Education Strategies in Algeria: Between Critical Theories and Artificial Intelligence Mechanisms
A Critical Study

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Abstract
This study aims to identify the immense potential of e-learning, which has transformed the dynamics of knowledge and generated sweeping network-based currents that humanity has struggled to counter, particularly those related to pedagogical aspects and teaching methods that have exhausted their effectiveness due to a flawed philosophy of experimentation, excessive stereotypical approaches, and rigid improvisation. Specialists have devoted themselves to technological mechanisms—programs and applications through which numerous innovations interact, such as artificial intelligence, the metaverse, visual storage, and other media—offering creative spaces for educational stakeholders. This research paper seeks to answer several questions, chief among them: What is the reality of digital education? Have we been able to keep pace with technological education through strategies that enable us to activate our curricula and computerize our course materials? Or is the matter merely a series of bubbles stemming from fleeting enthusiasm? We have reached several conclusions, most notably that e-learning saves time and effort, accommodates individual differences, and contributes to the diversification of teaching methods and the flexibility of communication channels.
Keywords: Modern technologies; electronic reception; Artificial Intelligence; digitization of competencies; Language computing.

Introduction
E-learning is an innovative mechanism within the educational process that contributes to the development of broadcasting and reception methods and offers considerable possibilities within the teaching space through numerous programs, applications, and advanced digitization tools. Electronic media, along with the capabilities they provide via the internet, have transcended the boundaries of classical education through modern technologies that have fundamentally altered the balance of the educational process. Knowledge has become accessible—regardless of geographical distance—to both teacher and learner alike, allowing specialists of various orientations to address educational issues for the purposes of revision, reform, and enrichment. The recipient has become deeply immersed within the space of the educational process. This accelerating technological explosion has contributed to changing many of the standards that once dampened morale and stifled creative approaches. It has engendered integration among curricula, methods, and effective environments by delivering educational content to the learner through dynamic positive interaction, in accordance with modern information technologies.

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This study aims to untangle the research dilemmas concerning the latest appropriate methods and tools for computerizing education, the mechanisms of e-learning, and the strategies for transitioning from the stage of rote instruction to the stage of innovation and development—or rather, the transition from paper-based education to dynamic digital education. This is due to e-learning's capacity to develop the significant skills possessed by students and pupils. This type of education encompasses all electronic forms, means, and pathways of instruction.

The research poses several key questions: Have we succeeded in digitizing our curricula and syllabi in accordance with the standards and foundations of e-learning? Have training courses been established for teachers and learners to confront the challenges of e-learning? Have advanced devices and equipment been provided to educational institutions? What is the path toward computerizing educational material according to advanced media algorithms? Have we succeeded in establishing the foundations and regulations for the transition from classical to digital education? Can specialists overcome the phobia of innovation? When will we reach the stage of creating Arabic-language applications and programs through which texts interact and move along a communicative bridge among international specialists via the exchange of expertise—even across different languages—especially when dedicated to humanity?

The research objectives revolve around contributing to educational methods in general, and Arabic language pedagogy in particular, by examining modern technologies and their relationship to e-learning according to a digital strategy that responds to international educational standards through comprehensive curricula designed on computer mechanisms and contemporary teaching media. The study also seeks to strengthen the learner's reception channels and reinforce educational aids in Algeria as a fundamental requirement. Programs, curricula, and syllabi must be updated to develop the Arabic language project, computerize it, and advance it to reach the horizons of contemporary education and achieve the highest outcomes in keeping with emerging realities.

The significance of the research lies in the nature of e-learning as a newly emerged form of education that has arisen as a result of massive technological development. It aims to exploit all modern means to save time and effort for both teacher and learner. This type of education relies on modern communication tools, chiefly the computer, utilizing internet-based tools, in addition to other educational media, software, applications, and platforms—without neglecting the benefits of image and sound and their optimal utilization, whether in direct instruction or distance learning.

The hypothesis includes proposals and measures that focus on the essence of e-learning in supporting the specificity of the Arabic language, developing it, and activating it. This is especially crucial given that entering the realm of technology differs entirely from traditional forms of education in terms of tools and methods, through specialized teaching software (*teachware*). Modern educational technologies offer numerous advanced and effective alternatives, without overlooking audiovisual aids, satellite platforms, and the resources provided by the internet.

The study adopted flexible methodologies that varied between description, analysis, and comparison, through which it reached tangible results and transformations beyond the theoretical realm that may change the teaching of the Arabic language and other subjects for

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the better through e-books. E-learning also contributes to raising the level of learners and integrating them into virtual learning environments using advanced electronic means—most notably the metaverse—which increases the recipient's motivation. Achieving high rates of cognitive compatibility, integration, and balance between teacher and learner to build competencies inevitably passes through the multidimensional umbrella of e-learning.

1. Educational Technology: A Conceptual Examination

Educational Technology is a term that emerged from the spread of the scientific and technological revolution. It signifies the development of the educational process by relying on various technical means suited to human elements, aiming to achieve the highest percentage of outcomes according to scientific research methods to establish competencies and behaviors. Technology in general has two aspects: a material aspect and a non-material aspect. On this basis, educational technology also has two sides: a material side—referred to in English as *hardware*—which consists of equipment, devices, and tools; and a non-material side—*software*—which consists of computer programs. From this, it can be said that devices, tools, and machines are components of technology.[1]

The word *Technology*, which was Arabized, derives from the Greek word *Techne*, meaning "art" or "skill." Technology represents all the means used to produce things necessary for human comfort.[2] It is worth noting a fundamental matter sought by educational institutions in our country upon which educational technology is based: thinking styles, teaching methodologies, and problem-solving methods, particularly in mathematics. As for the term *Logos*, it denotes "study" or "discourse." Combining the prefix and suffix yields the meaning of educational technology, which corresponds to the term "instructional techniques."[3]

Galbraith pointed to the concept of technology as the systematic application of scientific knowledge to be applied in practical fields, most notably education.[4] What we conclude is that educational technology is not limited to equipment alone; rather, the true objective is the methodology and style of teaching according to systematic methods upon which the educational process rests, as indicated by UNESCO.

Educational technology offers many advantages, particularly regarding functions supporting the teacher and learner, such as fostering interest, stimulation, speed, and accuracy. The role of the teacher in the field of educational technology has shifted from an instructor to a facilitator of learning processes and environments, tailored to the diagnosis of each case and its appropriate subject matter to reach the desired goals. As for the learner, they have been liberated from the strongholds of lectures and tedious rote instruction to become an interactive, searching investigator. Educational technologies have produced new methods, such as individualized instruction, micro-teaching, computer-based instruction, media technology, the internet, and other new devices and instructional packages.[5]

We have witnessed many pioneering models in the world of education that have proven the effectiveness of the computer as a successful educational tool in terms of exposition and lecture (*Tutorial*), drill and practice (*Drill and Practice*), simulation (*Simulation*), problem solving (*Problem Solving*), programming (*Programming*), educational computer games (*Games*), interactive multimedia (*Interactive Multimedia*), graphics (*Graphics*), and animation (*Animation*). This is without overlooking the serious technique in e-learning that

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allows the learner to control and access numerous tools via the computer, providing an educational environment rich in instructional media.[6]

Advanced education through artificial intelligence, for instance, relying on the best achievements of e-learning, grants the learner a high degree of both sensory and cognitive perception. It also enables the guiding teacher/advisor to perform their duties with high precision and scientific rigor according to a systematic methodology in processing materials and syllabi, utilizing numerous human or technical resources to educate the youth and achieve ideal instruction.

Benefits of Computer Use in Teaching:

The educational field is witnessing rapid acceleration in methods, subject matter, and handling techniques. This makes technological and computer media the cornerstone of modern techniques in technological education, offering advantages such as information storage, processing, and organization by date and category, allowing for rapid retrieval when needed. This contributes to language activation and accelerated language learning, relying on digital technology that assists in processing the Arabic language morphologically and syntactically by computerizing it based on algorithms and literal codes. This type of education and its media provides numerous skills, keeping the learner engaged and drawn to the new learning environment, away from normative practices that caused mental wandering due to routine. Technological media grant instructors capability and efficiency by reducing their burden and helping solidify competencies rapidly.—

2. The Arabic Language in Light of Artificial Intelligence Mechanisms

Digital technology is invading multiple spaces and transcending diverse disciplines. Human cognition stands stimulated and awestruck before these mechanisms, programs, and capabilities that rival human cognitive capacity. Surrendering to the perceived superiority of the digital machine, human effort has decreased as help is sought from technology to computerize everything. Consequently, the door has been opened to computer programs, techniques, and media. The pace of rapid technological development left little room for slow investigation, driving specialists toward digital platforms that offer indispensable technological tools that contrast with traditional education. Efforts to keep pace occur through these electronic innovations and computer applications.

Artificial intelligence, for example, is considered one of the most vital products of technology designed to assist teachers and professors in accomplishing complex tasks. It provides educational tools that save effort and eliminate the struggle of searching for pedagogical aids during times when tangible examples are scarce. What we seek through this article is to highlight what these media have achieved in the emergence of e-learning—without abandoning the foundations of classical education—so that interaction between sender and receiver is achieved through digital margins that allow creative reading and the construction of strong, varied learning experiences that engage the learner through technological media.

Electronic platforms play a positive role in approaching linguistic comprehension, particularly regarding our language and heritage, which require proportional effort. This can only be achieved by relying on these digital capabilities, which exert a positive impact on the recipient. Furthermore, current reality mandates this form of interaction; we have entered a modern technological world that imposes a pattern and creates a scientific necessity. If ignored, our

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language will fall behind and cannot be communicated globally while we remain bound by past ideas, addressing ruins and relying on resounding slogans that do not aid transition into the technological world. Technology has offered much to researchers and scholars in the scientific-linguistic field, making research effortless—especially in decoding documents, updating them, re-reading them, storing them via translation mechanisms, and delivering them to distant points with less effort and in less time.

Electronic platforms and digital corpora are essential mechanisms for advancing and developing Arabic language pedagogy, especially as the world witnesses a massive movement in technology. This requires all active forces—including linguists, educational technology experts, pedagogues, and curriculum designers—to harness all capabilities to introduce Arabic into the digital realm, computerize it, and support it with the latest technological innovations. This is especially relevant since Arabic academic studies have proven the efficacy of these media and their compatibility with the requirements of both Arabic and the new digital language.

It is likely that many people worldwide, particularly non-Arabic speakers, do not know the Arabic language or its script, let alone having encountered it from near or far. Therefore, in this era of cognitive competition, Arabic requires digital representation to remain viable for use and keep pace with technological acceleration. However, this endeavor demands specialized efforts and competencies, particularly given the prevalence of various forms of illiteracy in our societies—including reading and writing illiteracy, technological illiteracy, and illiteracy related to computer programming and internet use. This is exacerbated by the fact that the vast majority views these sciences as secondary or as an intellectual luxury devoid of utility.

An Arab—meaning anyone for whom Arabic is their native tongue—cannot remain behind, complacent and claiming primary status based merely on geographic presence or the sanctity of the language as preserved by the Quran. What such claims overlook is that the technological battlefield requires different equipment and armaments. Searching search engines reveals that certain minor languages are progressing at a rapid pace that Arabic has not matched, particularly regarding research on simple topics documented in those languages. These outnumber Arabic topics manifold, not to mention translation engines, which remain barren regarding Arabic topics compared to other languages.

The internet represents one of the most critical contemporary technological options for the educational sector. Consequently, public, official, local, and international interest in it has increased, making it a primary tool in media and academic institutions. This is due to its reliance on Computer-Mediated Communication (CMC), which has paved the way for a new communicative era relying on multimedia for content presentation and interactivity in audience communication within a digital technical framework.

To fill the knowledge repositories on the web and bridge the gap, we must computerize and develop the Arabic language, creating tech programs related to search engines, translation, and technical processing. However, one cannot blindly follow these technological media without taking linguistic specificity into account or guarding against their negative impacts, which can be converted from a bane to a boon—especially since this represents a new digital culture in educational thought. Among the positives of computing are machine translation, verb

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conjugation, discourse analysis, semantic extraction, and speech-to-text or text-to-speech conversion.

This existence has become tied to transferring linguistic presence onto the internet. Socrates once said to his companion, "Speak so that I may see you." Today, the motto has changed to: "Communicate remotely so that others may see you," allowing you to perceive your identity whether distant or close, in an era where the question of identity ("Who am I?" and "Who are we?") is raised intensely and broadly.[7]

The linguistic issue requires technological care, but implementation cannot occur without mobilizing all capacities in information, translation, Arabization, and language culture. This is a sensitive matter, as we observe a concerning immersion in internet spaces within our homes and institutions, where youth have embraced a digital language that found fertile ground in their minds.

3. E-Learning and Virtual Learning

Education is a sensitive field through which nations rise and civilizations flourish. It is a challenge contingent upon keeping pace with development and scientific advancement. The world across various stages has witnessed intense competition over knowledge acquisition, prompting scholars and decision-makers to invest in it to avoid ignorance and reach higher standings. Numerous theories have sought effective formulas for the educational process, yet the goal remains distant. Attention was often focused on the recipient and educational programs while neglecting the core of the educational process—specifically delivery methods, teaching arts, and learning strategies. This necessitated new mechanisms to revolutionize sterile normative patterns that chase the information age in vain. This requires investigating more effective methods to free the learner from accumulated memorization loads that exhaust their energy and induce anxiety toward education.

The web offers vast services in overcoming obstacles, particularly regarding information, communication, source accessibility, and broad dissemination—starting with diverse scientific platforms across web pages and digitization techniques that offer communicative services.

Education in the Metaverse:

In the metaverse, the recipient experiences a sense of pedagogical presence or companionship alongside the guiding teacher within the educational space through Virtual Reality (VR), Augmented Reality (AR), and Mixed Reality (MR). Access occurs via VR/AR headsets, creating an environment where students learn, train, or meet remotely within the metaverse via dedicated platforms. Accessing, viewing, and interacting with this metaverse educational environment is achieved through specialized headsets and control technologies. The world transitions from reality to embodied imagination across virtual dimensions termed by Mark Zuckerberg, founder and CEO of Facebook, as the "Metaverse" or the "beyond-world," reflecting serious efforts by specialists to bridge the distance between the real and digital worlds.

Humanity is experiencing an unprecedented wave of knowledge where new paradigms continuously emerge due to ongoing development and the expansion of scientific research, particularly in education. The metaverse offers multiple functions that assist administrators, curriculum developers, and educational staff in engaging intellect and making the student an active participant. Educational persuasion relies on addressing the mind and emotions through

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image and sound. This capability is pronounced in the metaverse, where the capacity to overcome integration barriers is substantial. Supervisors and learners enjoy viewing virtual worlds through applications and digitization mechanisms that materialize imagination. This makes the link between signifier and signified more concrete and renders imagination tangible through specialized lenses using creative tools.

The benefits provided by metaverse-based education allow competencies to be achieved with minimal effort, as the difficulty of obtaining educational aids is eliminated through direct, effective audio-visual engagement. Those in the educational field recognize the importance of game-based learning; thus, the metaverse is highly suitable and motivating, allowing the learner to find enjoyment while acquiring information and achieving competencies. The metaverse provides an environment conducive to interaction beyond the traditional classroom and is expected to offer an immersive educational experience. The shared virtual space in the metaverse can be viewed as a promising platform for the future of learning, enabling developers to build innovation models that facilitate knowledge transfer. Studies show that achieved outcomes are high compared to normative methods based on dry, rote instruction. Metaverse technology renders dynamic, interactive, and realistic content clearer, allowing the learner to touch examples as if they were live reality, thereby stimulating skill development.[8]

Learning via the metaverse will not resemble classical methods, whether from the perspective of learners or teachers. Through digital media and technology, the metaverse allows us to enjoy studying and teaching simultaneously, deriving pleasure from learning rather than the frustration and routine felt in other curricula. Using headsets and controllers, learning—especially in early stages—becomes like a journey through time where the recipient is immersed in scientific material they can almost touch. This applies to nearly all subjects, including medicine, anatomy, engineering, scientific and physical education, complex experiments, aviation, and other challenging arts. It also enables the development of language abilities—whether native or foreign languages—through image, sound, and entering the cultural context of native speakers outside the classroom. It allows learners to transcend temporal and spatial boundaries by traveling across continents or visiting galaxies beyond the paper page, conducting experiments as if they were real.

Researchers and specialists, such as Mogos (who focuses on technology in education), state that internet achievements utilized in active learning, combined with metaverse technology, will provide an immersive alternative to ineffective distance learning. Education in the metaverse is experiential, project-based, and centered on problem-solving. This is vital, especially given the lack of laboratories in many schools and their absence in distance-learning environments.[9]

Metaverse education offers expanded opportunities and provides compensatory means for those who were not fortunate in traditional paper-based education through virtual learning tools. Contemporary educational reality mandates preparing programs, curricula, and pedagogical tools compatible with the new virtual reality. These tools must be diverse, innovative, and pioneering, encompassing all school and campus activities online in a manner that collaboratively fosters student creativity and intellect.

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4. The Knowledge Revolution and Technological Media

The field of knowledge is witnessing an unprecedented revolution characterized by an infinite flow of electronic information, supported by highly advanced research tools. Through software, search engines, and media, learners can access information rapidly, update electronic sources, navigate educational theories with minimal effort, and swiftly copy or prepare educational topics. The internet is an inexhaustible source of information that facilitates rapid review and keeps pace with global developments. It is an indispensable communicative channel and scientific path for educational reform.

However, obstacles to exploiting this tool include a lack of rational internet usage culture and the informational/knowledge level of both scholar and instructor. Teachers often rely on traditional, monotonous curricula and avoid technological means due to weak training and limited knowledge, resulting in lowered educational quality and weak cognitive content. The internet represents a major technological option for the educational sector, leading to increased local and international interest. It has become a primary tool in media and academic institutions due to Computer-Mediated Communication (CMC), which paved the way for a new communicative era relying on multimedia content presentation and interactivity within a digital framework.

Metaverse technology represents a new vision for the future and an evolution in artificial intelligence, serving as a coming revolution in the virtual world. Stock prices for tech companies investing in virtual reality, such as Microsoft and Facebook, have experienced significant growth. The term metaverse is strongly linked to the virtual world and science fiction, having first appeared in 1992.[10]

The term "virtual" has generated much debate, but it refers to a reality simulating physical reality. Virtual Reality (VR) denotes a learning environment distinct from real-world instruction that utilizes multimedia technology, allowing the learner to learn in an environment that feels real, thereby influencing behavioral and kinetic engagement.[11]

5. Between Traditional Education and Virtual Learning Media

For this mode of education to succeed, numerous programs, mechanisms, and advanced digitization tools must be provided, alongside training courses for educational staff to keep pace with technological developments within virtual environments—such as synchronous online learning (*Online Learning*), blended learning (*Blended Learning*), and enhanced network learning (*Enhanced Learning*). Furthermore, this type of education requires virtual teachers (*Virtual Teacher*) embodied through 3D technology, where a single professor suffices for numerous classrooms across various regions. In the metaverse, this technology helps learners acquire complex, costly competencies without the heavy burdens that exhaust universities when offering them as courses across various disciplines.[12]

Education in the metaverse requires specific elements and equipment, most notably interactive whiteboards (*White Board*) and artificial intelligence that manages educational content creation, alongside supercomputers and tools that afford learners advantages replacing traditional education costs—such as libraries, learning resources, continuous interaction techniques, and virtual labs that simulate real events within a fully equipped virtual environment. As for examinations, they are conducted online under professor supervision to ensure process success within set timeframes using synchronous online interaction

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(*Synchronous Online*) or live communication between teacher and learner, where the student joins the class using an entry code.

6. Digital Education in Algeria: Reality and Aspirations

Regarding the Algerian experience in utilizing e-learning technology, it remains in its infancy and continues to stagnate. This may be attributed to a lack of awareness regarding the effectiveness of this educational model and its contribution to raising the academic and professional standards of the individual learner.[13]

E-learning in Algeria progresses slowly due to lags in internet bandwidth compared to other nations. Nevertheless, the state continues efforts to improve the digital sector to catch up with developed countries, aided by professors who took on the challenge by launching educational platforms in both paid and free formats. These platforms have seen wide adoption by middle and secondary school students. They initially focused on students preparing for the Baccalaureate or Middle Education Certificate examinations by offering lessons, summaries, and solved exercises across all subjects and specialties. The initiative expanded to include audio-visual videos supplementing classroom instruction. This system also allows parents to monitor their children's schooling, uniting administration, students, and parents on a single platform.

Interest in digital space from Algerian authorities has grown with the third millennium, particularly as society enters a phase of new transformations characterized primarily by globalization. As a primary process occupying the world through its political, economic, social, cultural, and educational manifestations, globalization has produced multiple impacts, notably regarding identity and multiculturalism within a dominant global discourse proposing new societal structures. In contrast, the dominant discourse regarding the "educational reform" crisis is often framed as a daunting reality that is difficult to contain, comprehend, or solve.

To learn and know, one must perceive and reason; every human is endowed from birth with the necessary capacities for perception and reasoning. According to this view, the ideal educator is not one tasked with transmitting tradition or molding the student's mind, but rather one whose role is to utilize the child's abilities and safeguard them from deceptive views. This provides the learner room to express opinions and engages them in open discussion based on argumentation.

Learning the Arabic language within this accelerated technological environment—and in light of developments in pragmatic linguistics—mandates transcending primitive methods of instruction to adopt argumentative techniques within the learning process. This activates the Arabic language, focuses on content and values, moves away from superficial study, abandons old normative concepts, and opens up to modern scientific approaches.[14]

To build educational excellence and protect the nation from decline, joint efforts must align academic studies and linguistic methodologies with the specificities of our language. We must evaluate and rationalize our curricula, link subject matter with pedagogical methods, and re-train teachers to move away from classical routine, randomness, and improvisation that have been rendered obsolete by modern scientific and technological skills.

To make this output more effective, computer engineers are developing smartphone applications allowing students to review material anywhere without constraints. Furthermore, investors have been encouraged to establish educational projects utilizing internet technology

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effectively to deliver educational content that transcends spatial and temporal boundaries, creating a new educational experience that breaks traditional molds. The educational arena has gradually received numerous educational websites—some of which established their own rules and are attempting to prove their success, as exemplified by the "Top Academy" site in Algeria—while others modernized traditional education by transferring the experience into virtual space in a simple, contemporary manner.

From this perspective, subscribing to study sites in Algeria can achieve numerous goals. For example, it provides opportunities to larger segments of society to obtain education and training, reduces long-term learning costs, overcomes spatial and temporal barriers (such as transportation difficulties or scheduling conflicts), and enables students to receive scientific material tailored to their capabilities through visual, auditory, or textual modes.

However, alongside these developments and the surge in e-learning platforms, educational specialists express growing concern regarding the quality of educational services provided—ranging from content and instructional methods to the overall design and layout of these electronic platforms.

Conclusion

Through the field of e-learning, this study concluded that digital instruction has become a fundamental necessity for developing educational systems. This is due to its numerous advantages that educational institutions in the Arab world seek to realize by integrating into the virtual world powered by technological tools. Education is moving toward contemporary strategies that adopt e-learning as an effective alternative, embodying new horizons through electronic media like the metaverse to escape pedagogical stagnation.

The study reached several key findings:

- Connecting education in Algeria with technology eliminates physical distances, thereby offering expanded learning opportunities.
- E-learning enables teachers to innovate engaging learning methods and present clearer, more realistic models than traditional education programs.
- Technological education consists of an infinite array of virtual worlds and spaces that demand high physical and mental presence.
- It provides an immersive experience combining enjoyment with improved online learning interactions.
- It enhances social communication channels and aligns viewpoints.
- It advances teaching and learning while improving online work environments.
- It offers new opportunities for achieving high cognitive gains.
- It is essential to keep pace with global e-learning developments and emulate pioneering educational models without blind imitation.
- E-learning is a successful system reliant on modern technologies to deliver and consolidate knowledge without restrictions.
- E-learning in Algeria remains in its initial stages, facing technical and operational hurdles.
- There is a need to contribute to raising awareness among educational institutions regarding the importance of technology and advocating for e-learning media adoption.
- Conferences, seminars, and training sessions for teachers in the field of e-learning must be intensified.

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- Schools must be equipped with high-quality electronic hardware.
- The Arabic language must be computerized, and Arabic grammar digitized according to computer programming systems.
- Electronic software and applications tailored to the specific characteristics of the Arabic language must be developed.
- Linguistic research laboratories must be intensified and activated using contemporary technologies and advanced equipment to advance Arabic.
- Linguistic dictionaries must be updated and developed through translation and specialized language applications.

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