
In-Progress Reflection No. 14 on
Current and Critical Issues in the Curriculum, Learning and Assessment

15 Clues to Support the Education 2030 Agenda



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Open Note of the IBE

The IBE has launched the series In-Progress Reflections on *Current and Critical Issues in Curriculum, Learning and Assessment* to open a communal space for a global conversation, collective production and discussion on those issues of high concern for Member States. It intends to support country efforts in mainstreaming challenging issues within the processes of curriculum renewal and development across different levels, settings and provisions of the education system.

Initially, the focus areas of the In-Progress Reflections series encompass, among others,: (i) Early Childhood Care and Education (ECCE) as a foundation of holistic child development and learning; (ii) Reading and writing in early grades to support the development of essential competencies; (iii) Youth Culture and competencies for Youth in the early 21st century (covering formal, non-formal and informal education); (iv) ICT curricula and inclusive pedagogy contributing to relevant and effective learning outcomes; (v) STEM (Science, Technology, Engineering and Mathematics) curricula to foster sustainable development; (vi) Curriculum for Global Citizenship Education (peace, human rights, sustainable development, values, ethics, multiculturalism, etc.); (vii) Assessment to enhance and support learning opportunities; and (viii) Inclusive education as an over guiding principle of education systems.

The series of reflections covers a wide array of knowledge products, among them: discussion papers, policy briefs, frameworks, guidelines, prototypes, resource packs, learning tools and multimedia resources. These materials are discussed, refined, used and disseminated engaging education and curriculum agencies / institutes, and in particular curriculum developers and specialists, development experts, policy makers, teacher trainers, supervisors, principals, teachers, researchers and other educational stakeholders. Also, they serve as reference materials for the IBE menu of capacity-development training on curriculum, learning and quality education – namely masters, diplomas, certificates and workshops – to forge policy and technical dialogue involving a diversity of stakeholders and to support sustainable country field work.

Through blogs and e-forums, we encourage the audience to actively interact and bring in diverse perspectives. Effectively, the online space for reflection allows us to stay connected, facilitates exchange between experts from different regions of the world, and truly fosters continuous reflection on the issues concerned. The blog is structured to gather diverse resources, which include tools and documents (as previously mentioned) under specific themes so as to provide a complex and rich set of materials targeted to the specific needs of Member States. The In-Progress Reflections will capture relevant visions, views and comments shared by the audience, and serve as a key resource to support Member States' efforts in mainstreaming relevant findings and effective practices in national policies, curriculum frameworks and developments and in professional practices.

Dr. Mmantsetsa Marope: Director, International Bureau of Education



15 Clues to Support the Education 2030 Agenda¹

Summary: If we consider both the objectives of the Education 2030 Agenda and the accelerating changes in the world as a result of the fourth industrial revolution, it is evident that we need to rethink the concepts that have permeated the development of education over the last four decades. We are faced with the sizeable challenge of redefining these concepts and education systems from a transformative and unitary point of view. This comprehensive reflection weaves together a vision for education and learning that aligns with the Education 2030 Agenda by examining 15 clues of analysis. It focuses particularly on the following aspects: 1) education as a mirror of pursued types of society; 2) the state as a guarantor of the right to education; 3) education as a cultural, social and economic policy; 4) the roles and characteristics of education systems; 5) from zero to onwards learning; 6) education conceived per age group; 7) inclusion as the cornerstone of education systems; 8) education for glo-local citizenship; 9) education for sustainable development; 10) STEM education for sustainable societies; 11) the importance of gender perspective for democratising society and education; 12) the role of computer programming as a new challenge for ICT teaching; 13) the changing relationship between education and work; 14) the curriculum – school – pedagogy triad; and 15) teachers as decision-makers.

Keywords: 2030 Education Agenda – learning – fourth industrial revolution – teachers – pedagogy – education systems

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Towards a new structure

The Education 2030 Agenda (UNESCO et al., 2015) provides us with a great opportunity to rethink the aims, objectives, strategies, tools and implications of education, as well as revisit the organizational and operational structure of the education system and its main components. One of the main objectives of this new agenda is to renew the synergies between concepts that have influenced discussions on education and its collective definition over the last forty years (Amadio, Opertti and Tedesco, 2015; Benavot, 2012; Braslavsky, 2005; Savolainen, 2009; UNESCO, 2015b). It is essentially an attempt to harmonise and integrate these concepts by redefining education as a change agent. The Sustainable Development Goal 4 (SDG 4) “Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” is a step in this direction.

As a result of intense discussions and mutual agreements between many institutions and stakeholders (UNESCO, 2014), the 2030 Agenda represents a new global system of education governance based on the key ideas of education for all and education for sustainable development (Tikly, 2017). This new agenda has at least 5 main features. Firstly, it is ambitious as it aims to transform the lives of people and communities by making education the main agent of change in different aspects of community life. Secondly, it is based on a holistic, and thus multidimensional, view of development that sees education as the key to ensuring that development brings together the principles of sustainability, inclusion, social justice, equity and cohesion. Thirdly, it is humanistic as it identifies and prioritises the values, references, attitudes and behaviours that foster dignity, coexistence and respect among people, communities and populations. Fourthly, it is progressive as it trusts that education’s power to convene, to persuade and to act will help improve the well-being and opportunities of people and communities. Fifthly, it emphasises the importance of seeing and managing development as an arduous and dynamic combination of cultural, political, economic and social elements, at the heart of which lies education.

These main features of the new agenda explicitly demand that the educational debate be a constructive and truly pluralistic dialogue open to citizens, civil societies and political systems. Education is no longer seen as an area reserved exclusively for educators and education systems, and/or as the main responsibility of educators, who are unfairly blamed for the state of education.

Two main concerns seem to have opened up two-way feedback channels between societal, political and education stakeholders. Some are looking to prioritise, delve into, clarify and democratise discussions surrounding the type of education, education system, educational institution, curriculum, pedagogy and teacher required for different societies, communities, citizens and people (Amadio, Opertti y Tedesco, 2015; Opertti, 2014;). Others, on the other hand, are looking to recreate and strengthen the relationship between the *for what* and the *what* of education and the *how*, *where* and *when* to educate and learn, whilst bearing in mind that a significant number of educational proposals have failed due to the conceptual and operational disengagement between the what and the how (Filgueira et al., 2014; Jonnaert and Therriault, 2013; World Economic Forum, 2017).

These two concerns have led to the need to rethink education as a whole along with the education system provisions that enable its development. It is impossible to obtain solid and sustainable answers from isolated initiatives and interventions that are not connected with or do not respond to other parts of the system and that are not based on a systemic view of education, without taking into consideration the challenges faced in specific contexts when trying to define and implement educational proposals (Opertti, 2011). In fact, people are gradually starting to analyse and unitarily manage the components and elements of education systems better (Marope, 2014). This new direction is supported by several institutions and actors who, regardless of their sphere of influence, are involved in education and share their own adapted vision of what the right to education and learning means, implies and involves (UNESCO, 2015b).

This renewed education agenda may be contextualized, inspired and supported by global changes accelerated by the fourth industrial revolution, the main features of which are:

- I. The universal presence of mobile Internet with increasingly smaller, cheaper and more powerful sensors;
- II. The rise of cyber-physical systems that use technology to blur the borders between the physical world (i.e. autonomous vehicles and 3D printers), the digital world (i.e. the internet of things and the blockchain), and the biological world (i.e. gene activation and modification); and
- III. The development of new skills for people and the machines used in the development of artificial intelligence (Davis, 2016; Schwab, 2016, 2017).

This revolution known as Industry 4.0 was a key catalyst to the creation of the Sustainable Development Goals, especially SDG 9 which supports industrialisation, infrastructure and innovation (Maddah, 2016).

The implications of the fourth industrial revolution affect all aspects of our current and future lives and influence not only what we do and how we do it but also who we are (Schwab, 2017). Our identities as people, citizens, educators and learners, employees and employers, and communities and societies are affected. Changes can be seen on multiple levels, for example in relationships between humans and nature, between humans themselves, between humans and robots, between humans and produced or consumed objects, and between our virtual and physical identities. Changes can also be seen between cultures, ethnicities and religions, between countries, regions and sub-regions, and between ideologies and societal aspirations.

Technology no longer simply gives us access to products and services that increase our everyday efficiency and pleasure (Schwab, 2016), but it also increasingly helps to shape our perception of the world, modify our behaviours and define what it means to be human (Davis, 2016). Fusion technology has and will have even more of an impact on our lives, for example by improving and extending life, or redefining the cycles of life and death as well as of training and work (Davis, 2016; Ross, 2017; Schwab, 2016, 2017).

It is no longer a matter of accelerated changes in a world that offers the relative comfort of constant evolution and promotes the values of adaptation, flexibility and individual and collective creativity as people and societies affirm their identities and respond to change. The discussion seems to evolve around the direction taken by these changes, which are characterised by their exponential rate, their broad scope and the strong impact they have on societies, citizens, individuals, the economy and businesses, as well as the systemic impact they have on countries and societies (Schwab, 2016; 2017).

Faced with the difficult task of analysing a planet with an uncertain future and a world that is bubbling up in all directions, we would like to put forward fifteen clues that may help to weave a vision for education and learning that aligns with the Education 2030 Agenda and brings about its transformative, holistic, humanistic, progressive and developmental identity (Opertti, 2016a). As previously mentioned, the challenge is actually to reinforce the programmatic structure of this new agenda by giving new meaning and content to its concepts, processes and tools so that they may transform the lives of people and communities.

Clue 1: education reflects pursued types of society

Education is not always fully recognised as a societal, political and technical matter that owes its existence and legitimacy to the types of society we aspire to create with it. Discussions often tend to remain stalled due to seemingly contradictory views and positions, whether on the objectives of education versus the expectations and legitimate interests of various institutions and societal actors, or the educational versus the political, or the educational versus the social. All educational proposals are founded, more or less explicitly or implicitly, on dialogue and long-discussed definitions of the society, politics and education triad, which are not exempt from opposition and conflict. Educational reforms often fail despite their noble intentions because the balance of power and synergies between the components of the triad, which ensure the management, development and success of reforms, are unknown or ignored (Jonnaert, Ettayebi and Opertti, 2008; Tucker, 2011).

A pursued type of society can be seen as a combination of common values, frameworks, regulations, institutions and symbols through which people identify themselves and feel part of a social collective (Fressard, 2006). Although closely linked to the past and the present, it acts mainly as a compass to guide the future. Pursued types of society give meaning to and support education, but do not necessarily imply adherence to a particular school of thought, ideology, paradigm or exclusive understanding of societal life. In any case, they should not be seen as closed systems, which keep education hostage and trapped in ideologisms, fundamentalisms, fanaticisms and/or violence. All educational proposals, however, are based on a pursued type of society regardless of how they are devised and explained.

A pursued type of society is thus an open structure based on dialogue and a series of convergent references that apply to society as a whole and confer obligations on institutions and actors. Likewise, in societies that are increasingly marked by tensions regarding the proliferation and recognition of identities, affiliations and multiple lifestyles, a pursued type of society can be seen as a way to reach equilibrium as well as to really consider diversity at the local, national and international level.

Indeed, the Education 2030 Agenda allows us to rethink educational visions, strategies and content based on transformative pursued types of society, and to align education system components to them. Pursued types of society are often briefly referred to as part of reform contexts and foundations, but sometimes so vaguely that their influence over the selection, conceptualisation and concretisation of desired learning, as well as of the curricula, pedagogies and teacher roles that support their development, is diminished. A pursued type of society, whose sole purpose is to declare educational change, risks being strongly questioned by opposing educational practices.

Clue 2: a state as guarantor of the right to education

The Education 2030 Agenda entails rethinking the role of a Guarantor State to ensure the provision of pertinent, sustainable and lifelong learning opportunities, processes and outcomes. In light of this new agenda, we have identified the five main characteristics of a Guarantor State. First and foremost, it has a duty to guarantee every individual's right to educate themselves, learn and acquire relevant knowledge and competencies for themselves, their lives in society and to exercise citizenship on different levels (Amadio, Opertti and Tedesco, 2015; UNESCO, 2015b). The right to education is closely linked to equal opportunities and learning outcomes. Although local and national governments inevitably determine to what extent education is free and compulsory, the worldwide trend adopted by the Education 2030 Agenda, and by an increasing number of countries, is to establish minimum criteria regarding the free and obligatory nature of secondary education (De Armas and Aristimuño, 2012).

Secondly, a Guarantor State has to consider education as a common basic good and the need to guarantee the basic rights of every individual. It thus has to reaffirm the collective nature of education as a mission and undertaking that advocates and shares common values and references. The concept of education as a common basic good is, essentially, a political, socio-historical and cultural construct that acknowledges different contexts, opinions and knowledge systems as its source of legitimacy, development and sustainability (UNESCO, 2015b).

Thirdly, a Guarantor State leads, directs, co-develops, regulates, follows-up and co-evaluates the fulfilment of the right to education and learning. It is important not to associate a Guarantor State with a state-centric vision that supposedly monopolises environments, provisions, approaches and knowledge. A guarantist vision, which is not state-centric, does not imply in any way, shape or form a preference for markets and, ipso facto, the privatisation of social services. Rather, it recognises the need to rely upon different formal, non-formal and informal institutional arrangements, numerous learning environments and educational provisions, and a wide range of curricular, pedagogical and teaching strategies to ensure that each student is given real opportunities to learn and educate

him/herself. The challenge is thus to create different organizational structures (Educar 2050, 2016), which bring together various institutions and actors, with the help of a state that is committed to guaranteeing both fair and quality education and does not limit its power based on the principle that inclusion only refers to access to education.

Fourthly, a Guarantor State recognises and protects the right of individuals, families and communities to choose their education based on their affiliations, beliefs, locations and interests. It cannot abrogate power nor take decisions that are inherent to the rights of individuals and families. A Guarantor State should not support commercialisation, privatisation or uncontrolled freewill, but rather encourage freedom of choice whilst offering universalist orientations, guaranteeing equal opportunities and outcomes, and ensuring the strict respect of universal values and references by all members of society. In fact, allegedly guarantist states are often unable to ensure fair educational opportunities as they do not adopt the approaches and strategies required to really take into consideration the different expectations and needs of students, communities and families.

Fifthly, a Guarantor State has the ethical and educational responsibility to give differentiated and personalised attention to culturally, economically, socially and individually vulnerable populations and people. However, it should not do so by primarily providing assistance and compensation for inequality, but by providing equal or equivalent learning opportunities to help learners acquire the knowledge and competencies that they are universally expected to develop (López, 2005). This does not mean ignoring learners' diverse backgrounds, conditions, skillsets or learning paces. It means reaffirming that educational objectives and expected outcomes are really universalist because they support diversity.

In conclusion, the five characteristics of a Guarantor State match the four As that Katarina Tomasevski (2001) identified as indicators of the governmental right to education. These are: (i) availability which suggests education is free, financed by the government, has adequate infrastructure and well-trained teachers; (ii) accessibility, which suggests the system is non-discriminatory and accessible to all, and that measures are taken to include minorities; (iii) acceptability, which suggests the educational content is relevant, of good quality and culturally appropriate, and that schools are secure and teachers are professional; and (iv) adaptability, which suggests education evolves in line with societal needs and questions inequality in order to adapt to local circumstances and cater for specific situations.

Clue 3: education is a cultural, social and economic policy

Discussions on the role of education are often based on partial understandings of its added value. They mention, amongst other things, that education teaches the basics of coexistence and living together, strengthens the common universal values of society, reduces marginalisation and poverty, improves income distribution, supports economic growth and increases human capital and competitiveness (Amadio, Opertti and Tedesco, 2015; Delors et al., 1996; Rizvi, 2016; Robinson and Aronica, 2016; Scheleicher, 2011; UNESCO, 2015b; UNESCO-IBE, 2015).

Numerous aspects of education are often put together to form a cultural, social and economic policy, but in a fragmented, and sometimes disjunctive, way based on seemingly incompatible conceptual frameworks. The mere recognition of education as a tri-dimensional cultural, social and economic policy is not enough for it to leverage societal transformation. Furthermore, such educational policies run the risk of bringing together tri-dimensional considerations, themes and approaches without a common thread, and thus resulting in packed, superimposed and incoherent disciplinary content.

Education is a cultural, social and economic policy with three basic functions: (i) it contributes to ensuring individual and collective well-being as an inseparable pair (Halinen, 2017); (ii) it establishes the fundamental basics of sustainable development and sustainable lifestyles whilst also considering local, national and

international challenges; and (iii) it contributes to the creation of fairer and more harmonious, inclusive, cohesive and peaceful societies. The ultimate goal of education is to encourage and help students to become secure, open, tolerant, proactive and competent individuals and citizens with the values, attitudes, knowledge and skills to address various individual and collective challenges. The experience and evidence provided by competent societal actions have shown the relevance and sustained impact of educational proposals (Masciotra and Medzo, 2009).

The first of these three functions puts discussions regarding well-being, both individual and collective, and its multidimensional nature on the table. Well-being does not depend just on schooling, access to education and a restricted set of key disciplines and areas of knowledge. On the contrary, it suggests that the balanced and integrated development of individuals is based on a combination of volitive, valuable, attitudinal, emotional and cognitive components (Halinen, 2017). This thus brings up the inextricable link between education and learning (Amadio, Opertti and Tedesco, 2015), as well as between emotions and learning, given that the emotional nature of cognitive processes goes hand in hand with the cognitive nature of emotions (Pons and Cuisinier, 2010).

Moreover, it brings us to discuss the importance of diverse and complementary learning experiences that prepare students to face the numerous challenges and situations life has to offer, as well as to rectify the false antinomies between alleged competencies and soft and hard knowledge that lead us believe that certain attributes, such as learning to live in society and working collaboratively, are less important than others (Tedesco, Opertti and Amadio, 2013). This, however, does not mean that the basic reading and writing, mathematics, communication and digital citizenship skills required for general learning should be ignored.

The second function challenges education's ability to establish the basic knowledge and competencies that account for the political, cultural, social and economic sustainability of both individual and collective development and lifestyles (Steele, 2016; UNESCO-IBE, 2015; Wals, 2010). It strongly questions partial views of development, which are generally expressed through study programmes that divide knowledge into unconnected disciplines and approaches (Morín, 2016) and thus do not see development as a multidimensional phenomenon with interconnected components.

Alternatively, sustainable development and lifestyles should be seen as an educational cross-curricular theme (Amadio, 2013), as they touch upon aspects of educational policy, curriculum, pedagogy and teacher roles. However, the desire to consider cross-cutting issues often remains an intention and thus does not influence what is taught and learnt. The competencies associated with sustainability, as defined and agreed by key institutions and actors, both from within and outside the education system, do of course reflect pursued types of society and play an important role in defining and building the types of educational institutions, curriculum and pedagogy desired.

The third function involves the way in which education supports and helps develop the competencies required to ensure that the values of freedom, inclusion, justice, tolerance, cohesion, peace and excellence are considered complementary and essential towards achieving comprehensive citizenship education (Cox, 2017). It is not just about transforming these values into educational cross-curricular themes with objectives, but also, and more importantly, it is about analysing how education systems adopt a powerful and coherent vision of the balanced and integrated values that permeate schools, curricula, pedagogies and teacher roles and practices. The true integration of these values does not mean eliminating different opinions and approaches, but rather avoiding the proliferation of contradictory messages that leave students without clear and structured frameworks to help them understand and consider diversity as a richness of society. This is particularly true for education systems whose teaching and learning visions, approaches and practices are excessively divided into levels and offers (Opertti, 2011).

Clue 4: an education system as such

The Education 2030 Agenda calls us to rethink, amongst other major challenges, the rationale, objectives, strategies, management and scope of education systems in order to transform education and give every individual lifelong education and learning opportunities. We have identified six essential characteristics common to the most progressive education systems with the widest and most democratic learning opportunities (Opertti, 2011; Trucker, 2011).

First and foremost, the main challenge is to move away from traditional bureaucratic systems which help some students reach high levels of learning, to modern systems that give all students equal opportunities in reaching high levels of learning (Schleicher, 2011). Traditional models required students to adapt to teaching periods, content and strategies based on an unrealistic standard learner profile. Nowadays, however, diverse themes and content, multiple types of learning experiences, a wide array of teaching strategies and the integration of online and classroom teaching are combined in different ways to ensure personalised education and learning in collective learning spaces (Amadio, Opertti and Tedesco, 2015; Horn and Staker, 2015; OECD, OIE-UNESCO and UNICEF, 2016; UNESCO-IBE, 2015).

Secondly, education systems are no longer mainly state-centric, divided into completely separate levels, i.e. between primary and secondary, and tied to a formal educational environment. In fact, as mentioned in clue 2, education systems are guarantors of the right to education. They promote lifelong learning opportunities through infant, childhood, adolescent, youth and adult education policies and programmes, and remove the barriers between public/private and formal/non-formal/informal education.

Thirdly, education systems are currently characterised by their multilevel governance which tends to make the relationships between their different actors more fluid and open to negotiation than before (Burns and Köster, 2016). Education systems are generally based on a unitary concept and composed of three interdependent levels: (i) a consensual political definition of the *for what* and the *what* of education, supported by the Parliament or a political body that represents the people at large, and implemented by educational ministerial leaderships; (ii) technical excellence protected on a professional level by institutions who are responsible for implementing educational policies as directed by ministerial leaders; and (iii) local communities and schools empowered to co-develop the education policy created at the two previous levels. In other words, schools are given the autonomy and the responsibility to recruit and manage human resources and materials.

Fourthly, educational policy planning and management rejects its prescriptive, centralist and highly hierarchical stamp in order to connect all education system units/departments in a horizontal structure that facilitates dialogue, the flow of information and genuine collaboration. For example, a school principal or teacher is more likely to become an effective decision-maker if they adopt planning criteria and tools that consider the diversity of contexts and students as assets in forging learning opportunities.

Fifthly, discussions on educational resources no longer revolve around the traditional way of allocating funds, salaries and operating expenses. Instead, they now focus on drafting long-term public policies that describe effective ways of how to allocate available resources based on the transformative objectives of education policies. “Additional” budgetary resources are not usually given to do the same in education systems who pride themselves on their progressive vocation and actions.

Last but not least, education systems operate based on a network of shared responsibility and mutual accountability between governments, schools, communities and families (Banco Mundial, 2011). Every education system is assessed based on policies and programmes that bring together necessary and complementary technical, political, societal and civic views. It is no longer appropriate or possible to authenticate educational proposals based solely on internal evaluations. It is necessary to have an overall external view of the education system, in order to understand and identify successes, obstacles and challenges. The purpose of this evaluation is to support and rectify to ensure progression, and not to blame, stigmatise and single out (Muskin, 2015; Tedesco, 2016).

Clue 5: from zero onwards learning

Traditional education systems were designed to meet the educational needs of infants, children, adolescents and youth, but not of adults. People believed there was an age limit to learning. UNESCO, however, has advocated for lifelong learning since the end of the 1940s. The six International Conferences on Adult Education (CONFITEA I to VI), the Faure Report and the Delors Report all greatly discuss this topic. In other words, learning is now seen as a government-led and supported continuous training process, which takes into consideration the social and cultural diversity of communities and individuals, in order to respond to societal needs and provide citizens with learning opportunities, both formal and non-formal (UNESCO UIL, 2016; 2017).

Nowadays, the emerging fourth industrial revolution is increasing people's need to update and develop their skills in light of employment opportunities that constantly vary in number, profile requirements, working conditions and tasks. Of course, this need does not match the divided, unequal and disparate lifelong learning opportunities that correspond more to pure market logic than the will of the state to promote learning opportunities. Therefore, a new agreement on lifelong learning needs to be made a priority in public policy debates (World Economic Forum, 2017), as it key to ensuring real educational, social and labour inclusion. We will now discuss some of its implications.

Firstly, the idea of moving towards education systems that promote lifelong learning in diverse learning environments and through different means, whether face-to-face, online or hybrid (Horn and Staker, 2015), is a social and economic imperative for the sustainability of today's workforce, and most importantly tomorrow's. It entails moving culturally from the idea of education for work and job security to that of education for employability and career security (World Economic Forum, 2017). People are constantly developing their knowledge and skills, in order to move forward in their careers and be able to use them more competently in light of evolving work opportunities.

Secondly, lifelong learning suggests that learning, now completely limitless, brings together formal, non-formal and informal environments, promotes alliances between public and private sector institutions and actors, and encourages approaches and strategies on teaching and learning to focus more and more on personalised learning with the support of technology. An education system is responsible for promoting, integrating and managing this diversity to ensure that all individuals are able to take control of their learning in the changing, or rather unsettled, labour market. In fact, the strict and fixed formal, non-formal, informal divisions and private, public divisions of the past are not as relevant today. What matters instead are the ways in which diverse educational proposals, regardless of their format, contribute to increasing learning opportunities that make a positive difference to the overall well-being of individuals and communities.

Thirdly, lifelong learning in its broader sense implies the need to revise the rationale, meaning and content of levels of education, which traditionally defined a series of basic elements, such as exit profiles and teaching and learning content and approaches, in isolation without taking into consideration other levels. Unlike traditional level-specific curricula, modern curricula are developed more and more around themes, perspectives and tools that fit all levels such as exit profiles based on competent individual and citizenship actions, cross-cutting themes like education for citizenship and sustainability, and age-specific curricular frameworks that include links to other levels of education (Amadio, 2013; Amadio, Opertti and Tedesco, 2015; Finnish National Board, 2016; OECD, OIE-UNESCO and UNICEF, 2016; Opertti, 2017; UNESCO-IBE, 2015; UNESCO-OIE, 2013).

Each level of education thus plays a more significant role in ensuring people have the necessary knowledge and competencies to keep on learning without having to deal with abrupt changes and discontinuity between learning environments and educational levels, provisions and approaches.

Fourthly, the discourse surrounding lifelong learning objectives and models usually brings up the following dilemma. On the one hand, it is seen as a way to form human capital to enable citizens to take control of their education by making use of different services. However, on the other hand, it is seen as a way to ensure social equality by strengthening democratic citizenship and improving quality of life for everyone (Milana et al., 2016; Regmi, 2015; Volles, 2016).

It seems we need to progress towards public policies that promote human capital training as a way to help achieve sustainable development objectives, equal opportunities, social equality and genuine competitiveness, and that are supported by governments which effectively take up their role as guarantor of the right to learning opportunities from zero onwards. This implies two things. Proactive and vigilant states need to both remove the institutional and financial obstacles that hinder access to lifelong learning and training, and facilitate the certification and recognition of skills developed by individuals throughout their personal and work lives by creating alliances and involving various institutions (World Economic Forum, 2017).

Clue 6: an education conceived per age group

The definition of student exit profiles, in other words what students are expected to achieve at the end of each level of education, is a challenging task. It depends on both the design, content and scope of each level of education, and the synergy between them. There is generally little dialogue and collective construction between the traditional compartmentalised levels of education, such as between ECCE and primary education, primary and secondary education, within secondary education, and between secondary and tertiary education. This structure is completely at odds with the idea that student exit profiles should aspire to prioritise a student's need for integrated and balanced development, as well as support a fluid and personalised progression of learning (Finnish National Board, 2016; OECD, OIE-UNESCO and UNICEF, 2016; UNESCO-IBE, 2015).

It is precisely the compartmentalisation of levels of education that makes students fall victim to a lack of shared visions and actions that ensure the continuing development of competencies as indicated in student exit profiles. The curricular, pedagogical and teacher changes between levels hinder the development, progression and coherence of learning. Students are often given contradictory instructions on *what* they should learn and *how* to do so. For example, if mathematics is taught in a considerably different way in primary and secondary education, and there is therefore no continuity between the content taught and the approaches used, the learning opportunities of each student, especially those in need of extra support, are negatively affected. This, unsurprisingly, results in high push-out rates due to, for the most part, education system malpractice.

In contrast to fragmented education systems, the current worldwide trend is to structure levels of education in a more integrated and coherent manner (De Armas and Aristimuño, 2012). Education systems are faced with the challenge of adapting their curricular, pedagogical and teacher strategies to their students' different learning styles as well as peer and teacher relationships. As such, the Education 2030 agenda puts forward its desire to universalise a fair, high quality 12-year education leading to effective and relevant learning (UNESCO et al., 2015a). UNESCO's Basic Education in Africa Programme (BEAP), which seeks to provide an uninterrupted and integrated 9 to 10-year compulsory education programme founded on a competency-based approach, is a step in this direction (UNESCO-IBE, UNESCO-BREDA and GTZ, 2009). The Nordic countries are also heading in a similar direction (Halinen, 2017; Halinen and Holappa, 2013).

In light of these developments, student exit profiles for 3 to 18 year olds could be anchored in a childhood and adolescent education programme that includes all ECCE, primary and secondary levels (i.e. from 3 to 14 year old) and a youth education programme that includes, amongst others, secondary as well as technical and vocational modules (i.e. from 15 to 18 year old). The transition from a level to age group approach implies an understanding of the educational challenges posed by the identities,

expectations and needs of individuals and groups, as well as taking into account changing and cognitive aspects, emotions and values. In fact, it implies that the core role of education systems is to adapt teaching strategies to students' individual learning styles and progression.

Regardless of age, this implies sharing a vision of education as a whole, a collection of fundamental themes and subjects to study, a unitary understanding of schools, a series of teaching and learning strategies, student assessment criteria and tools, and teachers who are trained to support personalised and progressive learning paths across education levels (Opertti, 2017). This does not mean that one level of education "colonises" another. The idea is not to "primaries" ECCE and secondary education, but to recreate and organize education in a way that leads to increased and democratised learning opportunities, processes and outcomes.

We will now discuss three important implications of moving towards an integrated ECCE, childhood, adolescent and youth education framework.

First and foremost, student achievement profiles would be age appropriate and based on the skills required by individuals to deal with and resolve diverse life challenges. Knowledge is an irreplaceable resource/tool that could help individuals use and apply those skills, but it is not enough on its own. Whatever situation individuals find themselves in, they need to be willing to do so, to assess and choose options based on their values, attitudes and emotions, and use their knowledge and skills. Competency and competent action rely on a combination of voluntary, attitudinal, emotional and cognitive elements.

Education should therefore provide individuals with the basics and tools to act competently in society (Jonnaert, Ettayebi and Defise, 2009), in other words to be able to find and apply solutions when faced with a challenge. For example, we not only tackle the challenges of climate change from a social and experimental science perspective, but we also do so by determining what we need to do to counteract its effect and prevent its consequences. A curricular and pedagogical approach based on the concept of competent action uses areas of knowledge and subjects as thinking tools with which to understand diverse realities, and thus hierarchize cross-cutting themes to create closer ties with how people act outside of education.

Secondly, we identified four major competencies areas that could form the basis of student exit profiles for 3 to 18 year olds, whilst considering the challenges of national sustainable development and the fourth industrial revolution (Gray, 2016; Leishman, 2017; World Economic Forum, 2015; Yorston, 2016). These would be:

1. The first area refers to fundamental literacy, which is founded on a dynamic and evolutionary vision of society. It concerns the universal competences required by students in everyday life that are indispensable for learning in any context or situation and with any skillset. It includes mother tongue and second language literacy, STEAM (science, technology, engineering, art and mathematics), computational thinking/programming and communication, culture, and citizenship and financial education. A Guarantor State should safeguard its development and realisation as a first step to ensuring equity and equal opportunities.
2. The second area refers to the methodological tools that help students respond to different types of challenges. In everyday life, students are faced not with discipline-specific challenges, but with situations in which they have to identify and use their knowledge of various disciplines in order to respond to multiple realities. It includes complex problem-solving, critical thinking, creativity, collaboration, communication and negotiation with others, formation of one's own opinion and decision-making, cognitive flexibility (ability to adapt to different environments) and learning to learn. This whole area takes into consideration people's need for thinking tools to help them find solutions to challenges, and do so as a team.

3. The third area refers to the character traits of individuals that affect how students understand and perform in environments that change at exponential rate and often unpredictably. It considers disruption, a process which vitiates our traditional individual and collective decision-making (Stiegler, 2016), as a permanent factor affecting our lives. It includes skills associated with emotional intelligence, looking after oneself, managing daily life, curiosity, acting with initiative and entrepreneurial spirit in society, adapting to change, exercising leadership and service orientation. It argues that autonomous, solidary, healthy and sustainable lifestyles play a key role in shaping an individual's character.
4. The fourth area refers to a global and local commitment that enables students to become global citizens whilst also acting locally. It recognises the relevance, influence and implications of the inevitable link between the global and the local. It includes being aware of universal human rights and values regarding gender, identity and affiliation, the appreciation of differences among and within societies, and being prepared to interact with different people. It thus involves promoting environmental awareness and/or committing to building a sustainable future for one's local area, country, region and for humanity. Citizenship implies protecting others and ourselves regardless of where we are.

Thirdly, it would be possible to develop a single educational, curricular and pedagogical framework to cover ECCE, adolescent and youth education. Such a framework would be a political, civic, social and educational agreement on the *for what*, the *what*, the *how*, the *when* and the *where* of education, and it would involve multiple institutions and actors both from within and outside the education system (UNESCO-OIE, 2013). It would be used to develop syllabi for each education level, including assessment. The framework would then be used to determine the funds needed to put the necessary infrastructure in place and acquire the required teaching and learning equipment and material. It entails reversing traditional education reform processes by first discussing learning needs and opportunities and then moving on to teaching conditions and resources.

This framework would thus provide opportunities for the state, civil society and private sector to put together several proposals that fit student exit profiles for 3 to 18 year olds. As guarantor of the right to education, the state would ensure that these proposals contribute to the universalisation of quality educational opportunities for everyone. It would therefore empower schools to select pedagogical strategies that would best ensure equitable learning outcomes and the development of competencies with the help of education systems designed to support students.

Clue 7: inclusion, the cornerstone of education systems

Inclusion is basically ensuring that every child, adolescent and youth is taken into consideration equally by the education system. It is about guaranteeing fair and quality learning conditions, processes and outcomes for all. What role does inclusive education play in education systems? We have identified six elements that inform the discussion.

First and foremost, it is important to note the paradigm shift in inclusive education that went from focusing on the needs of students with individual needs or “special students”, to affirming that we are all special and have ability potential to discover and support (Ainscow, 2016; Ainscow and Messiou, 2014; Opertti, Zachary and Zhang, 2014; UNESCO, 2017). Inclusive education does not mean dividing and separating students based on their “abilities”, nor physically integrating them into schools without adapting the infrastructure, curriculum, pedagogy and teacher roles. The focus should in fact be on the characteristics of each individual and how each person can learn more and better by being part of a collective learning space with peers and teachers.

Secondly, similarly to education for citizenship and for sustainable development, inclusive education is cross-cutting to educational policies given that it is the cornerstone of an education system. Inclusive education is not specific to one department or unit, programme or ministerial project, but gives all institutions from ECCE to tertiary education the responsibility of educating each student based on his/her singular and diverse needs.

Thirdly, the flipside of singularity is to personalise education by creating opportunities for students to take control of and regulate their own learning (OECD, OIE-UNESCO and UNICEF, 2016). However, this cannot be achieved through individual education plans that require students to learn separately and away from real life and educational contexts. How can we promote the principles of learning to know and live with each other if we separate students in order to “best” meet their needs?

It is indeed possible for teachers to personalise learning by encouraging students to help each other based on their respective strengths and weaknesses, and thus transforming supposed difficulties into learning opportunities. As a matter of fact, one of the main reasons inclusion has been so successful in Nordic countries is that learning difficulties regarding, for example, the language of instruction, are detected at a very earlier stages and dealt with as a natural part of the learning process (Savolainen, 2009).

Fourthly, the curriculum plays a key role in achieving inclusion as it recognises the need for different pedagogical approaches to ensure equal learning opportunities, whilst based on the same educational objectives for all students. It is not about the curriculum providing the student with stuff he/she “could learn” – an approach that makes the student the problem. Instead, it is about the curriculum creating learning spaces and strategies that enable students to develop their potential – an approach that emphasises the relevance of sound proposals forged by the education system (Opertti, 2016b).

Fifthly, inclusive education is a general societal matter that requires listening and responding to queries from communities and families about the best learning environments for their children as well as understanding and accepting differences. Although the worldwide trend is to transform special schools into learning support centres in mainstream schools, we cannot ignore the fact that students from special schools are often marginalised in mainstream schools (Florian, 2014). They are basically victims of curricula and pedagogies that see them as students who receive individual support to alleviate their difficulties, rather than students whose values, emotions, abilities and knowledge are inseparable and should be used to guide their learning.

Last but not least, inclusive education requires long-term commitment and techno-political will to progressively increase and direct resources towards proposals that effectively promote inclusion. If we continue to allocate resources in the same way or embark on a series of initiatives/ projects without a shared understanding of what inclusion means, we may actually never reach full inclusion. It is therefore necessary to scrutinise education systems from top to bottom (UNESCO-IBE, 2015; UNESCO, 2017), and ask ourselves how inclusive their mentalities, cultures, policies and practices are. The key is to create genuinely inclusive learning opportunities.

Clue 8: educate for global and local citizenship

The themes and content that guide teaching and learning processes are a key aspect of the curricular frameworks regarding basic education, adolescent and youth education. Education for global citizenship, amongst other relevant educational themes, plays a distinct role in creating and sustaining fair, inclusive, developed, peaceful and cohesive societies.

There is a growing concern for citizenship themes worldwide, as seen with the Education First Initiative launched in 2012 by the United Nations Secretary-General, Ban Ki-Moon, which prioritises “improv[ing] the quality of learning” and “foster[ing] global citizenship”. Likewise, UNESCO (2014) indicates that “the content of learning must promote [...] understanding and respect for human rights; inclusion and equity; cultural diversity; it must also foster a desire and capacity for lifelong learning and learning to live together”.

We will now discuss at least four of the points in the current debate on education for citizenship. Firstly, the synergies and tensions between educating a set of universal values and references founded on an open and cosmopolitan view of the world in which national societies depend on each other to build sustainable lifestyles and the understanding and respect for cultures, a sense of belonging and local responses. It is important to recognise cultural plurality whilst also promoting universal values within cultures, regions and countries. However, we must not promote a culture that pretends to be able to justify everything – a blurred multiculturalism devoid of dialogue – or deny the existence of different cultures based on the assumption that there is only one way to do things “properly” – a stifling monoculturalism that does not acknowledge different practices (Lenoir and Xypas, 2006).

Secondly, the ways in which to integrate the two fundamental components of education for citizenship are discussed more and more frequently. On the one hand, we have traditional civics education which is taught in the final years of secondary education and is based on political and democratic matters as well as the exercising of civil rights and responsibilities. On the other hand, we have contemporary civil education which is taught from early childhood onwards and discusses the latest current topics regarding coexistence and learning to live with others. These two components are fundamental and complementary, so if one of them is neglected, then the foundations of democracy and cohabitation will gradually start to fade (Cox, 2017; Cox et al., 2014).

For example, the comparative study of civics/citizenship education in six Latin American countries, namely Chile, Colombia, Guatemala, Mexico, Dominican Republic and Paraguay, demonstrates that themes promoting diversity and sociocultural pluralism are prioritised over those relating to politics and civil rights (Cox et al., 2014).

Thirdly, we need to define the scope of citizenship education. In addition to integrating civics and civil education, education for citizenship should also teach the competencies required for (i) learning at least mother tongue and second languages, and coding that implies to ensure students have the competencies required for programming and creating software, apps and websites; (ii) STEM literacy; (iii) understanding and transforming society, and (iv) appreciating cultural differences (Opertti, 2016a).

Fourthly, the debate surrounding how education for citizenship can be put into practice refers to two complementary aspects. One is based on its status as a stand-alone subject, a combination of several subjects or, as is more recently the case, a theme that cross-cuts all subjects in a curriculum (UNESCO, 2015a). For example, it is just as important nowadays to study citizenship in arts and sports as well as in law and social sciences.

The second one is based on understanding real-life challenges, using knowledge of different areas to find solutions, demonstrating critical thinking and being proactive in order to exercise citizenship competencies. Nothing strays further from this vision than asking students to regurgitate information by objectively testing their knowledge. Students need to be taught to respond to new challenges by identifying and using appropriate knowledge, and as such, be made aware of the values and attitudes required to do so.

In conclusion, education for citizenship is essential to ensuring quality of life and measuring democracy. It implies transitioning from teaching civics as a separate subject – which is still important and should be reinforced to teaching it through all subjects in order to form citizens with the competencies required for competent local and global action.

Clue 9: educate for sustainable lifestyles

Concerns for sustainable development and lifestyles demonstrate society’s desire to promote a quality of life and well-being that respects and falls within the physical and biological limits of the Earth (Steele, 2016). It is about looking out for the well-being of future generations.

In the context of the 2030 Agenda for Sustainable Development (UNESCO et al., 2015a), Northern and Southern countries are questioning the idea that development is simply economic growth without due regard for its reliance and impact on the Earth's natural resources and the fair distribution of its outcomes. In the face of partial economic views of development, the concept of sustainable development focuses on how and what to do, in order to meet the needs of current generations without compromising those of future generations in line with a humanist vision of education (UNESCO, 2015b). It also implies, on the other hand, convincing communities and individuals to adopt sustainable lifestyles, which essentially reflect our identities and can be seen, for example, in how we look after ourselves, how we feed ourselves, how we travel, and how we have fun and interact with others.

The biggest challenge for education today is to successfully ensure that students understand the basic values, attitudes, skills and knowledge required to become active doers and promoters of sustainable societies and a sustainable planet. The professor of Social Learning and Sustainable Development, Arjen Wals (2010), talks about three key skills that students must be able to manage. The first is *environmental literacy*, in other words being aware of environmental issues and other related matters, and committing to working individually and collectively in search of solutions to actual problems and to prevent new ones. The second is *global citizenship literacy*, which, as previously mentioned, fosters a sense of belonging to a shared humanity and thus recognises cultural, political, social and economic interdependence on local, national and international levels. The third is *sustainability literacy*, which involves thinking critically and proactively about oneself and society in order to improve human health and individual and collective well-being, whilst also protecting the natural resources that support life.

This triple environmental, global citizenship and sustainability literacy approach questions the way in which education systems organize and teach content. It aims to ensure that themes which require an overall understanding of the country and of education are not taught through each subject individually; that cross-cutting themes are given priority over the silos or discipline-specific content; and that interdisciplinary pedagogical approaches which encourage students to find solutions to real-life problems are developed. Curricular proposals are based more and more on themes that facilitate understanding, knowing and acting in a complex, uncertain and challenging world (Halinen, 2017).

As a cross-cutting theme, sustainability should be founded on collaboration between teachers of different disciplines to break away from discrete subject teaching. It is important to look into the knowledge of human and ecological systems, as well as at a series of practices that enable students to revisit beliefs and hypothesis on ways in which to view the world, use their critical thinking skills to manage the complexity of the world in which they live (Morin, 2016), and develop ideas and products for a sustainable future. Students at all levels of education should be considered producers of knowledge rather than "receivers of knowledge and information", as was the case in the past.

Moreover, sustainability should be taught in such a way that students are encouraged to ask questions, look for answers to fundamental questions and examine the pros and cons of different solutions to real-life problems affecting the community as a whole and their place of residence. Teachers should help their students understand the complexity of sustainability issues, as well as encourage them to take up their civic duty and use their creativity to become the authors of their own futures. Sustainability should be taught in line with a pedagogy that transforms the lives of individuals and communities rather than a pedagogy based on the frontal transmission of knowledge (Burns, 2016).

In conclusion, a constructive dialogue between societies, political systems and education is essential to ensuring sustainability themes are made a priority in curricula from early childhood education right through to teacher education. All subjects must thus address sustainability in an interdisciplinary manner based on vision of where the country is heading over the next twenty years, in order to form students who are capable of building a truly sustainable world and society.

Clue 10: STEM education for sustainable societies

As previously mentioned, curricular and pedagogical proposals should hierarchize the core cross-cutting themes at each level of education. One of these themes is STEM (Science, Technology, Engineering and Mathematics) education, which is key to forging tools for sustainable development and lifestyles.

It is often said that the demand for qualified workers is closely linked to global competitiveness (World Economic Forum, 2014). Moreover, people argue that highly qualified or very creative jobs are less at risk of automation in the future. On the world stage, however, there is a shortage of STEM workers, especially in terms of women qualified to work as STEM technicians or researchers, and an increasingly higher number of students pursuing university degrees in areas other than STEM (UNESCO, 2015c, 2015d). For example, less than 22% of graduates in OECD countries and the BRICS (Brazil, Russia, India, China and South Africa) obtained STEM degrees in 2012 (OECD, 2015a).

This situation thus advocates for the promotion of STEM education. We have identified six aspects. Firstly, STEM education should be aligned with a vision of national development that has specific objectives and targets. For example, a target for Malaysia, which is one of the world's leading countries in STEM, is to create 1.3 million STEM jobs in diverse sectors of the economy. Its ultimate goal is to become a developed country by 2020 (UNESCO-OIE, 2016).

Secondly, STEM education should be seen from a lifelong learning perspective and thus as a core component of the citizenship and life competencies required to take informed action in society. Everyone should have STEM training to help them understand and play an active role in building a green world through cities and green technology. This contrasts with what Morin coined disciplinary fragmentation (2011, 2016) – in other words, the traditional way of separately teaching content from each STEM discipline that makes it difficult for students to understand, link and apply the different areas of knowledge.

Thirdly, STEM education should be encouraged as a field of study in secondary schools, especially in the upper years. Several countries, among which is Malaysia, have introduced a quota scheme with the aim of reaching a 60% enrolment in a branch of STEM from upper secondary students (years 10 to 12) (UNESCO, 2016). If we take into consideration the limitations of prescriptive approaches that control demand by offering specific subjects, it would seem more appropriate to design learning trajectories based on themes that relate to the concerns of youth, such as healthy lifestyles, programming and climate change. Students are often turned off STEM subjects because they are forced to listen to and learn “hard, factual science” without knowing how it fits into the real world. Thematic learning trajectories are an effective way to engage students that tries to break away from the old idea that upper secondary education is only about preparing students for university.

Fourthly, STEM education should be conceived as a pedagogical strategy that highlights the integrated, critical and proactive use of knowledge, skills and values advocated by STEM disciplines to help students confront real-world problems. Students both create and use knowledge to develop their cognitive and non-cognitive skills whilst interacting with others and acting collectively (UNESCO-IBE, 2017).

Fifthly, society and especially communities should be aware of the role of STEM literacy in the development of competent citizens, as well as how to encourage curiosity from a very young age as it is a driver for learning. Open public spaces with access to a multitude of STEM resources and opportunities are key to so-called smart cities.

Sixthly, the key to strengthening STEM education lies in having and encouraging committed, professional and open teachers to seeing each child as a seed of creativity. Teachers are faced with the enormous challenge of linking STEM subjects to the lives of their students, as well as rigorously and clearly

explaining concepts and ideas by creating various opportunities for their students to see how what they have learned has an effect on their development as people and citizens. Education that is not meaningful and owned by students is not sustainable (UNESCO-IBE, 2017).

All in all, considering STEM education as a cross-cutting learning theme adheres to an inclusive vision of development, provides the basis for universal STEM literacy, directs human resources towards training in strategic areas of development, and contributes to increasing a country's productivity and competitiveness.

Clue 11: gender perspective to democratise society and education

The quality of educational proposals basically depends on the depth, clarity and communicability with which cross-cutting themes are addressed from early years' education onwards. The gender perspective is one of the key themes that determines the level of democratisation of societies and educational opportunities.

The gender perspective may draw on comprehensive understanding of education, politics and civil society. We will now look at four aspects. Firstly, the overall picture illustrates a bleak outlook on the exercising of women's rights. Amongst other things, women occupy a little more than a fifth of parliamentary seats worldwide; earn between 10% and 30% less than men in most countries; are denied the right to acquire, change or keep their nationality in more than 60 countries; and one in three women still experience physical and sexual violence (Peppen Vaughan, 2016; UNESCO, 2015d, 2015e).

Similarly to other important institutions and actors, education plays a major role in influencing whether or not something is done to change the values, attitudes, practices and understanding that from a very young age favour discrimination and perpetuate inequality. It is thus necessary to examine educational policies as well as curricular, pedagogical and teacher proposals to determine to what degree they consider and respect women's rights.

Secondly, the gender perspective shows a nuanced view of access to education and educational performance. On the one hand, ensuring equal access to education for men and women has been one of the greatest educational achievements since the year 2000 (UNESCO, 2015e). However, equal access does not necessarily imply equal student achievement. For example, the PISA 2012 results indicate that 60% of 15 year olds in the countries with the lowest maths, reading and science scores were male. Female adolescents achieved better reading scores in all the evaluated countries, whereas male adolescents performed better in mathematics in six of every ten countries (OECD, 2015b).

Research has also shown that our perceptions and preferences are influenced by sociocultural gender norms. Female adolescents enjoy reading more, and lack of confidence in their mathematical abilities even if they manage to obtain high scores. They are thus four times less likely to study engineering or programming than their male peers (OECD, 2015b; UNESCO, 2015e; UNESCO-IBE, 2017).

Nevertheless, neuroscience provides no evidence to suggest that our gender predisposes us to study mathematics and science or reading. In fact, it confirms that scientific and mathematical reasoning develops from a set of basic neurocognitive skills shared by both men and women (Spelke, 2005). Recent research has shown that when these skills start to develop in infancy, boys are four times more likely to follow atypical development trajectories than girls, and may thus develop mathematical learning difficulties. No significant differences have been found, however, between older boys and girls with regard to the development of these skills (Reigosa-Crespo et al., 2012).

This data should not be interpreted from the biological perspective of a woman or a man that does not consider gender as a localised cultural and social construction. We may need to ask ourselves whether we are aware that what and how we teach may be detrimental to educational and learning opportunities. Certain mentalities, certain family and pedagogical practices, certain learning resources such as textbooks, certain activities used by teachers to study different curricular themes, and idealised views of professions may lead to discriminatory education. For example, the combination of regressive curricula, pedagogies and teacher practices may either openly or subtly discourage girls to study science and mathematics. Likewise, secondary curricula and pedagogies may discriminate against boys by failing to consider their personal motivations and concerns.

Thirdly, a gender-inclusive curriculum and pedagogy reaffirms a person's right to be respected regardless of their identity and sexual orientation. It ensures that various teaching and learning approaches are used to help students nurture their curiosity and test their interests without being typecast into certain roles, or onto certain educational and occupational pathways (UNESCO-IBE, 2017). A curriculum may either encourage regressive ideas and practices that foster societies in which the roles of men and women are well-defined (Peppen Vaughan, 2016), or provide students with multiple learning experiences to help them see the importance of understanding different perspectives in order to manage their lives and take their own decisions based on their preferences. For example, learning to lead aspects of home economics in secondary school should be a cross-cutting educational theme of equal significance to men and women.

Fourthly, a transformational gender perspective is a societal undertaking that commits to overhauling community and family mentalities and practices. Families need to learn to see gender equality as an essential element of democratic societies and the healthy social integration of young generations. They also need to understand and accept that the potential of an individual and of society in general may be severely limited if regressive cultural customs force people to pursue careers based on the social identity given to them by their gender (Peppen Vaughan, 2016; UNESCO, 2015e; UNESCO-IBE, 2017).

In conclusion, women are clearly more affected by educational inequality and discrimination, but men are not untouched by it either. Educational inequality and discrimination applies to and has consequences for both genders. We thus need to develop a new sociocultural and political understanding and vision in order to truly guarantee equal opportunities within the education system.

Clue 12: computer programming as a new ICT challenge

Information and communications technology probably has the most influence over how education systems are conceived and organized to promote learning opportunities. ICT was initially seen as a digital inclusion tool that gave access to devices in traditional computer rooms and, more recently, via one to one projects that provide every student with a laptop. The main objective is to use digital inclusion as a way to ensure equal opportunities and bridge cultural, social and territorial gaps. For example, the recent comparative review of national mobile learning initiatives in Latin America (UNESCO, 2016) shows that significant progress has been made with regards to digital inclusion through the creation of public policies that have a strong focus on technology. However, as stated by Lungo (2016), there are still questions to be answered regarding where this process is headed and how effectively it improves learning.

Digital inclusion should go hand in hand with an inclusive pedagogy that supports the teachers' use of ICT in teaching and learning processes, as well as in specific areas of learning and subjects. Although digital technology has been transforming the structure of curricula, teaching, learning and school environments for more than thirty years, the biggest desired changes have yet to occur. The current devices and digital resources are for the most part often used as new ways to teach content using traditional approaches (Amadio, Opertti and Tedesco, 2015). In other words, students and teachers are doing the same things but with state-of-the-art technology.

The real challenge no longer lies in combining digital inclusion with inclusive pedagogies, but in realising that ICT is becoming a new language that requires teaching programming skills across all educational levels and years. Most of the skills that we, as people and citizens, need today require a productive, creative and transformative use of technology supported by new ways of thinking and acting (Prensky, 2014; UNESCO-IBE, 2015).

The role of ICT is to enable things that education has never been able to offer before. These might include connecting in real-time with others around the world and receiving immediate responses; using databases and search engines to discover new relationships; programming more and more powerful machines to increase our productivity; creating and using simulations to get new perspectives; and designing new objects with 3D printers.

Education systems are starting to address this new challenge by teaching a new language, called coding, programming or computational thinking, from primary school. In other words, students learn from a very young age to give step-by-step instructions to computers on what and how to do things in order to solve problems – also known as computational algorithms. Students thus learn to use computers based on their needs as well as unlimited ways to create and share knowledge in collective learning spaces.

For example, in 2014 the United Kingdom replaced its ICT curriculum for children aged 5 or older with programming. The idea is to move away from computational literacy, in other words learning to use existing software such as word processors and spreadsheets, to teaching students how to code and create programmes. In the United Kingdom, teaching programming skills is seen as a long-term solution to bridging the gap between the number of technological jobs available and the number of people qualified and skilled enough to do them (Cuthbertson and Murakoshi, 2015; Dredge, 2014).

Some countries have gone one step further than simply introducing a new subject. Malaysia, for example, introduced computational thinking as a cross-cutting theme in all areas of its primary school curriculum in 2017. Computational thinking covers the aforementioned digital literacy, how to use the internet, how to solve problems and the ethical implications of each of these topics. Students who learn the basics of universal computational thinking in primary school will be in a position to develop programmes, such as apps, websites and video games, in secondary school.

The challenge is no longer to only introduce ICT into education systems to support and improve the management of teaching and learning processes. Worldwide, education is being guided more and more by the idea that the new programming language will become one of the main ways to produce and disseminate knowledge, add value to work and become literate, informed and proactive citizens. Despite indications that coding skills may become redundant in the future as learning tools become more and more advanced, both computational and logical reasoning will, in reality, always be relevant as they contribute to digital fluidity (World Economic Forum, 2017).

Clue 13: educate to add value to work

The relationship between education and work is key to developing competent individuals and citizens. This relationship used to revolve around impassioned arguments for and against education as a way to meet the needs of the labour market and employers. Not only does or should education not let market trends dictate its pathway, the dramatic changes in the education-work relationship make the discussion irrelevant. We have identified at least four elements for analysis.

First and foremost, today's world and even more so tomorrow's will have to deal with the fact that employment will become increasingly more scarce and significantly different to what it is today. Studies predict that almost half of all jobs and about 70% of low-qualified jobs may be computerised within the next two decades (Kilpi, 2016). For example, over seven million men between the ages of 25 and 54 currently living in the United States neither have a job nor are looking for one. Eberstadt (2016) even

suggests that living without a job may not be such an absurd concept in the future. This reinforces the idea that the relationship between education and work is much less linear and direct than people used to think. However, it would entail revising the objectives and scope of social services in order to determine, for example, if people would still have the right to a universal basic income whether they work or not. Several countries are moving towards and testing out the idea of a universal basic income.

Secondly, employment opportunities will be based more and more on the ability to find solutions to problems that machines cannot solve. Technological advances have, on the one hand, relieved individuals of routine tasks thanks to automation, and on the other, set up various platforms and network jobs that encourage collective work. Employees have more space and opportunities to develop competences that have not yet been automated such as creative thinking, social skills and flexible thinking (Saarikivi, 2014). Employment is gradually moving away from an individual activity developed within hierarchical and vertical organisations to interpersonal spaces within organisations with horizontal interactions. These organisations have clear objectives, communicate efficiently with their teams and give their employees the freedom to find the best solutions based on diverse working arrangements.

Thirdly, and in light of the aforementioned changes, education faces the need to revise its idea of work. On the one hand, work-related skills should clearly be taught as part of individual and citizenship education regardless of the subjects chosen in secondary and tertiary education. Everyone should be able to demonstrate empathy towards others, contribute towards creating a friendly and productive atmosphere, and develop critical and creative thinking skills in order to find ingenious solutions to problems that do not yet exist. In France, for example, research has shown that students perform well when regurgitating knowledge, but lack creative spirit when faced with a problem they have not seen at school (Algan, 2016). A situation that affects the sustainability of a country's development strategy based on process and product innovation.

This new vision requires thorough revision of curricula to check whether we are preparing students for a vision of work that may expire due to increasing mechanisation and robotisation, or encouraging them to develop their curiosity, creative thinking, teamwork and ability to connect with and relate to others, which are all key to ensuring that work adds value and is creative. Education systems must focus on promoting diverse learning experiences, which are essential to the integral development of such skills. For example, engaging in yoga and other relaxation exercises from a very young age is a useful way to achieve better self-control, such as building better relationships with others and managing reactions. These basic emotional competencies are key to strengthening learning and relationships in education and in work (Opertti, 2016a).

Fourthly, the dominant worldwide trend in secondary education is to prepare students for higher education with a range of formal, non-formal and informal complementary provisions that are of relatively equal weight for the different branches of secondary and TVET education, as well as based on the same set of core competencies (Opertti, 2011). These can be variants of adolescent and youth education based on universal aims and objectives.

In conclusion, education systems need to be urgently reconfigured with regards to the relationship between education and work. The challenge of educating people to develop their creativity and amicably interact with others in different environments as workers questions the ability of education systems to foster learning opportunities that are pertinent to the needs of individuals and societies.

Clue 14: the curriculum – school – pedagogy triad

As seen on the world stage, what actually makes a positive difference to education is how educational proposals consider diverse contexts and relate to students, their expectations and their needs (Amadio, Opertti and Tedesco, 2015). Education cannot be changed by any one management system, regardless of its efficiency, without solid educational references, content and practices.

A big challenge is to possess the frameworks and tools to transform a solid educational vision into efficient teaching and learning practices. The curriculum – school – pedagogy triad ensures that teachers guide learning and that students take control and are responsible for their own learning (OECD, OIE-UNESCO and UNICEF, 2016). We outline three issues around the triad.

Firstly, curricula are educational policy tools that determine the type of education required for different types of person, citizen and global or local society by involving decision-makers, educators, organised interest groups and various institutions and actors (UNESCO-IBE, 2015). Rather than the result of study plans and subject programmes for specific levels of education, curricula are gradually becoming the educational policy tools that implement the *why* and the *what* to teach and learn across all levels. A vision of curriculum that covers core aspects of the teaching and learning process is part of educational policy DNA (Opertti, 2017).

The characteristics of current basic and secondary curricular proposals include (i) an overall vision of the world that considers local realities – a glo-local curriculum as defined by the IBE-UNESCO (Tedesco, Opertti and Amadio, 2013); (ii) a simple, clear and precise definition of what should be taught that gives teachers the freedom to decide how to do so within universal guidance; (iii) an increasing use of educational cross-cutting themes, such as education for citizenship and for sustainable development, that transform subjects into thinking tools to help solve real-life challenges; (iv) a combination of classroom and online teaching, which was coined a hybrid teaching model by Horn and Staker (2015), and implies motivating and nurturing the learning potential of each student in numerous ways through personalised learning; and (v) assessment as support for learning and learning progress rather than just an evaluation of learning (Amadio, Opertti and Tedesco, 2015; Muskin, 2015).

Secondly, schools act as an interface between curricula which guide learning and teachers who are policy-makers in the classroom. Current discussions are not per se about determining the level of autonomy given to schools, but about ensuring schools have the frameworks, tools and resources to effectively lead local education processes. An inclusive educational institution never stops researching and developing conditions and processes to provide all students with real learning opportunities. Schools should identify and make effective use of available resources to develop the learning potential of each student. Schools often fail to realise that interaction and mutual support between students, also known as peer learning, is one of the main resources at their disposal for strengthening learning (UNESCO-IBE, 2016).

Studies indicate that countries which obtain good results in international tests use curricular frameworks that determine what should be taught whilst also letting schools decide how best to deliver the content (Kärkkäinen, 2012). The challenge lies in seeing central and local spaces as complementary dimensions that contribute to the success of an educational proposal. Responsibilities are not transferred, but shared via two-way feedback.

Thirdly, pedagogies, in other words the teaching methods used, require a wide range of teaching strategies and learning proposals that meet the specific needs of each student whilst ensuring the classroom remains an interactive and collaborative space. In the past, pedagogies were excessively contested schools of thought that may have marginalised students' learning needs in a determined bid to justify themselves. However, we now know that the use of multiple approaches enables us to reach out to a particular student better without ignoring the others. Combinations of plenary, group and individual sessions in which knowledge is transmitted, discussed, verified and created may be used depending on the background, profile and learning pace of each student.

In conclusion, the curriculum – school – pedagogy triad is a menu from which teachers select, prioritise and develop their teaching proposals. Teachers are the decision-makers of choice in the classroom, and no-one or nothing can replace them.

Clue 15: teachers as decision-makers

As previously mentioned, education systems are organised around teachers who guide learning and students who take control of their learning (Amadio, Opertti and Tedesco, 2015; OECD, OIE-UNESCO and UNICEF, 2016).

Along this same line, the Education 2030 Agenda reinforces the need to ensure teachers are recruited and remunerated appropriately, empowered, motivated, and professionally qualified and supported by effective and efficient administrative systems with good resources (UNESCO et al., 2015a). The aim is to completely transform the key aspects of teacher profiles, roles, training, working conditions and professional development. We will now discuss six aspects.

First and foremost, teachers should have confidence in and be supported by educational and political systems, as well as by citizens and society as a whole in order to believe that their actions can have a positive impact on their students' learning. Societies with the most progressive education systems are those which trust the ethical mandates and professional capacities of their teachers, as well as ensure decent working conditions. However, this is unfortunately not the case worldwide. For example, teachers in Latin America earn much less than people in other professions (Ñopo and Mizala, 2012) and, as such, are not given the recognition nor the status they deserve for the key role they play in forging a sustainable future.

Secondly, the teacher profile is key to determining what type of education for what type of person, citizen and society. Teachers are essentially educators with an unavoidable ethical mandate to not only lead but also facilitate learning processes by striving to meet the educational objectives set by society as well as ensuring the holistic development of their students. (Filgueira et al., 2014). Their role as “expert orchestrators” of learning environments, which favours and supports the development of life and citizenship competencies (OECD, OIE-UNESCO and UNICEF, 2016), entails guaranteeing the physical and emotional well-being of their students as well as guiding and supporting them throughout their learning (Amadio, Opertti and Tedesco, 2015; Halinen, 2017).

Thirdly, if education is to pave the way to students to act competently in society, teachers have to know their environment well and consider knowledge as an irreplaceable but insufficient tool for dealing with daily situations and challenges. Teachers should have three key qualities: (i) a high level of general intelligence to understand the position and paths chosen by the societies in which they play an active role; (ii) a sound understanding of the disciplines they teach and of the digital technology used in teaching and learning processes; and (iii) the ability to engage students and help them understand what is being taught (Tucker, 2011).

Fourthly, teachers are responsible for democratising learning opportunities by adopting several key pedagogical principles: (i) teachers and students work together as allies by considering all students as active subjects and meaning-makers; (ii) classroom decisions are taken in everyone's interest; (iii) the classroom as a whole is seen as a powerful learning tool; and (iv) all children can and want to learn and can be infinitely ingenious if given the right support (Hart and Drummond, 2014) – they are creators as well as receptors of knowledge.

Fifthly, and in light of the increasing use of hybrid learning models with strong digitalisation components, teachers should act as compasses that guide the flow of information (Savater, 2012) in order to explain and give sense to phenomena and situations (Aguerrondo et al., 2014). As Umberto Eco said (2014), “the Internet tells us (students) almost everything, except how to search, filter, select, accept or reject that information”.

In the context of the meta-cognitive processes required by today's information-saturated society, we need to not only develop our abstraction skills, but also our ability to assess the abstraction processes carried out by technological devices (Amadio, Opertti and Tedesco, 2015). In fact, as previously discussed, the

strength and intensity of the worldwide changes caused by the fourth industrial revolution have brought up for discussion the increasing influence of technology, especially algorithms, over our identities and behaviours (Davis, 2016).

Sixthly, the prioritisation of teacher training and of teaching as a profession implies the need for intensive and demanding high-level university qualifications (Halinen and Holappa, 2013). On the one hand, teacher training should adopt diverse teaching and learning methods given that personalised learning in collective classroom contexts is needed in order to acknowledge differences between students as well as between their different backgrounds, profiles and learning styles.

On the other hand, teaching methods should integrate discipline-specific knowledge more to avoid teacher training resulting in compartmentalised spaces and disciplines based on the *what* and the *how* to teach and learn. Current and future teacher training will involve using a combination of disciplinary and pedagogical approaches to give teachers the references and instruments needed to challenge students to create and share knowledge when faced with situations that relate more to themes than to fragmented individual learning or subject areas and disciplines.

Likewise, technology is becoming key to supporting teacher professional development as it facilitates peer learning and exchanges on knowledge, classroom experiences and local, national and international practices (World Economic Forum, 2017). Technology also enables teachers to significantly take control of their own professional development and search for training courses that best suit their needs. The state plays a key role in promoting and supporting the professionalization of teaching based on actual teacher needs instead of educating a prescriptive approach.

Last but not least, in the same way as the quality of an education system cannot exceed the quality of its teachers (Barber and Mourshed, 2008), the learning potential of each student in an education system cannot generally exceed the teachers' ability to understand, guide and support him/her.

Conclusion

The Education 2030 Agenda is transformative, holistic, humanistic, progressive and developmental. The educational concepts that have marked the debate and collective definition of education over the last four decades are thus in need of a salutary revision. The fifteen analytic clues discussed in this document adhere to a broad view of this Agenda in light of the changes caused by the fourth industrial revolution and the need to recreate the foundations for local and global sustainable development and sustainable lifestyles.

The Education 2030 Agenda specifically highlights the fact that pursued types of society should be used as references when rethinking educational visions, content and strategies which must be supported by a Guarantor State that ensures effective, relevant and sustainable lifelong learning opportunities. Moreover, this new agenda suggests strengthening the role of the state as guarantor of the right to education and learning by leading, co-developing and following up on educational processes whilst also prioritising vulnerable populations and individuals and calling on diverse institutions and actors, educational or otherwise, to attend to the diverse needs of students. All of this, with the aim to reaffirm education as a cultural, social and economic policy that always needs to be considered as such in order to ensure individual and collective well-being and sustainable lifestyles.

Similarly, learning opportunities should be increased, democratised and supported by a proactive state, which promotes access to education without age restrictions and facilitates the accreditation and recognition of skills developed by people throughout their lives, in order to implement a transformative educational vision. This means, amongst other things, moving towards an education system based on age cycles and forging educational framework for children, adolescents and youths based on the development of competencies and knowledge. Four areas of competencies, namely basic literacy, methodological tools, personality traits and glo-local commitment, have thus been put forward as a way to ensure sustainable development in light of the notoriously disruptive effects of the fourth industrial revolution.

Within the thematic framework of the Education 2030 Agenda, personalised learning is seen as essential to providing inclusive education. Inclusion is based on the idea that every student is special and capable of learning whatever their ethnic group, migratory background, physical, social and intellectual condition, gender and sexual orientation. The creation of fairer, more inclusive, cohesive and sustainable societies requires reinforcing themes, such as education for glo-local citizenship, education for sustainable development and lifestyles, STEM education and, of course, the relevance of gender perspective as a cross-cutting theme that strengthens the democratisation of society and education. In fact, we need new socio-cultural and political understandings of a gender perspective to back up and audit the education system so as to truly achieve equal learning opportunities and outcomes.

The fourth industrial revolution challenges us to consider technology as one of the traits that defines human identity and our development as people, citizens and workers. As regards education, the need to introduce computational thinking, programming or coding as a tool to help students in basic education upwards produce, share and disseminate knowledge is being contemplated. Likewise, the linear relationship between education and the labour market also needs to be revised in order to make work a universal dimension of citizenship education and ensure future citizens are able to adapt to the rapidly-changing jobs, tasks and working conditions.

Finally, the curriculum – schools – pedagogy triad is a menu from which teachers, in their role as decision-makers in the classroom, personalise education to help their students take control and manage their own learning. The document reaffirms the need to develop a comprehensive teacher agenda encompassing teacher profiles and roles, training, working conditions and professional development. The crucial question remains: what type of education and teacher for what type of person, citizen, community and society.

Bibliography

- Aguerrondo, I., Vaillant, D., De Stefani, M., and Azpiroz, M. 2014. *Aprendizaje Efectivo Para Todos. ¿Cómo Lograrlo? Resumen de Informe de Investigación*. Montevideo, Universidad ORT–Uruguay.
- Ainscow, M. 2016. Diversity and Equity: A Global Education Challenge. *New Zealand Journal of Educational Studies*, Vol. 51 (2), pp. 143-155.
- Ainscow, M. and Messiou, K. 2014. La diversidad del alumnado: una oportunidad para aprender y mejorar. *Cuadernos de Pedagogía*, 446, pp. 42-45.
- Algan, Y. 2016. *Rien ne peut expliquer que l'école amplifie les inégalités*. Le MONDE des IDEES (25 Agosto 2016). Disponible en : http://www.lemonde.fr/idees/article/2016/08/25/yann-algan-rien-ne-peut-expliquer-que-l-ecole-amplifie-les-inegalites_4987802_3232.html
- Amadio, M. 2013. *A Rapid Assessment of Curricula for General Education Focusing on Cross-Curricular Themes and Generic Competences or Skills*. Background paper prepared for the Education for All Global Monitoring Report 2013/4. Paris, UNESCO.
- Amadio, M., Opertti, R., and Tedesco, J.C. 2015. El currículo en los debates y en las reformas educativas al horizonte 2030: para una agenda curricular del siglo XXI. *IBE Working Papers on Curriculum Issues*, No. 15. Ginebra, UNESCO-OIE.
- Banco Mundial. 2011. *Estrategia de Educación 2020 del Banco Mundial*. Versión preliminar del resumen. Washington, Banco Mundial. Disponible en: http://siteresources.worldbank.org/EDUCATION/Resources/ESSU/463292-1269917617150/6915424-1279137061297/ExecSummary_Spanish.pdf
- Ban, K. 2012. *La educación ante todo. Una iniciativa del Secretario General de las Naciones Unidas*. Nueva York, Naciones Unidas.
- Barber, M. and Mourshed, M. 2008. Como hicieron los sistemas educativos con mejor desempeño del mundo para alcanzar sus objetivos. *PREAL*, No 41. Disponible en: www.oei.es/historico/pdfs/documento_preal41.pdf
- Benavot, A. 2012. Policies towards quality education and student learning: Constructing a critical perspective. *Innovation: The European Journal of Science Social Research*, 25(1), pp. 67-77.
- Braslavsky, C. 2005. La historia de la educación y el desafío contemporáneo de una educación de calidad para todos. En Ruiz Berrio, J. (ed.) en *Pedagogía y educación ante el siglo XXI*. Madrid, Universidad Complutense de Madrid, pp. 269-285.
- Burns, T. and Köster, F. (eds.). 2016. *Governing Education in a Complex World*. Paris: OECD Publishing. Disponible en: http://www.oecd-ilibrary.org/education/governing-education-in-a-complex-world_9789264255364-
- Cox, C., Bascopé, M., Castillo, J.C., Miranda, D., and Bonhomme, M., 2014. Educación ciudadana en América Latina: Prioridades de los currículos escolares. *IBE Working Papers on Curriculum Issues*, No. 14. Ginebra, UNESCO-OIE.
- Cox, C. 2017. Global Citizenship Concepts in Curriculum Guidelines of 10 Countries: Comparative Analysis. *In-Progress Reflections series on Current and Critical Issues in Curriculum, Learning and Assessment*, No. 9. Geneva, IBE-UNESCO.
- Cuthbertson, A. and Murakoshi, S. 2015. *Coding in the classroom: How has the UK curriculum overhaul fared six months on?* (27 Febrero 2015). Disponible en: <http://www.ibtimes.co.uk/coding-classroom-how-has-uk-curriculum-overhaul-fared-six-months-1489714>

- Davis, N. 2016. *What is the fourth industrial revolution?* Geneva, World Economic Forum. <https://www.weforum.org/agenda/2016/01/what-is-the-fourth-industrial-revolution/>
- De Armas, G. and Aristimuño, A., 2012. *La transformación de la educación media en perspectiva comparada. Tendencias y experiencias innovadoras para el debate en Uruguay*. Montevideo, UNICEF. Disponible en: <https://www.unicef.org/uruguay/spanish/transformaciones-web.pdf>
- Delors, J., et al. 1996. *Learning: The Treasure Within*. Report of the International Commission on Education for the Twenty-first Century. Paris, UNESCO.
- Dredge S. 2014. *Coding at school: a parent's guide to England's new computing curriculum*. (4 Septiembre 2014) Disponible en: <https://www.theguardian.com/technology/2014/sep/04/coding-school-computing-children-programming>
- Eberstadt, N. 2016. *Men Without Work: America's Invisible Crisis*. West Conshohocken: Templeton Press.
- Eco, U. 2014. ¿De qué sirve el profesor? *Revista del CIPES para la Gestión Educativa*, 10(26), pp.24–25.
- Educar 2050. 2016. *El futuro ya llegó... pero no a la escuela argentina. ¿Qué nos atrasa y dónde está el futuro de nuestra educación?* Buenos Aires, Educar 2050. Disponible en: <http://educar2050.org.ar/wp/wp-content/uploads/2015/11/Paper-Innovaci%C3%B3n-2016.pdf>
- Filgueira, F., Pasturino, M., Opertti, R. and Vilaró, R. 2014. *La educación prioridad de país: aportes a la construcción de una educación genuinamente inclusiva*. Fundación 2030-Diálogos en torno a un proyecto educativo de largo aliento 2015-2030. Disponible en: <http://www.espectador.com/documentos/Educacion.pdf>
- Finnish National Board of Education. 2016. *National Core Curriculum for Basic Education 2014*. Helsinki, Finnish National Board of Education.
- Florian, L. 2014. *Reimagining special education: Why new approaches are needed*. The SAGE Handbook of Special Education. 2nd edition, Vol. 1. London, Sage Publications, pp. 9-22.
- Fressard, O. 2006. El imaginario social o la potencia de inventar de los pueblos. *Trasversales*, No. 2.
- Fullan, M. and Langworthy, M. 2014. *Una Rica Veta. ¿Cómo las Nuevas Pedagogías Logran el Aprendizaje en Profundidad?* Montevideo, Mastergraf.
- Gray, A. 2016. *The 10 skills you need to thrive in the Fourth Industrial Revolution*. Geneva, World Economic Forum. Disponible en: <https://www.weforum.org/agenda/2016/01/the-10-skills-you-need-to-thrive-in-the-fourth-industrial-revolution/>
- Halinen, I. 2017. Curriculum for Sustainability. The conceptualization of competencies related to sustainable development and sustainable lifestyles. *In-Progress Reflection on Current and Critical Issues in Curriculum, Learning and Assessment*, No. 8. Geneva, UNESCO-IBE. Disponible en: <http://unesdoc.unesco.org/images/0024/002473/247343E.pdf>
- Halinen, I. and Holappa, A.S. 2013. Curricular balance based on dialogue, cooperation and trust – the case of Finland. Kuiper, W. and J. Berkvens (eds.), *Balancing Curriculum Regulation and Freedom Across Europe*. (CIDREE Yearbook 2013), The Netherlands, SLO, pp. 39-62.
- Hart, S. and Drummond, M.J. 2014. The SAGE Handbook of Special Education. Florian, L. (ed). *Learning without limits: Constructing a pedagogy free from determinist beliefs about ability*. 2nd edition, Vol. 2. London, Sage Publications, pp.439-458.

- Horn, M. and Staker, H. 2015. *Blended. Using Disruptive Innovation to Improve Schools*. San Francisco, Joseey-Bass.
- Hughes, C. 2014. *Herramientas de formación para el desarrollo curricular: Aprendizaje personalizado*. Ginebra, UNESCO-OIE.
- Jonnaert, P., Ettayebi, M., and Opertti, R. 2008. *Dynamiques des réformes éducatives contemporaines. Logique de compétences et développement curriculaire*. Brussels, De Boeck, pp.17-25.
- Jonnaert, P., Ettayebi, M., and Defise, R. 2009. *Curriculum et compétences: Un cadre opérationnel*. Brussels, De Boeck.
- Jonnaert, P. and Therriault, G. 2013. Curricula and curricular analysis: Some pointers for a debate. *Prospects*, 43(4), pp. 397-417.
- Kärkkäinen, K. 2012. Bringing about curriculum innovations: Implicit approaches in the OECD area. *OECD Education Working Papers*. No. 82. Paris, OECD.
- Kilpi, E. (ed.) 2016. Perspectives on new work. Exploring emerging conceptualizations. *Sitra Studies*, 114. Disponible en: <https://www.sitra.fi/julkaisut/Selvityksi%C3%A4-sarja/Selvityksia114.pdf>
- Leisman, C. 2017. *Crucial competencies in the fourth industrial revolution*. HRSG, Ontario. <http://resources.hrsg.ca/recruiter/crucial-competencies-in-the-fourth-industrial-revolution>
- Lenoir, Y., Xypas, C., and Jamet, C. 2006. *École et citoyenneté. Un défi multiculturel*. Paris, Colin.
- Levin, H. 2012. More than just test scores. *Prospects*, Vol. 42, No. 3, pp. 269–84.
- Lugo, M. T. 2016. *Las tecnologías como oportunidad de innovación educativa*. Observatorio TIC en FID: Integración de la TIC en la Formación Inicial Docente (13 Septiembre 2016). Disponible en: <http://ticenfid.org/maria-teresa-lugo-las-tecnologias-como-oportunidad-de-innovacion-educativa/>
- López, N. 2005. *Equidad Educativa y Desigualdad Social. Desafíos a la Educación en el Nuevo Escenario Latinoamericano*. Buenos Aires, UNESCO-IIEP.
- Maddah, M. 2016. Welcoming the Fourth Industrial Revolution: Paving the Road of Innovation Towards a Cyber-Physical Reality by 2030. American University of Science and Technology (AUST), Beirut. Disponible en: <https://50.unido.org/files/research-paper-competition/Research-Paper-Maddah.pdf>
- Marope, M. 2014. Improving the equity of quality and learning in education: A systemic approach. N. V. Varghese (ed.), *A Report from the IWGE. From Schooling to Learning*. Paris, UNESCO-IIEP, pp. 55-79.
- Masciotra, D. and Medzo, F. 2009. *Développer un Agir Compétent. Vers un Curriculum Pour la Vie*. Brussels, De Boeck.
- Milana, M. et.al. 2016. The Role of Adult Education and Learning Policy in Fostering Societal Sustainability. *International Review of Education*, Vol. 61, pp. 191-209.
- Ministry of Education of Malaysia. 2013. *Malaysia Education Blueprint 2013-2025 (Preschool to Post-Secondary Education)*. Putrajaya, Ministry of Education.
- Morin, E. 2011. *La Voie. Pour l'avenir de l'humanité*. Paris, Fayard.
- . 2016. *Enseñar a vivir. Manifiesto para cambiar la educación*. Barcelona, Paidós.
- Muskin, J. 2015. Evaluación del aprendizaje del estudiante y el currículo: Problemas y consecuencias para la política, el diseño y la aplicación. *Reflexiones en progreso sobre Cuestiones fundamentales y actuales del currículo, el aprendizaje y la evaluación*, No. 1. Ginebra, OIE-UNESCO.

- Ñopo, H. and Mizala, A., 2012. *Evolución de los salarios de los maestros en América Latina*. Instituto Peruano de Economía (IPE) (7 Enero 2013). Disponible en: <http://www.ipe.org.pe/comentario-diario/07-1-2013/evolucion-de-los-salarios-de-los-maestros-en-america-latina-nopo-y>
- OECD. 2013. *Innovative Learning Environments. Educational Research and Innovation*. Paris, OECD.
- . 2015a. *Education Indicators in Focus*. Paris, OECD Publishing.
- . 2015b. The ABC of Gender Equality in Education. Paris, OECD Publishing. Disponible en: <https://www.oecd.org/pisa/keyfindings/pisa-2012-results-gender-eng.pdf>
- OECD, OIE-UNESCO, and UNICEF. 2016. *La naturaleza del aprendizaje: Usando la investigación para inspirar la práctica*. Panamá, UNICEF LACRO. Disponible en: https://www.unicef.org/lac/20160505_UNICEF_UNESCO_OECD_Naturaleza_Aprendizaje_.pdf
- Opertti, R. 2008. Les approches par compétences et la mise en oeuvre de la réforme des curriculums en Amérique latine: processus en cours et défis à relever. P. Jonnaert, M. Ettayebi and R. Opertti (eds.), *Logique de Compétences et Développement Curriculaire*. Brussels, De Boeck, pp. 79-100.
- . 2011. Cambiar las miradas y los movimientos en educación. Ventanas de oportunidades para el Uruguay. F. Filgueira and P. Mieres (eds.), *Jóvenes en Tránsito. Oportunidades y Obstáculos en las Trayectorias Hacia la Vida Adulta*. Montevideo, Rumbos/UNFPA, pp. 63-113.
- . 2014. La educación uruguaya del futuro que necesitamos hoy. E. Martínez Larrechea, E., Chiancone Castro, A. (eds). *Repensar el sistema educativo para sostener una sociedad inclusiva*. Montevideo, Grupo Magro Editores/UDE. pp. 71-101.
- . 2016a. 15 pistas sobre la educación en el mundo. Separata. Uruguay, *Diario El Observador / EDUY21*.
- . 2016b. El currículo en la agenda educativa 2030. *Ruta Maestra*, Currículo para transformar la educación (15). Bogotá, Santillana, pp.6-11.
- . 2017. Curriculum in the Education 2030 Agenda: Latin America and the Caribbean. *In-Progress Reflection on Current and Critical Issues in Curriculum, Learning and Assessment*, No. 10. Geneva, IBE-UNESCO.
- Opertti, R., Zachary, W., and Zhang, Y. 2014. Inclusive education: From targeting groups and schools to achieving quality education as the core of EFA. Florian, L. (ed.), *The SAGE Handbook of Special Education*. 2nd edition, Vol. 1. London, Sage Publications. pp. 149-169.
- Peppen Vaughan, R. 2016. *Gender equality and education in the Sustainable Development Goals*. Background paper prepared for the 2016 Global Education Monitoring Report: Education for people and planet: Creating sustainable futures for all. Paris, UNESCO. Disponible en: <http://unesdoc.unesco.org/images/0024/002455/245574e.pdf>
- Pons, F., de Rosnay M., and Cuisinier, F. 2010. Cognition and Emotion. Peterson, P., Baker E. and McGaw, B. (eds.) *International Encyclopaedia of Education* (Vol. 5). Oxford, Elsevier, pp. 237-244.
- Prensky, M. 2014. The world needs a new curriculum. *Educational Technology*, 54(4), pp. 3-15.
- Regmi, K. 2015. Lifelong Learning: Foundational Models, Underlying Assumptions and Critiques. *International Review of Education*, Vol. 61, no. 2, pp. 133-151.
- Reigosa-Crespo V., Valdes-Sosa, M., Butterworth, B., Estevez, N., Rodriguez, M., Santos, E., et al. 2012. Basic numerical capacities and prevalence of developmental dyscalculia: The Havana survey. *Developmental Psychology*, 48, pp. 123-135.

- Rizvi, F. 2016. Privatization in Education: Trends and Consequences. *Education Research and Foresight Series*, No. 18. Paris, UNESCO. Disponible en: <https://en.unesco.org/node/262287>
- Robinson, K. and Aronica, A. 2016. *Escuelas creativas. La revolución que está transformando la educación*. Barcelona, Debolsillo.
- Roegiers, X. 2010. La pédagogie de l'intégration. *Des Systèmes d'Éducation et de Formation au Cœur de nos sociétés*. Brussels, De Boeck.
- Ross, A. 2017. *The industries of the future*. Simon and Schuster Paperbacks, New York.
- Savater, F. 2012. *Ética de urgencia*. Barcelona, Editorial Ariel. pp. 31–49.
- Saarikivi, K. 2014. Interview with Katri Saarikivi: What Neuroscience Tells us About Upgrading Work y Cognition. Biohacker Summit Blog (1 Diciembre 2014). <http://biohackersummit.com/2014/12/01/interview-neuroscientist-katri-saarikivi/>
- Savolainen, H. 2009. Defining an inclusive education agenda: Reflections around the 48th session of the International Conference on Education. Acedo, C., Amadio, M. and Opertti, R. (eds), *Responding to diversity and striving for excellence. An analysis of international comparison of learning outcomes with a particular focus in Finland*. Geneva, UNESCO-IBE, pp. 49-59.
- Schwab, K. 2016. The fourth industrial revolution. Geneva, World Economic Forum. Disponible en: https://www.google.com.uy/?gws_rd=ssl#q=the+fourth+industrial+revolution+klaus+schwab+3+maart+2016
- Schwab, K. 2017. *La quatrième révolution industrielle*. Préface de Maurice Lévy. Dunod, France.
- Schleicher, A. 2011. Educación: Una inversión estratégica con altos logros (Documento presentado en la conferencia organizada por el Centro de Estudios Educativos de la Global Foundation for Democracy and Development, 18 April 2011). Santo Domingo.
- Spelke, E.S. 2005. Sex differences in intrinsic aptitude for mathematics and science?: a critical review. *The American Psychologist*. 60(9), pp. 950–958.
- Steele, R. 2016. *Conceptualizing Competencies for Sustainable Development and Lifestyles, and how to give effect to them*. Geneva, UNESCO-IBE.
- Stiegler, B. 2016. *La disruption rend fou. Culture Mobile penser la société du numérique*. Disponible en : http://www.culturemobile.net/system/files/pdf/cm_visions_bernard-stiegler_02.pdf
- Tedesco, J.C. 2016. Diez notas sobre los sistemas de evaluación de los aprendizajes. *Reflexiones en progreso sobre Cuestiones fundamentales y actuales del currículo, el aprendizaje y la evaluación*, No. 5. Geneva, IBE-UNESCO.
- Tedesco, J.C., Opertti, R., and Amadio, M. 2013. Porqué importa hoy el debate curricular. *IBE Working Papers on Curriculum Issues* No. 10. Ginebra, UNESCO-OIE.
- Tikly, L. 2017. The Future of Education for All as a Global Regime of Educational Governance. *Comparative Education Review*, Vol. 61, no. 1, pp. 22-57.
- Tomasevsky, K. 2001. Indicadores del derecho a la educación. Disponible en: <http://www.derechoshumanos.unlp.edu.ar/assets/files/documentos/indicadores-del-derecho-a-la-educacion.pdf>
- Tucker, M.S. 2011. *Standing on the Shoulders of Giants. An American Agenda for Education Reform*. Washington DC, National Center on Education and the Economy.
- UNESCO. 2012. *Education and skills for inclusive and sustainable development beyond 2015. Thematic think piece*. UN System Task Team on the post-2015 UN Development Agenda. Paris, UNESCO.

- . 2014. *Final Statement. The Muscat Agreement*. Global Education for All (GEM) Meeting, 12-14 May 2014, Muscat, Oman.
 - . 2015a. *Educación 2030. Declaración de Incheon y Marco de Acción. Hacia una educación inclusiva y equitativa de calidad y un aprendizaje a lo largo de la vida para todos*. Paris, UNESCO. Disponible en: <http://www.unesco.org/new/fileadmin/MULTIMEDIA/FIELD/Santiago/pdf/ESP-Marco-de-Accion-E2030-aprobado.pdf>
 - . 2015b. *Replantear la educación. ¿Hacia un bien común mundial?* Paris, UNESCO.
 - . 2015c. *UNESCO Science Report Towards 2030*. Paris, UNESCO.
 - . 2015d. *A Complex Formula: Girls and Women in Science, Technology, Engineering and Mathematics in Asia*. Paris, UNESCO.
 - . 2015e. *EFA Global Monitoring Report. Gender and EFA 2000-2015: achievements and challenges*. Paris, UNESCO. Disponible en: <http://unesdoc.unesco.org/images/0023/002348/234809E.pdf>
 - . 2016. *Revisión Comparativa de iniciativas nacionales de aprendizaje móvil en América Latina. Los casos de Colombia, Costa Rica, Perú y Uruguay*. Paris, UNESCO. Disponible en: <http://unesdoc.unesco.org/images/0024/002439/243976s.pdf>
 - . 2017. *A guide for ensuring inclusion and equity in education*. Paris, UNESCO.
- UNESCO Institute for Lifelong Learning. 2016. *Conceptions and realities of lifelong learning. Background paper for 2016 Global Education Monitoring Report*. Paris, UNESCO. Disponible en: <http://unesdoc.unesco.org/images/0024/002456/245626e.pdf>
- . 2017. *Promoting Lifelong Learning for All*. Hamburgo, UNESCO-UIL. Disponible en: <http://unesdoc.unesco.org/images/0024/002465/246598E.pdf>
- UNESCO-IBE. 2015. *Repositioning and reconceptualizing the curriculum for the effective realization of Sustainable Development Goal Four, for holistic development and sustainable ways of living*. Discussion paper presented at the World Education Forum, Incheon, Republic of Korea, 19–22 May 2015. Geneva, UNESCO-IBE.
- . 2016. *Reaching Out to All Learners: a resource pack for supporting inclusive education. Training Tools for Curriculum Development*. Geneva, UNESCO-IBE.
 - . 2017. *Training Tools for Curriculum Development: A Resource Pack for Gender-Responsive STEM Education*. Geneva, UNESCO-IBE. Disponible en: <http://unesdoc.unesco.org/images/0025/002505/250567e.pdf>
- UNESCO-OIE. 2013. *Herramientas de formación para el desarrollo curricular: Una caja de recursos*. Ginebra, UNESCO-OIE.
- . 2016. *La Experiencia en Malasia de la Participación de las Niñas en la Educación de las Ciencias, la Tecnología, la Ingeniería y las Matemáticas (STEM). Reflexiones en progreso sobre Cuestiones fundamentales y actuales del currículo, el aprendizaje y la evaluación*, No. 3. Ginebra, UNESCO-OIE.
- UNESCO-IBE, UNESCO-BREDA, and GTZ. 2009. *The Basic Education in Africa Programme (BEAP). A Policy Paper - Responding to demands for access, quality, relevance and equity*. Eschborn, BREDA, IBE-UNESCO and GTZ. Disponible en: <http://unesdoc.unesco.org/images/0018/001834/183492e.pdf>

- United Nations. 2015. *Transforming our World: The 2030 Agenda for Sustainable Development*. New York, United Nations. Disponible en: <http://www.un.org/sustainabledevelopment/eng/summit/>
- Volles, N. 2016. Lifelong Learning in the EU: Changing Conceptualizations, Actors, and Policies. *Studies in Higher Education Journal*, 41(2). 343-363.
- Wals, A.E.J. 2010. *Message in a Bottle: learning our way out of unsustainability*. Groundswell International (14 Diciembre 2010). Disponible en: <http://www.groundswellinternational.org/climate-change/message-in-a-bottle-learning-our-way-out-of-unsustainability/>
- World Economic Forum. 2014. Global competitiveness Report 2014-2015. Geneva, World Economic Forum. Disponible en: http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2014-15.pdf
- . 2015. New Vision for Education. Unlocking the Potential of Technology. Geneva, World Economic Forum.
- . 2017. White Paper. Realizing Human Potential in the Fourth Industrial Revolution. An Agenda for Leaders to Shape the Future of Education, Gender and Work. Geneva, World Economic Forum. Disponible en: http://www3.weforum.org/docs/WEF_EGW_Whitepaper.pdf
- Yorston, J. 2016. *Global Education: The Future of Learning and the Fourth Industrial Revolution*. NESLI, Melbourne (3 Febrero 2016). Disponible en: <http://www.nesli.org/global-education-the-future-of-learning-and-the-fourth-revolution-3.html>