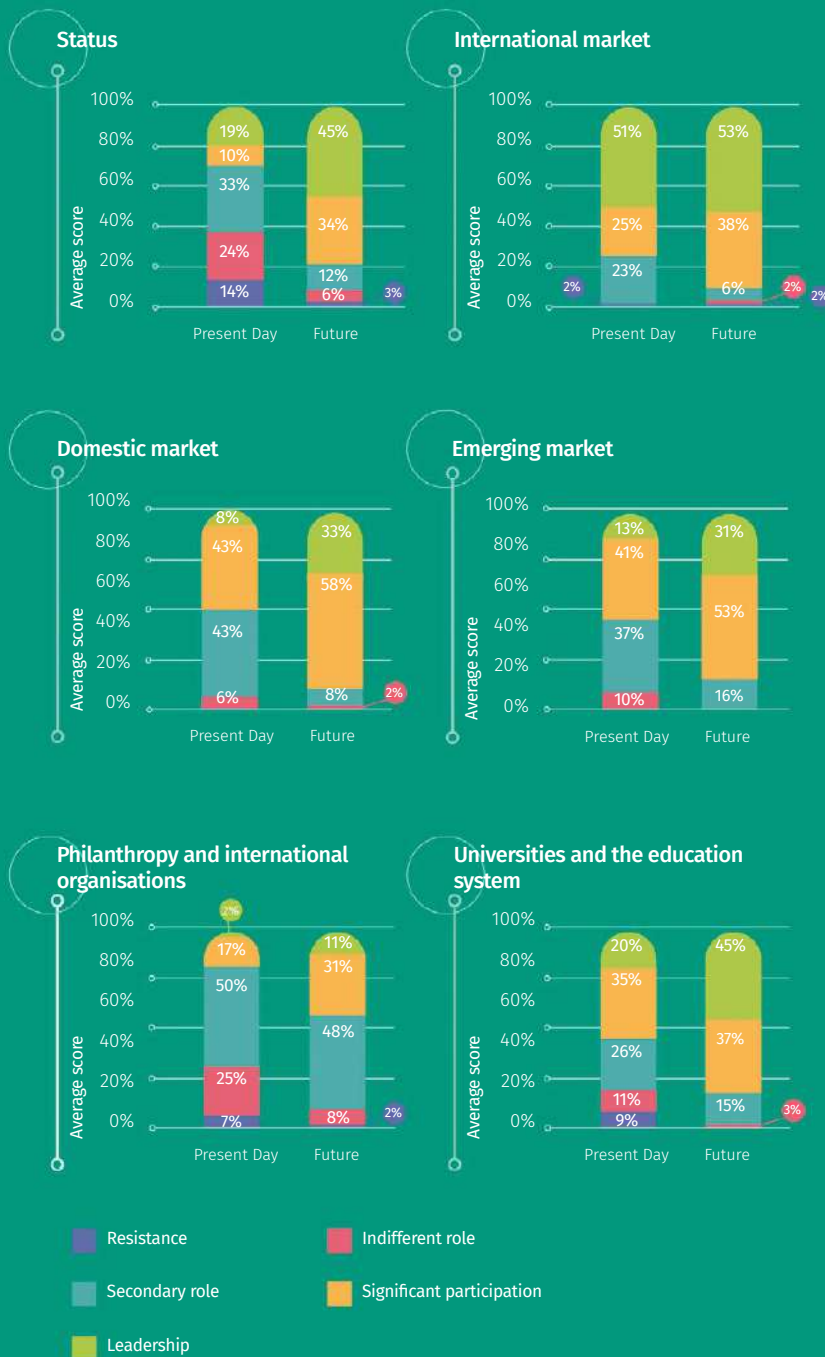
Respondents perceive that large international companies currently have a dominant role in the introduction of AI in education, a trend they anticipate to persist in the future, although they also believe that the role of the state and, to a lesser extent, other actors will increase in importance.

The next dimension of the survey asked about the role that different actors and institutions currently play and will play in the future development of AI in Latin America. Figure 6 shows that, on average, respondents assign the main leadership role to large companies in the international techno-education market, both now and in the future. According to their perceptions, it is the large international companies that will drive the process of introducing AI in education to the greatest extent. In contrast, Domestic companies and the emerging market of entrepreneurs and startups appear to have a less dominant role in the current perspective of respondents, but will become more important in the future, as evidenced by the increase in the percentage of respondents who believe that both players will take a leading position by 2030. No respondent indicated that the domestic

or emerging market is currently or will in the future play a resilient role.

When we compare perceptions for the present and for the future, it is interesting to note the considerable reduction in the percentage of respondents who say that some of these actors will play an indifferent or resistant role. This reduction is particularly noticeable in the case of the state -rated by about half of respondents as currently indifferent or resistant- but also visible for philanthropy and international agencies and universities and the education system. For the perception of the future, these percentages are considerably reduced, and virtually no respondents perceive that any of these actors will play a resistance role. It would seem that, in the view of the respondents, AI in education will become an everyday occurrence, about which very few can remain indifferent and virtually all will accept as part of the educational process.

Figure 6. Roles of selected institutions and actors in the development of AI in education in Latin America.



Note: respondents answered the question “What do you think is and will be the role of the following institutions and actors in the development of AI in Latin America?” The institutions and actors of reference were 1) National States, 2) International market (large EdTech companies), 3) National market of EdTech companies, 4) Emerging market (entrepreneurs, start-ups, etc.), 5) Philanthropy and international organisations and 6) Universities and Education System. The possible role options were “leadership”, “important participation”, “secondary role”, “indifferent role” and “resistance”.

The case of nation states is extremely interesting. As for the situation at present, opinions seem to be spread across all possible role options: while 19% of respondents believe that the national state plays a leading role at present, 14% believe that its role is one of resistance and 33% believe that its role is secondary. Looking ahead, respondents foresee nation states taking on a more prominent role: 45% of respondents believe that the role of the nation state will be one of leadership and 34% of respondents believe that the role of the nation state will be one of major participation. A similar trend can be observed in the case of universities and the education system.

In regard to philanthropic organisations and international entities, a majority of respondents assign them a secondary role (50% presently and 48% in the future), although in the future there are a greater number of respondents who give these actors a leadership role (11%) and an important participation role (31%).

Among the various respondent groups, we found some interesting differences. As illustrated in Figure 7, the group of academics appears to be least convinced about the prospective leadership role of nation states in the future development of AI in education, with only 32% expressing this belief. This contrasts markedly with the other two groups, where more than half of the respondents believe that in the future nation states will play a leading role in this field.

Although all the actors give a preponderant role to large companies in the international market, as noted above, it is worth noting that in the group of public officials a lower percentage of respondents believe that this actor will play a leading role in the future (40%) than the other two groups, potentially reflecting the greater regulatory power that states could develop at the global level in the coming years. Furthermore, it is notable that for this group the leading role of the international market in the development of AI in education will be reduced in the future, an exceptional trend in this survey.

In this sense, it is possible to observe a vision of transformation of the roles of actors in the promotion of AI in education in Latin America.

In turn, we observed in the group of private sector representatives a tendency to attach greater importance than the other groups to the role of domestic and emerging markets in the development of AI in education, which may indicate a certain confidence in their own role in influencing this process. In fact, the percentage of private sector representatives who believe that the domestic market will play a leading role is similar to the percentage who believe that the state will play such a role (50%).

Figure 7.
Roles of selected institutions and actors in the development of AI in education in Latin America by group.



Note: Respondents answered the question "What do you think is and will be the role of the following institutions and actors in the development of AI in Latin America?" The institutions and actors of reference were 1) National States, 2) International market (large EdTech companies), 3) National market of EdTech companies, 4) Emerging market (entrepreneurs, start-ups, etc.), 5) Philanthropy and international organisations and 6) Universities and Education System. The possible role options were "leadership", "important participation", "secondary role", "indifferent role" and "resistance"

Dimension 3

Educational scenarios in Latin America.

Half of the experts believe that AI will have a profound impact on education in Latin America between 2022 and 2030.

In the third dimension of the survey, we explore different possible scenarios for education in Latin America, in the perspective of the respondents. The construction of scenarios allows an interactive vision of different dimensions linked to the possible transformations of education in the coming years to be put into play. The exceptional situation of the COVID-19 pandemic in 2020 generated an unprecedented process of educational adaptations with the interruption of face-to-face classes that in many Latin American countries lasted two full years (IDB, 2022). This situation is analysed in comparison with the changes that AI is producing or will produce in education. These are two very broad and totally different processes, but the comparison allows for an analysis of possible future scenario trends.

As Figure 8 shows, on average, 61% of respondents believe that the pandemic will bring about profound changes or even “mark a before and after” in education in Latin America. Only 7% believe that the pandemic will not bring about relevant changes.

In terms of the differences between the groups, the relevance that public officials assign to the pandemic with respect to its role in bringing about change in education is notable: 62% believe that the pandemic will mark a before and after in education. This percentage is substantially lower in the group of private sector representatives (33%) and, above all, in the group of academics (16%).



Figure 8.

Dimension of the changes that the COVID-19 pandemic will generate in education in Latin America by 2030.



Regarding the central theme of this document, Figure 9 highlights that half of the respondents believe that AI will generate major changes or a “before and after” in education in Latin America, a very high figure that shows the potential impact of technological transformations in the coming years. In contrast, 40% believe that AI will bring about moderate changes in education and 10% indicate that it will not bring about relevant changes between now and 2030.

On average, respondents seem to see the pandemic as a more disruptive driver of change than AI in education in Latin America.

Meanwhile, 36% of respondents believe that the pandemic marked a turning point in education, and only 16% believe that AI will lead to such a significant shift.

In comparing the three surveyed groups, academics emerged as more sceptical about the extent of the changes that both phenomena will usher into education. In his view, the pandemic and, above all, AI will generate mostly moderate changes. In contrast, 62% of government stakeholders believe that IA will bring about profound or transformative changes in education. The opinion of private sector representatives in this case is more intermediate compared to the other two groups.

Figure 9.

Dimension of the changes that Artificial Intelligence will generate in education in Latin America by 2030.



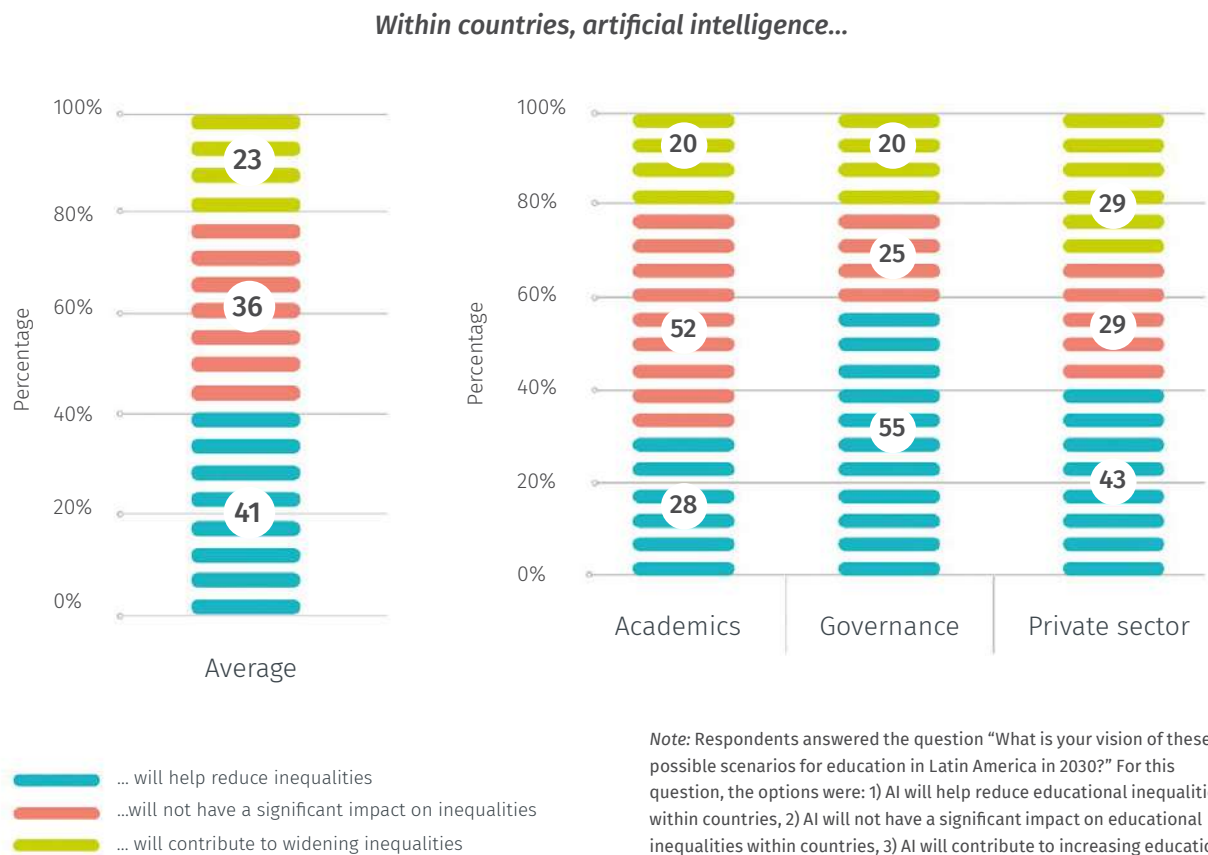
Note: Respondents answered the question “What is your vision of these possible scenarios for education in Latin America in 2030?” For this question, the options were: 1) AI will not generate relevant changes in education, 2) AI will generate moderate changes in education, 3) AI will generate profound changes in education, 4) AI will be the key dimension of the changes to come in education.

According to respondents, AI would help reduce educational inequalities within countries, but there does not seem to be a consensus on the impact of AI on inequality between countries.

In terms of possible effects on inequalities, Figures 10 and 11 reveal divergent views among respondents regarding how AI will impact on educational equity within and between countries. Looking at Figure 10, 41% of respondents believe that AI will help reduce educational inequalities within countries and 36% believe that AI will not have a significant impact on this variable. In this context, most respondents believe that the introduction of AI in education will have a neutral or positive impact in terms of reducing inequalities within countries.

Figure 10.

Impact that Artificial Intelligence will have on inequalities within countries in education by 2030.



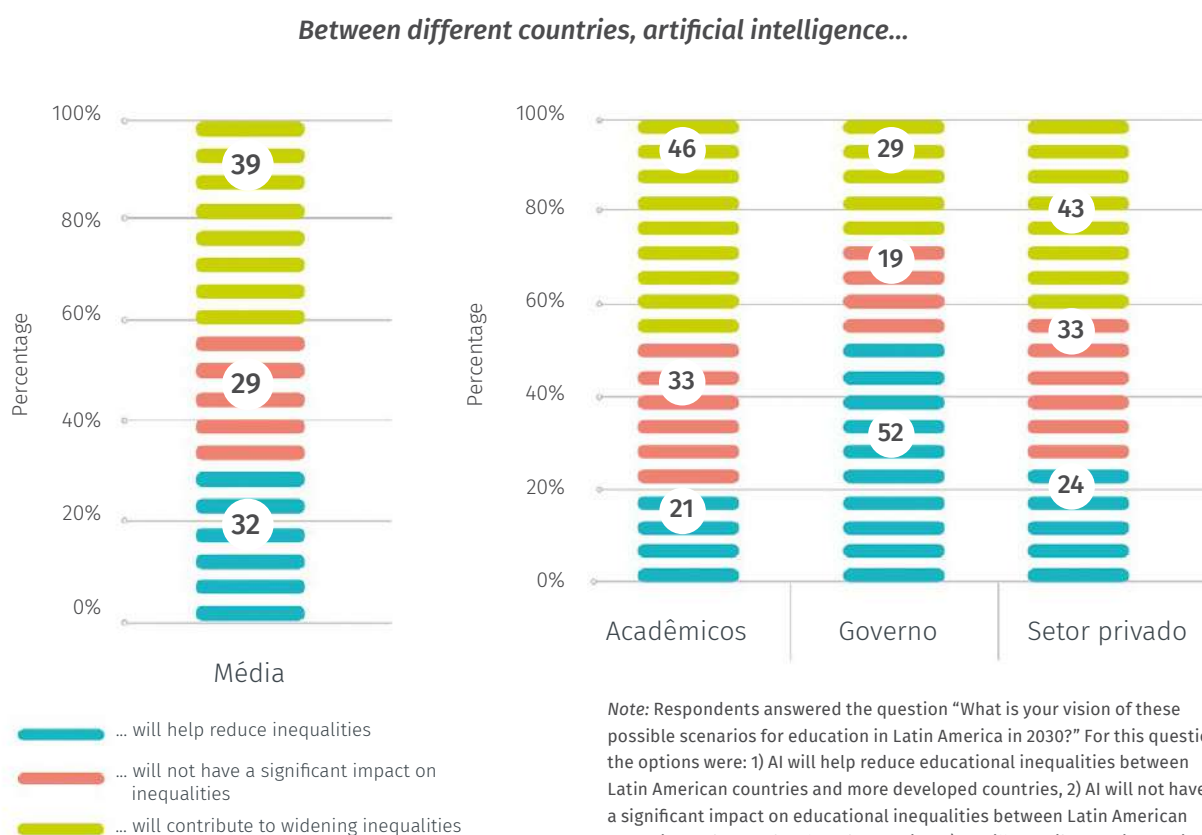
However, as Figure 11 shows, we also observe that when we ask about inequalities between countries, the percentage of respondents who believe that AI will have a negative impact rises to 39%. Respondents appear to be warning of differential appropriation of these technologies by some more developed countries over less developed countries to a greater extent than the way in which more privileged sectors within countries might differentially appropriate the benefits of AI introduction.

If we analyse the responses by group, we observe strong differences.

The group of academics surveyed is the most pessimistic about the future impact of IA on reducing inequalities within and between countries. Furthermore, it is notable in this group that only 21% believe that AI will help reduce educational differences between countries, reflecting previously existing trends in relation to the introduction of technology in education systems, often unevenly distributed. In contrast, the group of civil servants is the most optimistic: 55% believe that AI will help reduce educational inequalities within countries and 52% indicate that AI will also reduce gaps between countries in the region. The private sector reference group is again intermediate in its views on this dimension.

Figure 11.

Impact that Artificial Intelligence will have on inequalities between countries in education by 2030.



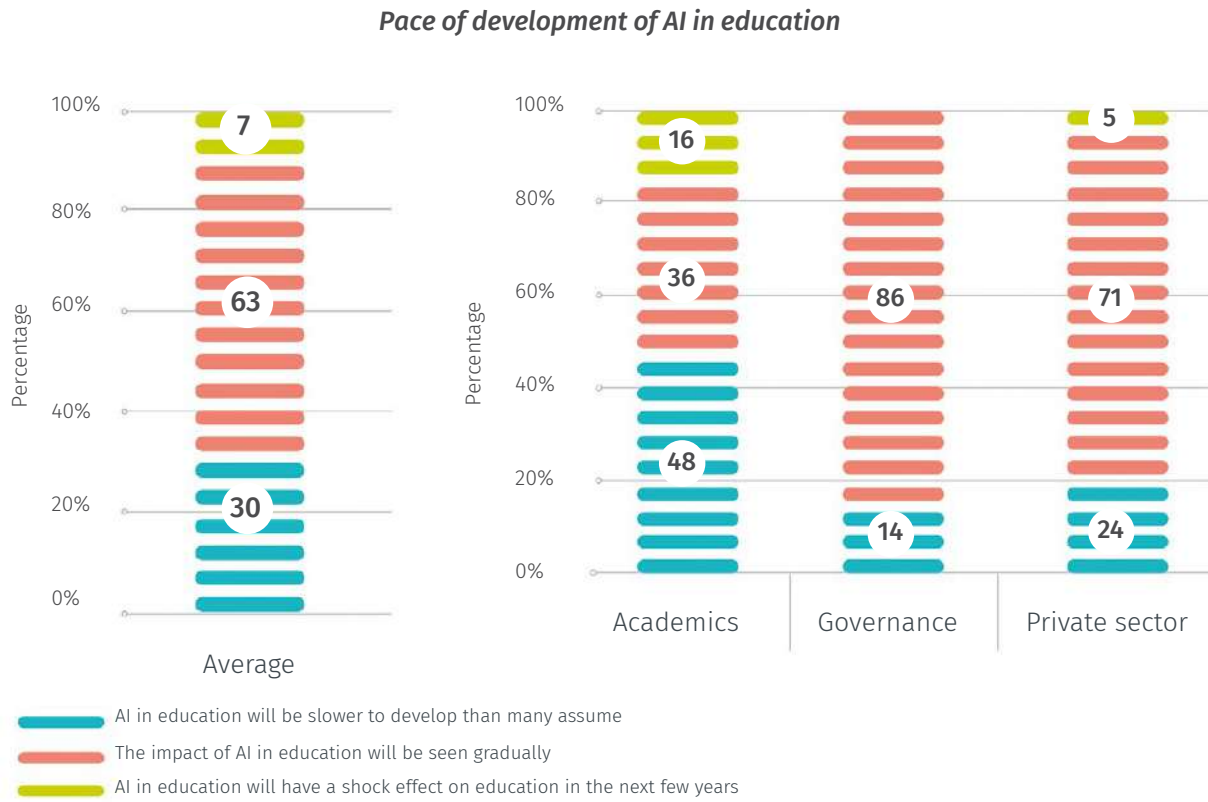
Note: Respondents answered the question “What is your vision of these possible scenarios for education in Latin America in 2030?” For this question, the options were: 1) AI will help reduce educational inequalities between Latin American countries and more developed countries, 2) AI will not have a significant impact on educational inequalities between Latin American countries and more developed countries, 3) AI will contribute to increasing educational inequalities between Latin American countries and more developed countries.

Most of the experts indicate that the changes AI will bring to education will be gradual and not sudden.

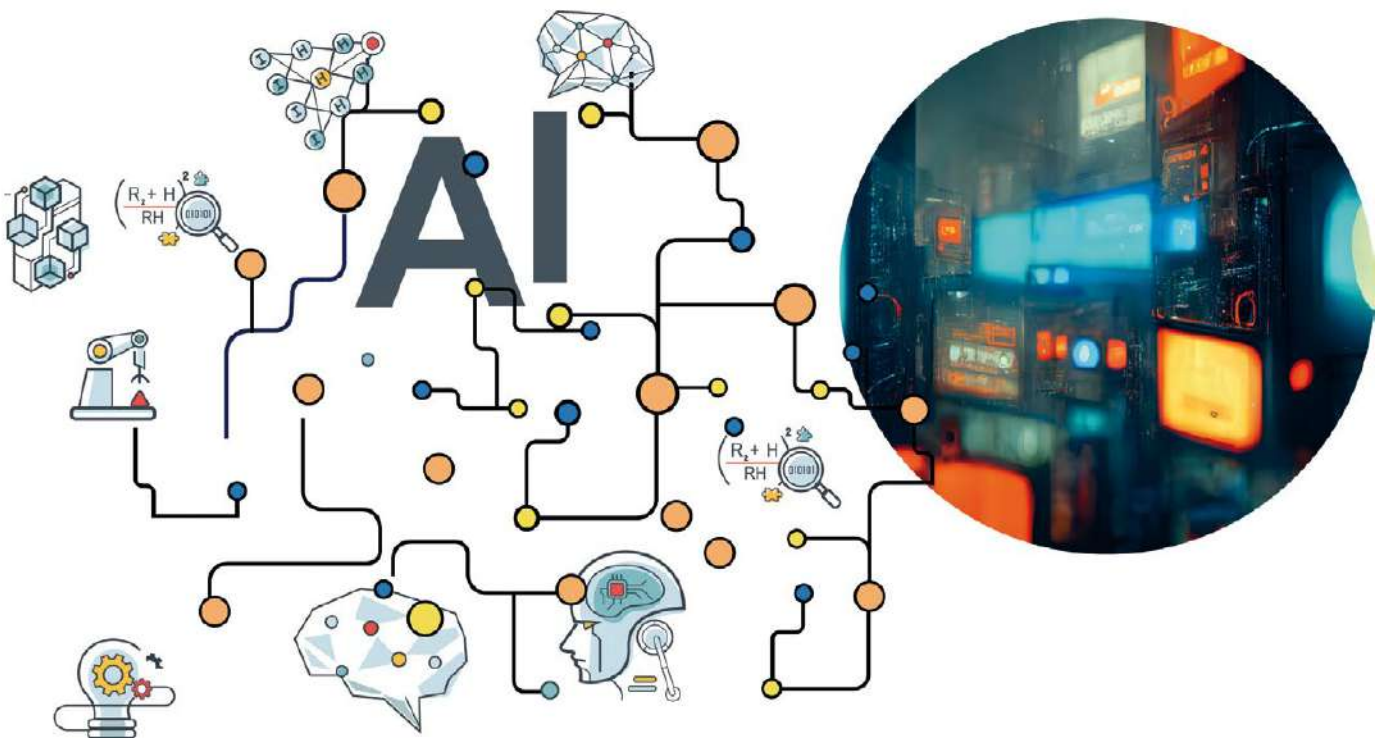
Regarding the pace of development of AI in education, as Figure 12 indicates, the majority (63%) of respondents believe that the impact of AI will be seen gradually. Also, on this question, there are large differences between the groups of respondents. In the group of academics, a large percentage (48%) believe that AI in education will develop more slowly than what other experts consulted expect, showing this group to be more cautious about the speed of the changes that AI could bring about. However, it is also in this group that we see the highest percentage of respondents (16%) saying that the changes brought about by AI in education will come as a “shock” in the next few years. This tells us about a greater heterogeneity of prognoses in this group.

Figure 12.

Pace of development of AI in education in the coming years.



Note: Respondents answered the question “What is your vision of these possible scenarios for education in Latin America in 2030?” For these questions, the options were: 1) AI in education will develop more slowly than many assume, 2) The impact of AI in education will be seen gradually, 3) AI in education will produce a shock effect in education in the coming years.



Dimension 4

Conditions and competencies for AI development in Latin America.

Experts recommend boosting schools' internet connectivity and teacher training in the future challenge of incorporating AI into education.

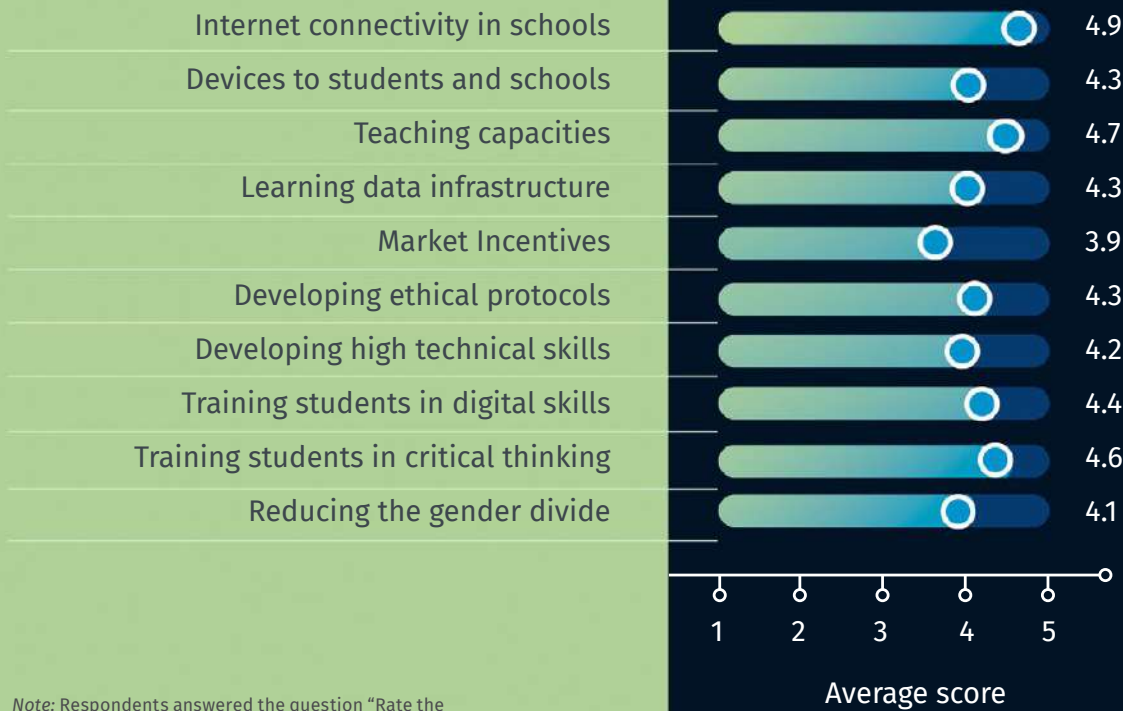
In the fourth dimension of the questionnaire, we asked respondents about possible recommendations for governments in Latin American countries concerning the development of AI in education, from a broader perspective that addresses the central issues of introducing digital technologies in education systems. Once more, this comparative look at different topics allows us to contextualise the relevance of AI within a broader framework in order to assess its relevance in the view of the experts consulted.

As depicted in Figure 13, the main recommendations align with the policy priorities that have been installed in the technology in education debate in recent decades. In this sense, connectivity in schools and teacher training, with 4.9 and 4.7 on average on a scale of 1 to 5, appear as the most valued options. Conversely, market incentives appear to be less relevant to enhance in the coming years. This view coincides with the tendency of the experts consulted to value the role of the state more highly than the role of the private sector, as we saw in other questions of the survey. However, it is also worth noting that even the lowest rated option (market incentives) scores highly (3.9). It also highlights the high value that the experts consulted assign to the training of students' critical thinking, even above the training of digital skills.



Figure 13.

Recommendations for governments of Latin American countries regarding the development of AI in education.



Note: Respondents answered the question “Rate the importance of the following recommendations for the governments of Latin American countries in relation to the Development of AI in education (1. Not important at all - 5. Very important)”. The recommendations were: 1) Ensure internet connectivity in schools, 2) Distribute devices to students and schools (computers, tablets, mobile phones, etc.), 3) Develop teaching capacities to use digital technologies and AI in a pedagogical sense, 4) Develop a high quality digital learning data infrastructure, 5) Incentivise the market to create innovative solutions with varied and high quality technology and AI for education, 6) Develop ethical protocols to control student data and privacy, 7) Develop high technical capacities to develop AI in the countries of the region and increase technological sovereignty, 8) Train students in digital skills to use and develop AI in the future, 9) Train students in critical thinking skills for consumption and use of digital media with AI, 10) Reduce the gender gap in access to technology and AI development.

With regard to the differences between the groups in terms of public policy recommendations, we observed a high degree of homogeneity, with little differentiation between the different groups. (see figures 14 and 15).

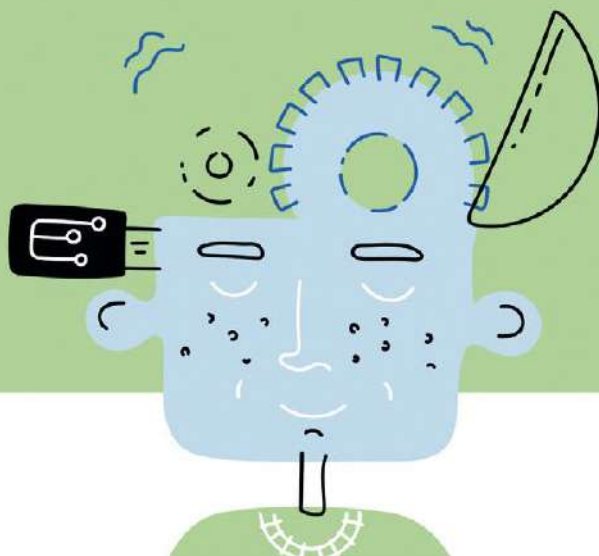
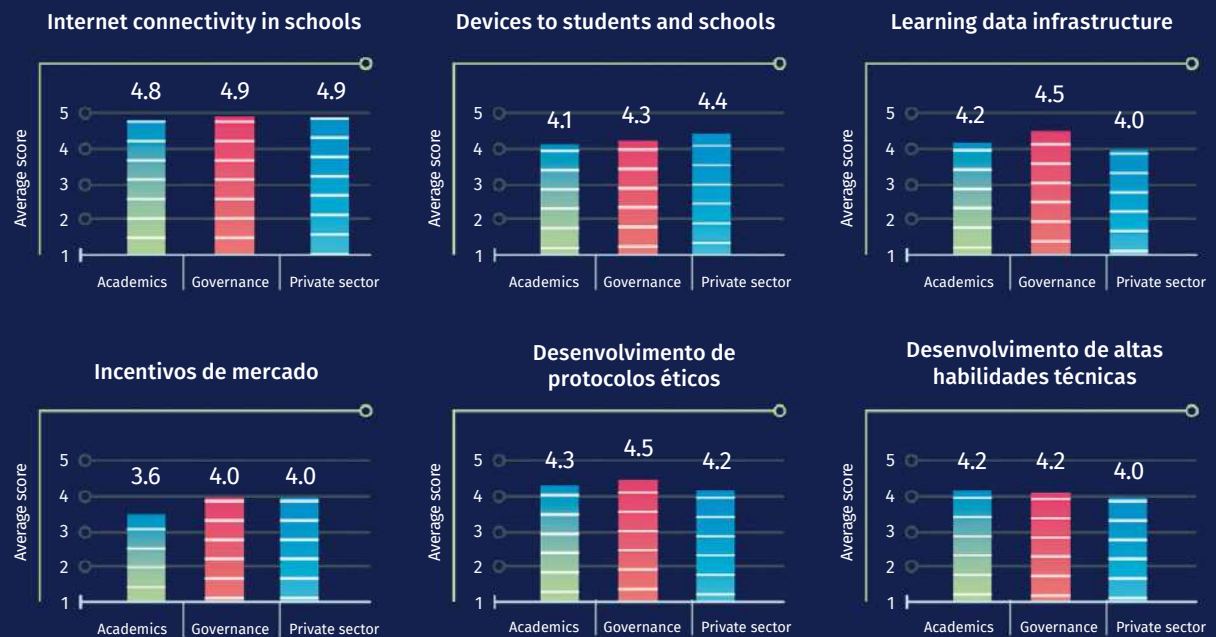


Figure 14.

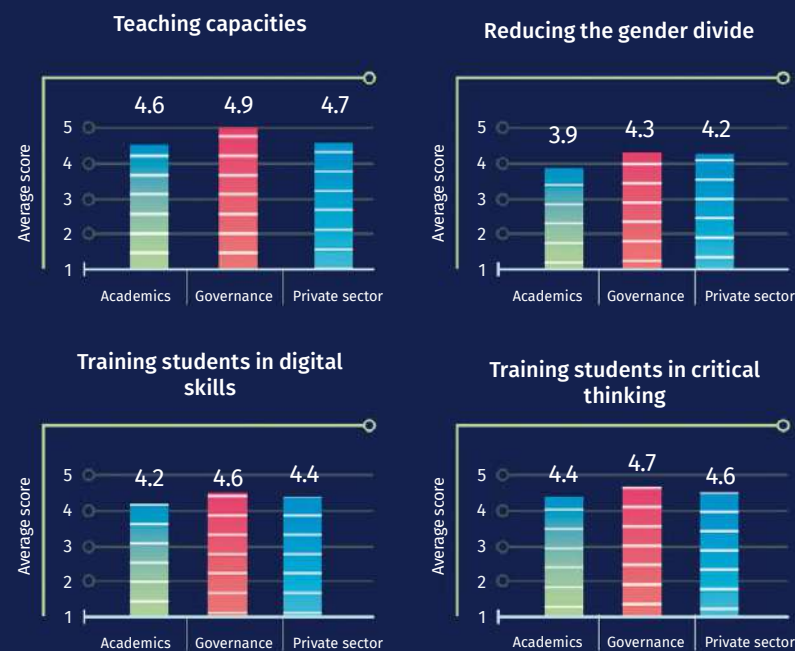
Recommendations for governments of Latin American countries regarding the development of AI in education by group.



Note: Respondents answered the question “Rate the importance of the following recommendations for the governments of Latin American countries in relation to the Development of AI in education (1. Not important at all - 5. Very important)”. The relevant recommendations for this chart were: 1) Ensure internet connectivity in schools, 2) Distribute devices to students and schools (computers, tablets, mobile phones, etc.), 3) Develop a high quality digital learning data infrastructure, 4) Incentivise the market to create innovative, high quality and varied AI and technology solutions for education, 5) Develop ethical protocols to control student data and privacy, and 6) Develop high technical capacities to develop AI in the countries of the region and increase technological sovereignty.

Figure 15.

Recommendations for governments of Latin American countries regarding the development of AI in education by group.



Note: Respondents answered the question “Rate the importance of the following recommendations for the governments of Latin American countries in relation to the Development of AI in education (1. Not important at all - 5. Very important)”. The relevant recommendations for this chart were: 1) Develop teaching capacities to use digital technologies and AI in a pedagogical sense, 2) Train students in digital skills to use and develop AI in the future, 3) Train students in critical thinking skills for consumption and use of digital media with AI and 4) Reduce the gender gap in access to technology and AI development.

Dimension 5

Good practices.

Prominent examples.

In the final section of the survey, experts from the three groups were consulted on cases of outstanding AI initiatives in education in Latin America.

Experts highlighted several policy examples. The tables below present these initiatives as noted by participants in each group. It is important to clarify that we merely listed the initiatives that participants highlighted; however, it does not emerge from the survey results what use is made of these initiatives. Consequently, we cannot identify the users of these initiatives or determine whether their use is local or global, as this information was not provided by survey respondents.

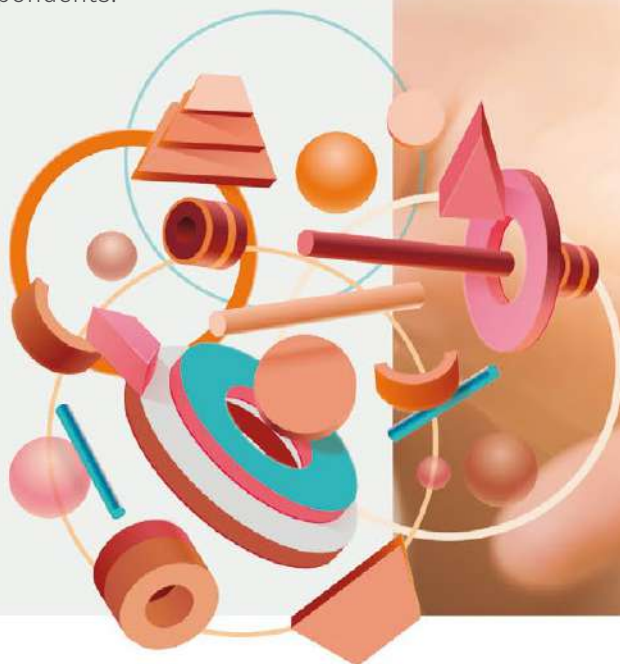


Table 1.

Public modality initiatives highlighted by survey participants.

Name	Type of initiative	Description
Plan Ceibal	Public	Plan Ceibal was the most mentioned programme. In particular, specific programmes are identified within Plan Ceibal, such as its Mathematics and Science initiatives.
Asistiré Programme	Public	It is aimed at strengthening and promoting the permanence and graduation of students in secondary school. Since 2018, the programme has been working along three lines of action: the digital assistance intake, the promoters and the inclusion tables.
ALEKS Platform (Plan Ceibal)	Public	This educational mathematics platform of Plan Ceibal allows teachers to personalise tasks, carry out a diagnosis for each student and generate a learning path.
Boti: ChatBot used by the Government of the City of Buenos Aires	Public	With regard to education, it provides information on issues such as enrolment for the school year, schools that correspond according to location, among others.
Datalab - UNAL	Public	Data Analysis Laboratory of the National University of Colombia. In this inter-faculty lab, students from different levels of undergraduate, graduate and postgraduate training are trained in AI and Data Science to solve real problems with local impact.
Valentina Programme	Public	It is an initiative that promotes the development of talent in order to reduce unemployment and underemployment in Guatemala and Latin America. Through an innovative and inclusive model, future skills are developed in young talent, maximising young people's potential and opportunities for the demands of the labour market in the digital age.



ESTER Platform by the Panamanian Ministry of Education	Public	The “ESTER” platform has been created for the student to master the formative and summative contents in an enjoyable and fun way with learning activities. It allows access to training programmes from any mobile device. It also has an app for iOS and Android devices.
Coding for Kids Programme	Public	This programme aims to promote the development of computational thinking, mainly in children and adolescents from 8 to 14 years of age. This strategy seeks to develop skills such as critical and computational thinking, creativity and problem-solving through the use and implementation of a device called micro:bit.
Passei Direto	Public	In the Passei Direto application, all content is submitted by students or created by verified producers who are specialists in certain subjects. With various formats of materials, including video lectures, summaries, questions and answers, exercises, etc., the materials are distributed across all disciplines of knowledge areas. For unlimited access, students can subscribe to the Premium Plan or earn points through gamification.
National Strategy for Artificial Intelligence (AI)	Public	This Peruvian AI system is an electronic-mechanical system that can make predictions, recommendations, or decisions, influencing real or virtual environments for a series of human-defined objectives.

Note: While the table was compiled by the Commission itself, the description of the programmes was adapted from the websites of each of the proposals.

Table 2.

Private initiatives highlighted by survey participants.

Name	Type of initiative	Description
IALAB	Mixed	The UBA's Artificial Intelligence and Law Update Programme is the only postgraduate programme in Latin America exclusively dedicated to the impact of artificial intelligence on law.
NOVA CAMP Challenge (it is a digital camp, not a digital programme)	Mixed	The Colombian Ministry of National Education and the Explora Park have opened registrations to participate in the NOVACAMP Challenge, a national digital camp to explore, feel and create. In this active learning experience, participants have the opportunity to meet people from all over the country as they overcome different levels of challenges.
Conecta Ideas Peru	Private	"Conecta Ideas Perú" is a free programme that uses interactive digital resources for students to learn mathematics in a fun way.
Fedesoft	Mixed	Fedesoft works in the development of public policies, in the promotion of training and competitiveness of firms in the sector, in the generation of specialised sectoral information and in the exploration of global opportunities that position Colombia as a world-class technology supplier.
PleiQ	Private	This programme creates educational tools in order to change the way of teaching with designed content, considering the curricular bases of kindergarten education.
Letrus	Private	This Literacy Programme combines technology and pedagogy to improve writing and empower students to write their own story and share their voice in the world.
Mumuki	Private	This programme aims to provide a complete and accessible solution for teaching programming on a mass scale.

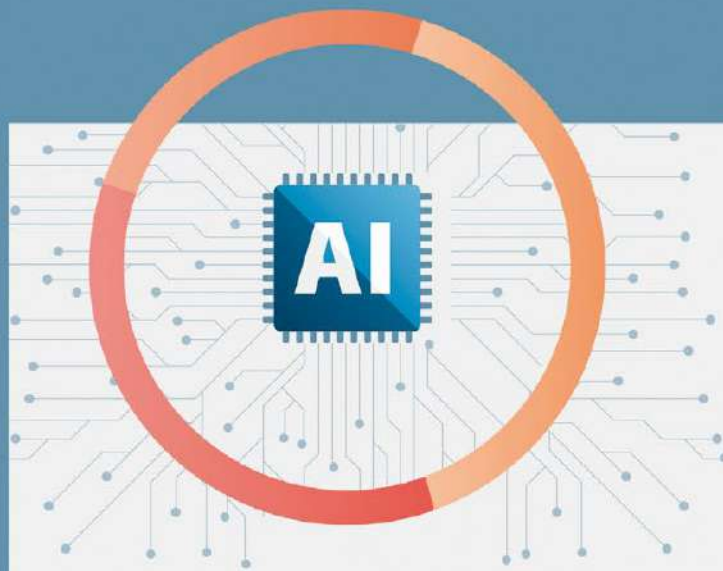


School of Live Date	Private	It is a platform specialised in machine learning, deep learning, etc., learning with real data and real industry problems.
ProFuturo Mathematics	Private	This programme helps develop and improve students' mathematical skills. Mathematics ProFuturo is a professional educational instrument for girls and boys between 8 and 12 years old, and it also allows teachers to monitor the performance of their students in real time.
ChatClass	Private	ChatClass is a New York-based company that helps companies educate employees and customers through conversational learning. The platform uses tools present in the daily lives of Brazilians, such as WhatsApp, and has already reached more than 500,000 students.
1bot	Private	1bot is a Guatemalan company with international operations. They work in 3 main areas: robotics, programming and entrepreneurship.
Humai	Private	This company develops a series of modular courses to offer a complete and accessible training for different Data Science professionals, such as analysts, programmers or AI researchers.
Code.org	Private	Code.org is a non-profit educational organisation dedicated to the vision that every student in every school has the opportunity to learn Computer Science as part of their basic K-12 education. The organisation seeks to expand access to computer science in schools, with a focus on increasing the participation of young women and students from other underrepresented groups.
CTI	Private	CTI (Content Technologies Inc.) is an artificial intelligence research and development company specialising in production automation, business process automation, instructional design and content application solutions.
Paper.co	Private	It provides unlimited access to trained tutors so that every student can ask questions, work through problems and build their confidence.

Note: While the table was compiled by the Commission itself, the description of the programmes was adapted from the websites of each of the proposals.

4 Conclusions

The pace of progress and possible consequences of artificial intelligence in the world of education pose crucial questions for the future of education systems. **It is a field of uncertain possibilities and risks.**



The pace of progress and potential consequences of artificial intelligence in the field of education pose critical questions for the future of education systems. It is a field of uncertain possibilities and risks. The capacity for exponential acceleration of change through the introduction of *machine learning-based* technologies generates revolutionary potential. We know that everything can change very soon, in radical and unexpected ways, but it is also possible that these are unfulfilled promises (which education has already seen in the past) and that we are still far from seeing profound AI-based transformations in education.

The abrupt emergence of the pandemic in March 2020 shook the world. The disruption of face-to-face classes was particularly pronounced in Latin American countries. This generated an obligatory process of accelerating the introduction of technologies in teaching and learning. The global EdTech market experienced unprecedented growth in what was already a growing trend. The volume of digital learning data grew exponentially and, in many ways, became challenging to control (Sharma, 2022).

This laboratory of technological expansion in multiple directions has provided new lessons and warnings for the future. The potential for personalisation and acceleration of learning presents a great opportunity to expand the right to education. At the same time, the threat of widening inequalities based on different possibilities of access to and use of technologies, together with the risks in privatising control of digital education, are issues that require new public conversations.

These emerging scenarios raise questions. In this paper, we have set out to address questions about the future of AI in education in Latin America by consulting different groups of experts. The starting point has been the uncertainty surrounding an issue that is growing strongly, but still in an emerging stage.

To gain a better understanding, we have undertaken an analysis of current and future trends from different perspectives. The three groups of actors surveyed belong to three different fields of practice and institutions: academics, public sector education stakeholders and private sector stakeholders linked to new educational technologies.

We did not know to what extent these three groups would agree or disagree on different key thematic axes to understand the direction of AI in education towards the year 2030, when the cycle of the SDG targets will be completed.

This report points to some significant findings:

The survey results reveal that all stakeholders perceive AI's increasing importance in education in the future, although this relevance would be most noticeable in university and tertiary education.

While AI in education can fulfil a number of different roles, respondents' perceptions show no clear differences among these potential roles. The issues that seem to have the most potential for growth between now and 2030 are the uses of AI for learning beyond school and for learners with special needs.

Large international companies currently seem to have a greater role in the introduction of AI in education than actors such as the state, the local private sector or the education system.


In the projection to the year 2030, the different expert groups have diverging opinions. While the group of academics is more sceptical of the possibilities for the state to play an increasing role in the development of AI in education, the other two groups believe that in the future nation states will play a leading role in this field.

AI would help reduce educational inequalities within countries, but at the same time, experts consulted estimate that it will increase inequalities between countries in the region.

Perceptions of the present and future do not differ markedly between the different stakeholder groups surveyed, although there is a tendency for government officials to be more optimistic about the future relevance and positive consequences of AI in education in its ability to reduce educational inequalities within and between countries. Academics are the most pessimistic group of experts regarding these dimensions and the future role of AI in education in Latin America.

The rate of growth of AI in education is seen as a rising trend that will not be disruptive by 2030. We understand this to be indicative of a field that, even when we focus on groups specialising in the topic, is still under construction and at a stage of uncertainty about its potential impact in the near future.

Future priorities in terms of recommendations for public policy are focused on internet connectivity in schools and teacher capacity building, issues that even seem to predate the introduction of AI in education.



These findings reflect some of the dilemmas and challenges facing the potential AI development scenarios in the field of education:



1

What role should the State play with a view to the potential impact of AI in education? Should it consolidate itself as an agent for the development of advanced digital tools that reach all students as a public asset to guarantee their right to education? What role should the private sector play?

This first dilemma involves crossing the role of the state with the pace of technological innovation. The private market seems to have a great advantage in propagating an accelerated pace of technological innovation. Different scenarios are already being explored around the world. The public sector can buy from the private sector advanced technological resources that it is not able to develop autonomously, or generate partnerships of various kinds to distribute the emerging technology in the education sector.

These alliances can be unstable and shifting in such a dynamic world. This is why it is so important to develop state capacities to participate in new AI developments in education. It is key to know the trends, to understand the directions, possibilities and risks in terms of public policy. Only a high level of specialised knowledge will allow such a complex sector to be harnessed for the benefit of educational development.

This paper warns of the need to bring these discussions to the centre of decision-making. Those who do not have the capacity to participate in the most advanced dialogues on the introduction of AI in education will be missing out on a growing field of solutions that can exponentially increase access to knowledge, teaching and learning. In addition, understanding the complexity of this new technological field will enable responses to emerging threats, such as ethics and security in the use of students' and teachers' private data.

To face these multiple challenges, it is recommended to develop public educational agencies specialized in the most advanced technological development.

These agencies should be endowed with the resources to develop products, partnerships and hire specialists in a dynamic field that crosses technological and pedagogical knowledge. An example in this direction is the well-known case of the Ceibal Plan in Uruguay, which has become a central reference in Latin America in this area.

It is also recommended that countries foster supranational alliances for the development, purchase and public distribution of digital educational resources. Given the large inequalities among countries that were highlighted in the survey -spanning economic power, specialised human resources, and the size of the critical mass that masters the codes of technological advancement- it is key to go beyond individual solutions. International organisations can be partners in the creation of networks between countries that generate effective partnerships for the use of AI in education. New partnerships between countries, particularly in a region with as many common challenges as Latin America, could pave the way for achieving convergence in the approach and use of AI in education in the coming years.

2

How can we include AI in the education system? Is it possible to involve teachers in this process and/or should the potential be tapped beyond schools? How does the advance of digital technologies redefine the boundaries and meanings of an education system?

The arrival of AI in the education system can take many forms. Some developments may give rise to new external or complementary offerings to schools via direct student digital learning consumption. Other solutions are tailored with a focus on schools and teachers, but can also take on different meanings. For instance, AI can facilitate the automation of learning assessments, providing immediate feedback to students. This streamlined process can empower teachers to allocate more time to instruction or individualized tutoring.

In essence, AI transforms the environments and possibilities of education. This is why a broad educational conversation is needed. This document is a step in that direction, consulting three major stakeholder groups to generate dialogue in diversity. It is important to involve teachers and educators in this dialogue and in the ways in which technology can be introduced in schools with a sense of pedagogical relevance and ownership by both teachers and students.

In this direction, it is essential to develop digital skills in teachers and students, enabling them to understand the contexts of technological development and its multiple possibilities and risks. Developing digital citizens has become a central focus of education systems, as pointed out in the survey. Digital Citizenship is a set of competences that enable people to access, understand, analyse, produce and use the digital environment critically, ethically, and creatively (UNESCO, 2020).



3

What impact will AI have on social and educational inequalities? Will those with greater resources be able to make better use of the digital technologies or will they become levellers that increase equity within education systems?

This paper delves into the potential social impact of AI in education. The risks are clear: those who have more access to technology are already in a socially advantaged position and could gain more advantages if they access paid platforms and resources powered by AI that allow them to advance in their learning. In turn, an even greater risk highlighted by respondents is that inequalities between countries will grow as a result of unequal access to technological development.

This aligns with the first challenge, calling for an active role of the state to make the most of the potential of new technologies in favour of the most disadvantaged sectors. The defence of the right to education is venturing into new territories that require an understanding of how culture and education are distributed in a digitalised world. Today, innovation is becoming an indispensable condition for reaching everyone with the best digital tools, as is the case in parallel with medicine: the distribution of medicines or vaccines with recent advanced technology is a matter of human rights, as will increasingly be the possibility of using AI in education.

On the other hand, a sociological perspective of AI prompts us to conceptualise different situations of exclusion and generate innovative responses by leveraging technological possibilities. For example, in this paper, we have seen the prominent role AI can play in the education of individuals with special needs, as indicated by the various experts consulted. It is key, in this regard, to incorporate in these developments and debates the communities of indigenous peoples, gender perspectives and the different populations that live in situations of disadvantaged minorities.

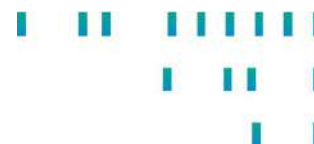
4

What do we not know and what is worth investigating?

Finally, it is important to highlight the relevance of opening up new research on novel phenomena that may alter the educational order. We have recently seen the emergence of AI engines that have advanced language recognition capabilities such as CHATGPT and can contribute to broadening or narrowing educational horizons - either by providing new tools to enhance thinking or to facilitate copying in essays.

Establishing new research agendas is becoming an increasingly urgent and relevant task. The contribution of academic research can be vital to avoid the interests at stake for different actors or to provide interdisciplinary views from philosophy, technology, pedagogy, among other varied fields that intersect in this issue. We are going through the time of a large laboratory, where different educational developments with AI are being experimented with at an advanced speed. Rigorously studying the effects and possibilities of these solutions becomes an essential task to expand the frontiers of the right to education in the years to come.

References



Atilas, J. T., Almodóvar, M., Chavarría Vargas, A., Dias, M. J., & Zúñiga León, I. M. (2021). International responses to COVID-19: challenges faced by early childhood professionals. *European Early Childhood Education Research Journal*, 29(1), 66-78. Inter-American Development Bank (2020). *Use and effects of artificial intelligence in education*. Washington, DC: IDB.

Inter-American Development Bank (IDB) (2020). *Artificial intelligence at the service of social good in Latin America and the Caribbean: Regional overview and snapshots from twelve countries* <http://dx.doi.org/10.18235/0002393>

Inter-American Development Bank (IDB) (2022). What has happened to education in Latin America during the pandemic? <https://publications.iadb.org/es/que-ha-sucedido-con-la-educacion-en-america-latina-durante-la-pandemia>

Brossi, L., Dodds, T., & Passeron, E. (Eds.). (2019). *Artificial intelligence and youth well-being in Latin America*. LOM Ediciones.

Estevadeordal, A., Beliz, G., Estevez, E., Ovanessoff, A., Plastino, E., Rao, A., & Gilliam, M. (2018). Algoritmolandia: artificial intelligence for a predictive and inclusive integration of Latin America. *Integration and Trade Review*, IDB, n. 22, 44.

Fundación Telefónica (2012). *Learning with technology. International research on future educational models*. Madrid: Fundación Telefónica/Ariel.

Goodfellow, I., Bengio Y., Courville, A. (2016) *Deep learning*. Vol. 1. Cambridge: MIT press.

HolonIQ. (2020). *Education in 2030: Five scenarios for the future of learning and talent*. New York: HolonIQ.

Jaramillo, S. G. (2020). COVID-19 and primary and secondary education: The impact of the crisis and public policy implications for Latin America and the Caribbean. *V1Cross-sectional visions*, 167.

Mancilla-Caceres, J. F., & Estrada-Villalta, S. (2022). The Ethical Considerations of AI in Latin America. *Digital Society*, 1(2), 1-6.

Marczak, J., Engelke, P., Bohl, D., & Saldarriaga, A. (2016). América Latina y el Caribe 2030: future scenarios. *Washington, Estados Unidos, BID & Atlantic Council*.

Mathrani, A., Sarvesh, T., & Umer, R. (2021). Digital divide framework: online learning in developing countries during the COVID-19 lockdown. *Globalisation, Societies and Education*, 1-16.

Miao, F., Holmes, W., Huang, R., & Zhang, H. (2021). *AI and education: A guidance for policymakers*. UNESCO Publishing.

Mitchell, T. (2006). *The discipline of machine learning*. Vol. 9. Pittsburgh, PA: Carnegie Mellon University, School of Computer Science, Machine Learning Department.



Sanchez, Pi, N., Martí, L., Bicharra García, A. C., Baeza Yates, R., Vellasco, M., Artemio, C. (2022). *A Roadmap for AI in Latin America*. Side event AI in Latin America of the Global Partnership for AI (GPAI) Paris Summit, GPAI Paris Center of Expertise, Nov 2021, Paris, France. hal-03526055

Ocaña-Fernández, Y., Valenzuela-Fernández, L. A., & Garro-Aburto, L. L. (2019). Artificial intelligence and its implications for higher education. *Purposes and Representations*, 7(2), 536-568.

OECD (2020), **Back to the Future of Education: Four OECD Scenarios for Schooling**, Educational Research and Innovation, OECD Publishing, Paris, <https://doi.org/10.1787/178ef527-en>.

OECD/CAF (2022). *Strategic and responsible use of artificial intelligence in the public sector in Latin America and the Caribbean*. *OECD Public Governance Studies*. OECD Publishing, Paris, <https://doi.org/10.1787/1f334543-en>

OREALC-UNESCO, CEPAL & UNICEF. (2022). *The crossroads of education in Latin America and the Caribbean*. *SDG4 Education 2030 Regional Monitoring Report*.

Pedró, F., Subosa, M., Rivas, A., & Valverde, P. (2019). *Artificial intelligence in education: Challenges and opportunities for sustainable development*. Paris: UNESCO

Tadesse, S., & Muluye, W. (2020). The impact of COVID-19 pandemic on education system in developing countries: a review. *Open Journal of Social Sciences*, 8(10), 159-170.

Sharma, H. (2022). *Mapping the Global EdTech Revolution during the Pandemic: From 'Determinism' to 'Solutionism'*. In: Mogaji, E., Jain, V., Maringe, F., Hinson, R.E. (eds) *Re-imagining Educational Futures in Developing Countries*. Palgrave Macmillan, Cham https://doi.org/10.1007/978-3-030-88234-1_7

UNESCO (2020). *Digital citizenship as public policy in education in Latin America*. *Regional Science Office for Latin America and the Caribbean*, Montevideo.

World Economic Forum Boston Consulting Group (BCG). (2018). *Eight futures of work: scenarios and their implications*. World Economic Forum, Geneva, Switzerland.



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