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The Role Of Modern Communication Technology In Reducing School Circumstantial Problems During The COVID-19 Pandemic

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Abstract:

Many studies and reports in recent years have demonstrated the importance of ICT in education ", where UNESCO has identified it as an essential tool for disseminating knowledge in societies and its adoption in the educational system helps to improve the quality of education, Schools use means of communication to communicate, disseminate, store and manage information, Achieving the principle of interactive education by replacing chalk panels with smart panels, for example Students use their smart phones to learn, and to achieve this possibility of distance learning, which helps educational institutions, including the school, to consider them among the most important institutions of socialization in controlling and reducing the circumstantial problems they face. The Algerian school is not isolated from such problems and this is what I emphasized in the current health crisis. We will address in our study alongside modern communication media the role they play in confronting exceptional circumstances under the COVID-19 pandemic

Keywords: Modern Communication Technology, Situational Problems, COVID-19

1. Introduction

The rapid and increasing development of modern information and communication technologies and their intensive use have created new patterns of interactions in daily life, including technology-based education. Today, distance learning has become an essential tool in addressing and meeting the challenges facing contemporary education, within a technological learning environment that encompasses a wide range of tools and techniques. The technological learning environment is integrated and global, allowing both learners and teachers to engage with developments from other countries. The massive technological advances in information and communication technologies, especially with the rise of the Internet, have created a vast electronic environment from which many institutions, particularly educational institutions and information centers, have benefited. This has provided researchers and students with a wealth of easily accessible, highly beneficial, and diverse resources, making open e-learning a reality available to almost everyone.
What role do modern communication technologies play in reducing situational school problems during the COVID-19 pandemic? To answer this question, the following elements were addressed:

- The concept of modern communication technology
- The concept of educational technology
- Distance learning during COVID-19
- The adaptation of Algerian educational institutions to distance learning during the Corona crisis

2. The Concept of New Information and Communication Technology:

Technology: The concept of technology has garnered significant attention from many researchers, and its meanings have evolved with the development of human needs and specialized, diverse daily practices. As a result, researchers and thinkers have defined it in various ways, generally taking two directions: the first is specific to the industrial world and its material products (technology associated with the industrial revolution, used to improve production and productivity), and the second is broader, encompassing any knowledge application in any field and location. The term "technology" refers to multiple meanings. In the context of manufacturing, it refers to the technification of production tools, meaning making them technical (technological), whether in agriculture, industry, or communication tools. It also refers to the organized knowledge related to scientific principles, discoveries, industrial processes, and scientific theories that form part of the culture of a developed society, which is a continuous process (Ghoneim, 2008).
Thus, the term technology includes the applied processes of scientific foundations in industry, agriculture, services, administration, and organization, among others, and the methods humans use to develop and enhance tools and production methods. According to some sources, the first appearance of the term "technology" was in Germany in 1770. It is composed of two parts: *techno*, meaning "art" or "handicraft" in Greek, and *logy*, meaning "science" or "theory." The

combination of these two parts yields the meaning "the science of handicrafts or applied science." There is no original equivalent for this term in Arabic, so it was Arabized by transcribing its pronunciation (تكنولوجيا: technology).
Technology is defined as "the systematic knowledge of techniques, encompassing the scientific and technical knowledge that must be controlled in order to shape objectives. Technology evolves in line with science and techniques, as they are interlinked, and it spreads through normal flow or imitation" (Sifon, 2016). Consequently, technology has three dimensions:

- The equipment and machinery used by humans, also known in informatics as hardware.
- The knowledge, ideas, and methods that enable the use of this equipment and machinery, also known in informatics as software.
- It is a spatiotemporal product, meaning it does not exist in isolation from its environment and its situational constraints (Delio, *New Information and Communication Technology*, Algeria).

Technology has similar terms, including **technique** or **technical method**, which refers to the manner or method of accomplishing tasks and performing actions. For example, animals have an innate technique for building nests and hunting prey.
Technique: "It is the method of action, a way, means, or embodied act through the specific combination of elements (knowledge resource, labor movement, etc.) that allows the transformation of raw materials into a product. Technique works by blending knowledge elements specific to a particular field to form the final product" (Sifon, 2016).
André Siegfried defined it in the *Dictionary of Sociology Terms* as "a set of procedures based on reason, but tested through practice, and which have become the collective property of civilization. Through these procedures, we use tools effectively to achieve the desired goals" (Feriol, 2011).
A term close to **technology** is **science**, since the inventors of various technologies may be referred to as scientists, craftsmen, inventors, or experimental technicians.
Media: It is difficult to define a precise concept of media without linking it to the nature of the society it is directed towards, along with all the political, social, and economic components of that society. Media can be defined as "the main means of communication between people, established through predetermined goals, meticulously planned to inform about what is happening in a specific area through various types of news, education, entertainment, and fulfilling their desire to understand the surrounding phenomena" (Kandilji, 2015).
Communication: The word "communication" is derived from the Latin root **communis**, meaning common, public, or spreading through the sharing of information, ideas, and attitudes with another party. Many specialists have provided definitions of communication, including:
Cooley's Definition: Sociologist Charles Cooley defined communication as "the mechanism through which human relationships exist, grow, and develop. Mental symbols are shared through the means of spreading these symbols across space and their continuation through time. This includes facial expressions, gestures, signals, tones of voice, words, printing, railways, telegraph, telephone, and all those devices that work quickly and efficiently to conquer the dimensions of time and space" (Kafi, 2015).
Talking about communication as the connection between society and a fundamental link between individuals and institutions has become commonplace. Although communication may seem intuitive and automatic, without considering its social significance, this apparent spontaneity hides the complexity of a social process. Communication does not merely involve "who says what"; there are other dimensions, such as the level of communication, the style and performance of communication, and the functions communication achieves. In other words, it is impossible to imagine a society without communication, or effective social engagement without communicative relationships. Norms, values, cultural content, social education processes, and relationships—essential elements in the existence and life of any society—cannot form and grow without communication.
"No group can emerge or continue without communication or interaction between its members to achieve social integration. Communication is a fundamental need for human societies, and every society, regardless of its level of development or primitiveness, must have a communication system" (Al-Ula). Therefore, communication is a continuous process in both time and space, a complex phenomenon that cannot be viewed through a single linear lens. Today, this process is largely controlled by the technological tools represented by information and communication technology.

2.1. Information and Communication Technology (TIC):

It is worth noting that this concept is not singular in meaning or specialized to one field; it is of interest to several disciplines: mathematics, computer science, communication, literature, sociology, psychology, telecommunications engineering, and philosophy. The concept first emerged in the 1980s in the United States under the term **Information Technologies**, resulting from the integration of computers with telephone lines. Later, in Japan, it appeared as **Computer and Communication**, and in Europe as **Telecommunication and Telematics** (telecommunication and computer science). Finally, influenced by media and communication sciences, it became known in Europe by the current term **TIC** (Information and Communication Technology). The term **Information Technology** was first used by Americans in 1984,

and they typically do not add the word "communication" to it, as most of them, unlike Europeans, believe that information encompasses or is equivalent to communication.
According to the official approaches of two international organizations—the United Nations and the Organisation for Economic Co-operation and Development (OECD)—the concept of **Information and Communication Technology** refers to "electronic means that transmit, store, process, and disseminate information."
It is important to emphasize again that this concept is of interest to various fields: mathematics, computer science, communication, literature, sociology, psychology, telecommunications engineering, and philosophy. It originated in the 1980s in the United States as **Information Technologies**, emerging from the integration of computers with telephone lines. In Japan, it was termed **Computer and Communication**, and later in Europe as **Telecommunication and Telematics** (telecommunication and informatics). Eventually, due to the influence of media and communication sciences, the term **ICT** gained widespread usage in Europe. The term **Information Technology** was first used by Americans in 1984, and they often omit the word "communication," as most Americans view information as inherently including communication, in contrast to the European perspective.
The official definition of **Information and Communication Technology**, according to international organizations such as the United Nations and the OECD, refers to "electronic means for transmitting, storing, processing, and disseminating information."

2.2. New Information and Communication Technology (NITCTs/NTICs):

When specifying the concept of "Information and Communication Technology" and linking it to the term "new," it refers to a more modern, communication-based subject that is connected to a new information revolution in a well-defined, contemporary era, characterized by new electronic communication tools and techniques. The distinction between Information and Communication Technology and New Information and Communication Technology lies in the fact that the former includes pre-electronic media, such as newspapers, magazines, radio, and television, while the latter refers specifically to electronic media such as radio, television, and the Internet.
Because New Information and Communication Technology is flexible and constantly changing, some researchers have categorized and specified its tools as follows: communication satellites, personal computers, television sets, videotex, teletext, coaxial cables, fiber optics, various types of video discs, email, the Internet, remote conferencing, and more.
Moreover, it "combines three technical fields: telecommunications, audiovisual media, and computer science. The intersection of these fields results in Telematics (remote computing), and their integration creates Multimedia communication tools, requiring electronic components and electrical power for their use" (Delio, 2014). Some of its key features include:

- It integrates three technical fields: telecommunications, audiovisual media, and computer science.
- It has dissolved the boundaries between writing, sound, and images, thanks to the Internet and multimedia capabilities.
- It has made information, in all its verbal and symbolic forms, accessible to everyone to varying degrees.
- It is characterized by speed in processing information and the vast storage capacities of information processing systems.
- Its use has led to a reduction in the cost of receiving, processing, storing, and transmitting information.

Finally, it is worth noting that these new information and communication technologies are also referred to by other terms, such as digital technologies, instead of "new," as they represent the integration of three major technologies: telecommunications, media, and computer science, which were previously evolving independently and in parallel.
Other similar concepts include Information Technology (IT), Information, Communication, and Knowledge Technology, New Media, Digital Media, or Electronic Media, and Digital Communication.
Information Technology (IT/TI): This refers to the process through which information is produced, collected, distributed, received, stored, retrieved, processed, and classified using appropriate technological tools, such as electronic computers and modern communication devices.
The set of tools that assist in handling information through preparation and data processing includes software, operating systems, word processing, and considering inputs and outputs. It refers to the total equipment and technologies used for gathering, processing, and classifying information in various ways, such as printing, CDs, audio, and audiovisual tapes, and retrieving them through specialized devices when needed (Qasimi, 2017). This concept is commonly used in the field of library and information science, with some researchers limiting it to modern technologies, defining it as: "a mixture of computers and communication means, starting with fiber optics to satellites, microfilm technologies, and reproduction."
Others blend equipment and the knowledge they provide, defining it as "a set of accumulated and available knowledge, experiences, skills, tools, material, organizational, and administrative means used by humans to obtain verbal, visual, digital information, process, transmit, and store it to facilitate access and exchange and make it available to everyone."
These technologies include:

- Electronic computer technology
- Wired and wireless communications
- Audiovisual technology
- Printing

All these technologies are part of information technology, feeding into several technological streams such as:

- Computer hardware equipment or hardware technology
- Automatic control
- Communication technology
- Computer programs
- Knowledge engineering
- Software engineering (Sifon, 2016)

Information, Communication, and Knowledge Technology (TICC): This technology adds the concept of knowledge bases and knowledge management, as well as information and communication technologies in education (Delio, New Information and Communication Technology, 2014).

New Media: New media refers to information and media that are transmitted electronically using the Internet or one of its services. It is "media that deals with public opinion, information, news, experiences, images, and video clips that are electronically published by independent individuals, not subject to any political system or others, except for the personal commitment of the individual to the values and principles they believe in and according to their self-monitoring" (Belkhiri, 2014).

New media includes:

- Blogs and microblogs
- Social networks like Facebook and Twitter
- Image and video websites like YouTube
- Electronic journalism

It has several synonyms, including: alternative media, social media, interactive media, digital media, electronic media, automated media, networked media, popular media, community media, citizen journalism, and others.

New media can be divided into four main sections:

1. Internet-based media and its applications.
2. New media based on portable devices, including book and newspaper readers.
3. Media based on traditional platforms such as radio and television, with added new features.
4. New media based on computer platforms, either shared online or through different storage devices, including visual presentations, video games, e-books, and others (Others, 2014).

Electronic (Digital) Media:

Electronic media emerged spontaneously following the stages of development of the global information network (the Internet) and the increasing use of its services. The emergence of electronic media included the rise of several electronic newspapers and magazines, forming a new media phenomenon tied to the information and communication technology revolution. This was followed by the appearance of electronic applications and blogs, opening numerous avenues for the public, as they became new, fast-spreading, and low-cost media tools.

Electronic media relies on a new medium of modern media, which integrates all traditional media to deliver content in more distinct and impactful ways. Thus, it can be said that electronic media is a new form of media, sharing the general concept, principles, and goals with traditional media but depending on a new medium. Electronic media represents new media services and models that allow the creation and development of media communication content, either automatically or semi-automatically, within the media process. This is achieved using modern electronic technologies, resulting from the integration of telecommunications technology and information technology as rich media tools in both form and content. This integration includes signals, information, images, and sounds.

Therefore, electronic media can be defined as a new type of media that operates in the virtual space, using electronic media as its tools. This type of media is managed by governments, institutions, and individuals with varying advanced capabilities and features the following characteristics:

- Speed of dissemination
- Low cost
- High impact

Another definition was reached by a team of experts assigned to study electronic media under the Arab League and its Permanent Committee on Arab Media, which is one of the organizational structures of the Council of Arab Information Ministers. They defined it as: "new media services and models that enable the creation and development of media communication content, automatically or semi-automatically, in the media process, using modern electronic technologies resulting from the integration of communication and information technology as rich media carriers in terms of form and content" (Kandilji, 2016).

The emergence of the Internet—and consequently electronic media—has imposed a completely new reality. It is not merely an evolution of previous media but rather a medium capable of encompassing what came before. Thus, many forms of media have emerged, such as:

- Electronic journalism

- Electronic visual, auditory, and written media
- The integration and overlap of these forms

This has resulted in diverse and varied media formats and templates, whose possibilities are vast and unpredictable, both currently and in the future. It has become possible to use mobile phones to broadcast entertainment and news channels. Additionally, mobile phone networks and the Internet have been developed to allow website browsing via mobile phones, with speeds and quality that rival browsing on computers.

Digital Communication:

Digital communication is the fundamental skill for most tasks that individuals must acquire in terms of the concepts of production, transmission, and reception of communication tools in their jobs and lives. Digital communication refers to the ability to create effective communication through various digital means (Hamed, 2015).

It is also defined as: "communication that uses electronic means to exchange verbal, written, and visual messages. Digital communication has the ability to expand across space and time more than any other form of communication, as it opposes the idea of monopoly and encourages expansion, participation, and the exchange of oral and written cultures" (Qasimi, 2017).

3. Definition of Educational Technology:

The concept of educational technology can be defined as the process of utilizing scientific knowledge and research methods in the planning, implementation, and evaluation of individual educational system components, as well as the system as a whole, with its interconnected relationships. The goal is to achieve specific behaviors in learners, using both humans and machines as tools.

Charles Hobel sees educational technology as an integrated system that includes humans, machines, ideas, opinions, methods of work, and management, all working together within one framework. Educational technology also refers to the preparation of educational materials and programs and the application of learning principles to shape behavior in a direct and intentional way. Some scholars emphasize the importance of the educational curriculum and its primary role in clarifying educational technology. The U.S. governmental committee has defined educational technology as the tools that emerged as a result of the communication revolution, which can be used for educational purposes and as a method to design and implement comprehensive teaching and learning based on goals.

The term educational technology is a Western concept that entered the Arab world and became widely known as educational technology.

Educational Technology:

The relationship between communication, its technological means, and education is so strong that some researchers argue that educational processes, in their aspects, are communicative processes. Others say that education is fundamentally a communication process. The shared functions between them are that both deal with society and aim to serve it. Educational technology is the science of shaping humans and focuses on designing data or conditions according to scientific knowledge about human behavior, with the aim of building or forming desirable social and psychological personalities. Despite the variety and diversity of educational technologies, what distinguishes them is that they are programs for work and practice whose components are systematically chosen and arranged in light of a knowledge system with an acceptable degree of scientific validity.

The importance of modern communication technologies in education and learning lies in the following:

- They satisfy many student needs and stimulate their interest in study subjects. They also offer new avenues of knowledge and encourage the use of scientific thinking to solve problems, improving student performance as part of enhancing the quality of learning through technology.
- The diversity of technological tools used in the educational process provides a broader range of enriching experiences. It also avoids excessive verbalism, leading to more effective and lasting learning.
- It promotes diverse reinforcement methods, solidifying correct responses. Examples include programmed learning through language labs that teach correct pronunciation, or the use of films to answer questions, or using computers and the internet.
- Preparing educational or informational material and presenting it through closed-circuit television within educational institutions, in a logical and sequential manner, helps students organize their thoughts and better understand the educational material.
- The use of technology, along with its accompanying visual, auditory, and aesthetic effects, as well as modern production methods, leads to behavioral changes and the formation of attitudes that align with societal changes (Al-Hashimi, 2014).

3.1 Related Concepts:

E-Learning During COVID-19: Related concepts: Virtual or electronic education or distance learning, hybrid education...

E-learning: The term e-learning refers to the use of electronic means in the education system, regardless of its field. Many researchers use the terms education and learning as synonyms with each other, and some of them indicate that the most common and accepted term for this new form is the term e-learning and not the term (e-éducation).The reason for this is that control or control over the education process itself has shifted from the hands of consumers as individuals, whether they are students, pupils or trainees. Distance learning (Learning distance) represents in essence an innovative type of self-service that the beneficiary obtains through his own efforts without assistance from its provider except within very narrow limits. Researcher believe that there are several differences between the terms education and learning, which can be explained as follows:

Education educatoin: refers to the process of transferring information through the educational and cognitive curriculum by an experienced person (the instructor and teacher) to one or more people (students) who need to receive that information, meaning that the term e-learning refers to the use of electronic means of various types by the teacher (the instructor) in order to deliver the scientific material to the students. Majd Hashem Al-Hashemin, Educational Communication Technology, Dar Al-Manhaj for Publishing and Distribution, Amman, 1st ed., 2014, p. 180.

• Learning: refers to the process of obtaining information, whether through self-effort or by receiving it by relying on others, which means that the term e-learning will refer to the use of electronic means of various types by the learner in order to obtain and understand the scientific material / Ziad Hashem Al-Saqa, The Role of E-Learning in Increasing the Efficiency and Effectiveness of Accounting Education, Algerian Institutions Magazine, Issue 02/2012, p. 47

In recent years, a large number of different and varied concepts and terms have emerged that are related to the content of e-learning. Among these concepts and terms are the following:

• Correspondence education: It is concerned with the first applications applied to informal education through the use of postal services to overcome long distances.

• Distance education or distance learning: It is mainly used through the application of modern information and communication technology and is linked to the extent of interaction of education experts in advanced technological fields in transferring appropriate educational materials.

• Distance teaching and learning or distance learning university: These are all terms related to the use of television in education and face great competition from the use of digital and visual technologies emanating from modern information and communication technologies.

• Open education: Which is available through specific channels and is based on cooperation and coordination between the provider and participants in this type of education.

• Shared or cooperative education: Which is based on educational participation between advanced technology specialists, teachers and learners in creating a learning environment.

• Global education: Which is based on the vision of the unity of education at the global level for the purpose of the common civilizational progress of humanity.

• Virtual education: It expresses an integrated approach to advanced technology such as the Internet, and represents a new typical concept in which the natural distance and the need for synchronization are shortened, and this new model is affected by reducing the boundaries and disparity between the types of education systems in the primary, preparatory, secondary, technical and higher stages.

• Virtual school: It represents a type of the previous concepts and this concept is considered the most widespread at the present time as it meets the needs of the traditional school in providing new educational services and provides advanced educational formulas linked to learners/Mohamed Mohamed El Hadi, Digital and Visual Technology, Seventh Scientific Conference on Information Systems, Cairo, Academic Library for Publishing, 2002, p. 49.

Hybrid Learning: It is calculating the percentage of participation from face-to-face learning and distance learning in hybrid education according to the cognitive and skill content required to be achieved in the courses. It is the organized and purposeful employment of technology used within the educational system with all its elements according to practical standards so that this technology becomes integrated into it in a vital way with the aim of raising the level of the educational system and increasing its effectiveness and efficiency.

4.

- Calculating the percentage of participation between face-to-face learning and distance learning in online education requires defining the knowledge and skills content to be achieved in the courses.
- The organized and purposeful employment of technology used within the educational system, with all its elements, requires practical standards to ensure that this technology is integrated in a dynamic way, aiming to enhance the educational system's level and increase its effectiveness and efficiency.
- Educational technology does not simply mean the use of tools and devices but rather represents a way of thinking and dealing with things, tools, work methods, and administration in a structured framework. The electronic part of e-learning refers to education that takes place remotely via the internet and its web-based applications, whether synchronous learning (real-time with different locations) or asynchronous learning (different times and places).
- The geographical separation between the teacher and the learner requires creating an academic environment for the student, helping them establish an educational setting conducive to learning and self-motivation.
- E-learning offers the opportunity for lifelong learning, overcoming time and geographical barriers, and expanding the scope of education to a global scale. It also reduces the cost of education compared to traditional in-person learning.
- Through distance learning, students can attend lectures in university auditoriums for 50% of the time while continuing to interact electronically with faculty members via virtual platforms.
- One example of hybrid learning platforms is Zoom, a video conferencing program where one participant hosts the call and has full control over it. The call can include more than one participant, and permissions can be shared with others. This program is suitable for group work meetings, allowing a host and participants to share their screens at any time, facilitating faster communication between them.

The systematic integration of technology into education requires defining criteria that ensure this technology becomes an essential and functional part of the educational system, raising its overall effectiveness and efficiency.

4.1 Comparison Between Traditional Education and Digital Education:

In Traditional Education:

1. Reliance on traditional methods for communication between different parties involved.
2. Interaction between the parties is relatively slow.
3. Dependence on paper documents.
4. Services are available to individuals five days a week, according to the organization's working hours.
5. Relies on physical and human resources.

In Digital Education:

1. Communications are conducted using electronic networks.
2. Interaction between the parties is fast.
3. No paper documents are used.
4. Work continues seven days a week, 24 hours a day.
5. Relies on the use of technology.

4.2 The Adaptation of Algerian Educational Institutions to Distance Learning During the COVID-19 Crisis:

1. Educational institutions benefited from social media, both in promoting their goals and improving their public image, as well as interacting with their internal and external audiences. They use social media promptly to understand public attitudes and reinforce their image, serving as a bridge between the institutions and students, allowing them to promote various activities and identify the needs of visiting students.
2. Digital communication tools were able to create a vibrant virtual community that, in many cases, resembles the real-world community in many of its characteristics.
3. The digital educational institution has its own administrative structure, consisting of a group of workers and employees at different levels, and it is necessary for these working relationships to be directed and organized to serve the goals set by the educational institution.
4. Various types of information are disseminated through different communication channels via electronic screens and email, using all available means.
5. Website improvement.
6. Providing a virtual image of the institution.
7. Establishing external relations, such as international conferences, to exchange training between students.
8. Creating a constructive dialogue culture between the institution and its internal and external audiences.
9. Transparent communication to put an end to rumors and conflicts, especially during times of crisis.
10. Digital communication tools contributed to the democratization of the educational institution.
11. Providing access to the latest developments through social media.
12. Some projects were launched to improve communication within the university, such as magazines covering various scientific activities.
13. Establishing relations with the press, giving utmost importance to media relations, for instance, linking the university with radio stations that host students and researchers to cover important societal topics.
14. Utilizing all modern communication tools, such as Facebook, which are widely used.
15. Focusing on language training.
16. Using various foreign languages to communicate and attract international relations.
17. Unifying the communication strategy across all Algerian universities through electronic portals.

5. Conclusion

The education sector is considered one of the most vital sectors due to the services it provides and the responsibilities it undertakes, especially given the importance placed on this concept in Algeria. Therefore, all institutions or universities under the higher education and scientific research sector must improve institutional communication processes, both internally and externally. For example, internally with students, professors, and staff, whether the communication is upward, downward, or horizontal. This can be achieved through the use of modern technology and its various tools.

We are in the digital era, facing new challenges, as new technology and media in the digital age have changed the way we connect and communicate with others. Physical presence is no longer a prerequisite for communication. A new electronic culture has emerged, integrated into the daily lives of individuals and organizations. This integration significantly influences individuals' everyday lives, making digital technologies not merely an existing phenomenon but an essential part of our lives, embedded in our daily affairs. "These digital technologies are domesticated and, in turn, shape the way we manage our daily lives."

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