

Smart Education: network of actors and interests on a global scale

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ABSTRACT – Smart Education: network of actors and interests on a global scale. The network of academic-governmental and economic-business actors involved in the latest phase of digital society, contributing to the smartification of education, is examined. The methodology is part of a documentary review, supported by the compilation of 224 scientific articles. The results point to: 1. The strategic involvement of the Asian continent (particularly China) in shaping the global map of smart education; 2. The role played by high-tech transnational companies in shaping the smart educational agenda; and 3. The integration of smart education with the growing social penetration of intelligent technologies and the socio-technical demands of digital society.

Keywords: Smart Education. Smartification Processes. Digital Society. Smart Technologies. 21st-Century Education.

RESUMEN – Smart Education: red de actores e intereses a escala global. Se examina la red de actores académico-gubernamentales y económico-empresariales que, en la más reciente fase de la sociedad digital, participan de la smartificación de la educación. La metodología se inscribe en una revisión documental, apalancada en la compilación de 224 artículos científicos. Los resultados apuntan a: 1.- La estratégica participación del continente asiático (particularmente de China) en la constitución del mapa-mundi de la *smart education*; 2.- El papel que desempeñan las transnacionales de alta-tecnología en la configuración de la agenda educativa *smart*; y 3.- La articulación de la *smart education* con la creciente penetración social de las tecnologías inteligentes y las demandas socio-técnicas de la sociedad digital.

Palabras-clave: Smart Education. Procesos de Smartificación. Sociedad Digital. Tecnologías Inteligentes. Educación Siglo XXI.

Introduction

When it comes to education, we can safely say that we live in interesting times. The digital revolution opens up new and challenging possibilities as the capitalist world-system is transformed, and an emerging global order is seen in which cognitive technologies (Deloitte, 2018) have come to play a key role. From natural language processing to computer vision, including semantic computing, machine learning, advanced decision-making and recognition systems for feelings, text, voice, video and images, robotics (and the like), each of these domains operates as a key piece in the socio-technical machinery from which digital modernity is objectified, as well as the horizon of expectations (fears, hopes, etc.) that in terms of education architects the 21st century.

Thus, one of the challenges that occupies a special place arises from the disruptive nature that characterizes the most recent version of the digital society, and the way in which a growing demand for analytical inputs is metabolized from which the forces and factors of change that are reconfiguring education become intelligible. As a dense network of automated systems and/or environments for educational purposes spreads, progress is made in the creation of virtual environments, the fields of application of artificial intelligence (AI) multiply and/or the presence of technical-intelligent objects (Silveiro-Fernández; Renukappa; Sureh, 2018) in the school field deepens. It is imperative to update the theoretical-analytical toolbox from which the educational agenda is stated/conceived, in order to accompany the changes, the respective magnitudes of change, to which the sector is subjected.

In this context, smart education (Unesco; Col; Bnu, 2022) has emerged as one of the key concepts from which the transformations experienced by educational work can be addressed, since the presence of smart is strengthened by the growing offer of products, services, public policies, etc., that carry with them the imprint of intelligence (such as smart cities, smart homes, smart buildings, smartphones, smart grids, smart devices, etc.), and the processes of smartification are deepened which, according to Sadowski (2020), occupy a key, strategic place in the future of digital capitalism. The semantic network in which terms such as smart education, smart schools (Zeeshan et al., 2022), smart campus (Shi et al., 2019), smart classrooms (Kwet; Prinsloo, 2020), smart pedagogy (Unesco; Bnu; Iste, 2022), etc. are inscribed, responds to the value acquired by the adjective smart when it comes to understanding the avalanche of intelligent technical objects (networks, sensors, processors, algorithms, systems, etc.) that have spread in the educational field, and that from a macro perspective are the correlate of a singular type of education, of society (Deguchi, 2019), in which smart plays a cardinal role.

That is, once understood that:

Smart education is a widely used term to describe the exponential spread and growth of algorithmic, data-driven technologies in the economy and society, as well as their growing catalytic influence on education and training systems both globally and nationally. These technologies include AI, virtual reality (VR), augmented reality (AR), IoT, big data, block chain, 3D printers, wearable technologies, etc., each of which are redefining the relationship between humans and machines. (Unesco; Col; Bnu, 2022, p. 13, our translation).

It is clear that smart education has emerged as one of the key references from which we can understand the trends and techno-educational processes that take place within the framework of digital transformation, once this term (and the conceptual framework that extends to it) has been defined¹⁾ It invites us to look at education not only through the diffusion and exponential growth of a datafied education, mediated by algorithms, which aims to redefine (as indicated in the previous quote) the relationship between humans and machines (H2M); but also because from this we can advance in the understanding of the knowledge-power relations (Foucault, 1979) that dynamize the assembly of a smart society (Deguchi, 2019), whose objectification occupies a strategic, front-line place in the future of late modernity.

To this end, the current article aims to map the network of actors who, at an international level, enunciate their practices, projects and/or educational conceptions based on the possibilities offered by smart education, since this exercise allows us to appreciate the different agendas, initiatives and/or educational trials that, at a global level, respond to the conceptual framework that gravitates in relation to smart education; at the same time that it makes it possible to discriminate the network of academic, technical, political and/or economic interests that participate in the constitution of the socio-technical ecosystem in question. Taking into account that, according to Tian and Zhen (2017), “The construction of smart education [...] depends on several instances such as government agencies, industrial entrepreneurs, research institutions and schools” (our translation), on this occasion we try to draw the world map of smart education, to the extent that such a commitment allows to x-ray the most representative actors and interests that have embraced the techno-pedagogical roadmap enunciated as smart education, in the same analytical movement that makes it possible to understand the relations of knowledge, the respective economy of power, in which the techno-educational agenda outlined by smart education is inscribed.

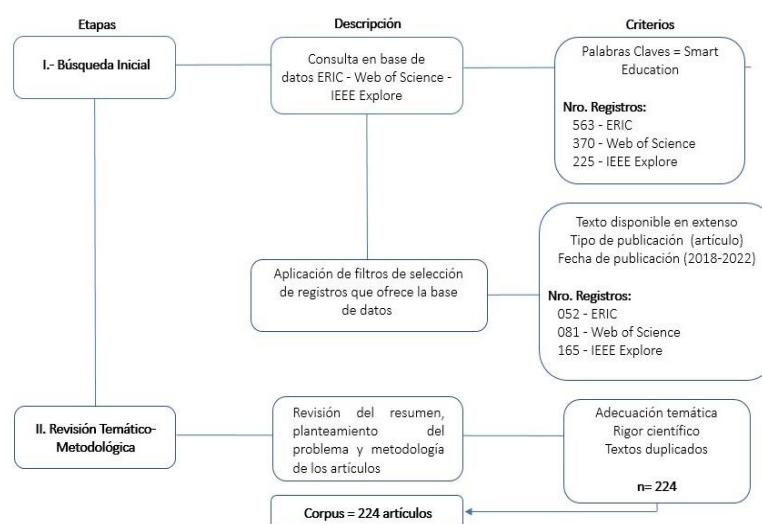
Methodology

The article is a byproduct of a doctoral thesis whose methodological design responded to the criteria of a documentary research (Upel, 2016). Based on a systematic review (Gomes; Caminha, 2014), 224 scientific articles were compiled from the digital repositories ERIC, IEEE Xplore and Web of Science (see Figure 1), each of which was subjected to a categorization process (Cuenca; Hilferty, 2007) in order to specify

the actors, relationships and interests, from which the ecosystem known as smart education is being objectified.

The precepts offered by textual-discursive analysis (Moraes; Galiazzi, 2006) were used when analyzing the compiled corpus, while the functional, data processing and visualization possibilities available in software such as Atlas.ti and Iramuteq were used. Likewise, external references (web pages) of the most strategic actors who stand out in the promotion of educational initiatives attached to the reference framework examined were consulted, in order to complement and/or update the information obtained in the documentary corpus. When advancing in the analytical processes and organizing/presenting the results, the actors and interests that Tian and Zhen (2017) point out in relation to smart education were considered).

Figure 1 – Selection of documentary corpus (stages/criteria)



Source: Own elaboration.

Findings

First of all, it is appropriate to bring up Figures 2 and 3. Each of these contributes to geolocating the scientific production examined and identifying the key, strategic references from which we can advance in the understanding of smart education.

Academic-governmental actors

To move in the desired analytical direction, it is worth noting that, according to Wang (2023, p. 17):

Since 2014, Jiangsu Province and Beijing's Haidian District have promoted policies that have led to the exploration of smart education. In 2019, China launched the construction of the "smart education demonstration zone" project". By November 2021, China had actively promoted the construction of 20 smart education demonstration areas. This shows that China has promoted smart education to the level of national strategy and places it as an important piece in the construction of a socialist power and an intelligent society (our translation).

In light of this, the strategic nature acquired by smart education has contributed to encouraging the presence of smart in the techno-educational agenda developed by China at a domestic level, while at the same time it has promoted the creation of a growing network of agreements, academic events, projects and/or educational-institutional commitments that, on an international scale, are key pieces in the composition of the educational ecosystem in question. The set of actions that are articulated in the Action Plan 2.0 for the Computerization of Education (2018) and the 14th Five-Year Plan (2021-2025) (China, 2021b) for Social and Economic Development, such as the New Generation Artificial Intelligence Development Plan (China, 2021c), the construction of the Smart education demonstration area (China, 2019), the Beijing Consensus on Artificial Intelligence and Education (Unesco, 2019), the Action Plan for Technological Innovation of Block chain in Colleges and Universities (China, 2020), the pilot project on 5G + Smart Education (China, 2021a), among others, illustrate the set of actions developed in order to promote the smart educational agenda, and create the required, necessary conditions for its objectification.

In this context, the centrality acquired by spaces such as the Global Smart Education Conference in the educational agenda is justified, to the extent that said space represents the concretization of a work program that, for almost five years, was carried out between the United States and China at the US-China Smart Education Conference (2016-2019), and which has currently become one of the main international showcases of smart education as well as the corresponding network of institutions, actors and interests that participate in its constitution. It is enough to point out the network of organizations that, in 2023, joined the promotion/consolidation of the indicated space, to recognize that from the Beijing Normal University and the UNESCO Institute of Information Technologies in Education, through the Chinese Institute of Social and Economic Development (CIESD), the National Engineering Laboratory for cyber-learning and smart technologies, as well as the cooperation of international organizations such as the Commonwealth of Learning, the Arab League Educational, Cultural and Scientific Organization (ALECSO), the International Society for Technology in Education (ISTE), the Secretariat of the Southeast Asian Ministers of Education Organization (SEAMEO), the UNESCO International

Research and Training Centre for Rural Education (UNESCO INRULED), and companies such as Huawei, NetDragon, Squirrel AI Learning, Tencent, China Unicom, Alibaba Cloud, Onion Academy, Baidu (as can be seen, in greater detail, in the next section corresponding to business actors), each of the aforementioned organizations illustrate the network of actors/interests that have joined the educational commitment driven by smart, and the competition of efforts that are articulated, in a trans-educational way, in its constitution.

The same can be indicated by bringing up the Smart Education of China (SEC) platform implemented, starting in 2020, by the National Center for Educational Technology, once said public platform operated as one of the most strategic lines of action available to the country to face the educational context imposed by Covid-19, while it has contributed (beyond said situation), to the strengthening of education as a public good, as can be seen from the results of the 2022 edition of the UNESCO-King Hamad Bin Isa Al-Khalifa Award. This is one of the most recent bets that are articulated to smart education in the Asian hegemony, and that together with the public policies and/or the cases stated allow us to appreciate the scope, the educational trends, to which the smartification of education points.

A similar context can be seen in relation to the participation of the Republic of Korea in the objectification of smart techno-educational work, taking into account that, since 2011, various initiatives have been promoted in the country with regard to the possibilities of school management or organization that outline smart education, making the Korean educational system one of the obligatory references when identifying trends, the world map, of smart education. Not in vain, the Classroom revolution through SMART education (Unesco, 2019) and the Green-Smart Schools of the Future Schools program (Korea, 2022) stand out for the resonance obtained at an international level, while representing two of the most emblematic educational bets that, in the country, have been promoted in the field of action outlined by the smartification processes.

To give an idea of the scope of these initiatives, it is worth highlighting that the Green-Smart Schools of the Future Schools program aims to promote the transition of Korean education towards the future, in the terms used by the Ministry of Education (Korea, 2021), by promoting innovation in the teaching-learning process and updating the infrastructure conditions of approximately 2,835 buildings, out of 1,400 schools over 40 years old, which, according to a press release published by the entity, are a priority for the period 2021-2025 (Korea, 2021). Added to this are projects such as the AI Crime and Accident Prevention System (Korea, 2023c), which aims at developing intelligent environments in school safety management, in order to facilitate proactive, remote responses to crime and/or accident situations that may occur in such institutions. Taking into account that the “SMART Education Initiative focuses on the creation of a virtuous cycle educational ecosystem using smart technologies” (Unesco, 2019, p. 06, our translation), The Ministry of Education has promoted various educational policies

transversalized by smart that, whether by enabling Personalized education for all with AI-embedded textbooks (Korea, 2023a) or by promoting joint work between the government and technology companies as provided for in the Edtech Promotion Plan (Korea, 2023b), dynamize the processes of educational smartification in the country, while placing Korea as a global reference when examining the unique type of education, of society, to which smart aims.

Focusing on India, some educational policies can be highlighted that point in a similar direction. To appreciate this from a panoramic perspective, the following excerpt from the National Education Policy 2020 is helpful:

Given the accelerated pace of technological development coupled with the creativity of tech-savvy entrepreneurs and educators, including student entrepreneurs, it is certain that technology will impact education in multiple ways, only some of which can be foreseen at present. New technologies including artificial intelligence, machine learning, block chains, smart boards, wearable devices, adaptive systems for student development, and other types of educational software and hardware will change not only what students learn in the classroom, but also how they learn (India, 2020, p. 56, our translation).

That is to say, taking as a starting point a socio-technical context that is recognized as both changing and uncertain, the government of the Republic of India has opted to enhance the horizon of possibilities brought by AI, adaptive, portable, intelligent systems, etc., to the extent that such technologies aim to profoundly transform education, and establish themselves as distinctive, unique brands in the forging of the most recent version of digital modernity. For this purpose, the centrality acquired by smart classrooms in the educational system of the Asian country is understandable, as well as the set of initiatives that, like the Smart India Hackathon (SHI), represent clear indications of the socio-educational process in question.

Not in vain, for the period 2022-2023 the Ministry of Education had planned the construction of more than 30,000 new smart classrooms, as stated in the memorandum of the Department of School Education & Literacy NO.F.19-21/2022-IS-6 (India, 2022), the content of which contributes both to identifying some of the strategic lines of work that this instance has been betting on within the framework of digital transformation, while also allowing to dimension the scope and operating conditions of the techno-educational infrastructure (laboratories, smart classrooms, etc.) that the country has. Considering the objectives set out in the national Digital India programme (India, 2015), the most recent update of the Samagra Shiksha programme (India, 2021a), and the work network fostered, for example, by the organisation of the SHI (which in its fifth edition, held in 2022, had the participation of 53 government institutions, 2,235 educational institutions and the support of transnational companies such as Amazon Web Services and the oil company Shell), the efforts that India has been making to transform itself into a smart society and lead (on a global scale) the socio-technical processes of smartification are clear. The centrality of

smart solutions in the cases mentioned, and the way in which they are articulated to concepts of cities/countries designed from ambitious programs such as the Smart Cities Mission (India, 2021b), the Smart Nation Singapore (Singapore) or the Digital Nation, Smart Island (Taiwan), for example, are clear indications of the path that has been drawn by the construction of a smart society model in which smart education occupies, it is worth emphasizing, a nodal role.

To this end, whether by paying attention to the cases noted in China, South Korea and India or by detailing a set of initiatives that, in the field of smart education, are underway in countries such as Japan (with the Doctoral Program for World-leading Innovative & Smart Education), the USA (with the Smart Schools Bing Act carried out since 2014 by the state of New York), the United Arab Emirates (with the Mohammed Bin Rashid Smart Learning Program), Nigeria (with the smart schools construction project undertaken in 2022 by the Universal Basic Education Commission), Rwanda (with the Smart Education Project-2021), the Organization for Islamic Cooperation (through policies such as the Smart Education financing initiative), among other policies highlighted by UNESCO-IITE, the Commonwealth of Learning and Beijing Standard University (2022) in the field of focus (see table 01), each of the examples mentioned allows us to identify some of the academic-governmental initiatives that have been promoted in regards to smart education, and the respective techno-educational ecosystem that, based on smart, has been occupying an increasingly larger space in the future of digital modernity.

Table 1 – Policies and strategies in smart education

Country	Population (2022)	Historical ICTE policies	Recent smart education policies
China	1.448.471.400	Ten-Year Development Plan on ICT in Education 2011-2020 (2012) 13th Five-Year Plan for ICT in Education (2016) Education Informatization 2.0 Action Plan (2018)	Education Modernization Plan towards 2035 Next Generation AI Development Plan
Egypt	106.156.692	Egypt ICT Strategy 2007-2010 Egypt ICT Strategy 2013-2017	Egypt National AI Strategy (2021)
India	1.406.631.776	National Policy on Information and Communication Technology (ICT) In School Education	National Education Policy 2020 National Strategy for AI (2019)
Mauritius	1.274.727	National ICT Strategic Plan 2011-2014: Towards i-Mauritius National ICT Policy 2007-11 ICT Strategy for the Mauritius's Education Sector presented by Education Minister National Open Data Policy 2017	Digital Mauritius 2030 Strategic Plan Digital Government Transformation Strategy 2018-2022 Mauritius Artificial Intelligence Strategy 2018

Russia	145.805.947	Strategy of Development of Education in the Russian Federation for the Period Until 2025 (2015)	The Digital Transformation National Goal (2018)
Singapore	5.943.546	ICT Masterplan I (1997-2002) ICT Masterplan II (2003-2008) ICT Masterplan III (2009-2014) ICT Masterplan IV (2015-2020)	Smart Nation Strategy (2018) AI Singapore
South Africa	60.756.135	e-Education White Paper (2004) Open Learning Policy (2018)	Ministerial Task Team on the Fourth Industrial Revolution and Post Schooling Education (2020)
South Korea	51.329.899	Masterplan I (1996) Masterplan II (2001) Masterplan III (2006)	Masterplan IV (2010): Smart Education Masterplan V (2014): Student Centred Learning
United Kingdom	68.497.407	Realising the Potential of Technology in Education: A Strategy for Education Providers and the Technology Industry (2019)	National AI Strategy (2021) Scotland's Artificial Intelligence Strategy. Trustworthy, Ethical and Inclusive
USA	334.805.269	National Education Technology Plan (2017) National Education Technology Plan Higher Education (2017)	Updating National Education Technology Plan for 2021

Source: Adapted from Unesco; Col; Bnu (2022).

Thus, such a set of initiatives allows us to appreciate the network of public policies and/or techno-educational projects that, in the contemporary world map, are stated as smart, and that, whether taking into consideration the cases identified by UNESCO, the Commonwealth of Learning and the Beijing Standard University in table number 01, or tracing the agreements, the articulations and/or the impacts of the educational-governmental policies pointed out in a preliminary manner, each one leaves evidence of the global dimension that typifies the smart educational agenda, and the way in which it has permeated various countries, the interest of a plurality of academic/governmental actors, who have embraced the educational horizon drawn by the smartification processes. This factor, combined with the validity/current nature of the policies and initiatives mentioned, calls for paying attention to the network of actors and interests that participate in the creation of a global techno-educational task, whose objectification is stated (conceived and implemented) as smart.

Business Actors

Bearing in mind that the constitution of the smart ecosystem demands a joint, close work agenda between academic-governmental actors and the business sector (especially linked to high-tech transnationals), I contribute the current section to point out the network of business interests that come together in the objectification of the domain of attention. To do so, it is worth focusing attention (initially) on the USA and IBM by virtue of the foundational role that authors such as Zhang (2020, p. 13) assign to this country/company in the promotion of the smart ecosystem, and the emergence of smart solutions that have operated as a dynamo, as a spearhead, in the smartification processes. In the words of this researcher:

In November 2008, IBM of the United States took the initiative to propose the concept of 'smart earth' and quickly expanded this concept into a series of smart solutions such as 'smart life', 'smart enterprise' and 'smart city' program, which also included "smart education" (our translation).

That is to say, in order to appreciate the network of business actors that, at a global level, have opted for the roadmap that makes smart education possible, it is imperative to highlight that the USA represents a sort of foundational axis in the creation of the global market for smart solutions, and that in this process IBM is a must-mention due to the respective set of concepts, services and/or products that the company put into circulation based on the smart earth initiative. Mapping the network of interests involved in the objectification of smart education refers, in such terms, to the value proposition offered by the transnational in the search for a planet (a city, life, company, education, etc.) that is increasingly smart, in which the implementation of smart solutions represents, as seen in the previous quote, a central role. Hence, IBM and the value proposition indicated can be considered points of reference when it comes to advancing in the understanding of the type of education/society that the smartification of contemporary work aims at, and of the dynamism acquired by a market for smart solutions and/or devices that has not stopped expanding, constantly, on a global scale (Laricchia, 2022).

In this context, the growing variety of initiatives that have been promoted by corporations such as Microsoft, Siemens, Samsung, Cisco, Sony, Verizon, Huawei (2022, 2023), Intel, Lenovo, Tencent, China Mobile, NetDragon, etc., in the field of attention, and the way in which these have permeated (in unique and strategic ways) education, are made explicit. Whether through the techno-educational portfolio advertised by Siemens (2023), Microsoft (2020) or Tencent (2023) within the framework of one-stop solutions for smart university campuses, the Smart and Secure Campus or the Smart education solutions; From the products offered by Samsung (2020) with the Samsung Smart School program, China Mobile (2020) with the 5G-based smart campus solution, Sony (2023) with intelligent video analysis technologies, Huawei with the almost infinite set of possibilities available with the Intelligent Campus Solution (2023) and Smart Education Solutions

(2020), or the design of hybrid, flexible, resilient and intelligent learning environments that feeds the Cisco commercial portfolio (2023), the techno-commercial value acquired by the smartification of educational work becomes clear, and the way in which this materializes in the offer of a growing range of solutions, products and/or services, which permeate education in the course of digital transformation.

To appreciate this in more detail, it is worth paying attention to the following examples. Consider Samsung's focus, the coverage of the Smart School program (see Figure 4), as well as the techno-educational profile that typifies this initiative.

Figure 4 – Number of students in the Smart School program worldwide



Source: Samsung (2020).

Of the aspects worth highlighting in the preceding figure, two are worth pointing out: 1.- The Smart School program operates, like Samsung, on an international scale, and although the numbers indicate a greater presence in Asia and Europe than in the rest of the world, this does not mean that one can underestimate the role that this proposal has played in the global dissemination of smart education, as well as one of its key concepts: smart school; and 2.- Although the data corresponds to the scope of the project for the year 2020, the Samsung Smart School initiative has not stopped consolidating and updating in recent years, as can be seen, for example, from the inauguration of smart classrooms in India in 2022, and the incorporation of more than 5,000 students and 260 teachers who, assigned to the *Jawahar Navodaya Vidyalaya* system, joined the program in the year in question (Samsung, 2022). Understanding that such educational offer aims to “[...] provide selected institutions with Samsung smart devices, as well as personalized education models and technological solutions to initiate a real change in classroom learning” (our translation), the scope and validity of the Samsung Smart School project in promoting the smart educational agenda is clear, as well as an emerging pedagogical device that, through smart technical objects, smart solutions and personalized

education models, are a clear, synthetic expression of the educational agenda under consideration.

The same can be indicated by examining the smart campus value proposition offered by Siemens (2023), and the techno-educational perspective according to which “[...] every day, the Internet of Things (IoT), digitalization, automation and the large amounts of available data bring us closer to the creation of an ideal learning environment, a true smart campus” (our translation). That is to say, according to the portfolio of products and services offered by the aforementioned corporation, the smart campus is objectified from a convergence of technologies/processes such as IoT, digitalization, automation, datafication, etc., each of which operates (in an integrated manner) in the construction of a smart campus, and the emerging learning environments/models that have come to typify, from a smart perspective, education.

This concept, which aims to redesign educational environments based on the economic and training demands imposed by the digital society, has been applied in public and private institutions in England, Panama, Canada and the USA, as can be seen on the German multinational's website, betting on the integration of technologies that include sensors, AI, decentralized energy systems, big data, cloud computing, and the universe of possibilities offered by smart technologies. This has made Siemens one of the most important business players in building the world map of smart education and in defining a university campus model that responds to the trends and socio-technical demands that typify the most recent version of digital capitalism (Uskov; Howlett; Jain, 2018).

An analogous perspective characterizes the value proposition offered by the Asian company China Mobile, and the way in which it responds to a larger set of factors, to a trans-educational vision of the smartification processes, which aims at the institution of a model of intelligent society designed, in an intersectoral manner, based on smart (see Figure 5).

Figure 5 – 5G applications by sectors and industries (scan QR)



Source: China Mobile (2020).

That is to say, just as it is strategic to highlight that “China Mobile has developed a smart campus solution based on 5G that is based on

three central axes, namely, improving teaching, sharing quality resources and optimizing campus management” (China Mobile, 2020, p. 21, our translation), in similar terms it becomes necessary to appreciate that the framework entitled Jointly building the engine of smart society draws a common horizon outlined by the constitution of a smart society, in which each of the instances, processes and interactions from which a social task transversalized by 5G is constituted, is called to be mediated/configured by the socio-technical processes to which smart aims. Hence, educational initiatives tested by the company in terms of 5G smart classes with dual teachers, 5G cloud AR immersive and interactive learning, 5G remote holographic teaching and 5G safe campus (for example), demand to be appreciated in light of the dense set of socio-technical phenomena that cut across the configuration of a smart society, in tune with the multi-sectoral transformations experienced by digital modernity.

To this end, the aforementioned cases contribute to gauging the role played by economic-business actors in the constitution of a techno-pedagogical ecosystem known as smart education, objectified from a set of technologies, commercial portfolios, educational models, etc., thanks to which it is possible to understand not only the conformation of the global market for smart techno-educational solutions, but also a unique type of society that is objectified, in a trans-educational way, from the reference in question. Hence, examining the emerging network of actors/agendas that energize the smartification educational processes allows us to focus on the connections, on the dense web of techno-economic-educational interests from which the smart educational agenda is objectified, and the complex ways in which 'solutions', singular and interested techno-educational agendas have been produced, which, outlined by the indicated products, portfolios, companies, etc., permeate the constitution of the smart education ecosystem, and what it represents (in trans-educational terms) in the course of the most recent version of digital modernity.

Final Considerations

Having identified some of the most representative academic, governmental and/or business initiatives that stand out when drawing the world map of smart education, it is strategic to point out, in summary, the following considerations:

- 1.- Although the review of the actors and interests examined allows us to agree that the smartification of education operates as a global phenomenon, it is still necessary to underline the centrality of the Asian continent in the configuration of the ecosystem in question, and the corresponding weight exerted by countries such as China in the constitution of the domain in question. Hence the centrality with which institutions such as Beijing Normal University, the ministries of education of China, South Korea and India, and companies such as Samsung, Tencent, Huawei and/or China Mobile appear in the constitution of smart education, without underestimating both the international scope of smart education, as well as the strategic role played by

corporations such as IBM, Microsoft, Cisco, Siemens, etc., in assembling the expansive market for educational solutions described as smart.

2.- Although the mapping of the initiatives examined is favorable for identifying the multiplicity of actors and interests that participate in the development of smart education, the leading role played by technology companies in the dissemination of smart solutions has forced us to pay attention to the emerging power economy in which the centrality acquired by technology companies (big tech) in global socio-technical affairs stands out, and the way in which this manifests itself in the strengthening of a series of phenomena that, articulated with technological solutionism (Morozov, 2013), the corporatization of education (Roberts-Mahoney; Means; Garrison, 2016), and the forging of a monitored education (Amiel et al., 2021), are strengthened as the techno-educational changes aimed at by the smartification of education expand and deepen.

3.- This invites us to examine the network of actors and interests that come together in the smart educational agenda from a critical perspective, in light of the multiple challenges that characterize global work, since smart, the emergence of socio-technical processes of smartification, brings with it a set of new and disruptive phenomena that, in the educational field, demand to be addressed with attention. Therefore, examining the aforementioned network of actors and interests is an initial step, an exercise in academic-intellectual calisthenics that invites us to pay attention to smart education and the way in which it fits into a series of trans-educational phenomena that outline, on a global scale, the forging of a type of education/society configured from the smart.

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Note

- ¹ To advance the understanding of smart education and the set of meanings that refer to a concept typified by being emerging and responding to processes that operate in a trans-educational way, we invite you to review the resources published by the UNESCO Institute for information technologies in education (Unesco IITE) through the web link: <https://iite.unesco.org/theme/smart-education/>.

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