

Information and Communication Technology in Occupational Health: A Literature Review from 2014 – 2022

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Abstract

The purpose of this work was to conduct a systematic search of the literature based on the variables associated with “Information and Communication Technology” and “occupational health” within a range between 2014 and 2022, applying inclusion and exclusion criteria to the various documents obtained from search engines such as Dialnet, EbscoHost, Elsevier, ProQuest, ScienceDirect and PubMed. As a result, 50 articles were obtained referring to the period, language, source of information and contribution in terms of the cognitive, attitudinal and procedural dimensions of the ICT variable that were predetermined for the research. Similarly, it was also possible to gather important information on the cultural dimension of occupational health about risk within the competencies of the public sector and, specifically, within the line of governance. The article selection process followed a Prism diagram, which revealed the totality of articles discarded for not meeting the criteria. Likewise, the descriptive and quantitative methods helped obtain and process data, thus allowing the systematized presentation of results supported by descriptive figures to organize the information dynamically. The findings derived from the study showed that ICTs have undergone a significant evolution framed in the adequacy of the standardization of processes, especially in the field of public service provision that requires the circumstantial improvement of governance at all internal and external levels. Likewise, they provide an improved solution in terms of the occupational health of individuals, specifically in terms of their mental and physical health, being a relevant factor for the improvement of their working conditions through their implementation within the public and private sectors, where they offer a wide range of application.

Keywords: *Information and Communication Technologies, ICT, Occupational Health, Public Management, Governance.*

INTRODUCTION

Information and Communications Technology (ICT) feeds on constant development to promote the integration of processes, people and results in a cycle that is favorable for companies or organizations, regardless of the sector or industry to which they are dedicated, representing circumstantial improvements that have been evidenced over time since its massive adoption in recent years.

However, with the evolution of man, several changes in communication were generated to include information as an alternative to keep

people updated about local events, spreading its concept through the first mechanisms, such as the use of carrier pigeons from the biblical tradition, through the time of the Roman legions in antiquity and even in the wars that took place during Modern Age to allow telecommunications after the creation of wireless telegraphy.

At the international level, ICTs benefit the community, creating opportunities for their targeted applications for healthcare with positive results, especially in disease control and prevention through disease surveillance (Adeola and Evans, 2018). Such ICT

encompasses hardware sensors and software sensing technologies, including web-based microprocessors, integrated circuits, cell phones, and apps. Also, they may include web-based interventions, mobile applications, videoconferencing systems or virtual reality systems and can complement an institution's face-to-face services (Fonseca and Osma, 2021; Thilakarathne, 2021).

In Latin America, around 244 million people (32%) live without internet access (Development Bank of Latin America, 2021). In Peru, the National Institute of Statistics and Informatics (INEI, 2020) reported that, for every 100 households, 95 had at least one ICT in the first quarter of 2020. Likewise, in the business sector, private education (41.5%), information and communication (38.3%) and electricity supply (38.2%) organizations are the ones who invest the most in the use of ICTs. In the case of municipalities, their political and administrative autonomy allows ICTs in their plans under a criterion of use that leads to their development, although sometimes, economic, geographical conditions, and human resource training, prevent their implementation (Núñez, 2018).

In this sense, it is worth highlighting the importance and social relevance of improving the working conditions of people, being this a determining factor in their health, which encompasses risks and prejudices in occupational health, thus allowing to establish a critical point of research interest regarding this topic that has been studied for a long time by international organizations such as the International Labor Organization and the International Standards of Standardization (ISO), on which some certifications are required to companies to ensure the effectiveness of their management and governance in terms of labor.

According to the above, this review article is a substantial scientific contribution that will be aimed at the publication of a national journal to offer new positions and own perceptions from the analysis of the variables mentioned. Because of this, the general objective is to review the literature on information and communication technologies in occupational health from 2014 to 2022.

Theoretical framework or literature review

According to studies from the international arena, Vaquero et al. (2020) developed a study that focused on conducting a data analysis according to the use, application and inclusion of ICT as an alternative for occupational safety for health collaborators, where they concluded, after analyzing the evolution of ICT from 1989 to 2019, that it is essential to incorporate monitoring devices and new technologies among collaborators to avoid health difficulties, given that, it is a group at risk that constantly has complexities in modified behaviors.

Wang et al. (2020) conducted a study that had as a fundamental axis to make a review on the personal use of ICT and its impact on the well-being of employees in private companies where they could prove that ICT influences employees through job autonomy, job demands and linked elements, and also determined factors that moderate the impacts of ICT in work design such as technological-social fit factors and technology-user fit factors. They concluded that the review's findings identify the work design processes that connect ICT and employee achievement of results as the moderating factors.

Marwaa et al. (2020) studied the present and potential use of ICTs to optimize coherent person-based post-stroke rehabilitation based on occupational therapies. Through this, they

found three subcategories of significant and supportive apps in rehabilitation, documentation and communication alternatives. They concluded that ICT is relevant for incorporation in stroke rehabilitation for assessment, compensation of remaining deficits and training.

Vehko et al. (2019) inquired about the elements of electronic health record usability and the elements of nurses' computer competence, where they proved that the factors of electronic health record usability, low support for cooperation and reliability were connected with high psychological distress. They concluded that the lack of reliability and low usability of electronic health records appear significant in terms of psychological distress and time pressure among registered nurses.

Aceto et al. (2018) developed a study to provide information about the linkage of ICT and health, determining ICT-centered health approaches. Their results indicated that emerging applications greatly optimize the effectiveness and efficiency of available healthcare solutions, strongly enhancing cooperation between constituted organizations and decreasing costs. Accordingly, they concluded that, for wellness and health monitoring, the diseases of medication intake are monitored using the applications.

Regarding the theoretical elements that support this work, the effect of ICT is indisputable in today's society since they allow interactivity, data processing and storage, as well as the development of fiber optic networks, 4G and 5G allows real-time interaction and reduces spatial and temporal distances (Yeo and Grant, 2019).

The so-called ICTs constitute an accumulation of technological tools that, under a practical point of view, make possible the recording,

processing, management, transformation, storage, use, visualization and preservation of information, which are increasingly considered essential and have been established as computer networks (Internet, Intranet) that promote numerous applications such as e-mail, chats, distance information, virtual library, among others (Aceto et al., 2018).

Some advantages are the possibility of adequate access to information and the adequacy of technological implementations, considering that technology is constantly evolving, which makes it possible to be in a constant process of innovation for the generation of knowledge, greater breadth and improvement of organizational functionalities. The technological evolution in society is of utmost importance since new and varied technologies are continuously emerging, greatly influencing the accessibility of technology and society (Loukis et al., 2019).

Witnessing profound social, political and economic changes motivated by the deployment of information and communication technologies (ICTs), means witnessing a major technological change brought about by the so-called information society (Magnavita and Chirico, 2020). The so-called information society brings a significant technological change (Magnavita and Chirico, 2020).

Incorporating ICTs into the workplace can be key in increasing competitive capacity, boosting economic development and generating more employment. Therefore, the country's competitiveness and role in the global order will depend fundamentally on its presence in the information society. Within this framework, a significant adaptation effort on the part of companies, workers and public administrations is essential to fully benefit from

the possibilities offered by the new economy (Loukis et al., 2019).

ICTs are novel and creative, providing new communication possibilities and effectively incorporating them into every process. Their characteristics include creativity and innovation because they provide access to new communication possibilities, have a greater impact and usefulness in the labor field, being part of the public and political debate; although their use implies uncertainty, they influence many aspects of social sciences such as sociology, organizational theory of companies and their management (Ifinedo et al., 2020).

From an etymological point of view, supervision implies a notion of global visibility, and leadership is the ability of one person to influence and instill encouragement in another person or group. Surely the supervisor, whatever his rank, in any scenario will not have an easy job managing the various technical and personal contents that are presented daily in the workplace. In conclusion, leadership and supervision constitute two distinct modes of action that complement each other (Butrón, 2018).

Fatal and non-fatal occupational accidents in high-income countries are five times lower than the world average and six times lower for Latin America and the Caribbean. However, in low- and middle-income countries, reliable information on working and health conditions is one of the main obstacles to developing appropriate public policies. As a result, various international health and development programs have identified improving occupational health information systems as a preferred goal (Min et al., 2019).

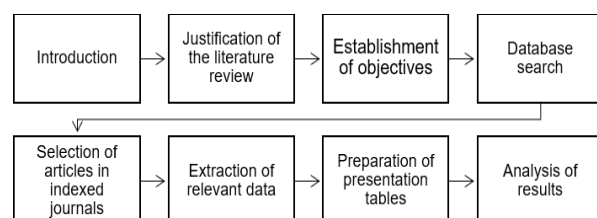
Methods

Regarding this reference, it is mentioned that the characterization given to the study is of a basic type, whose concept is associated with the acquisition of new knowledge based on practice or theory, with the sole purpose of promoting the formation of new practices (Carrasco, 2017). In this regard, the nature of this study was focused solely on the systematic search of the world literature on the variables “ICT” and “Occupational Health” under the precept of obtaining information from other authors and systematizing it; categorized under the descriptive typology, which is supported by statistical tools for the presentation of the results.

Having mentioned the above, the scope was descriptive because it explains the data collected from a research process through the systematic organization and supported by statistics that help in the presentation of the results and subsequent analysis (Baena, 2017).

Following the scientific construct required by the literature review, the procedure is represented in Figure 1.

Figure 1 Research process.



Source: Own elaboration.

The process described in Figure 1 represents the steps followed to obtain the final product, which included a search in verifiable information sources such as Dialnet, Science Direct, Elsevier, ProQuest and EbscoHost, based on the following:

Selection criteria:

Period: from 2014 to 2022.

Language: English and Spanish.

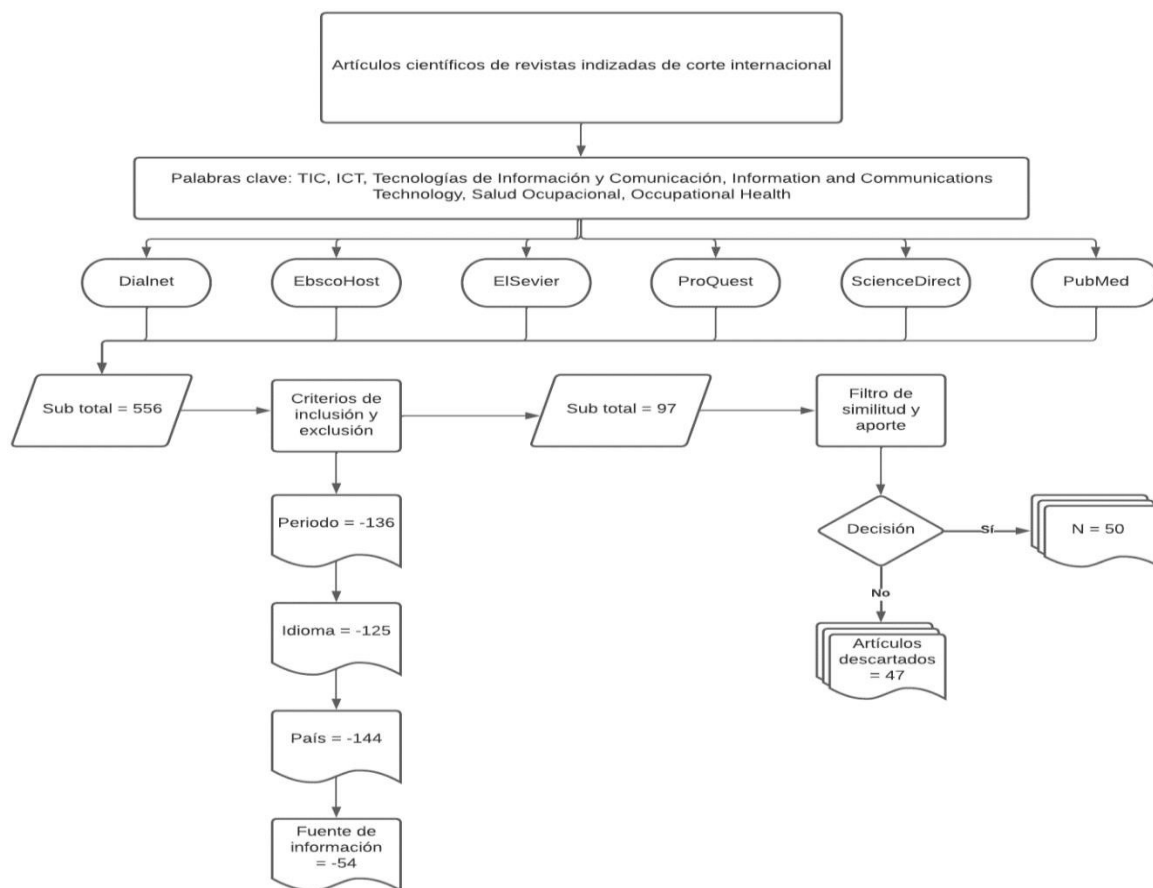
Types of publication: scientific articles indexed in international journals Q1, Q2 and Q3.

Use of keywords: “ICT,” “Information Communications Technology,” “Information and Communication Technologies,” “Occupational Health,” and “Occupational Health.”

Likewise, as exclusion criteria, those that do not meet a criterion of the last seven years are studies in other types of languages other than those mentioned above, lack publication in an international journal with a percentile lower than Q3 and, especially, books or doctoral theses will not be considered for this research purpose.

In this sense, Figure 2 shows the following prism diagram representing the final selection of articles according to the sources of information consulted:

Figure 2 Prism diagram of the literature review



Source: Own elaboration.

Results

About the findings provided by the review of the scientific literature for the mentioned

variables, they have been organized systemically in order to process the data according to criteria of countries, language, periods and sources of information, following

the respective logical process of presentation for the analysis and retrospective regarding the significant contributions of the 50 selected

articles. On this basis, the general matrix of the database is presented below:

Table 1 Database of the analysis process

Nº	Title	Author	Year	Source (Scopus, Web of Science, Scielo, EbscoHost, ProQuest)
1	“Innovation: reflective governance and information and communication technologies (ICT) in Argentine public management.”	Gorrochategui Nora	2015	Dialnet
CONTENT OF THE ARTICLE				
Analysis: provides a retrospective view on “reflective governance,” “e-government,” and “open government” through the inclusion of ICT as a multidirectional mechanism to ensure that workers can participate, in a transparent way, in public management.				
2	“ICTs as a tool for risk management.”	Pasmiño César, Serrano Anita and Gonzalez Martha	2020	Dialnet
CONTENT OF THE ARTICLE				
Analysis: Risk management was planned through ICTs to facilitate the effective management of the incidence of risks. The process required identifying all risks and validating international standards to lead to developing a technological infrastructure plan that included ICTs as a risk prevention tool.				
3	“ISO standards and frameworks for ICT governance . Overview.”	Neighbor Hugo	2017	Dialnet
CONTENT OF THE ARTICLE				
Analysis: refers to all the regulatory protocols and reference frameworks to carry out ICT governance in order to show companies and organizations the appropriate way to align with the requirements and advances of society to make conscious use of technology to seek to formalize their security, quality, risk and operability processes over time.				
4	“New technologies and impact on occupational health.”	Rodriguez Juan	2014	Dialnet
CONTENT OF THE ARTICLE				
Analysis: We came to study all the problems and special needs of workers, which reflected the lack of importance given to the ergonomic conditions on which they perform and that lead to musculoskeletal diseases in industrial areas where companies have not been dedicated to acquiring sufficient technologies to prevent and study the risks that trigger problems in their productivity levels.				
5	“Telework, impacts on the health of human talent in times of pandemic”.	Tejeda Clara and Reyes Luis	2021	Dialnet
CONTENT OF THE ARTICLE				
Analysis: The findings were oriented towards the occupational health of workers within the environment of the pandemic that led to the adoption of telework as a tool generated by ICT to facilitate the development of work activities; however, a rise in ailments such as occupational stress, as well as other musculoskeletal ailments resulting from the hours in front of a computer and the degree of affectation in their mental health.				

6	“Post-new public management, governance and innovation. Three concepts around a form of organization and management of the public.”	Chica Sergio and Salazar Cristian	2021	Dialnet
CONTENT OF THE ARTICLE				
Analysis: As part of a documentary analysis focused on public management, governance and innovation, the concepts that shape the transformation of traditional processes towards using technologies through specific infrastructures to optimize organizations and the flow of activities within the public sector were deepened.				
7	“Use of ICT and its relationship with the work performance of administrative staff in national universities”.	Ticona, Julia	2020	Ebsco
ARTICLE CONTENT				
Analysis: the most common risks were MSDs, visual problems and psychosocial disorders due to work overload, work-family conflict and social isolation. All these factors were also related to time organization, prolonged use of ICTs and lack of space dedicated to teleworking.				
8	“Access, Skills and Constraints of Barangay Officials towards the Use of Information and Communications Technology (ICT).”	Cereneo Santiago, Ulanday Leah, Centeno Zarah and Bayla Cristina	2020	Ebsco
ARTICLE CONTENT				
Analysis: The findings revealed that most barangay officials have access to a personal computer at home and in the office using mobile data and Internet connectivity. The study respondents prefer to use the office computer to access the information they need due to convenience and availability of resources.				
9	“Importance of Generic Skills of ICT Graduates-Employers, Teaching Staff, and Students Perspective”.	Anicic Katarina and Bušeli'c Vjeran	2020	Ebsco
ARTICLE CONTENT				
Analysis: The results of the research show that the generic competencies of ICT graduates are very important; also that the three most important competencies, recognized by the three stakeholder groups, are the ability to acquire new knowledge quickly; the ability to apply knowledge in practical situations; and the ability to identify and solve problems.				
10	“The ethics of occupational health and safety in Turkey: responsibility and consent to risk”.	Artvinli Fatih	2016	Ebsco
ARTICLE CONTENT				
Analysis: the concepts of consent and risk were defined and then the different points of view on responsibility and consent to risk will be discussed. An analysis oriented towards the importance of knowledge of the ethical rules governing occupational health in workers emerged, so that all activities must be duly registered according to their degree of risk and, especially, within the public sector, where sometimes there are not enough technological infrastructures to perform the work effectively.				
11	“Hindrances in the usage of information and communication technology among public and private sector universities”.	Arshad Shandana and Ahmed Hafsa	2016	Ebsco
CONTENT OF THE ARTICLE				

Analysis: The findings revealed important differences between the use of ICT by teachers and students, the main gaps being those related to gender, Age and income level (in the case of teachers), which limited their agility to manage the virtual environment.

12	“The Impact of Mental Representations on ICT-Related Overload in Mobile Phones”.	Saunders Carol, Wiener Martin, Klett Sabrina and Sprenger Sebastian	2017	Ebsco
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CONTENT OF THE ARTICLE

Analysis: Based on the premise that the excessive use of ICT also has disadvantages in terms of the epiphenomenon of work overload, specific affectation in the emotional and cognitive state of workers; this can raise occupational health problems, where the difficulty to recover and effectively process the information that is provided by these technologies, can lead to more important problems within the mental integrity of workers.

13	“Evaluating information technology investments: insights from executives' trades.”	Havakhor Taha, Sbherwal Sanjiv, Sabherwal Rajiv and Steelman Zachary	2022	Ebsco
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CONTENT OF THE ARTICLE

Analysis: The results were based on data on 2,898 publicly announced IT investments from 926 companies during 2002-2016, suggesting that purchase of a company's stock by its top executives prior to a company's IT investment is associated with the long-term effect of the investment on firm value.

14	“Information Technology in Supply Chain Management: A Systematic Literature Review”.	Atayauri Estrella, Grados Evelin and Jara Evelyn	2021	Ebsco
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CONTENT OF THE ARTICLE

Analysis: The results determined a total of 18 articles selected for in-depth analysis. Most of the studies are related to industrial companies located mainly in China.

15	“Information and communication technology (ICT) skills and efficient management of educational resources in public secondary schools”.	Eremie Ibiene and Agi Ugochukwu	2020	Ebsco
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ARTICLE CONTENT

Analysis: revealed that the ICT competencies needed by principals include, among others: knowledge of handling ICT devices, good knowledge of the use of ICT devices in teaching, ICT capacity in teaching, and the ability to use ICT to store and retrieve information.

16	“Controlling petty corruption in public administrations of developing countries through digitalization: An opportunity theory informed study of Ghana customs”.	Addo Atta	2021	Ebsco
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ARTICLE CONTENT

Analysis: Despite countless anti-corruption interventions, including digitization-based efforts, petty corruption in public administrations in developing countries persists, undermining socio-economic development.

17	“The application of information and communication technology (ICT) in elementary mathematics instruction”.	Gabriel Flores	2020	Ebsco
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ARTICLE CONTENT

Analysis: In this work, it was possible to specify all the tools available in digital platforms that help in the exchange between students and teachers, being an alternative to alleviate the impact caused by political, educational and health factors; through a mechanism that can be adapted according to the needs of teachers to impart their knowledge with quality and support material directed towards the accommodation in technological media that can last in time.

18	“Electronic-HRM and Firm Performance: Mediating Role of Information Communication Technology (ICT).”	Altaf Mohsin, Rehman Asad, Sandhu Moeed, Shahidan Athifa	2019	Ebsco
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CONTENT OF THE ARTICLE

Analysis: Electronic Human Resource Management (e-HRM) is considered as a key system to improve the performance of companies. However, the performance of human resource companies, especially in the textile sector in Pakistan.

19	“Cybersecurity in digital justice: recommendations for the Colombian case.”	Marquez Maribel	2020	Ebsco
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CONTENT OF THE ARTICLE

Analysis: The use of ICTs in the justice sector speeds up judicial processes; however, this use also constitutes a risk, since justice is part of the public sector's critical infrastructure.

20	“The impact of information and communication technology (ICT) on tertiary institutions' administration in Nasarawa state. Nigeria”	Dangara Usman	2019	Ebsco
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CONTENT OF THE ARTICLE

Analysis: The results revealed that ICT has a significant impact on school records management, students' academic performance, teachers' job performance and teaching supervision, which are some of the key components and essential parameters for measuring the achievements of tertiary institutions in Nasarawa State.

21	“Mastering Innovations in the Lens of Information and Communications Technology (ICT) Competence and Practices of 21st Century Filipino Teachers: A Comparison among Thailand, Vietnam, and the Philippines.”	Hero Jesson, Zulueta Maria, Gloria Daianne, Tongol Jose, Cruz Aaron, Sagun Angelita, Cajurao Fr and Cabrera Wendell	2021	Ebsco
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CONTENT OF THE ARTICLE

Analysis: The results of the regression analysis of the data revealed that the six dimensions of ICT competence were significantly correlated with teachers' ICT integration practices.

22	“A review of empirical research on ICT applications in teacher professional development and teaching practice.”	Hu Dongpin, Yuan Bei, Luo Jiutong and Wang	2021	Ebsco
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CONTENT OF THE ARTICLE

Analysis: The content analysis of these publications identified a set of specific ICT applications in PD and teaching practice. In addition, it revealed the key characteristics of these ICT applications in terms of their functions, their effects on teaching and teacher development, factors influencing their applications, and existing application problems.

23	“Understanding the Internal and External Communicative Drivers of Organizational Innovativeness.”	Fu Jiawei	2020	Ebsco
CONTENT OF THE ARTICLE				
Analysis: Specifically, the diversity of inter-organizational partnerships fostered managerial innovation but in an inverted U-shape with technological innovation. Effective knowledge sharing through ICT only enhanced technological innovativeness. Combining inter-organizational partnership diversity and EO (i.e., proactivity) enhanced administrative innovativeness.				
24	“Systematizing ICT Education Curriculum for Developing Computational Thinking: Case Studies of Curricula in the United States, Australia, and the United Kingdom.”	Kusaka Satoshi	2021	Ebsco
CONTENT OF THE ARTICLE				
Analysis: This research sheds light on the characteristics of ICT curricula by comparing and contrasting the curricula of the United Kingdom, the United States and Australia. United States and Australia. ICT education is often approached solely from a science and technology perspective; however, a social science perspective is also needed.				
25	“Integration of ICTS and Digital Skills in Times of the Pandemic Covid-19”.	Manco José, Uribe Yrene, Buendia Roberto, Vertiz Jacinto, Isla Sandy and Reginfo Raúl	2020	Ebsco
CONTENT OF THE ARTICLE				
Analysis: The results showed that the level of ICT integration was high (89.9%), as were digital skills (86.9%). Spearman's Rho correlation analysis concluded that there was a positive and high relationship between ICT integration and digital skills (0.761, $p < 0.05$).				
26	“Investigation of Computational Thinking in the Context of ICT and Mobile Technologies.”	Alsancak Didem	2020	Ebsco
ARTICLE CONTENT				
Analysis: Analyses showed that experience with mobile technology differentiated computational thinking skills. Consequently, students with less experience with mobile devices and the mobile Internet had significantly lower computational thinking skills than those with more experience.				
27	“Opinion of ICT coordinators on the incidence of telematic tools”.	Aguayo Beatriz, Molina María and Pantoja Antonio	2020	Ebsco
ARTICLE CONTENT				
Analysis: As the most important barriers, the fact that coordinators believe that teachers do not know how to incorporate ICT into their pedagogical practices - and therefore do not consider them indispensable in their teaching, considering it superfluous or complementary - but not a driver of learning Teachers change their daily practice little or very little, even though their personal lives have undergone changes due to ICT.				
28	“The effect of the application of ICT skills on the process of knowledge management components and the effectiveness of creativity indicators for the improvement of employees'”	Kalashi Maziyar, Bahkshalipour Vahid, Azizi Bisotoon and	2020	Ebsco

	performance system in the Ministry of Sports and Youth”.	Khodaparast Siavash		
ARTICLE CONTENT				
Analysis: The results of this study show that there is a significant relationship between ICT use and creativity. It can be concluded that the development of ICT has created new conditions in the world and has positive effects on behaviors, skills, relationships and social interactions in micro and macro dimensions especially among managers and employees of the Ministry of Sport and Youth.				
29	“Formation and mitigation of technostress in the personal use of it”.	Salo Markus, Pirkkalainen Henri, Huang Cecil, and Kosketainen Tiina	2022	Ebsco
CONTENT OF THE ARTICLE				
Analysis: Researchers have identified high employee dependence or reliance on IT for work tasks as a stressor, but dependence can be especially problematic with personal use. This is because users can easily become dependent (or even addicted) to IT that provides streams of hedonic gratifications and short-term stimulation.				
30	“The influence of information and communication technologies on public participation in urban water governance: A review of place-based research”.	Mukhtarov Farhad, Dieperink Carel, Driessen Peter	2018	Elsevier
CONTENT OF THE ARTICLE				
Analysis: The findings go beyond the organizational support techniques that previous studies of technostress mitigation have focused on. In general, it was observed that most cases fall into two types of interaction between citizens and government, namely, government as a platform, and citizen sourcing.				
31	“ICT, governance and inequality in Africa.”	Adams Samuel and Akobeng Eric	2021	Elsevier
CONTENT OF THE ARTICLE				
Analysis: The analysis shows that a 1% increase in Internet access will reduce inequality by 0.024%, 0.049% and 0.161% at the 25th, 50th and 75th percentiles of democracy at a statistical significance level of 10%. The quality of regulation is evaluated at the 25% (- 0.801), 50% (- 0.421) and 75% (- 0.161). There is also a 1% increase in fixed broadband access, reducing inequality by 0.027%, 0.078% and 0.113% at the 25th, 50th and 75th percentiles of regulatory quality at a statistical significance level of 1%.				
32	“Work-related use of information and communication technologies after hours (W ICTs) and emotional exhaustion: A mediated moderation model.”	Xie Julan, Ma Hongyu, Zhou Zhiqing and Tang Hanying	2018	Elsevier
CONTENT OF THE ARTICLE				
Analysis: the results of the CFA of Study 2 showed that the hypothetical four-factor model (control of work schedule and location, W ICT, work-home integration preference and emotional exhaustion) provided a significantly better fit ($\Delta\chi^2 = 2094.43, \Delta df = 6, p < .01$) than the one-factor model.				
33	“Occupational health and safety in the industry 4.0 era: A cause for major concern?”	Badri Adel, Trudel Byan, Souissi Ahmed	2018	Elsevier

CONTENT OF THE ARTICLE

Analysis: artificial intelligence, big data and other fundamental technological waves were considered as alternatives to strengthen production, but they advise new approaches to the analysis of organizations to better adapt their management practices, including those related to health and safety. It is clear that if the technologies leading to Industry 4.0 are developed and manufacturers' actions in the area of occupational risk prevention remain isolated, manufacturers' remain isolated, workplace risks will double during the transition timeframe and some of the previously improved accident prevention records will be tarnished. Accident prevention records will be tarnished.

34	“Key elements on implementing an occupational health and safety management system using ISO 45001 standard”.	Darabont Doru, Antonov Anca and Bejinariu Costica	2017	Elsevier
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CONTENT OF THE ARTICLE

Analysis: The results showed the need for the application of innovative technologies, continuous improvement, external and internal best practices, recommendations, new knowledge, new resources in order to improve the performance of the ISO 45001 system. The results of the study represent an important working tool for every company, regardless of its size and scope of activity, that is interested in implementing or updating its OSH management system using the ISO 45001 standard.

35	“Creating a Future for Occupational Health”	Peckham Trevor, Baker Marissa, Camp Janice, Kaufman Joel and Seixas Noah	2017	Elsevier
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CONTENT OF THE ARTICLE

Analysis: Other changes linked to climate change, governmental and regulatory restrictions and inadequate control systems challenge and hinder progress and frustrate progress in occupational health, while new biomedical and information technologies increase the possibilities of understanding and intervening to improve workers' health. The concepts and evidence discussed during this project proposed that occupational health training and research be oriented toward a more holistic approach to public health.

36	“Communication Technologies and ECOWAS Regional Integration”.	Veiga Anonino, Vaz Ariana, Monteiro Orisa and Almeida Sara	2018	Proquest
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CONTENT OF THE ARTICLE

Analysis: ICT is a powerful mechanism to strengthen education, namely e-learning, to increase good governance and transparency, and to connect citizens in the region, and these are also the major guidelines of ECOWAS.

37	“Digitalization within the banking system as a continuous challenge”.	Nedelescu Dumitru and Bonita Ilinca	2018	Proquest
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CONTENT OF THE ARTICLE

Analysis: The clear advantages or strengths of the digitalization process in the banking system are the accuracy of the data, an indicator that is self-explanatory, as well as the duration of a process in a matter of time, it is essential to keep this aspect in mind from both points of view: customer - bank. Investing in digital development is therefore a very important element today.

38	“Structural model of sustainable development of information and communication technologies.”	Mata José, Castillo Fernando and Hernández José	2021	Proquest
CONTENT OF THE ARTICLE				
Analysis: At the corporate level, the sustainable deployment of ICT (Y2) is a complex issue because it requires good planning and the cooperation of workers. According to the results achieved, companies do not plan DSTIC, whose choices are based on how to reduce operating costs and not on the benefits for the external environment; the modernization of equipment has occurred because the technology itself demanded it and not because they have an initiative for the improvement of the environment.				
39	“Physiotherapists' and occupational therapists' perspectives on information and communication technology in stroke rehabilitation.”	Marwaa Mille, Kristensen Hanne, Guidetti Susanne, Ytterberg Charlotte	2020	Pubmed
CONTENT OF THE ARTICLE				
Analysis: Three subcategories emerged from the analysis of the participant interviews: 1) ICTs and apps as fundamental and supporting components in the rehabilitation process, 2) ICTs as elements of communication and documentation, and 3) difficulties in incorporating ICTs and apps in the rehabilitation process. From these categories, a central category emerged: the role of personalized apps to favor a coherent and person-oriented rehabilitation.				
40	“The impact of information and communication technology on public governance and corruption in China”.	Lee Ming and Lio Mon	2014	Research Gate
CONTENT OF THE ARTICLE				
Analysis: ICT had a significant and positive effect on the performance of China's provincial governments. The higher the ICT penetration, the better the governance score. The Chinese administration is fully committed to the development of ICT infrastructure, with the illusion of reaping the economic benefits of ICT. On the other hand, the Chinese government is also investing a great deal of resources to control the dissemination of information online.				
41	“Sustainable Information and Communication Technology (ICT) for Sustainable Data Governance in Nigeria: A Narrative Review.”	Aguboshim Felix, Ezeasomba Irene and Ezeife Joy	2019	Research Gate
CONTENT OF THE ARTICLE				
Analysis: It was evident that ICT projects in Nigeria failed, despite great enthusiasm and optimism and the global ICT trend and its relevance to the SDGs. Notwithstanding, these global ICT trends, the adoption of technological solutions in Nigeria has remained relatively slow because of corruption, ignorance, illiteracy and a poor economy				
42	“Does ICT Use matter? How information and communication technology use affects perceived mattering among a predominantly female sample of older adults residing in retirement communities.”	Francis Jessica, Rikard R, Cotten Shelia and Kadylak Travis	2019	ScienceDirect
CONTENT OF THE ARTICLE				
Analysis: The findings showed that the sample was predominantly white and female and, as research indicates, older women generally socialize more with others and have larger social networks than older men. The results obtained in the longitudinal and correlation analysis demonstrate that using ICTs to enhance social ties presents a significant and positive relationship with relevance.				

43	“The use of information and communication technology in healthcare to improve participation in everyday life: a scoping review”.	Zonneveld Michael, Patomella Ann, Asaba Eric and Guidetti Susanne	2020	ScienceDirect
CONTENT OF THE ARTICLE				
Analysis: A total of eleven studies were selected. The most commonly used technologies were videoconferencing and telephone. Ten of the 11 studies reported increased activity in daily life. Participation was considered primarily as intervention in a given life circumstance or in relation to daily living needs. An intervention to increase participation by means of information and communication technologies may be a valid alternative for readaptation. In future studies, the intervention and its outcomes should be evaluated and detailed in terms of a definition of participation.				
44	“Digital transformation: The role of computer use in employee health”.	Dengler Katharina, Hiesinger Karolin and Tisch Anita	2022	ScienceDirect
CONTENT OF THE ARTICLE				
Analysis: Similar results for high Internet use indicate that not only computer use, but also the use of information and communication technologies (ICT) in general drive significant correlations with health-related outcomes. With the increasing digitization of work, the focus of occupational health care is geared towards mental stress preparedness. Training of employees and managers can contribute to improving their occupational health, but the working circumstances in companies are determinants for the physical and mental health of employees.				
45	“New digital technologies and heterogeneous wage and employment dynamics in the United States: Evidence from individual-level data.”	Fossen Frank and Sorgner Alina	2022	ScienceDirect
CONTENT OF THE ARTICLE				
Analysis: They suggest that a higher level of formal education allows workers to pursue more diverse labor mobility strategies, such as changing occupations or becoming self-employed, compared to individuals with lower levels of formal education. In contrast to earlier automation, highly skilled individuals are the most affected by labor displacement and reemployment technologies. Major efforts are needed by policy makers to facilitate the integration of workers of all skill levels of workers of all skill levels.				
46	“Evolution of working conditions under the impact of ICTs”.	Héry Michel, Malenfer Marc, Devel Stéphanie and Levert Catherine	2021	ScienceDirect
CONTENT OF THE ARTICLE				
Analysis: It became evident that the automation of the production process is a way of eliminating hazardous work, removing workers from risky tasks in which they can be injured or poisoned. From the various examples described, it is clear that the primary concern is to make the most of the possibilities offered by ICT and to channel the negative effect on employees.				
47	“How information and communication technology drives (routine and non-routine) jobs: Structural path and decomposition analysis for China.”	Niu Meng, Wang Zhenguo and Zhang Yabin	2022	ScienceDirect

CONTENT OF THE ARTICLE

Analysis: The paper contributed by providing empirical evidence from China. On the one hand, existing studies treat ICT as a homogeneous whole and cover the different roles played by different ICT sub-sectors (i.e. ICT manufacturing and ICT services). There are obvious heterogeneities between ICT manufacturing and ICT services. On the other hand, we also fail to uncover the mechanism underlying the dynamic employment effect. The framework of this study can also be applied to the study of the relationships between ICT and non-ICT sectors in other countries, as well as to the study of how their ICT drives the formation and change of embedded routine/non-routine jobs.

48	“Socio-technical e-learning innovation and ways of learning in the ICT-spacetime continuum to improve the employability skills of adults”.	Martinez Juan, Torrent Joan and Gonzalez Ines	2020	ScienceDirect
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CONTENT OF THE ARTICLE

Analysis: The relevance of making the two basic dimensions of employability, economic and social, compatible in the design of government employment policies in the field of adult learning became evident. The relevance of taking advantage of new digital learning tools was also confirmed, as continuous mobile learning, ICT for pedagogical practices and the polychronic and multitasking use of ICT are also relevant latent elements.

49	“Technostress operationalised as information and communication technology (ICT) demands among managers and other occupational groups - Results from the Swedish Longitudinal Occupational Survey of Health (SLOSH).”	Satadin Magdalena, Nordin Maria, Brostrom Anders, Hanson Magnusson, Westerlund Hugo and Fransson Eleonor	2021	ScienceDirect
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CONTENT OF THE ARTICLE

Analysis: ICT demands were analyzed based on a six-item Likert scale as the main measure. “Managers” (varying (from different sectors and positions) compared to “non-managers”, including nine occupational groups separated by sector and educational level, showed the highest prevalence (74.7%) of ICT demands.

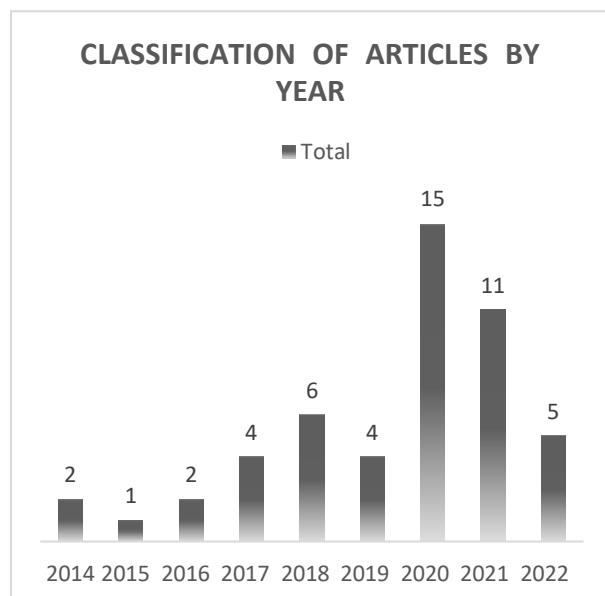
50	“The role of Information and Communication Technologies in healthcare: taxonomies, perspectives, and challenges”.	Aceto Giuseppe, Persico Valerio, Pescapé Antonio	2018	ScienceDirect
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ARTICLE CONTENT

Analysis: The main ICT-based healthcare paradigms that have emerged in recent years driven by the evolution of ICTs were characterized. By analyzing the scientific literature, we also identified the technological pillars underpinning the new applications driven by these technological advances. Similarly, the analysis of a series of application scenarios that are gaining momentum thanks to the beneficial impact of ICTs was carried out.

Consequently, the results are presented by year consulted according to the following figure:

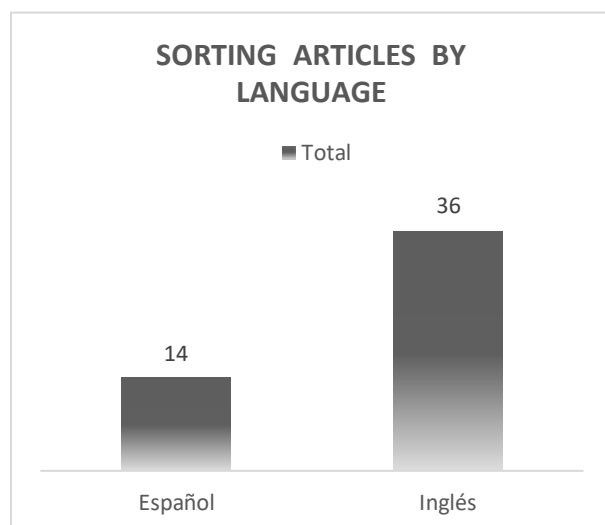
Figure 3 Classification of articles by year



Source: Own elaboration.

Figure 3 shows the distribution of the articles consulted for each year, where those from the year 2020 stand out (30% of the database), followed by 2021 (22%), while the rest of the information was distributed, to a lesser extent, between the years 2014 and 2022.

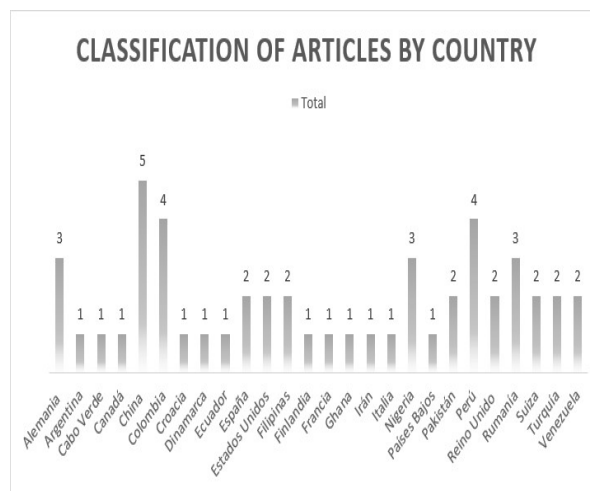
Figure 4 Classification of articles by language



Likewise, concerning the distribution by language, which was another of the criteria for inclusion in the study, the predominance of

articles from the English language stands out, which represented a total of 36 articles (72% of the database) and, in addition, the Spanish language accounted for 14 articles.

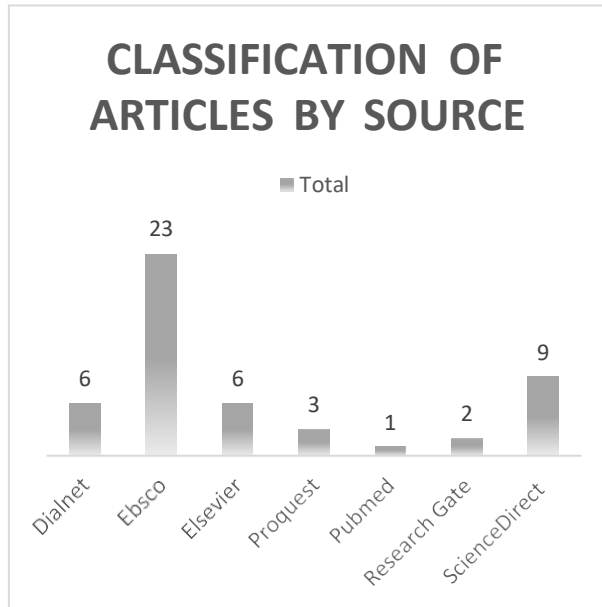
Figure 5 Classification of articles by country



Source: Own elaboration.

Continuing with the classification by country, the predominance was found in the Asian continent, specifically in China, with a percentage representation of 10%, followed by Latin American countries such as Colombia and Peru, whose percentages represent a total of 8% each, as well as, to a lesser extent, other countries such as Germany and Romania, where sufficient empirical evidence was found regarding the studied variables “ICT” and “Occupational health.”

Figure 6 Classification of articles by source



Source: Own elaboration.

Finally, in the classification of the articles by the source of information consulted, those from EbscoHost stood out, with a total of 23 articles (46% of the database), followed by nine articles selected from ScienceDirect (18%) and, for sources such as Dialnet and Elsevier, their percentage was 12%, respectively.

Discussion

The process of articulating the information from studies such as Rodriguez (2014) exposes the various pathologies that employees may suffer in their work environment as a result of the inadequate management of their managers and the lack of investment in the latest technologies to facilitate the performance of their tasks; causing not only musculoskeletal disorders but also the risk of stress and other occupational diseases that are the responsibility of companies since they must be guarantors of the physical and mental integrity of their workers.

The study of risks is a responsibility of companies that, Artvinli (2016) details incisively, seeking to create awareness about

the dimensions of occupational health, such as risks and diseases that collaborators may suffer according to their economic activity, which is why it is required to maintain permanent surveillance on indicators of incidents and accidents to generate a record of lessons learned and, based on this, design strategic plans that are supported towards continuous improvement, as well as the preservation of the most important assets of companies and organizations; their workforce.

In this sense, ICTs take on a fundamental relevance that Ming and Mon (2014) point out in their study, given that, according to their findings, they allow them to have control over the governance of all their processes; This can also be contrasted with the study by Gorrochategui (2015), complementing the fact that management, especially in the public sector, can be transformed circumstantially through the implementation and updating of its technological infrastructures, which demand constant adaptations according to the social environment where governance tasks are performed.

On this referent, Dangara (2015) was in charge of validating the cognitive and attitudinal dimensions of ICT in a sample group of 127 workers of tertiary public institutions, where he correlated the impact of ICT for the administrative performance of such collaborators employing a Pearson parametric test, whose results evidenced a statistical and significant relationship that included a circumstantial improvement in the working conditions when the improvement in the technological infrastructures associated with ICT was carried out.

Similarly, Saunders et al. (2017) in Germany highlight that the epiphenomenon of ICT-related overload can accompany information

and communication technologies (ICTs) or the emotional and cognitive state that occurs when individuals cannot effectively retrieve and process information delivered by or associated with these technologies. While other research tends to attribute this phenomenon to the amount of information delivered, this study provides important empirical support for an extended cognitive perspective of ICT-related overload, which views individuals' ability as dependent on differences in mental representations associated with cultural, demographic, and experiential factors. Specifically, the contributors analyzed experience less ICT-related overload, and emotional and cognitive memories increase ICT-related overload. Finally, they include that Age has important effects on the different dimensions of overload.

Taken together, the findings challenge myths about information overload and multitasking, as they support a conceptualization of ICT-related overload and suggest ways managers can reduce overload and take advantage of the ease of multitasking without incurring occupational risks.

Finally, Vecino (2017) provides the regulatory framework that responds to the procedural framework of ICT, where he mentions that there are international standards, such as the ISO 27000 series, to ensure the governance of ICT, seeking to demonstrate a way for companies so that they can align corporately to their mission in terms of quality, safety and occupational health, as well as strategic process management and support. In this regard, the general topic of the work sought an approach to ICT to generate sufficient data that management can process and improve assertive decision-making on a standard already accepted in more than 150 countries worldwide.

Thus, using ICTs can reduce inequalities between countries since, according to Adams and Akobeng (2021), they provide governance indicators for processes of democracy, regularization, the rule of law and political stability. For this reason, having state-of-the-art technology systems in terms of internet (broadband), cell phone subscriptions, and others helps to mitigate communication problems and speed up information processes in a globalized manner, especially in undeveloped countries.

Conclusions

The conclusions derived from the in-depth analysis of the literature review facilitated the experience of having a wide range of data on the variables, on which it was necessary to apply inclusion and exclusion criteria to select a total of 50 articles that were synthesized and presented in a systematic way for the articulation of good positions that will allow future studies or application of constructs on a natural contextual environment.

Thus, the results derived from the cognitive, procedural and attitudinal dimensions show that ICTs have an influence on workers that help manage governance processes in the performance sectors, which may be public or private, and that, as long as the appropriate technological infrastructures are in place, it is possible to speed up the performance levels of these collaborators. For this reason, the procedural dimension is fundamental in the updating and continuous improvement based on international standards that allow the certification and generation of new procedures adjusted to the constant changes of society.

Finally, the results of the review of the literature on the cultural dimensions of occupational health were directed toward the obligation of organizations to identify the risks

that may occur to workers at a physical or mental level so that these are recorded, controlled or mitigated effectively; supported by updated strategies or plans and supported by technologies that speed up response times. This is why a gap still needs to be deepened or closed by including ICT in all organizations' strategic, critical and support processes.

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