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Positive Impact of High Technology on Higher Education

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ABSTRACT

All intellectual, economic, educational, and scientific sectors work to benefit from the technological progress that the world has witnessed during the past two decades so that each sector can achieve the highest level of benefit. The higher education sector is not considered an exception in this context, as higher education institutions around the world work to benefit from technological development in the best way and manner possible, whether by taking advantage of the education systems provided or by taking advantage of the students' attraction to these institutions or through the promotion of educational institutions or by internationalizing of its educational programs in a way that benefits from this progress. The spread of the COVID-19 epidemic during the past year had a major role in implementing the automation of the educational systems for institutions.

Keywords: Higher education, Distance learning , COVID-19, Universities, Higher education institutions, Epidemics, Technology, High-Tech, Higher Education Institutions

This research paper aims to clarify the most important approaches, systems, and methods that educational institutions can apply to achieve the highest possible benefit from high tech in improving and developing their work plans.

INTRODUCTION

It is challenging to clarify the beginnings of distance education as we understand it today. This is because the origins of this educational system precede the emergence of high tech by many years. The French

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researcher, Charles Toussaint, who was teaching the French language in Berlin, besides the ideas put forward by the German musician Gustav Langenscheidt, one of the members of the Modern Languages Association in Berlin, might be considered a nucleus for organizing and establishing distance education teaching method. After that, the United States took the first steps by establishing Correspondence Curricula at (Illinois State University) in 1874, and with this step, distance learning spread around the world. The first correspondence courses began later, using parcels to reach students who could not attend their lectures under the traditional campus education system. After 17 years, specifically in 1892, the first independent department for distance education was established at the University of Chicago. Thus, it became the first university in the world to adopt the application of distance education. Distance education provided opportunities for elderly students, and it gave students a sense of responsibility towards their learning. Students would send their homework and jobs by mail, and then teachers would correct and resend them with grade reports, notes, and feedback to the students. By the early twentieth century, communication technologies improved, and distance education moved to radio waves after its invention by the Italian scientist Marconi in 1895[23]. In 1919 University of Wisconsin professors began designing an amateur radio station, the first wireless station licensed for educational broadcasting purposes. In 1922, seventy-three other educational institutions obtained regular broadcast licenses. Yet, only half of those with such licenses had broadcast stations, and by the end of the 1920s, 176 educational institutions had broadcast licenses.

Online learning appeared in 1983. When the Institute of Western Behavioral Sciences in the coastal La Jolla region of California opened the College of Management and Strategic Studies, using computers in the distance education process. In 1989, the University of Phoenix began offering educational programs online. In 1993, when the British scientist Tim Burns-Lee invented the internet browser which the University of Illinois established, online learning began to flourish. Starting in 1992, higher education institutions began granting master's and doctoral degrees, and the first to start this step was George Washington University, USA. In 2000, the rate of enrollment of students worldwide in educational courses via the internet was 8%, but this percentage increased to reach nearly 20% in 2008. The rate increased in 2020 due to the spread of the COVID-19 pandemic[12].

During the past few years, specifically, since the emergence of social media and its changing of how we comprehend and understand the internet and the way we use it, distance higher education systems have significantly changed. Our view of the world has changed, including higher education institutions, students and lecturers, for the new technology and its various applications, and new concepts such as artificial intelligence AI (the beginnings of artificial intelligence can be traced back to classical philosophers' attempts to describe human thinking as a symbolic system. Until 1956, artificial intelligence was formally established at a conference at Dartmouth College in Hanover, New Hampshire, where the term "artificial intelligence" was created) had a significant impact on higher education.

High-Tech Nowadays

In the twenty-first century, technology has gone viral in various areas of life, as it is considered the basis for all areas of intellectual, cognitive, financial, economic, scientific, and entertainment life. It also works to provide all facilities to people at a relatively low cost as well as its contribution to the development of societies and the provision of welfare means to third world regions and countries. The world has become a more accepting place to live, and this high-tech has helped connect individuals. In addition to the above, technology has had a fundamental and vital role in the development of trade, medicine,

economics, scientific research, studies, education systems, virtual and augmented reality, and even the development of electronic games in an unprecedented way. In the field of higher education, technology has had an indescribable effect and its impact cannot be determined in the field of education, as it caused the emergence of the concept of distance education, which is the educational system that caused the removal of physical obstacles and barriers between the educational process triad (student, lecturer, and higher education institution), which is the new educational system that enabled students to obtain information, achieve interaction with the lecturer, and obtain an accredited certificate without incurring the hassle of travel procedures and transportation, as it provided the time required for the completion of the educational process and provided a great service for the lecturer and the student. Technology came with blended (hybrid) education, which is a different type of education, as it can combine physical education with virtual classes and e-learning. Over the years, technology has revolutionized our world and our daily life.

In general, looking at the leap that technology has made in our lives, we note that its impact is indescribable as it provided amazing tools and resources that facilitated easy and comfortable access to the information that became available in our hands within a few seconds. High tech has also paved the way for the emergence of multi-functional devices such as the smart-watch, smart devices, and smart homes[16]. Also, computers are faster, more portable, more powerful than ever, and are faster at processing information. In general, and as a result, technology has also made our lives easier, faster, better, more enjoyable, and more receptive to anything new, and has given us many modern technologies such as smartwatches, tablets, voice controls, simulators, augmented reality, virtual reality and many technologies that were seen as pure magic. Using these devices, we can do marvelous things like sending money transfers instantly and making purchases for everything within a few seconds through some financial payment applications such as Paypal and other payment systems[22]. Today, there is no need to go to the bank to complete any financial transaction, and all that you have to do is send the transfer directly by clicking some clicks on your device[13].

Applications of High-Tech in the 20th Century and the Possibility of Applying This Technology in HEIs

When talking about the high-techs that have emerged over the past years, we find that these technologies are developing steadily and rapidly. It is imperative to note and know that there are applications in the field of higher education through which these new-techs can be used. It is also important to note that these technologies can be modified, transformed, and be changed in the coming years in a way that causes the emergence of updated and versions and copies of the same tech. The most important of these technologies in the twenty-first century can be referred to as follows:

Artificial Intelligence and Machine Learning

Artificial Intelligence has caused the hustle and bustle in the past decade. Still, it remains an entirely new technology trend due to its remarkable effects on how we live, work and deal with reality[3]. Other than that, artificial intelligence is used to a greater extent to analyze the relationships between the different parties to identify strategies and basic data. Artificial intelligence also aims to carry out functions to predict the demand for specific services and the best way to respond to them, such as operations and data that take place in hospitals to enable decision-making bodies. Artificial intelligence is also used to

discover the changing patterns of customer behavior by analyzing data during a specific period in real-time and matching it with other data and results[19]. Artificial intelligence has entered the higher education sector through application and practice and its use in theoretical applications and curricula. Artificial intelligence can also make a big difference to colleges and universities of all types and sizes[11]. When harnessed in higher education institutions, artificial intelligence can boost student outcomes and give higher education institutions the power to predict enrollment trends, improve employment efforts, and raise academic performance.

Additionally, college recruiting teams will be able to better focus their efforts by creating algorithms that can predict which applicants are most likely to be accepted and enrolled in educational programs and which countries they will apply from. These algorithms can also identify enrolled students who are most likely to advance, graduate, and become participating graduates and contributors to the job market[4]. The admission process to higher education institutions will be faster and more personalized than in the past. By applying AI, time-consuming tasks can be performed and executed, and problem-solving is made more efficient. Administrative staff can refocus their efforts on improving students' experiences in their studies. With the spread of artificial intelligence across all sectors, New jobs are expected to be created in the areas of development, programming, testing, support, and maintenance[2].

Automation

Like artificial intelligence and machine learning, robotic process automation is another technology that automates jobs and is the use of software to automate business processes such as interpreting applications, processing transactions, handling data, and even responding to emails. This technology automates repetitive tasks that people used to do. Automation processes are used in higher education by providing personal and frequent texting and communication, in addition to designing automated bots that help students seeking information related to the educational program, the duration of the study period, and the cost of the program. In this way, automation saves the time that educational institutions spend on carrying out some routine and traditional tasks.

Quantum Computing

Quantum computing is a form of computing that takes advantage of quantum phenomena such as superposition and quantum entanglement. Many applications of quantum computing today include banking and financial services, credit risk management, high-volatility trading, fraud detection, covering areas in quantum mechanics, linear algebra, probability, information theory, and machine learning. It is used in the higher education sector to determine the trends, systems, and controls prevailing in educational institutions and to determine the rates of literary plagiarism in studies and research. Quantum computers are now many times faster than ordinary computers.

Virtual and Augmented Reality

Virtual reality immerses the users in a new environment, while augmented reality enhances the climate of those users[10]. Although this technology trend has been used mainly for games until now, it has also been used for training and education, specifically with the spread of Coronavirus[20]. It is expected that these forms of technologies will be further integrated into our lives, and both virtual and augmented reality

have enormous potential in training, entertainment, education, and marketing[14][7]. Virtual and augmented reality technologies have been extensively used during the past months, with all their applications attached to the higher education sector as a result of the spread of the COVID-19 epidemic crisis, which had a significant impact on the spread of high techs in educational technology. Perhaps virtual and augmented reality are the two areas that have witnessed unprecedented development in this field[21].

Internet of Things IoT

Another promising new technology direction is the Internet of Things IoT[1]. Many "things" are now created with WiFi connectivity, which means they can be connected to the internet - and each other. The Internet of Things is the future, and it has already enabled devices, home appliances, cars, and other online communication and data exchange[9]. When it comes to higher education systems, HEIs can enhance learning outcomes by providing more rich learning experiences, improving operational efficiency, and gaining insight into Real-time, and providing actionable student performance[18].

The Positive Impact of High Tech and its Applications in Higher Education

Technology plays the role of a guide in assisting the lecturer and facilitating the educational process for the student in addition to introducing a new system for the method of presenting the lecture and communicating information to the student. High tech contributes to providing easy access to information for students without much effort in accessing it[5]. Technology also works to effect an actual and real change in presenting the lecture to the student in addition to working on developing the methods used by the lecturer in the teaching process and developing his ability to provide an advanced scientific approach to the student[17]. It is also noticeable that the application of high technologies leads to the development of the student's mental and intellectual capabilities in education in addition to developing talents and creative potentials in the study and school activities. Technology is seen as a modern educational tool used in the field of higher education and helps students to discover their selves, talents, abilities, and desires and develop their mental abilities to benefit from their studies to the fullest extent possible. The internet opens a new door to help students work in teamwork, participate in research, and exchange information in one classroom[6]. Technology is a great source of information that students and lecturers need. In addition to the aforementioned, it opened the door widely for the lecturer and the student to be in constant contact. And through it, lecturers will be able to communicate with other professors through the internet, and this technology has achieved the means of communication[8], opening the doors of communication and discussion concerning the study. The great information expansion achieved by the field of technology in higher education has made the means of education multiple and in a wide range as it has provided various jobs, and it has a positive impact on the methods of searching and teaching about information. Teaching aids differ in specifications and techniques, and the ability to affect development in the field of education[15].

The positive impact of the application of technology in higher education is considered to be of great influence and importance in higher education institutions. Some of these applications can be mentioned as follows:

- Facilitating the spread of science, as technology helped students gain access to various scientific sources, whether at home or university. Technology has also facilitated enrollment in universities and facilitated communication between the lecturer and the student.

- The ease of exchanging information facilitated the means of communication between the lecturer and the student. It also enabled the means of communication between students and helped them participate without restrictions or commitment to the language. It also facilitated participation and work among students to accomplish projects and joint work over the internet.
- Helping lecturers diversify methods of explaining educational materials allowed them to use pictures and drawings, making three-dimensional models that facilitate the explanation of the scientific material.
- Making learning more enjoyable: The use of technology in teaching has made it more enjoyable for students, which increases their motivation to learn, as boring lessons can be made more enjoyable for them through tablets and videos.
- Access to information: the use of technology in education, including the internet, increases the learners' ability to access a large quantity and quality of data, which saves a lot in a short time, but the teacher needs to raise students' awareness of the correct ways to access accurate information on the internet.
- Making the teaching process easier: The use of new technologies such as video, virtual and augmented reality, artificial intelligence, and others in the learning process contributes to simplifying information for students and making teaching easier for the lecturers by saving his time, helping him increase his productivity, and giving them a longer period to focus on the educational process. On the other hand, it also contributes to making the distance education process successful and more advanced by allowing the student to add his/her questions and get the answers simultaneously.
- Making the educational process more successful for a higher education institution: By saving student and lecturer time and providing best practices and means that contribute to improving the educational process, high tech can contribute to the educational institution's success, its development, and improvement of its work.
- Cooperation and participation between lecturers in different countries: Technology allows direct communication between learners at the touch of a button and facilitates the process of collaboration between them, which gives the learning process more quality and ease.
- Helping to visualize abstract or difficult to understand concepts: Technology helps the lecturer to visualize abstract concepts or those concepts that are difficult to be understood, in an easier way.
- Flexibility and enjoyment of education: Technology makes learning more enjoyable and flexible, and thus contribute to raising students' self-directed learning, which helps make learners more interactive with the sciences presented to them.
- Overcoming the obstacle of time and place: Technology contributes to the continuity of the higher education process, regardless of the difference in time and place in which both the lecturer and the student are located, as the student can start educational materials via the internet at any time he/she wants, which makes it easy to schedule study times and periods.
- Helping students with special needs to learn: With technology, many of the learning obstacles in front of students with special needs have disappeared, and some devices or applications help

them solve their problems and allow them to engage in the educational process more easily. Thus, through the application of technology in higher education, students can study the program they desire without incurring the psychological and physical difficulties resulting from their disability.

- Supplying students' skills: Technology contributes to several important skills for students during their studies at the college, such as time management, communication, and cooperation, as it gives the shyest students a space for participation, learning, and self-expression as for the rest of the students, and it contributes to saving time and lectures. Through the ease and speed it provides in accessing information, conducting research projects electronically, and others, in addition to its contribution to supporting interactive learning, granting self-confidence to the student, and developing his leadership spirit.

Immediate Applications of Technology to Higher Education

The impact of technology on the higher education sector: There is no doubt that technology affects all aspects of life, and when technology is involved in education, this has a significant impact on all aspects of the educational process, which is represented by the student who means the most critical vocal-point in the educational process, and then the lectures, curricula, and research studies.

The effect of technology on the student: The use of technology in education affects the student in many aspects, such as the democracy of education in the sense that the student has a space of freedom to be able to choose the appropriate specialization, in addition to being able to directly choose the curricula and materials he/she wants to study, and it also achieves independence and more. It increases the sense of self-personality. The use of technology in higher education increases student interaction in general, develops positive thinking, facilitates obtaining various information, facilitating access to the latest information in multiple fields with high ease, and the possibility of sharing it as well.

The impact of technology on the lecturer: High tech helps the lecturer greatly as it provides him with more information and knowledge of various forms. The use of technology facilitates the participation and publication of scientific materials, studies, research, and research articles and getting acquainted with new science around the world, and raising the quality and efficiency of higher education.

RESULTS

As we have noted above, it can be said that information, communication, and high tech, in general, have a positive impact on education and directly, have great benefit for the lecturer, the student, and the higher education institution as a whole.

Recommendations and Suggestions

- We recommend higher education institutions apply high tech whenever possible.
- There must be a fundamental role for higher education institutions in developing the lecturer capabilities regarding high-techs and preparing them in the best possible way.
- Lecturers are encouraged to look for the best techs that contribute to conveying the information to the students in the best way.

- ❖ Governments must educate societies about the importance of applying high technology in higher education and consolidate and accept these benefits.

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