Harnessing AI for Effective Distance Learning: Teachers' Perspectives on COVID-19's Impact on Education

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Abstract—**The COVID-19 epidemic has caused significant modifications to the education sector, especially concerning the implementation of distance learning as an online learning modality technique, providing substantial obstacles for students and educators throughout the globe. Within these changing surroundings, implementing artificial intelligence (AI) throughout online courses of study has emerged as an achievable strategy to enhance creativity and effectiveness. powered by artificial intelligence, chat tools provide smooth interaction among educators and students, and based on artificial intelligence, analytics enable vital information into the results of student learning and progress, which enables data-driven decisions to improve instructional methods. However, notwithstanding the possible positive effects of AI for distant learning, issues remain, especially the need for educators to get additional instruction and the requirement to address biases in AI techniques. Understanding teachers' perspectives is vital for efficiently incorporating AI into distant instructional settings. At the same time, ongoing investigation into AI's implications for classroom procedures and outcomes for learners remains essential for shaping the coming years of education. In light of these considerations, this study seems to be about educators' engagement with distance learning during COVID-19-induced closures of classrooms, demonstrating obstacles to utilizing online resources and emphasizing the importance of grasping students' perspectives to refine educational strategies during digitization.**

Keywords—COVID-19, distant learning, AI, online education, learning issues.

I. INTRODUCTION

The technology for online schooling is rapidly expanding. a lot of education professionals and curriculum writers are increasingly preoccupied with cutting-edge technology rather than focusing on basic problems such as characteristics of students and desires, the impact of media on the instructional process, equitable opportunity for integrated methods of delivery, and the new roles of educator, place guide, and pupil in the framework of distant education [1].

Many academics have referred to an extensive selection of courses, service providers, users, and media as "a distance that schooling" or "distance learning." Its distinct features include both the instructor and the pupil being separated in time or location [2], the student choosing to guide the learning process rather than receiving distant teaching, and the instructor and student occasionally exchanging textual or other forms of interaction [3]. Because of the COVID-19 epidemic, e-learning research is currently advancing swiftly. E-learning is mostly used in the sphere of education nowadays, and this use needs to be assessed.

The absence of teacher and student face-to-face interaction in the classroom is the most basic definition of distance learning [4]. Students of all educational levels can acquire education through distance learning without ever having to physically attend a class, which is the difference between it and face-to-face instruction. Thus, online educational opportunities present an unusual approach to acquiring knowledge despite tough situations, including the most recent coronavirus pandemic. By this policy, instructors conduct classroom instruction from personal residences during the pandemic by maximizing the use of information and communication technology (ICT) to permit students to continue to monitor the learning process from home. Additionally, teachers frequently consider the qualities of the student and how well the student fits the course material when choosing online learning programs for distance learning. Furthermore, the fact that the students and teachers are in remote areas with limited internet access does not enable the utilization of full-distance learning during a pandemic [5].

Moore and Kearsley define distance education as teaching and planned learning in which the teaching usually takes place in an area that is far from the studying, needing collaboration through technological advances, as well as a specialized institution organization [6]. Moreover, establishing a beneficial and effective collaborative experience is a wonderful method for educating and learning that will enhance relationships between learners and educators [7].

Massive open online courses (MOOCs), e-learning, and blended learning were all used to fulfill this expanding need [8], as well as the creation and uptake of MOOCs. It's crucial to remember that few studies [9,10] measuring students' satisfaction with remote learning during the COVID-19 outbreak included individuals from numerous colleges or

countries. To our knowledge, none of these studies used multilevel models for data analysis.

With the fast growth of distance education methods, there is an expanding need to give priority to basic concerns such as the characteristics of learners, educational materials and procedures, the reasonable availability of engaging delivery platforms, and the changing roles of educators, organizers, and learners in distance learning circumstances. In these circumstances, the introduction of technology such as artificial intelligence (AI) has enormous potential to further enhance the accuracy of distant learning, especially given the constraints posed by the COVID-19 pandemic. By employing artificial intelligence (AI) methods, educators could address these core concerns while simultaneously adapting to the evolving educational setting [11- 13]. According to Chiu et al. [11], evaluating instructors' perspectives on the effect artificial intelligence (AI) has on schooling can provide a helpful understanding of how to utilize technology to satisfy the needs of learners across various settings.

II. Literature Review

Two advantages of distance learning are the convenience with which students may schedule their free time and study periods, as well as the ability to record lectures and listen to them again to better understand challenging subjects. However, students mentioned the inability to access the internet, the lack of connection with classmates and lecturers, and the dearth of practical instruction as disadvantages [14].

Now, educational activities must "take place" in this ill-defined environment, where teaching and learning activities are to be carried out. We're dealing with fictitious visuals here that only last for a moment, but which actors' memories and consciousness can retain. There is a substantial and persistent demand for this specific type of education. To provide for it, governments, educational institutions, businesses, colleges, and organizations became keen to promote and implement it. It is very impressive that students have the highest demand. This produces unique virtual learning environments. These are typically time-limited because the virtual learning space simply vanishes after the learning and teaching tasks are finished. All across the world, they are hurrying to enroll in distance learning institutions, particularly distance learning universities [15,16].

The recent coronavirus disease (COVID-19) epidemic has caused enormous changes in the schooling sector, specifically in away learning and e-learning. This paradigm shift creates major difficulties for pupils as well as educators around the world. As educational institutions react to this changing methodology, including artificial intelligence ("AI") in online educational programs becomes increasingly accepted as an attempt to increase productivity and effectiveness. Gligorea et al. [17-19] also addressed adaptive understanding using AI through distant learning. Likewise, the utilization of AI-powered chat apps in online school environments for students as well as educators allows for immediate responses to instructor inquiries via chatbots and AI-powered virtual assistants. These computing devices were capable of responding quickly [20]. As a result, AI-powered analytics give teachers vital insights into student learning outcomes and development. This allows for data-driven decision-making and improves instructional approaches and curriculum design. By assessing measures

such as academic performance level, AI algorithms can discover students' knowledge strengths and shortcomings, allowing teachers to alter their learning techniques. Additionally, predictive analytics may recognize students who are in danger of slipping back, enabling early intervention to prevent difficulties with education [21].

A. Distance learning – Advantages

The major shift in teaching strategies happened after the COVID-19 epidemic and took place within a very short period, even though using digital tools had been identified as crucial and needed for acquiring the necessary 21st-century skills [22].

Even though many people think of distance learning as a whole, it includes a wide range of ways that may be customized for various courses based on the personalities of the students and teachers, their use of technology, etc. [23,24]. However, there is still much to learn about some of this issue's key practice-relevant elements.

The last ten years have seen a significant impact of technology on education. Students from all around the world now have the chance to pursue an education thanks to online learning, Technology has also been employed to improve traditional courses. A technological resource that can be exploited in higher education is podcasting. And how podcasting has affected the higher education sector. The findings show that podcasting can be a useful tool for academic endeavors. The ownership of the content and the question of whether the podcasts will be public or private are two significant issues that must be resolved, though. Furthermore, many academics take a while to accept the new technology [25].

Participants in a poll of 197 educators taking online graduate education courses at the School of Education at Webster University (MO) listed the advantages and downsides of online learning. The nomination of stereotypes regarding online learning was common. However, the educators' opinions on online learning were inconsistent in themselves. Both proponents and opponents of online learning regarded the same aspects of it favorably. Instead of a genuine assessment of the online learning medium itself, the positives and drawbacks indicated were more reflective of students' attitudes, toward online learning [26]. In higher education settings, online instruction has swiftly established itself as a standard method of instruction delivery. Although it is frequently used, not everyone prefers this learning environment. Both in favor of and against online education, there have been numerous arguments presented. The interpersonal interactions between the participants in the learning environment—the academic exchange of ideas among the students as well as direction and input from the instructor This study focuses on threaded conversations, a feature of online training that encourages communication [27].

There has been a lot of interest in the forced transition to distant learning brought on by COVID-19. Many people conceive of distance learning as a whole; however, many other approaches may be tailored for different courses depending on the personality of the students and professors, how they use technology, etc. [31,32]. About some of the most important practice-relevant aspects of this subject, there is still

much to learn. To achieve the best results, higher education should combine technological and traditional methods. While certain education courses may have successfully transitioned from on-site to online delivery, others might not have. maintaining an effective program for the preparation of teachers [28, 29].

"Massive open online courses" (MOOCs), a new type of distance learning in modern education, are growing more and more popular. This is significant in an era of remote learning and quarantines and suggests that MOOCs may soon be a viable substitute for traditional education when the educational system is reorganized [30].

Education has been impacted by COVID-19, which is affecting the entire world. Distance learning has replaced face-to-face education. The most fundamental responsibility of teachers in distance learning is to improve student engagement in the course, stimulate their learning, and boost their motivation. Students who have a strong sense of community or connectivity in any classroom, whether online or in face-to-face settings. The research showed that students felt more connected to their lecturer when they exchanged customized emails with them. Despite this, students in the email group had overall higher levels of satisfaction with their online education [31,32].

Internet-based educational tools can be extremely beneficial in modern schools. Nevertheless, they can't always be well conveyed in classroom conditions. In these circumstances, the research aims are as follows: adjust an assessment of several well-known online learning platforms (the Moodle platform, Open edX, and NEO LMS) according to parameters (the system characteristics, content support, creation of content, user management, and tracking system); conduct a conversation with university professors to emphasize the advantageous features of a distance school system from the professor's perspective; and test learners who use the platforms. Following consulting with 40 academics from Chinese and Russian universities (Moscow State University, the Higher School of Economics, Peking University, and Tsinghua University), the following advantages of online learning platforms were discovered: greater access freedom, lower educational costs, the ability to divide the content of an e-course into modules, flexibility of instruction, the ability to keep up with modern life's pace, and the ability to define assessment criteria. The Moodle platform has boosted the test scores of 300 students from a variety of academic backgrounds, according to the results. The most striking shift is that more than 50% of students with "unsatisfactory" ratings have noticed an improvement in their work. We may conclude that these platforms aid in facilitating easier and more convenient access to education based on analysis of online learning programs, student assessments, and teacher consultation. The teaching and learning process also uses information technology. For this reason, it is essential to implement such platforms in higher education [33].

The usage of (ICT) is growing in popularity right now, especially in 2020. Whereas other higher education institutions have used ICTs to move all of their educational materials and lecture facilitation to online learning environments [34].

Open and remote learning is now acknowledged as a valid method of delivering quality scientific and technology education. Numerous elements lend weight to this claim. Information and communication technology (ICT) improvements have created new options for networking with peers, teachers, and the institution as well as for exchanging knowledge, resources, and experiences. ODL may be a means to close the achievement divide between children possessing access to STEM education and those who do not, taking into account each one of these factors. Scientific knowledge is acknowledged as a requirement for handling each country's most pressing economic and social problems, improving its social order, and promoting the standards of living for its most impoverished citizens. Building science and technology capability has emerged as an essential strategy for promoting balanced and sustainable internationalization [35].

B. A Strategy of Distance Learning

A modern distance education method concentrates on the possibilities of technology (ICT) in teaching, particularly remote education. ICT technical instruments and their application tactics in the educational process have been investigated; an opposition between the intellectual perspectives of the technologies and the teaching methods and techniques has been discovered. It is suggested that the educational approach be changed to enhance the caliber of distance learning. The three primary pillars of the new educational strategy are the cognitive approach to training, formal-logical and fuzzy logic modeling of knowledge, and new criteria for evaluating students' knowledge [36].

Data showed that teaching students how to use a metacognitive technique called student-generated questioning is possible. Training in metacognitive strategies appeared to assist participants in producing questions above recall level with the desired quality of questions including analysis, synthesis, evaluation, or application. To give distant learners a tool to help them learn, it was found that instructors can educate them on the specifics of employing a metacognitive method. It is not a given that a remote student will use a metacognitive strategy in a distance learning environment just because they are aware of how to do so [37].

Greater numbers of academic subjects, including mathematics, are now being provided online thanks to distance learning's growing popularity among institutions of higher learning. Objectivism serves as the foundation for distance learning, which emphasizes the extremely linear and methodical transfer of knowledge from the instructor to the learner. Evidence does, however, seem to support the notion that students who were taught using a collaborative learning strategy were more eager to undertake difficult mathematical tasks than those who were taught using an individual learning approach. Many educators are advocating for a change in the educational paradigm in the context of online learning because they think that mathematics is best taught in a constructivist environment. These findings suggest that math teachers working remotely with adult learners might wish to consider incorporating a collaborative learning teaching strategy into their lesson plans [38].

Two years after the COVID-19 epidemic, many things still feel familiar, but some important shifts in our attitudes and behaviors may be taking place in anticipation of longer-term changes to the way we arrange our lives and our public spaces. These changes in higher education may be the result of a transition from providing education in an "emergency" or "reactive" manner in the near term to making deliberate and long-term investments in a future that will be substantially different from the one we currently live in. Many of the comments and recommendations made by the panelists for this year's Teaching and Learning Horizon discussion on current trends and the future of higher education show that change may be here to stay and that many institutions won't go back to "normal" [39].

Education institutions had to rely more extensively than ever on distance learning as a result of the pandemic. Even though the training was largely equivalent, there were notable differences. The success of gaming technologies has demonstrated that the learning experience can be made inherently exciting by freshly presenting the fundamental concepts. Learning is thus driven by inadvertent learning of key concepts in another environment. Just like a reader chooses a book by reading its abstract, digital instruction should capture students by appealing to their predispositions and emphasizing the experience rather than the training objective. To enhance the experience, a range of techniques are employed in digital learning, including simulation, games, video podcasts, etc. They are often not essential components of the experience; instead, they are supplements. The creation of teaching techniques that encourage students to finish the instructional program is necessary for their integration into the instructional flow. Some of the instructional tactics that have been researched as teaching strategies include project-based learning, digital storytelling, themes, and gaming. By emphasizing teaching and learning of actual applications in a specific environment, these strategies all work as a diverse family of instructional strategies that smoothly connect the learning of academic knowledge [40].

Teacher educators need to be aware of the instructional practices that are effective in online learning environments given the growing Online learning is becoming increasingly popular in teacher education. An online educational psychology curriculum explored the relationship between self-regulated learning (SRL) and mastery approach goals (MAP) in the preparation of prospective teachers and students.

In case-based instruction, the use of scaffolding, reflection, and revisiting situations was also investigated. The findings highlighted how case study instruction fosters this link and revealed a strong correlation between SRL and MAP in this online teacher education setting. The link between SRL and MAP was significantly mediated by case study training techniques such as revisiting instances for mastery, scaffolding and reflection, and critical thinking [41].

The COVID-19 crisis made adopting digital solutions by educational institutions very necessary. The rapid adoption of distance learning changed the way that people study and transformed how schools assess their students' progress. Assessment methodologies must identify success throughout disruption and change periods to create authentic learning cultures. It is clear how differentiating technology is in this pandemic catastrophe. By accelerating the power of technology to aggregate and appropriate micro-data to support efficient decision-making, informatics may support a range of infrastructure operations. To accurately assess student achievement, educational institutions can store dynamic information regarding academic activity. Digital platforms offer practical ways to gather performance information throughout the university and meet the growing concern about educational equity. Learning management systems expand and broaden academic procedures when they are properly linked. The use of digital evaluation enables the measurement of educational excellence to be more precise. This study aims to explain how digital assessment is implemented and evaluated to enhance learning and foster a culture of excellence in performance across the entire institution. It evaluates an evaluation information system that gathers student data from the classroom and extracurricular activities in a dynamic digital network [42].

C. Characteristics of Distance Learners

In an adjusted self-assessment, the associations involving encouragement to learn, instructional methods, self-confidence, the issue of attribution, and learning are analyzed. The study indicates that there is a correlation between behavioral characteristics and learning outcomes for faraway learners. Self-esteem, strategies for learning, and educational results are all related to one another. Internal attribution, motivation to learn, and results from education are all correlated with self-confidence.

There is no doubt that learning tactics and motivation have favorable and predictable effects on learning outcomes. Internal attribution and self-efficacy both indirectly improve learning outcomes and are predictable [43].

Living a lifelong learning philosophy is becoming commonplace in this era of fast technological and economic development. There will be an increase in the average student age. The percentage of learners above the age of 18 who actively participated in school-related events rose from 38% of the time in 1991 to fifty percent (50%) in 1999. (US Department of Education, National Center for Education Statistics, 1999). Adult distance learners are going to continue to increase in number as more individuals pursue higher education, prompting a greater demand for lecturers to teach them. Engaging with adult learners includes more than mere comprehension of how computers and educational resources work. Distance educators must constantly be learning. Distance education instructors frequently learn that to be effective, they must develop an alternate set of skills than those used in traditional educational settings.

Adult distance educators must be able to recognize learner traits to assist students feel more at ease in virtual learning environments. The author of this paper investigates the connection between older adult learners' characteristics and successful online instruction [44].

Open universities across the world utilize ICT-based methods of instruction and learning to offer excellent educational opportunities to their worldwide pupils. ICT access varies in each state, as do pupil profiles. Information on student involvement in information and communication technology, utilization of ICT structures, and student purpose to use information technology (IT) for academic purposes must be obtained. To determine the extent of ICT access among distant students [45].

To meet the demands of digitally based learning content, enhance the quality of current higher education, and boost learner motivation, it can be helpful to identify growing characteristics and dimensions of student autonomy through e-learning courses. As new issues raise concerns about the effectiveness and sustainability of the higher education system, the idea of autonomy is becoming more and more significant in the field of education today. Research has shown changes in students' perceptions of their level of autonomy, examined the extent to which they are willing to complete challenging tasks with only a limited amount of instructor guidance, established the extent to which students are responsible for managing their educational activity and monitoring progress, explored their initiative and perseverance, and identified the most common difficulties they encountered while completing the course [46].

D. Role of a Teacher in Distance Learning Conditions

As teaching technology has improved to include web-based courses and universities, distance learners have become increasingly scrutinized. Numerous technologies have been developed to improve communication, thousands of courses have been made available online, and tests have been devised to demonstrate both the success and comfort of students using web-based learning as predictors of student success. There are some benefits and drawbacks that instructors and students have in common as well as some that students do not. There hasn't been much research done on predicting instructor comfort or success [47].

Digitalization has been a trend in the educational landscape, during the pandemic. The tasks of a teacher have significantly expanded in higher education, and the degree of competencies has increased quickly. It fosters learning that is authentic, empowers students, fosters a supportive environment in the classroom, and improves students' learning outcomes [48,49].

Since the 2020 pandemic has driven colleges and university professionals to adopt e-learning and transfer curricula online, faculty must be ready to teach amid these brand-new circumstances. Since 2013, a successful face-to-face professional development model for instructor educators has been implemented to strengthen faculty knowledge regarding technology-enhanced teaching (TPACK) inside our instructor education program. Participation in collaborative instruction in a community of researchers focused on digital-enhanced education permitted faculty members to become knowledgeable and later serve as technological mentors [50].

Distance education in an academic higher school is a particularly significant evolution in up-to-date educational organizations. This method of training, paired with the continued development of technological methods, has the opportunity to effectively solve the issues of student education and lifetime learning. Distance learning, perhaps compared to any other method of education, has the opportunity to solve teacher preparation issues. The same approach considers the potential for language and thinking growth, as well as a digital culture, via online education. The integrity of schools and universities can be smoothly promised and realized through the implementation of structure values that ensure the continued existence of values and methods associated with the administration of various operational and territorial subsystems and, in the distant future, their just integration into the larger community [51]. The integrity of educational institutions can be effectively guaranteed and realized through the use of network principles in the ongoing evolution of values and methods related to the direction of different functional and area subsystems that are and, in the distant future, their just integration into global society [51].

Educational technology involves the creation, implementation, and evaluation of tools, strategies, and processes aimed at enhancing the education of students. The implementation of technology for learning has already been and continues to be learned in the majority of essential endeavors involving instruction, training, or teaching. Educational technology may contribute to enhanced education in terms of its value and relevance, and it also makes it accessible to a wider audience. The teacher, the standard of his planning, and the growth of his career are always the most significant issues. The most significant part of education is a student's performance. As an outcome, one of the main requirements is that they obtain specialized technological instruction. Today, since the use of information and communication technology, or ICT, has an impact on education, teacher education must make the requisite academic adaptations. Applying technology to education is an innovative procedure that all teachers should embrace. [52,53].

A framework where information and communication technologies (ICT) education can promote the regeneration of teacher education through group learning. Themes and patterns in the activity of these learning communities were discovered using a socio-constructivist approach and a design-experiment methodology. This discussion about how to modernize teacher education by incorporating ICTs in a way that fosters collaborative teaching and learning was sparked [54].

Many schools made the switch from face-to-face instruction to online or distance education and back again. It was expected of academics and teachers to significantly alter their instruction. On their setting, pupils, teaching methods, resources, and upcoming instructional plans. Professional development helped to strengthen teaching techniques to some extent, although some teachers felt they needed more help [55].

E. Challenge of Distance Learning

Persons use communicating as a fundamental instrument for resolving their needs, so it's a critical belief. Obstacles to communicating must be focused on before collaboration may be beneficial, which has been defined as a process. As is widely understood, distant educational instruction is a comparatively recent idea that employs advanced technology, materials, and techniques in the teaching-learning process. In addition to good communication in traditional circumstances, distance education programs provide increased flexibility. It is critical to remember that removing obstacles to communication is an essential component of creating an efficient communication process. People execute better in their jobs when they are aware of the communication challenges created by online educational institutions [56].

F. Challenges and Considerations- Artificial intelligence

Artificial intelligence provides intriguing opportunities for distance learning, but there are certain issues to consider. Teachers may require additional training to effectively use her AI technologies; also, to ensure a fair and equal educational experience for all students, potential prejudice within AI algorithms must be addressed [57-59].

G. Teacher recognition and recruitment

Research shows that teachers' perceptions of AI in education vary. While some educators embrace AI as a valuable tool, others have expressed concerns about the potential for AI to completely replace teachers. Understanding the teacher's perspective is essential for the successful integration of AI into distance learning environments [60].

H. The future of AI reinforcement learning

As AI technology continues to evolve, its role in distance learning will become increasingly important. Additionally, studying the long-term impact of AI on educational practices and student outcomes is essential in shaping the future of education [61].

III. CONCLUSION

During the COVID-19 outbreak, teachers had to rapidly modify their methods of instruction to reflect virtual education. Although e-learning seemed to provide an achievable solution to the issue, it additionally created obstacles that affected the performance of students in school. The technological barriers, such as issues in the educational environment, internet access worries, and obtaining supplies for the course, appeared as major challenges for students taking courses online. Moreover, students faced challenges accessing online assessments using smartphones and tablets, which exacerbated their issues. This study emphasized the significance of comprehending educational viewpoints and their experiences with classroom instruction online during the global crisis, along with the need for further studies in this specific field. Despite the continuing challenges of distance education, current research emphasizes the worsening effects of the COVID-19 pandemic and calls for urgent action to resolve these issues. highlighted the need for it. Incorporating multiple methods makes it possible to investigate the challenges experienced by educators, students, and online school managers during the coronavirus (COVID-19) outbreak. It is important to assess the perspectives of students, teachers, parents, and administrators at the elementary school level, as students' concerns are likely to be echoed by other stakeholders is emerging as a powerful tool that can not only help teachers navigate this transformation but also change the landscape of distance learning. By leveraging AI while recognizing and addressing AI challenges, educators can create a more engaging, personalized, and effective learning environment for students, a benefit that continues in the era of COVID-19. spreads beyond.

It is hoped that the insights presented by this study will be useful and valuable to implementers seeking to effectively address these concerns in the field of distance education.

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