CATHOLIC SCHOOLS IN A T-WORLD – FRONT RUNNERS IN SENSE MAKING[1]

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Abstract

Catholic Schools in a T-World – front runners in sense making is an article about the role of schools and teachers in a technology rich world. Not only about how education systems should incorporate technology in the educational processes, but mainly about how technology is changing the roles of schools and teachers. The foreseeable impact of the 4th industrial revolution goes far beyond manufacturing and other productive aspects of our life. Big data, the internet of things, artificial intelligence, robotics, all concur to radically change the way we work, but also the way we live and the way we organize our societies. These changes – the T-Wave – will require new skills and competencies from humans but will also force us to focus on what it means to be human in a more fundamental way. And education systems, because they cater for the future generations, must be prepared to surf the T-Wave. Catholic schools, like all other schools, will have to face the challenges posed by the T-Wave. But, unlike other schools, have it in their nature to go further and balance the technological strength of the future with the righteous role of mankind in that future. Because of their anthropological nature, catholic schools may go beyond educating along the lines of "21st century skills" or "civic education". They explore man`s most fundamental questions and the meaning of life.

We begin by analysing the T-Wave, its impact on our future and the challenges that arise for education systems. Then we present these the "challenge of purpose" faced by schools. Finally, we address the specificity of sense making that catholic schools, because of their nature, may (must9 bring to education and why this is paramount in a T-World if we are to contribute to the development of a prosperous human-centred society.

Keywords: Technology, catholic schools, XXIst century schools

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Resumo

"Catholic Schools in a T-World – front runners in sense making" é um artigo sobre o papel das escolas e dos professors num mundo tecnologicamente enriquecido. Não é sobre o modo com as escolas devem incorporar tecnologia no processo educativo, mas sobre como e tecnologia está a mudar o próprio papel das escolas e dos professores. O impacto previsível da 4ª revolução tecnológica vai muito para lá do modo como produzimos e outros aspectos operacionais da nossa vida. Big data, a internet das coisas, inteligência artificial, robótica, tudo concorre para mudar radicalmente o modo como trabalhamos mas também o modo como vivemos e o modo como organizamos as nossas sociedades. Estas mudanças – a T-Wave – vai exigir novas capacidades e competências dos humanos mas também nos vão forçar a focar no que significa ser humano de um modo mais fundamental. Os sistemas educativos, porque servem as gerações do futuro, têm de estar preparados para surfar a T-Wave. As escolas Católicas, tal como as outras, terão de enfrentar os desafios colocados pela T-Wave. Mas, ao contrário das outras escolas, têm na sua natureza irem mais além no equilíbrio entre a força tecnológica do futuro e o papel central da humanidade nesse futuro. Por causa da sua fundação antropológica, as escolas Católicas devem ir para lá de uma educação na linha das "competências para o século XXI" ou da "educação cívica". Elas exploram as questões mais fundamentos que se colocam ao homem e ao sentido da sua vida.

Começamos por analisar a T-Wave, os seus impactos no nosso future e os desafios que cria para os sistemas educativos. Depois, apresentamos o "desafio de sentido" que se coloca à escola. Finalmente, analisamos a questão da "criação de sentido" que as escolas Católicas, por causa da sua natureza específica, devem trazer para a educação e que é fundamental no mundo tecnologicamente enriquecido se queremos contribuir para o desenvolvimento de uma sociedade próspera e antropocentrica.

Palavras chave: Tecnologia, escolas católicas, escolas no século XXI

The technological wave: challenges for the education system

We live today what has commonly come to be known as the 4th industrial revolution. With the previous industrial revolutions, it has in common changing the paradigms of production, organization of work and, to a certain extent, how we go about living together. However, while the previous three industrial revolutions occurred around every 100 years or so (the first in mid-18th century with mechanization, the second in mid-19th century with electricity and chemical synthesis, and the third in the second half of the 20th century with electronics and automation), the fourth industrial revolution came not more than 40 years after the 3rd and its main characteristic is the speed at which it takes place.

This 4th industrial revolution is also commonly referred to as a T-Wave, because of its technological aspect. Spanning the 5 scientific domains identified in the *Game Changers* report (Grilo, 2016) - digital, robotics, genomics, advanced materials and energy -, it poses great challenges for governments, policy makers, regulators, corporations and individuals.

Due to the speed at which change it occurs and its reach (spurred by the internet and social media), the fourth industrial revolution challenges the way society adapts to the new patterns of work, communication and lifestyles that constantly arise. Everything new is disseminated in nanoseconds worldwide and adoption is just as quick as abandonment for the mew novelty.

The societal impacts of the fourth industrial revolution are as challenging to the way we live in general as they are to the way we work in particular. As we evolve into a technological enriched future, we should think about the people who build and live in that future with a new and different approach. Until now, societal responses to the T-Wave are inorganic and reactive. We try to keep up with technology incorporating it in our life, but we do not have a broader strategy for guiding the way. Algorithms are pushing the future; we need to create the androrithms that will shape it (Leonhard, 2016).

And, as we will argue, creating androrithms should be the main goal of schools. Even if not completely recognised by national education systems, the disruption caused by the T-Wave has put new strains on education systems. For some authors, because the modern school is a structure typical of 21th century industrial organization, fine tuning the education system is not enough; systems need to be completely redesigned (Sahlberg, 2015).

In this article, we pinpoint the main challenge brought to education systems by the T-Wave and argue why catholic schools are in a good position to address this challenge; as long as they focus on their distinctive character: their catholic dimension.

Change in the education system as discussed in this article is not just a new fad; neither is it simply about competitive advantage. It is an absolute necessity to foster an integrated, peaceful, sustainable society were people may ambition to live a long and happy life.

What is the T-World and why does it imply reshaping schools?

Technology has always shaped the way we work and live. It was so when man learned how to make fire and started dominating other animals, it was so when we learned how to grow crops and came out of the woods and into the cities and so it was so when we learned how to mechanize production. What is different about the 4th industrial revolution is: (i) the speed of change, (ii) the fact that technology has become ubiquitous (it is everywhere), and (iii) the unfolding capacity of technology to "work" independently of humans. These characteristics of the 4th industrial revolution have permitted technology to bridge the gap between the digital and the physical worlds playing an even more central and dominant role in our life. It is no wonder that production lines do not have workers, stores do not

have salesmen or cars do not need drivers. But we still distrust newspapers articles without journalists, market analysis without analysts, legal analysis done by algorithms or computer programs being written by the machines themselves. The speed of technological development has reached a point where the possibility that we will live to see a singularity (the capability of technology to develop independent of human intervention) is no longer in the realm of science fiction. "The whole beauty of all these types of algorithms is that because they are learning for themselves, they can go beyond what e as the programmers know how to do. And that allows us to make new breakthroughs in areas as sciences and medicine" (Hassabis, 2017).

In previous industrial revolutions, schools have played a central role in preparing workers for the "new world" that was in the making: from basic literacy and numerical skills for the future factory worker, to advanced literacy and numerical skills for the "knowledge worker" (Drucker, 1996). Likewise, school systems today try to adapt to the foreseeable demands of the t-World. However, the rapid pace of change denies modern school systems the time their predecessors had to prepare students for the challenges of their adult lives. Moreover, in previous industrial revolutions school's monopoly on teaching and learning was not affected. The incumbent could afford to get it wrong. This is not so in the t-World. Alternative technological enriched learning environments are available; just a click away. Information and not only data is available and affordable. Developments in artificial intelligence promise to customize teaching and learning. As in all other walks of life, schools should not try to beat technology – they will probably lose. The challenge is to do what technology cannot and to integrate technology when doing the rest. "In a nutshell, the kinds of things that are easy to teach have become easy to digitize and automate. The future is about pairing the artificial intelligence of computers with the cognitive, social and emotional skills, and values of human beings" (Schleicher, 2018: 14).

The speed of change has made useless our efforts to prepare students for a certain world. It is no longer possible to prepare students for "the" future; we prepare them for "a" future, an unpredictable one. On the one hand, this implies a much broader scope of knowledge and competencies. On the other hand, it also implies a different set of tools as they will be expected, in a degree unknown to previous generations, to be able to create and determine that future. "Concurrent to the technological revolution are a set of broader socio-economic, geopolitical and demographic drivers of change, each interacting in multiple directions and intensifying one another, and having profound implications on the way we live, we socialize and the jobs we will have in the future" (World Economic Forum, 2016: V). Thus, education and training systems need to consider the need to create strategies to regulate the learning experiences and to promote the development of skills, competences and 'languages', so that people can adapt to different ways to relate, communicate, socialise and work, and to different notions of time and space. Consequently, traditional education approaches based on knowledge acquisition and

reproduction model are increasingly being replaced by learning strategies based on knowledge creation and innovative and interactive models, making learning more and more adaptive, personalised and blended and contributing to the creation of innovative learning ecosystems (Bonk and Graham, 2006; LLL Platform, 2017). The development of technology sets new demands for the learning landscape as "learning takes place in both formal and informal environments, locally and globally, both virtually and socially" (Lonka, 2012: 26).

The 21st century skills

In such a rapidly evolving landscape, the ability to anticipate and prepare for future skills requirements "is increasingly critical for businesses, governments and individuals in order to fully seize the opportunities presented by these trends and to mitigate undesirable outcomes." To take an example, "in many industries and countries, the most in-demand occupations or specialties did not exist 10 or even five years ago, and the pace of change is set to accelerate. By one popular estimate, 65% of children entering primary school today will ultimately end up working in completely new job types that don't yet exist" (World Economic Forum, 2016: 3).

Recent data from the OECD also indicate that "about 14% of jobs in OECD countries are highly automatable. Another 32% of jobs could face substantial change in how they are carried out. The highest risk is concentrated in routine jobs with low skill requirements and often low wages (…). Entering the labour market may become more difficult for young people as student jobs and entry-level positions have a higher risk of automation than jobs held by older workers" (OECD, 2018: 1). Furthermore, on average, by 2020, more than a third of the desired core skill sets of most occupations will be comprised of skills that are not yet considered crucial to a job today. Overall, social skills — such as persuasion, emotional intelligence and teaching others — and cognitive skills — such as creativity, logical reasoning and problem sensitivity – will be in higher demand than narrow technical skills, such as programming or equipment operation and control (World Economic Forum, 2016). Indeed, more than technical and digital skills, cognitive skills, will be determinant. In this context, computational thinking brings a new insight to the skills of the future. Contrary to one might think, it does not mean getting humans to think like computers, but to think at multiple levels of abstraction; to solve problems, to manage our daily life, to communicate and to interact with other people using computational concepts; to understand intellectually challenging and engaging scientific problems; to develop a fundamental skill which enables us to go on to a multitude of different careers (Wings, 2006). When one thinks about employment trends, it is evident the necessity to commit with the STEM (sciences, technology, engineering and mathematics). But it is also evident that the potential net job creation in absolute terms in the STEM field alone will not be enough. "Disruptive changes will have a significant impact on skills requirements in *all* job families and that they are creating a range of opportunities and challenges in *all*

industries, not just narrowly related to 'hard knowledge', technical skills and technology. In order to manage these trends successfully, there is a need for potentially reskilling and upskilling talent from varied academic backgrounds in *all* industries" (World Economic Forum, 2016: 25).

Moreover, STEM together with social and cognitive skills are not only important for the current job market and for the 'jobs of the future', but for all areas of society and for the citizens living an inevitably technological world. In other words, they are crucial to prepare citizens to live and make decisions in a T-world.

Skills commonly referred to as 21st Century Skills are not all that new. However, the unprecedented speed and disruption of change caused by the T-Wave make these skills not only desirable but effectively indispensable. Thus, the commitment of international organisations with the 'new skills agenda' is demonstrated by several initiatives, research projects and reports. According to the European Union (2016: 2), skills are "a pathway to employability and prosperity" and "a key to social cohesion". The "*New Skills Agenda for Europe: Working together to strengthen human capital, employability and competitiveness*", a major initiative from the European Union, addresses the skills challenges that Europe is currently facing, stressing priority areas for action. Essentially, it suggests strengthening basic skills, promoting entrepreneurial mindsets, prioritising vocational education and training, focusing on digitals skills, making skills and qualifications more visible and comparable, and improving skills intelligence and information for better career choices (European Union, 2016). Notwithstanding, despite skills for innovation necessarily comprising technical skills, they also incorporate critical thinking and creativity, and behavioural and social skills that help people pursue their critical thinking and creative skills and put their ideas into action. Furthermore, the "innovation imperative in education" and "the power of digital skills and technologies in education" mean that digital technologies have the huge potential to transform education strategies and practices and open up new horizons, but cannot transform education by themselves (OECD, 2016). In this context, it is also important to bring subjects such as "education for sustainable development" and "global citizenship education" into "the mainstream of formal, non-formal and informal education through system-wide interventions, teacher training, curricular reform and pedagogical support" (Unesco, 2015: 50). Overall, the new educational challenges, as a result of the new nature of relations, jobs and ways of life, demand profound educational changes and reforms, where both technical and digital skills, on the one hand, and social, behavioural and creative skills, on the other, play the leading role.

However, though jobs are very important, the T-Wave is not only about jobs. In fact, it is even not mostly about jobs. The T-Wave is changing societal structure as a whole and the pace of change is so fast that societal changes occur without there being time to understand the impacts on our humanity.

Therefore, more than ever, we should think education much beyond preparation for the workforce. This is important, of course. But understanding the T-World and being competent to humanize it must come first if we aim at a peaceful, sustainable, inclusive society.

Therefore, humanities cannot be devalued. Instead, their role needs to be recognised by education organisations and by society at large, namely because they "have a central place in exploring the possibilities, the reach and implications of digital technologies" (Davidson and Goldberg, 2004: 4). It is due to the rapid developments in science and technology, that it is important to have critical civic competencies, ways of comprehending cultural and technological values. In short: "ways of world making", which are offered by the humanities. "A world without the humanities would be one in which science and technology knew no point of social reference, had lost their cultural compass and moral scope" (Davidson and Goldberg, 2004: 5).

One does not know where the T-Wave will take us. The societal re-structuring our children will face are the real challenges. But if the scenario of a future without jobs (Ford, 2015) may seem desperate for some, for others it may be an opportunity to create a more humane society. The technological developments described will fundamentally change our relation with work and our relation with each other. We may be on the verge of a new period in human development. A period of human fulfilment described by John Adams in a letter to his wife, Abigail Adams, in 1780:

> "I could fill Volumes with Descriptions of Temples and Palaces, Paintings, Sculptures, Tapestry, Porcelaine, &c. &c. &c. -- if I could have time. But I could not do this without neglecting my duty. The Science of Government it is my Duty to study, more than all other-Sciences: the Art of Legislation and Administration and Negotiation, ought to take Place, indeed to exclude in a manner all other Arts. I must study Politicks and War [so] that my sons may have liberty to study Mathematicks and Philosophy. My sons ought to study Mathematicks and Philosophy, Geography, natural History, Naval Architecture, navigation, Commerce and Agriculture, in order to give their Children a right to study Painting, Poetry, Musick, Architecture, Statuary, Tapestry and Porcelaine" (Adams, 1780).

It was not in John Adam's three generations. But might it be that it is for our grandchildren to be that generation entirely devoted to the true humanities? Preparing children to live in a 4.0 society as a whole is the challenge for school systems.

In innovation and technology-driven societies, education and training systems must empower people to socialise, communicate, work, think time and space in a different manner. Just as impressive as the technology in itself, is the pace at which it grows in complexity. Artificial Intelligence is still in its early stages, but what was once science fiction is now reality. Algorithms that learn, adapt and create new

algorithms let us wonder how long it will take until man does not understand the technology. The complexity of systems may overrun our capacity to comprehend and rule them. But even today we already know that understanding the way machines "think" will be a much needed basic skill for all students. To the traditional subjects present in basic education all around the world – languages, natural sciences, geography, mathematics, history and arts – we must today add computational thinking, and a pleiad of soft skills beforehand considered a by-product of growing up.

Education for the 21st century must ensure that people/learners do not end up as passive technology consumers but active digital citizens. Indeed, individuals are the real game changers who need to steer the change. "It's not digital technology that creates social change, people do!" (LLL Platform, 2017: 4).

It is this focus of education on "androrithms" and the need to balance the STEM/Humanities curriculum discussions on a human perspective of the future that creates new opportunities for Catholic schools in a time were values and religion are sometimes overcome by consumerism and alienation; "The great danger in today's world, pervaded as it is by consumerism, is the desolation and anguish born of a complacent yet covetous heart, the feverish pursuit of frivolous pleasures, and a blunted conscience." (Francis, 2013).

This is the general context in which schools operate, be them catholic or not. The challenges are the same, but, we argue, catholic schools are in a special place when we think about giving meaning to life and to human condition. The quest for meaning is the DNA of a catholic school. And the quest for meaning is the main challenge for schools in a T-World.

Educating for the T-World: the challenge for (Catholic) Schools

In this new 'era', education systems face different challenges. Melo (2018) defined five domains that challenge schools in the 4th industrial revolution:

1. Purpose: schools must re-assess what is their core mission. What value do they create for children, parents and society as a whole? Subject specific, teacher based content delivery ignores the fundamental fact that today all necessary information is available online at any time, in any place in any given format, flexible and adaptable to the individual need.

2. Structure: schools must rethink what to teach and how to teach it (content, time, space and structure). The traditional 19th century brick and mortar school house, with fixed classes, schedules and subjects are a strange structure when compared to all other environments students live in today and, foreseeably, will live and work in the future.

3. Content: schools must become creative agents. Education needs to go beyond the role of giving information and teaching how to turn it into knowledge and promote creativity.

4. Method: schools must boost cross-fertilisation and collaborative learning inside and across specialised areas and develop a holistic approach to education.

5. Technology: schools must integrate technology in the teaching and learning processes. Integrating technology in work processes has been a key feature of all areas of human activity. Surprisingly (or maybe not), school systems are lagging behind. Despite some hype around LMS, smart boards and tablets, digital teaching resources, LMS, online tutoring and APPs, school systems as a whole are still far from integrating technology in a meaningful way.

Of these five domains, the one that most challenges catholic schools and better speaks to its ethos is the first one: giving (re)new(ed) purpose to schools and teachers. Catholic schools have no lack of purpose. They are founded for the purpose of promoting the faith through education of the young. The opening paragraphs of the declaration on Christian education *Gravissimum Educationis* are clear in this regard:

"The Sacred Ecumenical Council has considered with care how extremely important education is in the life of man and how its influence ever grows in the social progress of this age.(1)

Indeed, the circumstances of our time have made it easier and at once more urgent to educate young people and, what is more, to continue the education of adults. Men are more aware of their own dignity and position; more and more they want to take an active part in social and especially in economic and political life.(2) Enjoying more leisure, as they sometimes do, men find that the remarkable development of technology and scientific investigation and the new means of communication offer them an opportunity of attaining more easily their cultural and spiritual inheritance and of fulfilling one another in the closer ties between groups and even between peoples.

Consequently, attempts are being made everywhere to promote more education. The rights of men to an education, particularly the primary rights of children and parents, are being proclaimed and recognized in public documents.(3) As the number of pupils rapidly increases, schools are multiplied and expanded far and wide and other educational institutions are established. New experiments are conducted in methods of education and teaching. Mighty attempts are being made to obtain education for all, even though vast numbers of children and young people are still deprived of even rudimentary training and so many others lack a suitable education in which truth and love are developed together.

To fulfill the mandate she has received from her divine founder of proclaiming the mystery of salvation to all men and of restoring all things in Christ, Holy Mother the Church must be concerned with the whole of man's life, even the secular part of it insofar as it has a bearing on his heavenly calling.(4) Therefore she has a role in the progress and development of education. Hence this sacred synod declares certain fundamental principles of Christian education especially in schools. (…)" (Pope Paul VI, 1965: introduction).

These words, written in the early stages of the third industrial revolution, already make an interesting link between leisure, technology, global communication and man`s "cultural and spiritual inheritance". Again, the challenges brought by the T-Wave touch the structures of society, as with the previous industrial revolutions. But now, the speed of change is of a different magnitude and the possibilities opened by technology, namely AI, make human adoption and adaption of change a challenge of a totally different nature.

Purpose: A new role for schools and teachers

In the pre-digital world, information and subject specific content was registered in books and people´s heads, books were found in libraries and knowledgeable people were found in schools. Access to the job market, the church or other social structures was granted according to the level of knowledge a person accumulated and, as a fact of life, access to knowledge and social status were correlated. The traditional school structure was fit for purpose in the pre-digital world: passing on knowledge from the teacher to the largest number of children possible in an efficient way. The school as a factory image is very adequate to depict this concept.

The school's monopoly on transmitting knowledge has been broken. It is not that knowledge is not important or that students do not have to acquire and master abstract concepts. But ICT has made information available at any time, in any place, in any given format. And not just that, but current technology has also made access easy, immediate and adapted to the individual need. Schools are no longer the repositories of information and knowledge nor are they the gatekeepers of learning. With the existing technology, the process of transmitting content is easily digitalized. And because "anything that may be digitalized will be" (Leonhard, 2016), the role of the teacher as a depositary of knowledge that purrs it on the students will be rendered obsolete in the coming future.

Information and knowledge are no longer part of a school centred monopoly. Access is widespread, cheap and easy. Convenience and individualization are the trademarks of information in the World Wide Web. However, access to information and knowledge is not enough for the upbringing of children. Basic and secondary education are about sense making and identity, knowing and understanding the fundamentals of language, sciences and arts, preparation to live a happy and productive life. Basic and secondary education play a central role in the development of national identities and building the future of countries and regions. Therefore, education systems are founded on a balance between democratic control of the curriculum (exercised through public educational authorities), parental fundamental rights in education (exercised by parental participation in governance structures, school choice or the right to found private schools) and the rules of pedagogy. The end of the school system's monopoly in access to information and knowledge does not mean we do not need schools. We need schools and teachers.

But we need them to fulfil a role that is not for technology *per se*. A role we cannot and do not want to give to algorithms because they need a human approach and decision. Therefore, schools must re-assess what is their core business; what is the value they may create for students, parents and society as a whole. Accordingly, the teachers' role must be adapted to the adjusted mission of the school.

This new role for schools and teachers is that of educational gateways. Curriculum design, aligning methods to the individual student's profile, certification of students' attainments, tutoring and mentoring, all these are functions of the schools and there teachers. Each school should have the autonomy, within national, regional or international agreed frameworks, to design individual curricular pathways for students, support the student through that path and certify knowledge and competencies. Schools and teachers will play a steering role in the education system for society 4.0.

But there is a need to make clear and to understand the underlying structures of subjects, to costume the educational path of individuals, to scaffold learning, to define what should be learned, how and when. Giving encouragement and being there to listen and merely accompany the learning process. And then there are societal needs as fostering the acquisition of values, developing civic participation or certifying the acquisition of knowledge and development of skills. Schools and teachers will be gatekeepers of the learning process rather than the content; they will structure the educational paths of students and help 'make sense' of what is learned. Or, in digital terminology, school will be "portals" (City, Elmore & Linch, 2012). In the digital age, the role of teachers and educators has evolved and will continue evolving. However, moving teachers' practice into the new education context is both "exhilarating" and "challenging" (Prensky, 2012: 3). It is then crucial to invest in teachers, "as transformers and awakeners", and to support teachers and educators in implementing digital technology in learning environments, namely by investing in their initial and continuous professional development and their own digital skills and competences (LLL Platform, 2017: 4).

In this context, teachers must be highly trained "professional pedagogues". This is not to argue that subject knowledge is dispensable. Only knowledgeable teachers are fit to instil in students a will for learning. However, subject knowledge and subject specific didactics are not enough for a teacher in the T-World. Just as we aim for a different student profile at the end of secondary education, we must aim for a different teacher profile. This implies a new toolkit of skills and knowledge for teachers: masters of pedagogy/methodology with strong research-based training. Likewise, schools must be organized taking into account this new role of educational gatekeeper. Their workforce should be calibrated for the new role of educational gateways. Today, most schools still are staffed according to educational levels offered (primary, secondary) and the subjects taught (e.g., languages, maths, history, sciences, literature or arts). The assumption is that each teacher is knowledgeable about his or her subject matter

and its specific didactics and student assessment and that this is enough. This assumption misses out on knowledge and competencies that we know are important for educational in any situation and are not sufficiently incorporated in the school system (neurosciences, psychology or pedagogy) and rests on another assumption: that teachers work independently of each other teaching a specific subject. Schools for a T-world need a richer mix of competencies and human resources. Teachers will not all be equally good at assessing, at teaching math or at helping to overcome special educational needs. Some teachers will follow the latest knowledge in neurosciences, others will be great pedagogues. All the reasons we expect students to learn to work collaboratively apply to teachers. The main one is that if educators work in a collaborative way, schools may: (i) organize in a way that each educator spends more time doing what he or she does best (student assessment, tutoring, lecturing, curriculum design) and (ii) open their recruitment pools to people with more diverse backgrounds (arts, neurosciences, technology) that are needed for schools to be the said curriculum gateways of the T-World. With this rich human composition, schools will be equipped to define the curriculum, promote and support learning and assess outcomes.

Current discussions on schools evolve around school autonomy, school governance and schools as learning organizations. The aim is to promote better learning for all students and is based on the idea that schools, because they are closer to the student than the other educational institutions (or authorities), are in a better position to cater for the individual student. This is a manifestation of the subsidiarity principle. However, the challenges of the T-World go a step further. To be curriculum gateways, schools do not only need to be more effective (autonomy, governance and organizational learning), but they also need to have a new legitimacy. To fulfil new tasks, schools need a new legitimacy in the eye of society.

System governance, curriculum design and attainment assessment are traditional tasks of educational authorities. "It is not uncommon to find a few academics and government officials in a country who determine what millions of students will learn. They will often defend the scope and integrity of their discipline rather than consider what students need to know and be able to do to be successful in tomorrow's world" (Schleicher, 2018: 75). If schools are to be the described curriculum gateways, they must develop most of these tasks. And for that they need legitimacy and internal competencies. What should students learn? When should they learn it? What does creativity look like? How do we assess citizenship, resilience or participation over the system? Schools in a T-World must be able to address these questions and their answers must be grounded in a legitimacy recognised by society. Therefore, we must find a way to give schools the democratic legitimacy of educational authorities (an issue of governance) and the technical legitimacy of higher education institutions (an issue of staffing and structure).

This is the new role for schools in a T-World. All schools, including catholic schools. But for these, the challenge assumes a different nature.

We come back to the question we posed at the beginning of this chapter: *the end of the school system's monopoly in access to information and knowledge does not mean we do not need schools. We need schools and teachers. But we need them to fulfil a role that is not for technology per se. A role we cannot and do not want to give to algorithms because they need a human approach and decision. Therefore, schools must re-assess what is their core business; what is the value they may create for students, parents and society as a whole.* For public school and lay independent schools, creating value means fostering XXIst century skills, creating a balance between STEM and humanities, developing citizenship and democratic participation in society. And all this is very important. But the fundamental issue with regard to "androrithms" is to think about what it means to be human. The challenge of ´sense making` in a T-world is not of a scientific nature; it is an anthropological question. Who is man and what the meaning of life is. If children who will live in the T-World are to be masters of the algorithms, they must understand and act on the distinction between man and technology, between man and the rest of creation. This is at the root of catholic education - "a true education aims at the <u>formation of the human person in the pursuit of his ultimate end</u> and of the good of the societies of which, as man, he is a member, and in whose obligations, as an adult, he will share" (Pope Paul VI, 1965: 1 – the underline is ours) –. But for other schools, especially for public schools, it is difficult to offer a coherent and comprehensive view that may support the question of human nature.

Reinforcing the human development aspects of education is ever more important because of the discussed impact of digital technology in all counts of life. A holistic and complete curriculum is essential to develop the capacity to impose androrithms over algorithms and live a truly human life in a digital world. In the absence of anthropological fundaments, decisions on borderline issues of technological intervention in nature and on biological and societal structures of humans may be taken in a participatory and democratic way; but will they be enlightened by truly human considerations?

Technology and people: promoting a prosperous but human-centred society

"It is not digital technology that creates social change, people do!" (LLL Platform, 2017: 7). People must not be passive technology consumers but active digital citizens. The emphasis on people rather than on technology is particularly relevant given our aim of drawing attention to what we would call the 'human era' of societal evolution; a positive and creative stage where the fundamental traits of human nature may be nurtured. As the philosopher Agostinho da Silva once wrote "human beings were not born to work; they were born to create" (Silva, 1990). In preparation of a T-World, "school becomes

the tool which refines individuals into reflective citizens and prioritizes opportunities for emerging human dignity" and digital tools become especially useful because they nurture individuals' sense of agency and responsibility (Shapiro, 2014).

The challenges and changes which we have been discussing in our report are the result of a societal evolution. Indeed, society has evolved over the centuries and it will continue to evolve and each evolutionary stage is characterised by different driving forces, values and purposes.

We can describe Society 1.0 as 'the hunting society' where groups of people hunted and gathered in harmonious coexistence with nature; Society 2.0 as the agrarian society, based on agricultural cultivation, increasing organization and nation-building; Society 3.0 as the industrial society, promoting industrialization through the Industrial Revolution, making mass production possible; Society 4.0 as an information society that realizes increasing added value by connecting intangible assets as information networks. Many would argue that we are now living in a Society 4.0 marked by a technological disruption and revolution. What we argue here is that we are living in a society 4.0, but already building a society 5.0, in which the main differentiating element is the human centrality and the focus on human happiness and prosperity. Thus, Society 5.0 (a concept arisen in Japan) can be defined as an information society built upon Society 4.0, aiming for a prosperous human-centred society. Here, the various needs of society are finely differentiated and met by providing the necessary products and services in the required amounts to the people who need them when they need them, and all people can receive high-quality services and live a comfortable, vigorous life that makes allowances for their various differences such as age, sex, region, or language. It is a new society created by transformations led by scientific and technological innovation, following hunting society, agrarian society, industrial society, and information society (Harayama, 2017).

In societies 4.0 and 5.0, digitalization is a means, but humans are central actors. However, in Society 4.0 (too) often technology drives the change and humans follow it. And here remains the main change: technology is only an instrument used by humans who lead and build social and societal change. Humans are the true game changers, not technology. Traditionally, innovation driven by technology has been responsible for social development. In a 5.0 Society 0 this way of thinking is reversed, focusing on how to build a society that makes us happy and provides a sense of worth, a society which is the foundation for human life (Harayama, 2017). And this brings as back to the purpose and special place of catholic schools in a 5.0 society: giving radical meaning to the human condition:

> "The influence of the Church in the field of education is shown in a special manner by the Catholic school. No less than other schools does the Catholic school pursue cultural goals and the human formation of youth. But its proper function is to create for the school community a special atmosphere animated by the

Gospel spirit of freedom and charity, to help youth grow according to the new creatures they were made through baptism as they develop their own personalities, and finally to order the whole of human culture to the news of salvation so that the knowledge the students gradually acquire of the world, life and man is illumined by faith.(25) So indeed the Catholic school, while it is open, as it must be, to the situation of the contemporary world, leads its students to promote efficaciously the good of the earthly city and also prepares them for service in the spread of the Kingdom of God, so that by leading an exemplary apostolic life they become, as it were, a saving leaven in the human community." (Pope Paul VI, 1965: 8)

Catholic schools are not the only schools that offer an anthropological base. However, they do have that base in their DNA and are therefore equipped to face the main challenges of a T-World. There was a time when taking numeracy and literacy to the "frontiers" of society could, by itself, justify their existence. In some parts of the world, this it still the case. However, for most of them, this is not the case anymore. Numeracy and literacy teaching can and will be digitalized. It is making sense of life that will stay as a fundamental human task and will be the purpose of schools and teachers.

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