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ALTINBAŞ UNIVERSITY

Institute of Graduate Studies

Information Technologies

**CONTRIBUTION OF OPTICAL FIBERS
AND MODERN TECHNIQUES TO IMPROVE
TEACHING ACROSS THE INTERNET DURING
THE CORONA COVID-19 PANDEMIC**

Sufyan Ahmed Abdullah ALBAYATI

Master's Thesis

Supervisor

Asst. Prof. Dr. Abdullahi Abdu IBRAHIM

İstanbul, 2024

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The thesis/dissertation titled CONTRIBUTION OF OPTICAL FIBERS AND MODERN TECHNIQUES TO IMPROVE TEACHING ACROSS THE INTERNET DURING THE CORONA COVID-19 PANDEMIC prepared by Sufyan ALBAYATI and submitted on 11/23/2023 has been **accepted unanimously/by majority of votes** for the degree of Master of Science in Information Technology.

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Sufyan Ahmed Abdullah ALBAYATI

Signature

DEDICATION

To the Messenger of humanity and the first teacher in life, the Prophet Muhammad, may God bless him and grant him peace.

To my dear father... out of respect and pride

To my dear mother... with love and tenderness

To my beloved brothers... kindness, affection and love

To my beloved wife... love and pride

To my children... with love and kindness

Researcher thanks and appreciation Praise be to God, and prayers and peace be upon the Messenger of God, his God, his companions, and those who follow him. As I finish writing my research thesis, I can't help it. However, I would like to extend my thanks and appreciation to everyone who contributed to the success of my thesis and helped me in my difficult days, led by the respected professors at the university, Dr. And my dear wife, who was my first supporter, I ask God to protect her and provide her with health and wellness, and my dear sister, Dr. Maha Ahmed, for extending her help to me, and special thanks to the creative professor Mukhled Awaid for what he provided. He have had support and effort with me over a whole year. I ask God Almighty to grant him success, grant him good offspring, open the doors of his livelihood for him, and guide him to what he loves and is satisfied with. In conclusion, I hope that God Almighty grants you success and protects everyone who wants good for me.

ABSTRACT

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Internet service has become an indispensable aspect of daily life, extending its necessity to homes, institutions, and organizations worldwide. With the surge in technological advancements, increased demand, and a growing number of internet users, traditional copper wires have proven inadequate to meet the evolving needs. The progression of internet technology from the first to the fifth generation underscores the imperative to adapt and keep pace with developed nations. In response to these demands, optical fibers have emerged as a pivotal solution, providing high-speed data transmission essential for millions of users globally. This is particularly crucial given the substantial data volumes, often exceeding hundreds of gigabytes. Optical fibers find diverse applications, with Fiber To The Home (FTTH) standing out as a specialized conduit for efficiently transferring internet services from companies to homes and workplaces. Moreover, optical fibers play a pivotal role in the deployment of submarine and terrestrial cables, fostering global connectivity through the World Wide Web (WWW). This not only ensures seamless data flow but also supports critical applications such as Fiber To The Home, connecting nations and facilitating robust internet services worldwide. The shift towards optical fibers is imperative in the context of evolving internet technology, with the fifth generation becoming increasingly prevalent. This transition demands the adoption of means, media, and high-speed transmission lines capable of handling the demands of modern internet usage. Optical fibers, with their capacity for high-speed data flow, emerge as a key enabler in this scenario. In conclusion, the utilization of optical fibers is instrumental in addressing the escalating demands for high-

speed and reliable internet services. From FTTH applications to the establishment of global connectivity through submarine and terrestrial cables, optical fibers play a central role in meeting the evolving needs of the digital age.

Keywords: Internet Service, Optical Fibers, Fiber to the Home, FTTH, World Wide Web.



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ABBREVIATIONS

AI	:	Artificial Intelligence
FSK	:	Frequency Shift Keying
IoT	:	Internet of Things
PAN	:	Personal Area Network
OFDM	:	Orthogonal Frequency Division Multiplexing
TDMA	:	Time Division Multiple Access



1. INTRODUCTION

Fiber optics, also known as optical fibers, significantly enhance the efficiency and technical performance of modern devices and equipment containing them. Optical fibers, composed of glass, have proven their ability to advance modern technologies with their exceptional specifications, ensuring high accuracy in transmitting data over long distances of several kilometers without obstacles. Despite their relative lack of hardness compared to copper, they outperform copper in technical applications due to the precise and rapid data transfer facilitated by the glass composition. Optical fibers boast a very large download capacity, far exceeding that of copper, and their bandwidth surpasses that of copper. These fibers find applications in sensors and have various uses in wired and wireless communication, military, medical, educational fields, and others.

The significant development facilitated by optical fibers has a profound impact on the evolution of modern devices, equipment, and technologies. This impact is especially notable in the realm of distance education, particularly after the Covid-19 pandemic. Modern technologies, recognized as the primary tools in the contemporary era, contribute significantly to the development of life and well-being across various branches and fields. In all aspects of life, modern technologies have become indispensable, prompting international institutions and organizations to focus on developing technology infrastructure. Efforts are also directed towards training personnel in institutions to enhance their skills in using these technologies. Civil society institutions are equally involved in developing and training society, offering educational courses, seminars, and lectures to increase electronic awareness, ensuring the accessibility of the technical revolution to all members of society.

The phenomenon of distance education, made possible by modern technologies, stands out as one of the most crucial benefits. Modern technologies have proven instrumental in sustaining the educational process and activities within institutions, organizations, and departments. Events, crises, and disasters that disrupt the normal course of life, particularly in business and educational aspects, underscore the importance of continuing education. This disruption affects all age groups and levels of study, including universities, schools, and educational institutions.

Distance education, facilitated by modern technologies, has achieved remarkable success in maintaining academic life. The significance and vital role played by modern technologies in overcoming crises, disasters, and epidemics worldwide become apparent. The global system, with its new challenges such as the spread of epidemics, diseases, military events, climate change, and other threatening factors, necessitates the establishment of rules, strong infrastructure, and effective systems in modern technologies. This development aims to cultivate skilled societies capable of utilizing these technologies to confront challenges and overcome difficult periods.

Amidst the outbreak of the Covid-19 pandemic, which prompted global calls to contain the epidemic, the challenges revealed weaknesses in some global systems. The pandemic demonstrated the capacity of people to use technologies for remote continuation, highlighting disparities among countries in technical, electronic, and educational preparedness. Differences in capabilities, technical bases, and proficiency emerged between countries and societies, particularly in addressing the educational aspect of schools and universities.

1.1 THE RESEARCH PROBLEM

The research problem revolves around addressing the following inquiries:

- a. Is there a discernible impact of modern technologies on distance education?
- b. To what extent do optical fibers contribute to the improvement and development of modern technologies?
- c. How did the world react and respond to the influence of modern technologies on distance education during the Corona pandemic?

1.2 HYPOTHESIS OF THE STUDY

The study hypothesizes that modern technologies have an impact on distance education, and that optical fibers have a major role in improving the performance of distance education through their high specifications in the modern technologies used in the continuation of distance education.

1.3 SIGNIFICANCE OF THE STUDY

The study is important in knowing modern technologies and their effects in distance education and the role that optical fibers provide in improving the performance of distance education.

1.4 STUDY PURPOSE

The primary objective of this study is to address the key questions outlined in the study problem. These questions specifically inquire about the impact of modern technologies on distance education and the influence of optical fibers on the performance of distance education.

1.5 STUDY STRUCTURE

To ensure a systematic approach and professional execution, the study will be organized into four chapters. The introductory chapter will encompass the study's introduction, methodology, and a review of previous studies. The second chapter will delve into the theoretical framework, specifically focusing on optical fibers and optical technologies, the modern theoretical framework for distance education, and the theoretical framework for the corona virus. The third chapter will involve the analysis of the study using questionnaires distributed to students and professors from iraqi and arab universities. This analysis will employ statistical, analytical, and standard methods to elucidate the relationship and effects between modern technologies and distance education. Practical methods will also be applied to elucidate the role of optical fibers in enhancing the technical performance of distance learning. The fourth chapter will encapsulate the study's conclusion, findings, and recommendations.

1.6 STUDY METHOD

The study employs two distinct methods in its content and composition. The precise descriptive method is utilized in crafting the second chapter, which focuses on the theoretical framework. Simultaneously, the analytical questionnaire method is employed to analyze the collected questionnaire data from samples, as detailed in the third chapter.

1.7 PREVIOUS STUDIES AND RESEARCH

1.7.1 Arabic Studies

- a. Researchers Haqain Fawzia and Arabi Iman pointed out in their study [10] of the necessity of directing universities and educational institutions towards the principles of digitization, developing technology, supporting e-learning and enhancing electronic capabilities in terms of developing means, devices and tools used in e-learning. After also developing and qualifying the individual capabilities of people and individuals who use these modern technical means, such as the Internet, computers, and other means that are used in e-learning and developing skills by involving them in electronic development courses, work in e-learning has become a necessity in our modern era, in which technology is considered the most prominent and most prominent revolution. It is widespread in this era, and it must be used to integrate education with modern technologies by involving it in all educational age groups represented by universities, middle and primary schools. It can also be used to activate and continue seminars and conferences, especially in abnormal circumstances, and the Corona virus Covid_19 is considered the best evidence of the importance of and the necessity of distance education. The Corona pandemic has shown us the advantages that distance education provides us in terms of continuing education despite the interruption of movement in the world at that time during periods of the spread of the epidemic. The world stopped movement, but education did not stop due to the activation and activation of the role of distance education.
- b. Researchers Al-Shammari Sadiq Kazem and Al-Saadi Marwa Abdel Abbas indicated in their research [15] that university students, regardless of their specializations, were forced to learn remotely in light of the spread of the Corona pandemic in order to prevent the spread of the virus among students. Traditional attendance and attendance were suspended, and e-learning was completely used. Some students suffered from the sudden use of this method of education. Here, some problems and challenges emerged that threatened to decline the level of students and deprive them of the advantages of personal communication, direct communication with the teacher or teacher, due to their different levels in using the methods. Thus, integrating education between in-person and electronic education was the successful solution for this stage, as blended education showed the

interaction between students and teachers through attendance on the one hand and reducing the spread of the epidemic on the other hand. The interest of this study was in dealing with students of the fourth stage of universities, as they are considered stages. Important and vital by virtue of its location, educational description, and academic maturity.

- c. The researchers Khalifa Ahlam and Bukhandi Wahiba pointed out in their research [14] to the extent of the possibility of applying distance education, as educational institutions are a major basis for building and developing the capabilities and skills of individuals and human resources necessary to work in various fields and specializations. On the other hand, it contributes to developing plans for development in societies, developing scientific research, advancing science and knowledge, and disseminating science in all societal groups. Now, technological development has prevented this, especially in developing countries and Arab countries in particular, where reports, statistical agencies, and competent regulatory authorities indicate that in 1992, the general rate for researchers in developing societies and countries was (0.8%). In addition, the current world witnessed exceptional circumstances represented by the rapid and sudden spread of the Corona virus Covid-19, and the public institutions of countries, especially educational institutions, were affected by this pandemic, which stopped the movement of the world and infected countries. By stopping all scientific activities, it was no longer possible to continue the educational process in its traditional form, and it kept millions of people, especially students, in their homes without education. Not all countries were at the same level in terms of the available technological capabilities. Class differences appeared in terms of skills for users and in terms of technical equipment and availability of technological means. The speed of lines in Internet networks and other observations about the differences that have emerged between one country and another. This study aimed to identify the measures taken by countries of the world to continue educational science after the closure of schools and universities. The study focused on shedding light on the sudden shift to emergency education.
- d. In his research [7], researcher Mimi Al-Sayed Ahmed conducted a study to reveal the relationship between the use of distance education and the digital calendar in light of the Corona pandemic in... Faculty members, in addition to identifying the extent to which the relationship between the use of digital education and distance learning differs depending

on the type of student (male - female) among the faculty members, as the research sample consisted of (92) samples of faculty members who were chosen randomly during the semester. The second states that distance learning is the strategic option that has no alternative in the face of the obstacles and difficulties faced by educational and academic institutions in light of the lack of movement, activities and daily life in general due to the spread of the virus. Distance education also shows us several benefits, including not being restricted by time and place in the timing of the lecture. Distance education is defined as a type of education in which the student does not attend the classroom.

- e. Researcher Ahmed Ibrahim Saleh indicated in his research [33] to know the trends and opinions of the Iraqi press regarding distance education or e-learning, while global interest in the issue of distance education and news related to it increases. It concerns the Corona virus, and the repercussions of this virus were to stop all aspects of life, which called for governments to impose a comprehensive ban. The goal of this ban is to reduce the spread of this epidemic and reduce infections. Universities and educational institutions are among the most prominent institutions affected by this ban, and distance education is the most prominent challenge for many countries. At that stage, this study or research reached several results, including that the media, with the means, expertise, and tools it possesses, has a major role in educating and raising awareness of societies regarding distance education. Also, the issue of distance education has crossed the borders of countries and has become a global event, and it was important The transfer of expertise and experiences between countries, since distance education falls within the strategic planning of countries and ruling systems, and citizens subject to health isolation follow the news and information about distance education from bulletins, news cycles, and other media programs. Whenever societies undergo changes regarding distance education, this is clarified. Communities through journalism and news. Also, the way male and female journalists work has changed and has become more restricted in terms of movement and coverage of events due to the spread of the epidemic.
- f. In her study [5], researcher Alia Jassam Muhammad pointed out in her study (The Role of Artificial Intelligence Applications in Improving the Quality of Educational Service for Educational Institutions), and she prepared a questionnaire form. It consists of three axes for the purposes of the research. The first axis dealt with the demographic distribution of the sample, and the second axis dealt with including the dimensions of

artificial intelligence. The third axis contained the quality of educational service. A five-point Likert scale was used to measure the research variables, and a questionnaire was distributed to the research sample, which numbered 80 faculty members. 74 responses were retrieved from these members, so the response was 92%, and a program was used SPSSIn analyzing the data, the research was able to reach several results, the most important of which is that the process of using artificial intelligence in the education sector makes education more active and dynamic, in terms of communication between universities and educational and teaching staff, more accurate in information, and more extensive in the search for modern information.

- g. Researchers Mutaym Jamal Al-Yasser, Hussein Falih Mahdi, and Ahmed Yahya Hassan indicated in their study [13] that e-learning is an important necessity and an important need in our modern era, which prompted professionals and teaching staff To enhance the capabilities of distance education and develop the electronic educational process, including programs and tools that contribute to the development of distance education, in order to keep pace with the accelerating changes in our accelerating era and for the purpose of achieving scientific cooperation and continuing education, and given the importance of electronic education, it has become an existing and important element in our time, and to continue to open workshops and courses. The development of the distance education methodology, and to achieve the research objectives, the researchers followed the descriptive analysis approach from samples. The number of samples reached 104 samples between male and female teachers from Iraqi universities for the purpose of obtaining the necessary information for the purpose of highlighting it in the research. The sample was divided into two parts consisting of 56 samples from scientific specializations. The research reached several results, the most prominent of which is the necessity of establishing training programs or workshops for teachers to train them in order to develop the skills of using electronic platforms and help them in delivering scientific material to students in a way that achieves interaction between teachers and students, as well as the necessity of preparing standards for electronic education and the use of electronic platforms in accordance with the standards of scientific institutions, Globalism.

1.7.2 Foreign Studies

- a. Researchers Zhichao Liu, Jinhua Yang, Juan Wang, and Lin Yu in their study [24] represents the intelligent assembly of large-scale complex structures using a smart manufacturing platform of the future during assembly processes. Extensive structural, many problems occur in technology Assembly the assistant existing (Firstly: Technique Assembly Traditional the list on LiDAR. It is often what He is Limited Openly environment manufacturing, where There are points blind, and it continues Online therefore not maybe investigation amendment Assembly. Secondly, not maybe for system LiDAR single The station to gather.

Therefore, assembly modification cannot be achieved). Secondly, the system cannot Single-station LiDAR clustering of large structures investigation Coverage complete, Than Means that it He should Use road Plural between stations Multiple to get on Coverage Complete Data Triple Dimensions to speak Many from mistakes data because of Transport between stations more from Accuracy Measurement from station one, Than Means more big in mistakes Measurement And control For the system As a whole. Third: (because of preparation The big one from the components Structural that It contains it the gathering Great may be lead to Errors Accumulated Interference assembly, but practical Assembly With help LiDAR no Enjoy With ability on Realization Replies verb So it can that It is happening Loss component Assembly Easily when happening overlap in Assembly Therefore, suggest This is amazing the paper Network combination sensor from Fiber Optical Fitted With technology Twin digital, Which You will allow By entering Data the test from condition entity Assembly the world Real To be done Apply it on sample "Twin" in the world Default And therefore Solution problems openness the test And data, as and is used the system network sensor from Fiber Optical As a means sensor Flexible to observe distribution area the pressure inside Area scope Complicated in the time Real, then Complete amendment Teacher in the time Real For assembly Default building on Distribution data. Include Regions Complex Regions that no maybe Access to her laser, and regions Self Roofs Contact complex, and regions Self the range Widespread distortions bending. It was completed design System monitoring condition Assembly on Basis network sensor Fiber Optical and done suggestion Algorithm monitoring condition Assembly building on quantities Physics Multiple. Feasibility Use a network Sensors Fiber Optical she loneliness

acquisition Parameters the condition The real one for system Assembly Smart Digital Dual discussion. Complete account Offset any position in region the test using the network Nervousness The two convolutions for the unit remaining to provide Parameters Compensation required for the model Default For structure Assembly.

- b. They presented a number of researchers, including Sylvan Gerarda, Antonino Alicia, Nicola Richard, Layla Martin Samosvincenzo D Michaelia, Dr, Luigi Giacomazzi, Simone Pietro Anylod, Diego D Francescane, Adriana Morana, Bloenclair, Emin Reguia, Philip Bylet, Marco Cancd, Thierry robing, Dear Bucantera, Yusef Wardanism in their study [25] is done today to merge Fiber Optical the list on Silica And devices the list on Fiber And devices sensor Fiber Optical in group miscellaneous from Environments Cruel Associated restrictions Radiation under radiation, Complete amendment Properties Macroscopic For fibre Optical from during three Mechanisms Basic Main:Attenuation Al-Najm on radiation, And emission Al-Najm on radiation, And he changed Factor Refraction Al-Najm on Radiation.Depending on file identification Fiber at the use, Contribute This is amazing phenomena In a way Different in Deterioration performance Fiber And from then He should As for Reduce it from Okay to bear Radiation systems or Exploited To design Devices Reveal on Radiation And standards Dosages.look in the influence The strong one For radiation on Applications Main like data transfer or sensor in outer space, And facilities Self Relevance By merging And fission or amenities physics energy high, since Seventies Century Twenty Many from Experiments And theories have conducted studies To determine Assets Microscopic For this the changes.maybe Explanation Deterioration Notable from during generation about road Damages Ionization or displacement For defects Raster in the glass not Crystallized The drug In a way Different(SiO₂)For layers Fiber the basic And the cladding. in reality, He plays Installation Chemist For fibre(Steroids/Concentrations)And operations Detail Turn Whatever.And therefore to set Identity of N nature And properties And mechanisms generation And whitening This is amazing Defects Raster Command Is mandatory from Okay Imagine Methods control in Fiber behaviors Radiological in paper Review This is amazing, Complete an offer Category responses Main For fibre Optical Approved on Silica:Silica Pure Tolerant For fiber radiation Optical the basic or Narcotic With fluorine
- c. The researchers Tetsuya indicated Hayashi and Tetsuya Nakanishi in their study entitled [28] field Communication to meet the demand Growing on Communication capacity the

channel, technology Multiple Transmission By division outer space(SDM).And it has It was completed His research Strongly in the years Last there is chance Telecom Fiber Optical types Different You belong suggestion Fiber Optical(1)from between Species different from Fibers Transfer SDM, Fiber Most Popularity Heal of fibres Multiple Nucleus(MCF).This is amazing the paper Built on We invited you to talk(2)in A seminar around SDMHeld in the meeting Annual Association Laser Japanese(24January-26January2018)And it saves More from the information that Describe MCFspecified parameters the design And efforts The effort from Okay search And development in MCFa company Sumitomo For industries electrical Ltd.

- d. Kensuke Ito*, Makoto miyamori, Ryuichiro sato, Hiroshi Takayanagi, Hideaki Llosa,And Toshihiko Homa in their studies [29]. Connectivity With fiber Optical he device He works on connects on Immediately two from Fiber Subject on the left And the right On a device on road to merge Surfaces Final For fibre on High degree heat.

2. THE ORIGIN AND TYPES OF OPTICAL FIBERS AND THEIR CONTRIBUTION TO THE DEVELOPMENT OF MODERN DETAILS

2.1 THE ORIGIN OF FIBER OPTICS

The first use of optical fibers in the transmission of telephone communications dates back to 1977, but the idea goes back centuries beyond that, in 1970, the Irish physicist (John Tyndall (1840) used a stream of water flowing from one bowl to another and a light source to show that light is reflected internally to follow a certain path while water was spilling from the faucet of the first bowl. (Tyndall) directed a ray of sunlight onto the water stream, he noticed that the light followed the zigzag path inside the curved stream of water, and this was the first research on the wave of light, and then ten years later, the scientist (William wheeling [1985]) invented a method of transmitting light, which he called (tube light), and the scientist believed that using Tubes of mirrors that are discharged from one light source will be able to transmit light to different rooms in the same way as water is delivered through a faucet used in buildings, but due to the ineffectiveness of Wheeling's idea and coinciding with the innovation of the scientist Edison, his idea did not develop. In the second half of the 20th century, fiber-optic technology experienced tremendous rates of progress. Success came to its early fruition in the 50s of that century with the development of the fiberscope image transmission device, which used the first practical glass fiber and was designed simultaneously by (Brian O'Brien [1945]) at the American optics company, and (Narinder Kapany) who was the first to develop the term optical fiber in 1956 with his colleagues at the Imperial College of Science and technology in London, and in 1977 the optical fiber technology was developed, which theoretically provides a minimum signal loss based on silica fibers. Optical fibers are widespread in communications, especially in the US Army, which used them in its advanced communication systems. In the early 70s, the first fiber-optic link was installed in the US Navy on board the battleship (Little Rock), followed by the US Air Force and developed a special technology in 1976, and after the success of those two operations, the defense and development program of the army was funded to develop stronger cables with high performance.

Optical Fiber is a very transparent and flexible fiber made of pure glass (silica) or plastic with a diameter slightly thicker than human hair, and therefore it is considered a very accurate and sensitive tool and is used in optical or optical communications because of its high ability to transmit data over long distances with high accuracy and a very high data transfer rate much better than traditional wire cables. Therefore, optical fibers were used instead of traditional metal wires because the signal travels with the least amount of risk and loss, and it is also immune to electromagnetic interference which metal wires suffer from. It is one of the most important technologies and technical tools that contribute to the development of modern technologies and enhance the capabilities of modern technologies in the modern era to connect the whole world via the internet, as it is one of the technologies that have made millions of individuals obtain and use leading services in communications with ease and fluidity and the transfer of internet and data across continents and seas, hence it is classified as the latest technologies and means of communication in the modern era, these fibers are individually wrapped for each fiber (part) in a plastic package and kept inside a protective tube suitable for the environment in which the cable will be used, there are different types of cable that can be used for a variety of purposes [19]

2.2 FIBER OPTIC CABLE COMPONENTS

Optical fibers consist of several parts and these fibers are in bundles inside optical cables used to transmit optical signals and data over very long distances. The use of optical fiber was not limited to the transmission of internet data only, but was used in several fields, including measuring the temperature and pressure of oil wells, in Physics, in the field of aviation, and was also used in submarines. Optical fibers are made in the following form: core, cladding, buffer coating, and jacket.

- a. Core: It is the center of the optical fiber, and it is made of glass.
- b. Cladding: It is a material made of silica that surrounds and protects the glass core of the optical fiber and aims to reflect light and not scatter it.
- c. Coating buffer: This component acts as a protective cover to protect the optical fiber from damage and external factors and is made of plastic.
- d. Jacket: The protective shield of the entire fiber and what's inside it.

2.3 OPTICAL CABLE ARCHITECTURE

The optical fiber cable is composed of a core layer and a cladding layer, which have been selected for the perfect internal reflections resulting from the difference in reflection coefficient between the two layers in practical uses, and the cladding is usually coated with a layer of acrylate polymer or polyimide, this coating protects the fibers from damage but does not contribute to the optical wave routing properties. The coated fibers are formed in an individual manner for each fiber (or fibers composed in the form of ribbons or bundles) or tube, and several layers of protection are added depending on the nature of use and they are all assembled to form the cable. Sometimes, light-absorbing glass (dark glass) and insulation are placed in rigid fiber cables between fiber bundles to prevent light leakage from one fiber to another.

It also reduces the error between the fibers and is called (cross-talk error) one of the types of errors in data transmission between fibers or to reduce glare in optical fiber applications for photography and internal uses, a fully and generally encapsulated optical fiber is placed next to a bundle of flexible fibers that have a strength similar to a polymer such as (aramid fibers) such as (Turan fabric or Kevlar fabric) inside a lightweight plastic sheath to form a simple cable, and each cable is equipped at the ends with a special fiber-optic connector to allow it to be easily connected and removed from the receiving and transmitting equipment and use in the unsuitable environment. A more durable cable must be manufactured through the manufacturing of semi-rigid cable tubes, which allows a spiral movement in the extension of the fibers and shows greater flexibility and thus protects the fibers from tensile and pressure forces during expansion and resulting due to temperature changes, and the flexible cable can be one of the types either dry or filled with a liquid called gel, and the optical cable performs similarly to the work of a four-pair copper cable in terms of the idea and the copper cable works by an electric signal, meaning the presence of an electrical signal which means no electric current, and the lighting the presence of internet service, while the absence of light means that there is no available internet service.

2.4 OPTICAL CABLE TRANSMISSION MECHANISM

In September 2012, the Japanese company (NTT) demonstrated that a single fiber and cable could transfer one petabit per second over a distance of 50 kilometers, but the cables

currently can contain thousands of optical fibers with the possibility of faster transmission and a larger amount of data up to terabytes per second in some cases, only a small amount of fibers are already lit and used, or the rest is for emergencies or for use later in other places or other facilities of life. In this case companies are building a network larger than their needs and the excessive number of fibers to sell or to benefit from them later to avoid excavation and civil works, as well as obtaining permits from government departments and obtaining not-to-conflict approvals with other services such as the electricity, water and sewage network, and to reduce the practical cost of extending an additional cable, so some fibers remain unilluminated and are called non-luminous fibers [16].

2.5 OPTICAL FIBER AND WIRELESS CABLE

With the rapid development of science and technology, most people have access to the internet across the world, our home and institutional networks rely on wired technology or wireless technology. Wireless communication technology is also considered a modern alternative to traditional wired networks, and some differences have emerged in the use and cost of modern pricing, which is more acceptable and more responsive in terms of performance and service.

Table 2.1: Comparison of Wireless and Fiber

Wireless transmission in terms of speed	Fiber optics in terms of speed
The data transfer process becomes congested and unable to accommodate the huge amount of data, as a wired Ethernet connection by default can provide a maximum of 10 Gb/s using Ethernet cat6	The data transfer speed is much higher and withstands a high momentum of users at the same time as the greater number of users surf the internet and share the same bandwidth
Wireless transmission in terms of distance	Fiber optics in terms of distance
While in wireless transmission, the distances are much shorter and it cannot transmit data over long distances or in large quantities, and it may interfere with other signals, be affected by news floor, and also be affected by weather conditions such as wind, rain, and others.	Optical fibers can transmit clear signals and much further. For instance, a single-mode wired fiber network is applied to large-scale data applications that are frequently used in mobile networks, pon and man networks in general. The wired network provides faster speed and longer distance transmission without interference and is more reliable than WIFI. It is not affected by weather factors and does not suffer from news floor
Wireless transmission in terms of installation convenience	Fiber optic hand installation convenience
The installation of Microwave Fixed Wireless Internet does not take much effort, as well as it only needs a few days to complete it, requires less materials, and is not very expensive as in optical fibers	Optical fibers need more time and are very complex based on environmental factors and other variables, and their installation may take days and months, as well as its cost is much expensive

2.6 TYPES OF OPTICAL FIBERS

2.6.1 Single-Mode Optical Fiber

It is an optical fiber designed to support a linearly polarized modes (LP01) for each specific wavelength direction and no higher order modes (LP11, LP20) only cladding modes that are not centered around the fiber core as single-mode fibers contain a relatively small core that is only a few micrometers in diameter and a small difference in the refractive index between the core and the cladding, and sometimes, the radius of the mode is a few microns and there is also a large pattern area fiber with a relatively large single-mode optical waveguide. Single-mode fibers also provide the user with a greater transfer rate in addition to a longer distance of about 50 times compared to multi-mode fiber, however, single-mode fiber is

more expensive than multi-mode fiber, and among all the differences between single-mode fiber and multi-mode fiber, the simplest is the difference in the size of the fiber core, as well as the associated loss or attenuation and the bandwidth of the fiber.

Single-mode optical fiber work mechanism:

Optical signals are transmitted in a uniform format and pattern in each optical fiber of the fiber bundle and are used in television networks and television cables, and this type is characterized by the small size of the radius of the glass core, where it reaches about (9 Micron) and infrared laser rays with a wavelength of (1.3-1.55) nm pass through it. Multimodal dispersion also does not occur in single-mode fiber, and this feature is important for application in fiber optic communications with a high data rate, especially over long distances, and for this reason it is used exclusively for long-distance data transmission and always for external applications over shorter distances.

The evolution of single-mode optical fiber in communications:

Research and development in the field of optical fiber transmission technology witnessed tremendous progress in the first ten years 1970-1980, from the first low-loss optical laser and the first room-temperature semiconductor injection laser in the laboratory to the field experiment of optical fiber transmission systems. This field is considered unique regarding the rapid deployment of laboratory developments in components technology for commercial systems. Transmission systems based on fiber-optic communication technology have revolutionized the field of communications and are driving change towards the all-digital network. A variety of new functions and features are based on the concept of broadband integrated services digital networks when the core of the fiber is very small as only a beam of light at an angle (0 degrees) can pass steadily through the length of the fiber without significant loss, and this type of fiber is called a single-mode fiber. Also, the main component of a single-mode fiber is that the core is too small to prevent transmission in a single mode. ISDN, which is an acronym for Integrated Services Digital Network, is a broadband that provides services that include low-speed telemetry, high-speed data, high-quality voice, high-definition television distribution, and two-way video, in addition to the plain old telephone service (POTS) which is available today.

Advantages of single-mode optical fiber in communications:

Some distinctive features are available in single-mode optical fibers in terms of communications, the most prominent of which are:

- a. Single-mode fibers do not have conditional dispersion, noise, modularity and other effects with multi-mode transmission.
- b. Single-mode fibers can carry signals at a much higher high speed than multi-mode fibers.
- c. Being a standard option for high data rates or long-range communications i.e. longer than a few kilometers that use fiber optic transmission equipment based on a laser diode.

Disadvantages of single-mode fiber:

The light coupling of single-mode fibers requires tighter tolerances than the light coupling in the larger cores of multimode fibers. Single-mode fiber components and equipment are more expensive than multimodal fibers, so multimodal fibers are widely used in systems where inexpensive connections, distance rates, transmission and speed should be mediocre.

2.6.2 Multi-Mode Optical Fiber

They are optical fibers that support multiple vector modes and often many for a specific optical frequency and polarization. Multi-mode fibers can direct light with poor beam and high optical power by using a high-energy diode tape, but to maintain the beam quality of the light source with a higher radiation, it may be better to use fibers with a smaller core and a moderate numerical aperture, although the effective release of light into the fiber may then be more difficult, as these fibers support hundreds of directed modes. There are also fibers with a large core and with diameters hundreds of micrometers larger. On the other hand, the coherence of the fiber outputs is reduced, and the output field pattern cannot be controlled, as many patterns of optical signals are transmitted through one optical fiber, which makes its use better for computer networks, and this type of fiber has a larger radius and reaches 62.5 micron, through which infrared radiation is transmitted.

Multi-mode optical fiber work mechanism:

Light in multimode fibers is transmitted through several different paths or modes, and multimode fibers with an ideal indicator will compensate for the longest different path and by slowing down the modes that are transmitted in shorter paths near the center of the core while allowing light that travels longer distances and faster in the ideal fiber, all modes reach the receiver at the same time. The compensation is also not perfect, and the modes arrive at slightly different times causing the pulse propagation, as this propagation is called conditional dispersion and it is inversely proportional to the bandwidth. Patterns are also transmitted by light pulses through the multimode fiber because the fibers do not compensate

for the time of movement through the link, and the propagation of any pulse dispersion produces two main factors, namely conditional and color dispersion. The conditional dispersion occurs because Vertical Cavity Surface Emitting Laser (VCSEL) do not emit light of a single wavelength, and wavelengths that are longer are transmitted at a higher speed, causing pulse propagation, but color dispersion is a function of fiber composition and despite the difference in size and wavelength, they are relatively similar in all multimodal fibers.

The evolution of multi-mode optical fiber:

The light-transmitting properties of the end-shell of multi-mode optical fibers have been studied. As well, the light produced from multi-mode optical fiber and modes is expanded very quickly in the end, due to the high Digital Aperture and large core size, the binding angle and position deviation play a strong influence on the transmission loss and the light point, which means that precise binding procedures must be applied in order to reduce the loss of tethering loss and the status bug factor.

Advantages of multi-mode optical fiber in communications:

For short-distance optical fiber communications, multi-mode fibers are often preferred over their single-mode competitors because they can accept light from simpler light sources, such as diodes and light-emitting diodes, i.e. lamps, for example, in less important fiber connectors, as well as with (LED), therefore, the possible data rates or transmission distances that can be achieved using these fibers are limited by the phenomenon of Multi-mode dispersion, as well as the group speed may depend on the propagation mode, where ultrashort pulses scattered in multi-mode fibers can be divided into several different pulses and access times and may confuse any signal transmitted, also this effect can also be significantly reduced by making multi-pattern fibers with an equivalent refractive rate, i.e. graded index fiber, where a greater bandwidth and distance can be achieved.

Disadvantages of multi-mode fiber:

There must be disadvantages and limitations where there are ISO standards which determine the residual level of dispersion obtained in multi-mode fibers, which limits the transmission bandwidth or bandwidth of any distance product, thus the highest performance is achieved, for example, with laser-enhanced fibers with a very precisely controlled refractive index profile.

2.6.3 The Difference Between Multi-Mode Optical Fiber and Single-Mode Optical Fiber

- a. Core diameter: One of the main differences between a multi-mode fiber and a single-mode fiber is that multi-mode fibers have a core diameter larger than that of a single-mode fiber, and its diameter is usually (50 μm) or (62.5 μm), while the diameter of its sheath is (125 μm). The diameter of the single-mode fibers is between 8-10 μm and the diameter of the cladding is (125 μm).
- b. Optical source: In it, both lasers and LED (Light Emitting Diode) lamps are used for short as a light source, and the laser light source is more expensive than the LED light source, but it produces a more distracting light source, i.e., several lighting modes of these light sources are used with multiple mode.
- c. Width range: Multi-mode fibers have a larger initial size than single-mode fiber, it promotes more than one propagation mode, while in single-mode fibers the scale dispersion is lower than in multi-mode fibers, which is why single-mode fiber has a higher bandwidth than multimode fibers.
- d. Conditional dispersion: A sum of wavelengths in the LED light sources used with multi-mode fiber, therefore, each of them propagates at different speeds, which leads to a large conditional dispersion, which is the limit for the useful length of multimode fiber optic cables. In contrast, the laser used to control the fiber is single-mode with coherent light of one wavelength.
- e. Cover Color: The color of the sheath is used in multimode cables and single-mode cables where the standard (TIA-598-C) recommends for non-military applications, it may use a yellow-colored cover for single-mode fiber and an orange or blue color for multimode fibers, i.e., depending on the type, some merchants also use purple color to differentiate high-performance OM4 fiber connections from other types.
- f. Transmission: In single-mode fibers are usually used for long-distance data transmission, for this they are intensively used by telecommunications. While multi-mode fiber with multiple fiber channels is used for short distances, it is therefore used in local networks due to its low cost.

Table 2.2: Method of Checking Single-Mode Fiber Patch Cable and Multi-Mode Fiber Patch Cable.

	Type	Cor/clad ding (um)	Fast Ethern et 100Mb	Gigabit GbE	10Gigabit 10GbE	40Gegabit 40GbE	100Gegabit 100GbE
Multimode	OM1	62.5/125	2KM	275M	33M	-	-
Multimode	OM2	50/125	2KM	550M	82M	-	-
Multimode	OM3	50/125	2KM	800M	300M	100M	100M
Multimode	OM4	50/125	2KM	1100M	400M	150M	150M
Single mode	OS1/ OS2	9/125	40KM	100KM	40KM	40KM	40KM

2.7 THE CONTRIBUTION OF OPTICAL FIBERS TO THE DEVELOPMENT OF MODERN TECHNOLOGIES

The main role of optical fibers appears clear and prominent in enhancing and developing the capabilities of modern technologies, electronics and in the world of technologies in general through the ability and high efficiency that optical cables possess in the way they work, the rapid transfer of data and information and the retention of accurate information during transmission, also its unique and advanced features, as well as in terms of the availability of basic and raw materials such as glass, silica and plastic that are used in the manufacture of these fibers, and all these specifications and features that make optical fibers a major, prominent and essential role in the infrastructure of modern technologies and technology in general, as well as its diversity into two types: single-mode and multi-mode cables. Its role has emerged significantly in the corona covid-19 pandemic through its direct support in the development of technologies used in distance and online education, where optical fibers are very much involved in the manufacture of primary and basic materials in technical tools and means used in the distance education process.

Optical fibers are characterized by many unique characteristics in the world modern technologies world, the most prominent of which are as follows:

- Accuracy of information during transmission.
- Speed of data and information transfer.

- c. Availability of basic materials and raw materials used in its manufacture
- d. Light weight.
- e. Its diversity as it is divided into two types in terms of the use: single-mode fibers and multi-mode fibers.
- f. Long-distance and short-distance transmission routes.
- g. The great flexibility that exists in the nature of the optical fiber body prevents it from being broken during work and buried or passed through water.
- h. Optical cables are better and more efficient than copper cables in terms of usage, durability, and data transmission accuracy.

2.8 THE SECOND RESEARCH

2.8.1 The Role of Modern Technologies and Their Tools in Distance Education Modern Technologies

Historically, the term technology and techniques goes back to the word techne, which means art and letters, which is a Greek word, and the technical history is often associated with the history of Science and knowledge, and that modern technologies are considered one of the tools and discoveries that seek to facilitate human life, and it is considered the widest and most widespread material, and also the most prominent need and the most important commodity in modern times, therefore most of the needs, details and accompaniments of life are related to modern technologies through the employment of these technologies with daily chores, as modern technologies have entered into the smallest details of life, especially in our modern era, as modern technologies represent the concerns and studies that developed countries seek to develop and strengthen their presence in all institutions and organizations within countries, and work on the development of frameworks using these technologies also on expanding the spread of users of these technologies through the preparation of courses and seminars in social professional centers aimed at educating people who are unable to use modern technologies, and what distinguishes modern technologies is the large diversity and multiplicity of their uses that have developed a lot and make it available in all global markets, and modern technologies vary in the diversity of their specifications, method of work and service to humans and society, while modern technologies store information in its various forms, and are also considered a modern and updated vision that has emerged and entered

into the operations of processing and communicating data and information as fast as possible and at the lowest cost. Thanks to the improvements and developments that have taken place in the field of technology and techniques, these technologies became the basic and main tools in all global institutions and systems. Developed countries or countries of the first world level are seeking to develop programs, tools, manufacture of backup and raw materials, and everything related to modern technology and techniques in order to contemporary and synchronize the needs of societies and progress in technical development which in turn increases and enhances the development of luxury and ease of use of technology in the service of human and society in general [33].

2.8.2 The Importance and Benefits of Modern Technologies

It is clear to everyone the reliance and great attention that modern and contemporary life has conducted in all its fields and activities and the great dependence shown by humans in the use of modern technologies. Modern technologies must be developed, especially in educational institutions, because modern technologies often facilitate the needs of people, hence the most prominent benefits and importance of modern technologies are [7]:

- a. Facilitating communication between people through communication networks and developed programs wherever they are.
- b. Ease of transferring data and information between people and institutions and the ability to benefiting from it.
- c. The introduction of modern technologies into security needs through cameras and their monitoring, which led to the reduction of crimes, thefts, and other security cases through surveillance by cameras and internet networks.
- d. Providing job opportunities, where modern technologies are characterized by their widespread and presence in the workplaces of governmental and non-governmental institutions and the private sector as well.
- e. The remarkable introduction of modern technologies into e-learning or distance education, especially in the period of the spread of Corona pandemic, where modern technologies had the most prominent role in the continuation of the education process in the world after the flow stopped in most countries of the world.

- f. The modern entry into the world of football, where modern technologies and technology have contributed to the development of refereeing in football through the VAR technology that was developed recently.
- g. Facilitate account operations in markets and public places through computers and computing devices in marketing and sales places, especially for large brands.

2.8.3 Aims of Modern Technology

The great interest shown by developed countries in the use of modern technologies, which they consider a major goal of sustainable development, and among the goals that must be constantly developed, due to the importance of technologies in our daily lives and providing a service to users, as the United Nations aims to deliver modern technologies, especially the Internet, to the majority and the largest number of The world's population, where the United Nations expected that Internet users will reach nearly half of the world's population by the year 2019 and in 2017, it was estimated that about 9,3 billion people are out of service, 2 billion of whom are women. Within the plan set by the United Nations, the use of The Internet is in the proportion of 53% of the population of the planet, and perhaps the most prominent goals of modern technologies are:

- a. Making the world system digital and introducing technology and technical use in the largest part of human uses in his daily life
- b. Electronic and technical control over global security systems, which is considered one of the most prominent benefits of modern technologies nowadays
- c. Keeping abreast of developments and constant preparation for the events that are happening on the planet from climate crises, crises, disasters, the spread of diseases and epidemics.
- d. Delivery of technical and technological development to the maximum extent possible of humanity, especially developing countries, some of which still suffer from a weak base of technologies.
- e. Diversification of technical devices and equipment and diversification of their use to facilitate the provision of users ' needs without spending financial and physical effort.

2.8.4 The Most Prominent Modern Technologies Tools Used in Education

There are many tools and means for e-learning, distance education, online education or any type or class of non-traditional education, that allow distance education to continue and be able to provide a service to students and society in general. In the needs of education, it is necessary to provide technology and modern technical tools to teaching bodies and educational institutions such as schools and universities, and also provide technical supplies to students, perhaps the most prominent of these technical tools and technology that must be provided in distance education are: [40]

2.8.4.1 The internet

The internet or networks that lead to communication are the main and most important means and the most prominent and widespread tool in modern technologies and in the system of distance education or online education, where distance education consists of several types of education, but all of them are directly and strongly related to the internet service. Perhaps we are not exaggerating if we say that there is no distance education, e-learning or any other type of education without the presence of an internet networking service that enables students to communicate with teaching staff, the internet provides direct discussions, sending e-mail, conducting correspondence, conversations and other communication services via internet networks, also it provides easy access to the required information through research sites, websites, forums and electronic centers, as well as getting acquainted with the latest scientific publications and communicating with practical fields, and also one of the most important benefits of the internet is that it allows people with special needs to distance learning and achieve their academic and scientific goals as well as getting rid of the time constraint.

2.8.4.2 Computers

The computer is considered the most important and widely used tool and method in the modern era, where computers are considered the first rule and the basic principle in starting and running procedures, and the use of computers in life is now something that cannot be discussed, while it has become a key tool in all government institutions and the private sector without exception, as in universities, schools, factories, banks, departments and other technical devices and organizations. The computer is characterized in its many and many

uses, it has broken into the teaching and learning process, where it has become an important part of all academic disciplines and a major subject in every field of study: secondary, university or primary and so on. The use of the computer in a limited work mechanism, where the computer works in the preparation of research, data entry, archiving, viewing videos and storing lectures, and the computer contains many applications and basic programs to use such as Word, Excel, PowerPoint, and other endless uses in the computer world.

Smart applications software:

These programs contribute to stimulating and raising the level of distance education, as they are considered one of the important tools and means required in the distance education system and show the urgent need for students to use these programs for their user-friendly experience and speed in technical performance and are always considered of a more enjoyable and effective technical experience while using. Also, what distinguishes these programs and applications is their electronic processing of many needs in education, such as video integration, audio installation on pictures, image and sound effects operation, as well as contributing to teaching English, especially for beginner individuals starting in education.

Programs for archiving lessons and documents (Editors):

The lessons given to students by teachers are recorded through editing software such as text and PDF so that students can read and study it at other times, and these programs also save illustrative photos for students, reports and research that the professor delivers in electronic lectures.

2.8.4.3 Social media websites

Social media websites and applications are somewhat necessary for students to communicate with each other, as well as their communication with the teacher or professor in communicating their ideas and academic demands, and these programs provide the necessary communication service. the most prominent and most widespread of these programs are Facebook, Twitter, Telegram, WhatsApp, Viber and other social networking sites. Social media, especially Facebook and YouTube, have made great progress and an effective contribution to the attribution and success of distance education through students' demand for these programs in their use and employment for education.

Camera:

It is one of the technical tools and means that are found in most modern devices such as phones and computers, and it has become an integral part of these devices. The accuracy and quality of work in cameras varies from one device to another, and the role which camera plays in practical and scientific communication is very important in increasing interaction between teaching staff and students, as the camera works to make communication live and with an audiovisual form between the two parties.

2.8.4.4 Audio conferencing

They are in the form of traditional phone calls aimed at communicating between two parties (such as a student and a professor), and there may be more than two users or sometimes a group of people in one call which referred as group calls, and they are via communication lines or the internet.

2.8.4.5 Video conferencing

It is considered a modern tool and an important technical means in communication and distance education, and the transmission mechanism is usually on television with high accuracy and requires high internet speed and is always used in conferences, seminars, and distance studies.

2.8.4.6 Electronic panels

It is an interactive electronic board that is often used for drawing, writing, recording sounds, videos, slideshows, and other uses in education, especially after modern technology has entered education and has become an integral part of the education process. The electronic board is considered one of the latest tools and means in replacing traditional education with e-learning or distance education for its excellence and success in contributing to the development of distance education. The electronic board has several privileges that make it easier for the student to save and store documents and videos that are submitted by the teacher and have a significant role in improving the quality of teaching and developing it.

2.8.4.7 Headsets

The headsets are one of the technical tools and means in assigning and enhancing the educational process via the internet and distance education, as the headset gives a higher

quality in the level of receiving the sound and helps students to concentrate more, as well as noise cancellation if students are sitting in public or crowded places. It is also available in different types and levels in term of performance, but it remains an unnecessary tool if it is compared with others.

2.8.4.8 Mailing lists

It is a list of mailing addresses added by an organization or individual, to which messages are transferred between mailing address through file transfer feature. The function of this tool is to transfer files from one computer to another computer connected to it via the Internet.

2.8.4.9 Interactive video

It is the technique that provides interaction between the learner and the presented material with the aim of making education more interactive. This method must be used in some subjects, in which an image must be provided to clarify the material, especially in medical specialties, where it is necessary to make visual applications. It is viewed directly through the interactive video format. This is the best formula for bringing distance education closer to face-to-face education between the student and the professor.

2.8.4.10 CDs

They are the disks through which the curricula are prepared and loaded onto students' devices and then referenced when needed. They work as an electronic treasury like optical disks that store documents, whether they are in a written, image or video format, and one of the most important features of these disks is that they are lightweight, unbreakable and interact with all computers, people still rely on these discs and use them despite the invention of many means that can store and save.

2.8.4.11 Bluetooth

Bluetooth represents one of the most important characteristics of modern technologies that are integrated within technology devices such as calculators, phones and smartboards, and this feature emerged in the early 90s, and is characterized by the power of Bluetooth and its

importance in sending files and data between devices that contain a Bluetooth feature in a transmission speed and size up to 24 GB. This feature is also characterized with its ease of use.

2.8.5 The Role of Modern Technologies in Distance Education (Online Learning)

After this highlighted some of the tools and means of modern technologies, it is necessary to know the role of modern technologies in distance education and the extent of its contribution and impact in establishing a new educational system that is contrary and different from the concepts of traditional education. Since ancient times, there have been attempts to find an electronic education system that is more developed than traditional education, and the idea of Education began in developed countries and advanced universities in the United States of America and Great Britain, and then the idea of distance education has spread in Europe, and distance education became a new educational policy then was applied in many countries. During the Corona pandemic, distance education appeared via modern technologies represented by the Internet. Computers, mobile devices programs and rapid tools of communication to ensure the continuation of education after the lockdown, hence these modern technologies have become the most requested and most important means of basic human needs [10].

2.8.6 The Negative Impacts of Modern Technology

There must be negative and side effects in the many and excessive uses of modern technologies on several psychological, social and health aspects of people who use and work on these devices and equipment, and the most prominent of these impacts are [7].

2.8.7 Human Health

The use of modern technology impacts human health, especially if the use of these technologies is intense and for long hours, such as mobile devices, social communication, sitting in front of a computer screen and other devices, where the impact of these technologies has become clear on some parts of the body such as the eye, which are directly affected by the brightness and strength of the screen lighting, and this brightness lead to the weakening of the eye's vision, also, prolonged and irregular sitting when using the computer negatively affects the physical organs such as the neck and caused back pain. It turns out

that the excessive use of modern technologies and the phone in particular negatively impacts the health of children and distracts them from performing sports and which are very vital in human life at a young age, and also leads children to neglect their food which causes a conflict and imbalance in children's diets.

2.8.8 The Occurrence of a Social Gap

One of the most important negative impacts that must be dealt with is the problem of isolation in families, and therefore the isolation of community members and the occurrence of psychological situations that may have serious and significant damage to the social status in societies, as the family isolation causes a lack of exchange of opinions and lack of daily communication between members of the same family, and children are also very impacted by the excessive use. Children are distracted from reading and learning while they are busy with games and applications of modern devices which are usually attractive to children and thus affect their academic cursus, educational life and the level of interaction, activity and vitality.

2.8.9 Unemployment

In some cases, technological and technical development can be negative for the workforce that does not have employment opportunities except the handicrafts. As the human insertion in businesses, projects and professions gradually disappear with the development of machinery and equipment, where the developments of equipment replace the workforce, and this leads to an increase in unemployment rates and the loss of many members of society who are able to work, but they do not find a job due to the availability of automated mechanisms and equipment, and in this manner, technological and technical development may become negative, especially in countries which do not have the ability of investments, providing advanced job opportunities and keeping pace with the development of technological tools.

2.8.10 Inactivity

It is obvious that the many and large uses modern technologies are reflected in the occurrence of cases of inactivity and obesity for people who use them frequently, such as using the

computer for data entry for a long time or maintaining phones or programs that require sitting for long, repeated, and continuous periods, which causes inactivity and obesity.

2.8.11 Blackmailing and Cyber Threats

Cases of extortion and threats have often appeared through smart programs and applications, which are considered one of the pillars and tools of modern technologies. Local and international complaints have appeared in this area, which is considered a very significant negative situation and occurs especially in countries whose security systems are fragile and not advanced in term of security. Hence, some countries have started developing mechanisms, spyware and monitoring programs for such cases, and enacting criminal laws to limit the occurrence of these anomalies, which lead to abuse and destruction of social life if they are not carefully addressed.

2.8.12 The Role of Modern Technologies in Institutions' Performance

The use of modern technologies is not limited to a specific specialty or specific sector, modern technologies have entered into all branches and needs of life of all kinds, means of their use and the diversity of their working methods. Modern technologies have many uses in institutions and organizations, the most prominent of these uses are [22].

- a. Business development using advanced technologies
- b. Increasing the quality of the organization in terms of work efficiency
- c. Increase productivity
- d. Speed in performance
- e. Aesthetic designs by modern methods with modern software and designs
- f. Entering the required data and information and check it by computer
- g. Save information and data by storage capacities
- h. Reducing the percentage of potential errors that may occur during work

2.9 THE THIRD RESEARCH

2.9.1 Distance Education Preface

Online education, e-learning or distance education is one of the most important activities and events that have contributed to the continuation of the academic cursus of students,

professors and teachers throughout history and not only in our time, where people have used modern technologies in many investments and benefits, most notably the online education platform, as it has recently appeared to us the importance and necessity of distance education in delivering the material and scientific content to students through communication via the internet and through the platforms that have been activated for students by official educational institutions, as there are many types of distance education, also there are different methods of use from one country to another in terms of programs used to deliver scientific content to students by teachers, instructors and professors.

The covid-19 pandemic, after its outbreak and its fast widespread around the world, caused a great leap and a qualitative change in the formulation and style of education. Traditional education, which was customary before the outbreak of the pandemic, was transformed into a different mechanism and method of education in which communication is carried via the internet, due to the lockdown applied to educational institutions.

The internet has the most prominent role in meeting the needs of distance education, and the internet is considered the first and main factor in the success of the distance education process and the access to content and scientific material from teachers to students.

Through the experience of online education after the global lockdown due to the corona pandemic, differences in technical capabilities have emerged from one country to another in terms of skills in using the internet and the use of modern technologies, also in terms of infrastructure policies for technical devices and tools that are used in online education, there are also significant differences in the education categories in terms of assimilation, where online education has been used for all ages and school stages, hence there are intellectual differences and d in the ability of using these technologies.

2.9.2 The Concept of E-Learning

In their study, the researchers (Dr. Khalifa and Dr. Bukhendi) indicated that the concept of e-learning is not an idea that was born today, but in the 19th century, and in the year 1892 the first e-learning process was conducted and the first independent electronic educational department was established at the University of Chicago in the United States, which provided and opened opportunities for students, and thus it is the first university that took the concept of distance education and helped many students to share their answers and discuss them through the tools of distance education used at that time. In the last two decades,

up to 20 countries from Europe and others around the world, have taken early steps in the development and use of technologies in the education and television pedagogy, and appeared what is known as the tale courser in Britain, which is one of the most successful use of distance education, and also it has spread in the USA through videos and tapes with published definitions of distance education [14].

Online education or e-learning, according to the classification of the Europeans Compassion, is one of the methods of education via the internet, which is the the most important factor in the application of the distance education process, thanks to the service provided by the internet in facilitating access to information and services, and it is among the inevitable and important necessities that must be provided and developed in all countries and used in educational institutions, given what the world is going through in terms of climate change or pandemics and the spread of diseases, or military events and other reasons that would stop and impede the educational process for all educational levels and age groups.

Online education represents a new and modern method that fits and adapts to the requirements of modern daily school life in our modern age. The importance of e-learning is manifested in being an important investment for technological and technical tools, and its use in developing and delivering scientific materials and facilitating the educational process for students in difficult circumstances.

Online education or e-learning is characterized by the fact that it is not limited to a specific time or place in delivering a lecture or information to students, where information is delivered to students without their presence at the university or class, but to their place where they are, whether at home or anywhere else and at any time as well. The optimal use of modern technology depends on the presentation of educational content using modern technologies such as the internet, smart applications and smart programs, for which the internet is the main carrier and operator of these browsers, applications and software.

E-learning is considered one of the most important and prominent modern developments imposed by the new conditions of life in the world in terms of technological and technical development, which our current era is interested in as a key tool in completing daily activities and tasks, especially those related to learning, education and the development of intellectual and scientific approaches. Also, online education is an important way to provide scientific content electronically and follow-up to scientific and educational matters in an interactive

system using various modern technologies such as computers or smart phones, applications, software and electronic desks, all of which run on one operating system, the internet.

2.9.3 Origin of Distance Education

Since ancient times , there have always been attempts to develop the methods and ideas of education and transform education from the virtual and traditional method to more advanced and technical methods, distance education arose in response to the needs of many adult learners who are unable to access regular education centers, and there is also another category of people who cannot access regular education centers for many socio-economic reasons, including the difficulty of travel, hardship, distance, high cost, material cost, difficulty in obtaining education and the inability to combine work and learning at the same time.

It was at the beginning of the first stages in distance education, which began in the 19th century, and began to move from the traditional educational content among learners, where education began through correspondence papers and in the form of packages including of the contents and study guide, and e-learning also began with articles and paper collections that arrive from educational institutions to students, and the learners sent their assignments to be reviewed and adapting the means and tools by the teaching staff, so the term “correspondence education” was used. The University of Chicago was the first to establish an independent Department of distance education in 1892.

Over time, education has moved to a more developed stage than its previous era, and technology has entered education, where we have noticed the development of tools, mechanisms, and technical equipment in delivering information and lessons to students. The processes of paper correspondence, articles and paper mail turned into more advanced and easier technologies in the delivery of scientific content such as videos, television, and broadcasting devices such as radio, and that was in 1970, and then CDs appeared, which increased the development and acceleration of the process of distance education, and thus British and European universities accelerated the dissemination and transmission of Distance Education.

In the modern time and due to the rapid global events that the world is witnessing from climatic change and the emergence of some diseases and epidemics that are rapidly spreading, as well as military interventions and difficult conditions through which it is not

possible to be present in educational centers and take scientific material directly from teachers, it has become necessary to adapt to the new phenomenon Education via the Internet or distance education, for example, when the Corona pandemic struck the world and spread to all countries of the world, and all centers and activities of life, most notably universities and schools, stopped practicing education. Distance education has proven its great importance in the continuation of education and the continuation of the learning process between students and teachers through the internet, computers or smart devices and smart applications, and despite the criticism, negatives and violations that occurred in distance education as a result of the sudden and very rapid transition from traditional education to online education, however, it was the only option available for educational institutions and departments in continuing the academic cursus and not postponing the academic years until the end of the pandemic.

2.9.4 Development Stages of Distance Education

Distance education has witnessed several stages of technical and intellectual development and progression in different periods of time, distance education has also developed in terms of independent management style and the methodology of dealing with education, and modern technologies have been introduced into the distance education system, along with the development of the relevant cadres, and the development of students' skills in dealing effectively with the distance education concept, where Distance learning has been developed with the development of technologies that are used in every period at any time, and the stages of distance education can be classified as follows [10] :

The First Stage (Correspondence):

Paper correspondence, typical mail or paper articles was the educational system adopted at the beginning of the idea of distance education, as countries relied on paper publications to deliver scientific material and academic content from education centers to students and that was at the end of the 19th century, the total dependance on distance education was on guidance, and some of the developing countries still use this method.

The Second Stage (Primitive Techniques and Live Broadcasting):

After the development seen by the world in technologies, it was necessary to develop distance education on such technical tools and introduce them into the process of distance education, such as radio, television and satellite stations, which became able to broadcast

lectures and deliver education from education centers to students directly (live broadcast) and thus education achieved great progress from the correspondence stage to the technology era and the beginning of the emergence of technologies in education.

The Third Stage (Electronic Books):

The use of electronic books in open universities, especially the use of audio tools and computer-generated materials, which are considered more advanced in distance education than live broadcasting.

The Fourth Stage (Internet Era):

The internet is considered the most prominent role and the most important electronic and technical revolution in the transition of distance education to its best level, where the internet was able to present distance education to all parts of the world with ease and in more accessible ways and with less effort. E-learning has made a significant transition compared to previous stages, and the use of technology in distance education has become a phenomenon widely propagated in the world via internet, where it saves a lot of time and reduces expenses and material costs in transportation and traveling to education centers.

2.9.5 The Importance of Distance and Online Education

Distance education with all its types and forms has become one of the matters that the most prestigious and known universities, schools, education centers, teachers and trainers are interested in with the tremendous technical and technological development that the world is witnessing today, especially in the field of Information Technology and the expansion and development of educational technologies, by taking advantage of every new method It would accelerate the learning and development process and deliver information to learners in the easiest and simplest way possible, and the most prominent of these technical developments is the emergence of what is known as distance education. Recent years have witnessed an increasing interest in providing education through the internet and there are many electronic universities, educational institutions and centers that offer this type of education due to its achieved and tangible success in many aspects, in addition to integrated programs and scientific certificates obtained in distance education.

2.9.6 Among the Most Important Points Provided by Distance Education or Online Education are: (Arab British Academy for Higher Education, 2014, 10)

- a. Continuous education: Distance education or E-Learning allows the continuity of academic and educational cursus and the continuation of giving lessons, assignments, jobs and study tasks to students and delivering the materials through the Internet using technical systems and applications, modern and smart programs that provide them with educational opportunities despite the interruption of activities, movement and daily business for any reason.
- b. Filling the lack of faculty members: In some countries where the teaching staff is insufficient to absorb the academic and annual curriculum, and the teaching staff is not sufficient to cover the increasing number of students seeking knowledge, and the state's inability to appoint teaching staff and its inability to complete the teaching quorum, distance education and e-learning may be the best way to solve such problems which is one of the most important benefits of online education.
- c. Saving time: Online education and distance education save a lot of time in the process of distance education and research, especially for graduate students who contribute to conferences and seminars via the Internet. The process of communicating via the internet saves a lot of time that students spend in going and returning to educational institutions, especially if they are abroad.
- d. Develop skills and technical devices: It is necessary to develop the electronic base of technology in the policy of distance education and keep pace with the development that is taking place on technical tools and devices, such as the development of optical cables, which have now become the main component in supporting and connecting to the internet, as well as developing skills and technical cadres and spreading the culture of technical education and e-learning.

2.9.7 Objectives of Online Education

The main objective is to establish, support, and create the concept of distance education with its various names, e-learning, online education, blended education and other designations and attributes that have been given to the distance education process. The main goal is to facilitate and enhance the access of information and lessons to students from educational

institutions. Many foundations and objectives have been set for the distance education system to increase its effectiveness and activities, provide ways and tools for supporting the development of distance education, follow up the performance provided by distance education, and follow up on the technical needs that it needs and strengthening communication between students and teachers.

2.9.8 There are Many Objectives of Distance Education, the Most Prominent of Which are

- a. Introducing modern technologies and advanced technology into the educational process and making it essential in modern and contemporary education.
- b. Facilitating the establishment of seminars and scientific conferences remotely, especially for graduate students and researchers.
- c. Develop and train people who use modern technologies in distance education, develop skills in modern technologies, and increase the practical skills in dealing with them.
- d. One of the most important goals of the distance education system is that the physical presence of students is not necessary, and they can receive lessons and lectures anywhere and at any time, and this is the most important advantage of the educational system.
- e. Synchronize and keep pace with technological and technical development and establish a strong and solid infrastructure for technology and support it.
- f. Reducing costs and expenses incurred in transportation, lectures and other costs that are found in traditional education.
- g. Focusing on all age groups and dealing and interacting with them depending on their comprehension level of this educational system and developing mental activities for these age groups.
- h. Attempting to raise the level and quality of education and advance the level of education by introducing modern technology for learning.

2.9.9 Challenges of Distance and Online Education

There are many obstacles and challenges that stand in the way of distance education, through modern technologies, and via the internet in particular, and the most prominent of these challenges are [5]:

- a. Lack of infrastructure: Many systems and countries were technically unprepared, as well as the ability and skill to use these modern systems, especially in developing countries, where many obstacles and challenges appeared in interaction with distance education, it also became clear the fragility of the infrastructure of many countries in the application and use of distance education due to the technical staff incompetency, weak support of technology, lack of training to develop skills and the incompetency of student using this technology, and all these cases were diagnosed and identified during the corona pandemic when the world was forced to take measures to prevent the spread of epidemic infection and make online and distance education the only method that has been conducted by educational and pedagogical institutions for two years.
- b. Loss of internet connection: One of the most important challenges that exist in the educational process in the modern era and at present is internet connection, and the development of the internet connection process must be addressed in homes and institutions and the development of internet networks to optical fibers that will transmit and broadcast internet in a high and clear manner, and the development of the use of internet and tools among users and urging them to join and work with e-lessons.
- c. Students' interaction with the electronic lecture: Student activity and interaction in the electronic lecture or the remote lecture represents an important challenge in distance education, as the absence of a study atmosphere such as classrooms and the presence of the teacher in the hall or the learning materials has a significant impact on the students' understanding and comprehension of the study materials, and the teacher or instructor is keen to create an interactive learning atmosphere that would communicating the study material and the lecture to the students in the best possible way, by opening a window for students' discussion and opening a live meeting in group calls. The main objective is that students become able to participate in the lesson, and it is also possible to make slides through which the lecture is reviewed with pictures and clips that explain the lessons more clearly to students, and with these tools and methods, students' interaction can be increased in electronic lessons.
- d. The role of parents in monitoring: Parents play a crucial role in monitoring their children, especially students of young and primitive age groups. Parents must also provide the requirements and tools of technical education and online learning for their children,

develop their skills, and urge them to pursue their teachers and perform the assignments, lessons and tasks given to them.

- e. Increasing the burden on teachers: The use of online education or distance education increases the burden on teachers and instructors, and fill-up their work schedule and their academic tasks, as distance education requires greater efforts from the teacher in providing and preparing the lecture and lesson for students due to his commitment to a specific schedule determined by the pedagogical institution in conducting the lecture.
- f. Providing tools and devices for distance education: The process of distance education or e-learning requires the provision of technical requirements and devices such as computers or communication devices and may have conditions that have a high technical specifications, and this may be difficult for people with limited income to meet these needs, and this matter represents a material challenge for the low population, thus the state and institutions must consider these population and provide means of assistance to them [2].

2.9.10 Disadvantages of Online Education (Distance Education)

Distance education or online education has disadvantages from an educational and pedagogical point of view, as some experiences used for distance education have shown disadvantages and negative indicators on the process of e-learning or distance education from several social and economic aspects and in terms of academic interaction between the teacher and students and some technical aspects regarding the quality and cost of these technologies, and that distance education is not compatible with all disciplines, the practical and medical specializations in particular do not fit with the idea of distance education, as it is not possible for distance education to be a positive and useful process only, but this system permeates some negative aspects, most notably:

- a. Loss of interaction and study motivation, and boredom from classes.
- b. The possibility of leaking some information among students and the spread of answers in electronic exams.
- c. The difficulty of monitoring by the teaching staff over the integrity and efficiency of the examination process.
- d. Broadcasting networks such as the internet hinder the quality of communication if the network is poor.

- e. The cost of the required devices that are used in distance education.
- f. Incompletion of academic programs in comparison with traditional education.

2.9.11 Types of Distance Education

- a. Blended learning: The concept of blended education is different from the rest of the classes, types and systems in which distance education is used, because blended education is a combination and integration between e-learning or distance education on the one hand and between classroom education or traditional education on the other, and it has been called (hybrid education, mixed education and blended education) and interest in this education type has emerged because of its importance and benefits in complementing and continuing the learning process, where great results have appeared for students who have adopted this system in education, and blended education is the first typical development phase of e-learning.
- b. Distance learning: Distance learning is an old concept, this system and method of Education has been practiced for a long time in many countries of the world, where it was initially based on the idea of paper correspondence between teaching institutions and the elderly. In 1970, distance education began to develop, where television, radio and tapes were introduced into distance education as tools and means for its development, and then seminars and conferences became broadcasted via television and radio and became one of the most successful educational tools at that time.
- c. E-learning: In this educational system type, computer, internet and various kinds of devices and equipment for communication have been employed in the education process, and that e-learning refers to the adoption of modern technologies in the conduct of the education process and the provision of scientific content to students through electronic devices and gadgets. E-learning is also defined as a one of the modern methods through which Audio-Visual Education is carried out between teachers and students through modern electronic technologies.

2.9.12 E-Learning has Two Categories Which are

- a. Online e-learning (Synchronous learning): In this education category, the teacher or instructor is obliged to attend directly with the students, teaching process and discussions are conducted live via the camera so that the lecture is as if it were in the classroom, hall

or laboratory, but it differs only in location, for example, it can be at home and all means are prepared to broadcast the lecture.

- b. Indirect e-learning (Asynchronous learning) : As for asynchronous or indirect education, it allows the student to come back later to the assignments given by the teacher, because the method of asynchronous education allows the student not to be limited to attending at a specific time [1].

Among The Tools and Means That Are Used In Asynchronous Education Are:

- a. Discussion groups.
- b. Mailing lists.
- c. Internet.
- d. File transfer.
- e. E-mail address.
- f. CDs.

Table 2.3: Comparison Between Distance Education and E-Learning: Due to the Diversity and Multiplicity of Systems and Types of Distance Education, There are a Number of Similarities and Differences Between One Type to Another or From One Class to Another, the Most Prominent of These Similarities or Differences are.

No.	Traditional distance education	E-learning
1	Includes old correspondence means and learning by sending assignments in paper form	Modern education includes modern tools and devices
2	The use and application of this system of education was started a long time ago	It is considered a modern system if compared with distance learning due to its emergence with the advent of modern technologies
3	It does not contain design determinants that enter into the mechanism of this educational system	It relies on educational design in its academic presentations, especially modern ones
4	The main reason for its discovery and emergence is the need of mature people for an educational system that differs from the traditional educational system	The main reason for its discovery and appearance is the acceleration of new global events in our modern era such as climate change and epidemic crises
5	Television, radio, and Broadcasting were used as a means of spreading this education in the beginning	Modern technology has been used in the development and prosperity of e-learning, such as the internet, for example, or carrier networks and other means of broadcasting.
6	It is considered the origin in the discovery and emergence of the idea of distance education and its transition from traditional education to a different education system	It is considered a complement and branch of distance education and the main reason for the development of the concept of distance education

2.9.12 Intervention of Organizations and Institutions in the Response to the Corona Pandemic

During the Corona pandemic, the efforts of some countries continued, especially countries that have strong infrastructure in electronics and modern technologies, which had the most prominent role in the continuity of distance education during the Corona pandemic that swept the world and led to the cessation of all activities, including education. International organizations, especially UNESCO, announced its mobilization in the face of challenges in the continuation of education for all age groups and school stages, whether advanced, intermediate, or primitive. UNESCO announced that the estimated percentage of students affected by the interruption of education is 87%, which is a very significant percentage, as approximately one and a half billion students were affected, distributed over 165 countries

have been affected by this pandemic, and there are also many international organizations that have contributed to facing the biggest challenge in the modern era, which is the continuation of education in all countries of the world despite the spread of Corona, where they supported these organizations and institutions and showed their commitment to help countries to confront this pandemic or mitigate the negative impacts that the pandemic left on the educational activities of countries, and many private sector companies have joined, such as Microsoft, Global System for Mobile Communications (GSMC), Google, Facebook, Twitter, Zoom, KPMG and Coursera, where these companies have sought to reduce the losses left by the Corona virus and stand in front of these challenges, as well as there are many solid and strong institutions and organizations in the world that have contributed to facing the Corona pandemic such as Amnesty International, UNHCR, WFP, World Bank, Asian Development Bank, and other international companies. All these institutions and organizations have contributed to facing the spread of the Corona virus by supporting Distance education using modern technologies, technical and electronic tools and means.

2.9.13 Distance Education Platforms

The current era is witnessing a significant growth and increase in the distance education platforms thanks to the modern technology tools, software and smart applications, and this accelerated growth is due to the accelerating global events in the modern era (the era of technology), where technology has become a vital and effective element in addressing global events and the volatility of rapid events, and technologies have developed and become in demand to such an extent that led to the development of factories and laboratories that manufacture technology and the increasing demand for technical tools and devices, which called for the development of skills and spending huge funds to import computers and systems that provide remote communication, and that the philosophy of education has turned into a mandatory learning for all users.

E-learning or online education has become one of the basic components of life in the educational cursus in contemporary societies, and the education system is always looking for continuous development in the learning systems that allow education to keep pace and maintain its continuous development required by the teaching and academic authorities, and scholars have always been seeking in searching for new ideas regarding distance education today, researchers are also developing this sector through modern education platforms that

have contributed to keeping education continuing despite the Corona pandemic that swept the world. The most prominent benefits and advantages of educational platforms are [1]:

- a. Providing community service in the continuation of education.
- b. It works to connect students with teachers in easy technical ways that allow users from all age groups to communicate with their teachers or professors.
- c. The multiple ways and methods in which the quality of programs and platforms work, as each software and application works in a unique way and a distinguished style and behaviour.
- d. It increases the technical awareness and technological development of students who use these platforms in their communication with the teaching authorities.
- e. The platforms are fully proportional to modern technology and modern life.

2.9.14 Among the Software and Applications That Contributed to the Continuation of Distance Education

Many programs and applications have made an actual and very important contribution and had a major role in the continuation of distance education. Universities and schools have used practical programs to deliver scientific material, daily lectures, and conduct exams. There is some software that work in the form of live broadcasting, and there are programs that work on the form of tests and examination questionnaires, and these programs and applications have also been used in broadcasting seminars and scientific conferences as well. the most used programs in distance education during the Corona pandemic are: [15]

- a. Google Classroom: It is considered the most famous and most used platform by educational institutions in delivering daily lectures and assignments to students, as well as in conducting tests and exams for students, and it is also an educational electronic platform through which teachers, professors and students communicate with each others, and through which student questions and inquiries are submitted, etc. This platform is made to serve everyone, and it is also considered one of the effortless services, so Google Classroom is dealt with without papers and study materials. Thus, Google Classroom provides save money for parents, and also does not oblige the student at a specific time to take the scientific material and homework given by the professor, and at the same time, the professor or the teacher can control the students' attendance to Classroom platform at a schedule imposed by the institution or the administration. It allows us to handle freely

our school schedule, and this is a good indicator of the quality of this platform. Also, data and information are stored for students who did not attend at the scheduled time, and ease of use is one of the major qualities of this platform, and it is not limited to a certain number of users or participants during the classes.

- b. Zoom meeting: It is a live communication platform and is usually used in seminars and conferences between professors or students during the explanation. The number of participants and users of this application is limited, as it allows between 100 to 500 participants, and the Zoom application is one of the most popular applications which used for high-level meetings on the internet, as well as making video calls. Among the features provided by the Zoom application are video calls and voice calls, the ability to activate the full screen mode and expand the view of the presenter. Also, through Zoom, you can schedule and join meetings.
- c. Conference Program: The conference application is not very different from the Zoom application in terms of use and method of work. This application or software is distinguished by its ability to accommodate the types of meetings between colleagues, friends, and businessmen. Some teachers used this application to broadcast their lectures to motivate students in scientific events, and also it is considered one of the secure programs that provide improvements such as data encryption and user protection from hacking.

3. QUESTIONNAIRE AND ANALYSIS

Table 3.1: After we Took a Sample of Students and Graduates to Answer the Questions of the Questionnaire Related to the Study and Regarding the Question (is an Optical Cable Network Better Than a Wireless Network), the Answer of the Age Group of Students who Less Than 20 Years Old are was in Several Percentages, Including That 14% Preferred it.an Optical Cables on.

The optical cable network is better than the wireless network in distance education			
	Agree	Disagree	Neutral
	21	67	13
Age < 20	14	4	4
Age 21-25	30	33	33
Age 26-30	13	15	15
Age > 30	43	48	48

Chart 3.1: After we Took a Sample of Students and Graduates to Answer the Questions of the Questionnaire Related to the Study and Regarding the Question (is an Optical Cable Network Better Than a Wireless Network), the Answer of the Age Group of Students who Less Than 20 Years Old are was in Several Percentages, Including That 14% Preferred it.an Optical Cables on.

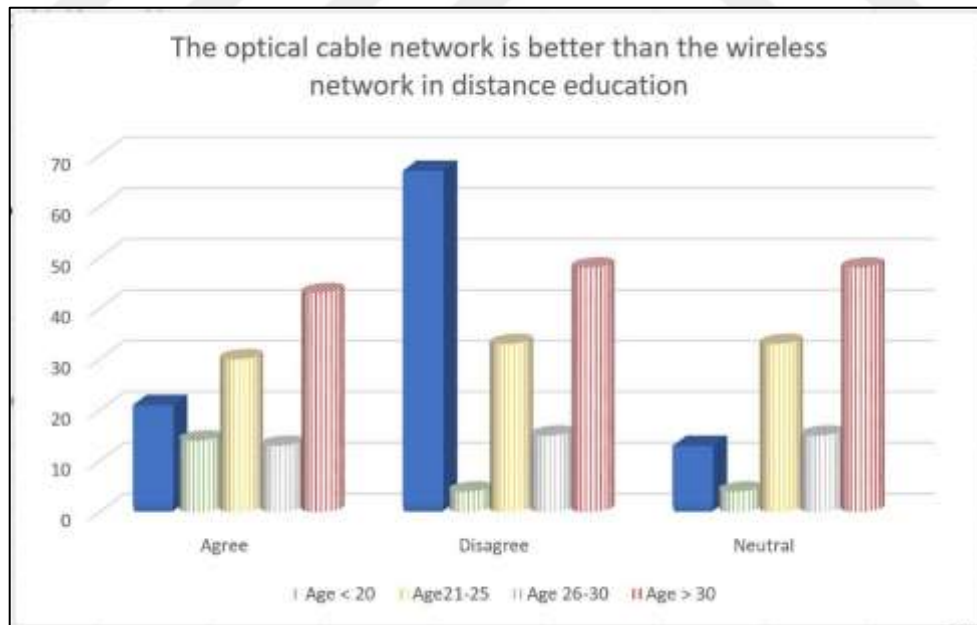


Table 3.2: After we Took a Sample of Students and Graduates to Answer the Questions of the Study's Questionnaire Regarding the Question (is the Speed of Data Transfer in Optical Cable Faster Than the Speed of Data Transfer in Wireless Devices), it was Found That the Answer of Individuals, Including Students and University Graduates, Aged Between 20-30 Years, was on the Order of 53% Preferred Optical Cables Over Wireless Devices, While 20% of Them Did not Prefer Them, and Their Answer was Disapproval and Move Towards Wireless Devices, While 28% of Them Gave a Normal Answer, Meaning They Did not Reject the Two Sides and Did not Agree with the Two Sides, as in the Table and Figure Below.

The data transfer speed is better in the optical cable than in the wireless			
	Agree	Disagree	Neutral
	53	20	28
Age < 20	1.886792	15	7.142857
Age 21-25	28.30189	40	25
Age 26-30	26.41509	35	32.14286
Age > 30	43.39623	10	35.71429

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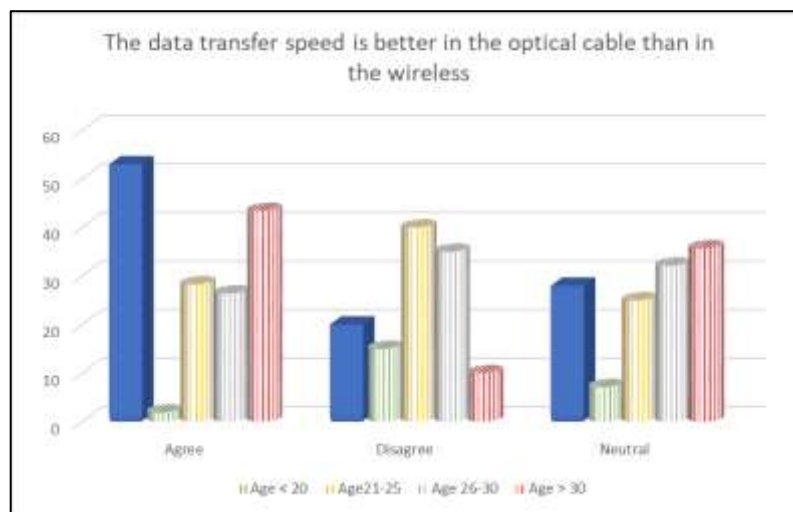


Table 3.3: After we Took a Sample of Students and Graduates to Answer the Questionnaire Questions Related to the Study and Regarding the Question (is the Optical Cable Network is Better Than the Wireless Network. the Results of the Questionnaire That we Conducted for a Group of Students and University Graduates Aged Between 20-30 Years Showed That the Following Percentages: 67% Preferred Optical Cable Over Wireless, While 13% Did not Prefer Optical Cable, but Rather Preferred Wireless. Also, the Percentage of 21% Preferred Optical Cable Over Wireless. % Were Neutral, Meaning They Preferred Both Together, as Shown in the Figure and Table Below.

than the wireless network in distance education			
	Agree	Disagree	Neutral
	67	13	21
Age < 20	5.970149	7.692308	4.761905
Age 21-25	26.86567	38.46154	33.33333
Age 26-30	31.34328	38.46154	19.04762
Age > 30	35.8209	15.38462	42.85714

Chart 3.3: After we Took a Sample of Students and Graduates to Answer the Questionnaire Questions Related to the Study and Regarding the Question (is the Optical Cable Network is Better Than the Wireless Network. the Results of the Questionnaire That we Conducted for a Group of Students and University Graduates Aged Between 20-30 Years Showed That the Following Percentages: 67% Preferred Optical Cable Over Wireless, While 13% Did not Prefer Optical Cable, but Rather Preferred Wireless. Also, the Percentage of 21% Preferred Optical Cable Over Wireless. % Were Neutral, Meaning They Preferred Both Together, as Shown in the Figure and Table Below.

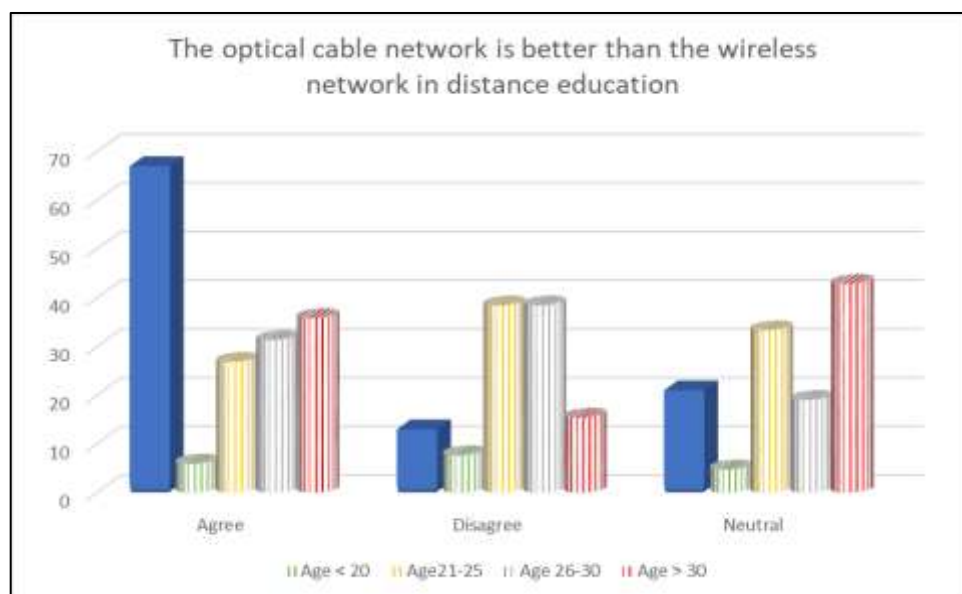


Table 3.4: After we Took a Sample of Students to Answer the Study's Questionnaire Questions Regarding the Question (is Distance Education Limited in the Time Required for Learning Compared to Traditional Education), it was Found That the Results of the Questionnaire, What we Did for a Group of Students, According to the Percentage, 60% Preferred to Agree to Distance Education, While 17% Did not Agree to Distance Education, While 24% Were Neutral in the Answer, as Shown in the Figure and Table Below.

Distance education is limited in the time required for learning compared to traditional education			
	Agree	Disagree	Neutral
	60	17	24
Age < 20	7.462687	5.882353	0
Age 21-25	25.37313	41.17647	33
Age 26-30	35.8209	23.52941	17
Age > 30	31.34328	29.41176	50

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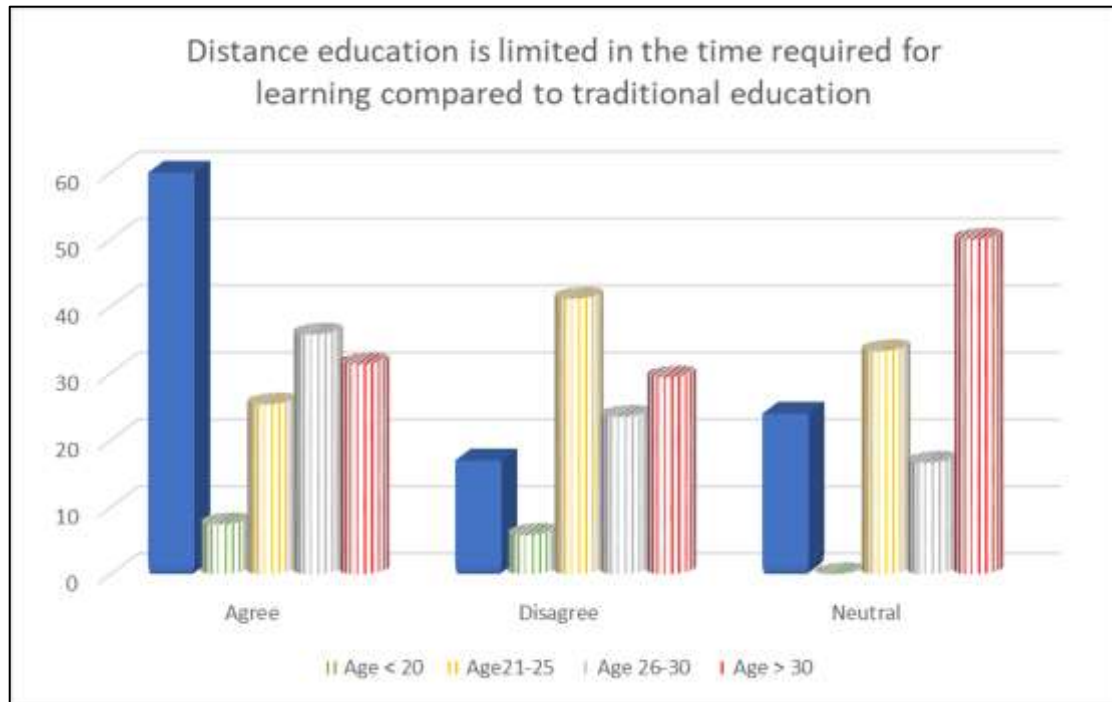


Table 3.5: After we Took a Sample of Students to Answer the Study's Questionnaire Questions Regarding the Question (Does Distance Education Facilitate Administrative Transactions for Students), it Turned out That the Results of the Questionnaire That we Conducted for a Group of Students Were as Follows: 62% of the Individuals Agreed, While 17% of the Individuals Agreed. They Did not Agree with That, While 22% of Them Were Neutral in the Answer, as Shown in the Figure and Table Below.

Distance Education Facilitates Students' Administrative Transactions			
	Agree	Disagree	Neutral
	62	17	22
Age < 20	6.451613	5.882353	4.545455
Age 21-25	30.64516	35.29412	22.72727
Age 26-30	35.48387	23.52941	18.18182
Age > 30	27.41935	35.29412	54.54545

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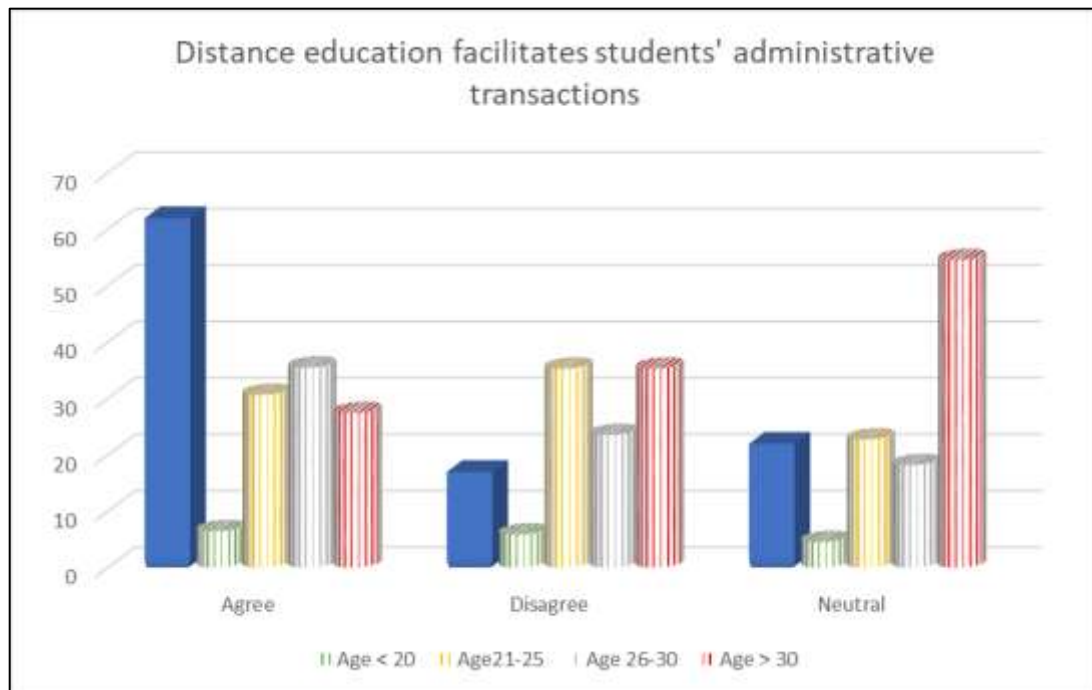


Table 3.6: After we Took a Sample of Students to Conduct a Questionnaire on the Following Question (is Distance Education Provides Various Educational Activities That Suit Learning Styles. the Results of the Questionnaire Showed That 58% of Them, with a Standard Deviation of (6.896552), Had a High Acceptance Rate, While 23% of Them Were Rejecting, While 20% Preferred to be Neutral in Their Answer, as Shown in the Figure and Table Below.

Distance education provides various educational activities that match Miscellaneous learning styles			
	Agree	Disagree	Neutral
	58	23	20
Age < 20	6.896552	4.347826	5
Age 21-25	27.58621	39.13043	25
Age 26-30	36.2069	21.73913	20
Age > 30	29.31034	34.78261	50

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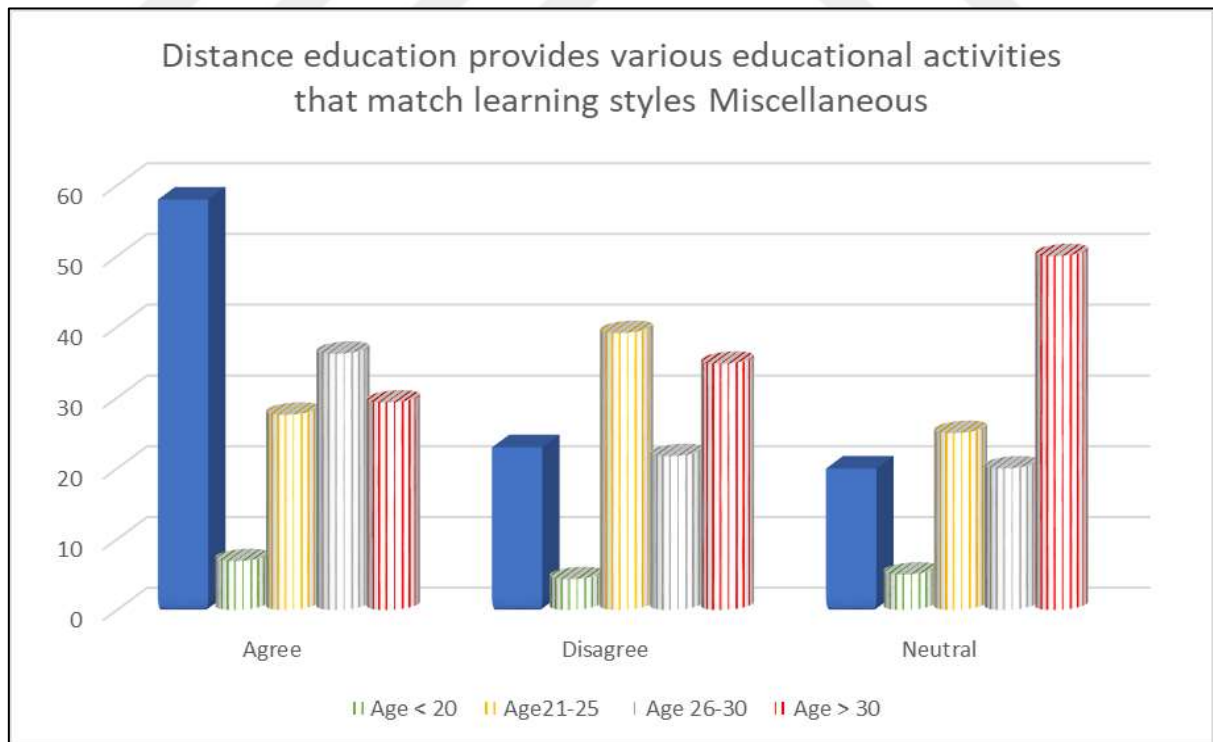


Table 3.7: After we Took a Sample of Students to Conduct a Questionnaire on the Following Question. Distance Education Provides Up-To-Date, Reliable and Accurate Educational Content.

the Results of the Questionnaire That we Conducted for a Group of Students were as Follows: 53%, with a Standard Deviation Rate of (5.660377), Which is a Very High Acceptance Rate, While 16% Disagreed, While 32% Preferred to be Neutral in Their Answers, as Shown in the Figure and Table Below.

Distance education provides educational content that is modern, reliable and accurate			
	Agree	Disagree	Neutral
	53	16	32
Age < 20	5.660377	0	9.375
Age 21-25	30.18868	37.5	25
Age 26-30	39.62264	25	15.625
Age > 30	24.5283	37.5	50

Chart 3.7: After we Took a Sample of Students to Conduct a Questionnaire on the Following Question. Distance Education Provides Up-To-Date, Reliable and Accurate Educational Content.

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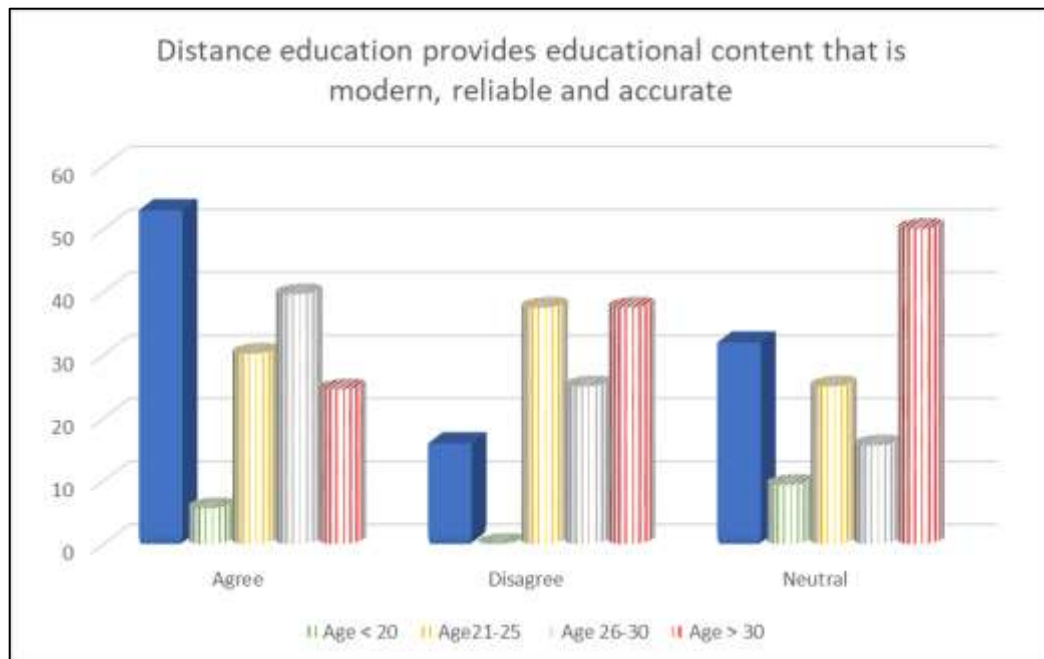


Table 3.8: In the Questionnaire by Students on the Following Question (do Distance Education Supports Student Interaction), the Results of the Questionnaire we Conducted were as Follows: 50% of the Students Agreed, While 27% of the Students Preferred not to Accept, While 24% were Neutral in Their Answer, as in the Table and Figure Below.

Distance education supports student interaction			
	Agree	Disagree	Neutral
	50	27	24
Age < 20	5.660377	0	8.333333
Age21-25	30.18868	29.62963	29.16667
Age 26-30	39.62264	40.74074	20.83333
Age > 30	24.5283	29.62963	41.66667

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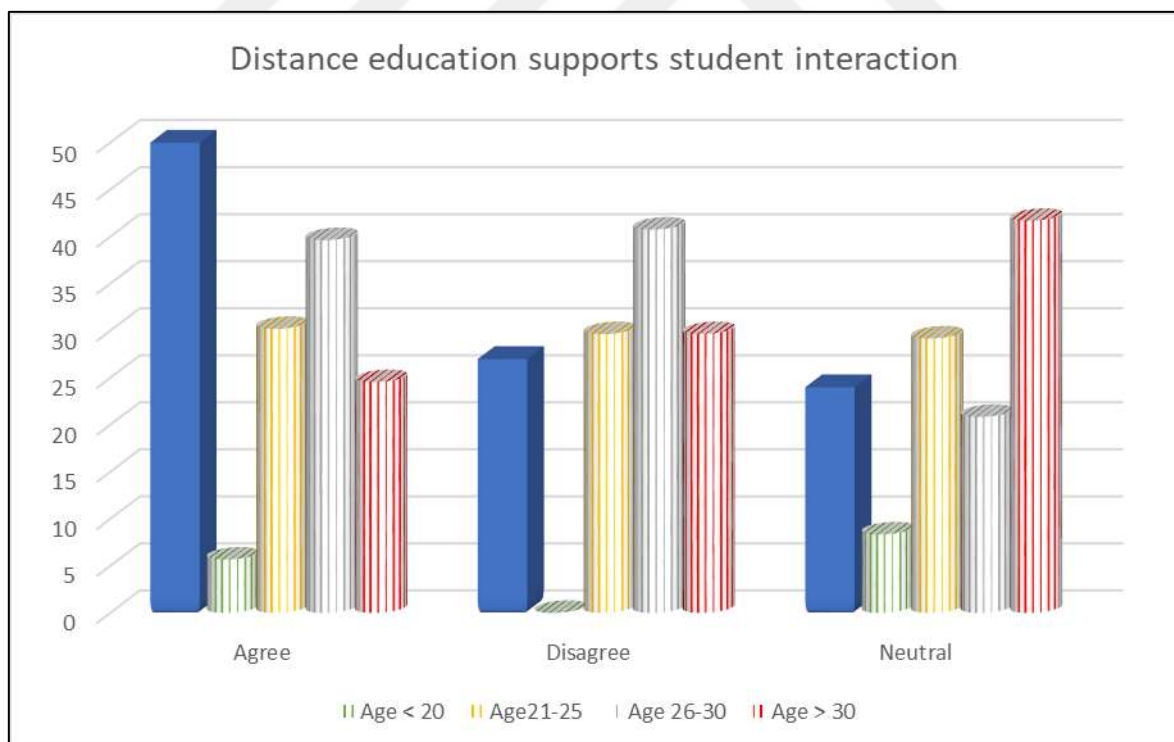


Table 3.9: We Surveyed a Group of Students on the Following Question (Distance Education Takes into Account the Individual Needs of Students. the Results Were 63% Agreeing with This with a High Standard Average of (7.936508), While 19% Disagreed, While 19% Preferred to be Neutral in Their Answer, as in the Table and Figure Below.

Distance education takes into account the individual needs of students			
	Agree	Disagree	Neutral
	63	19	19
Age < 20	7.936508	0	5.263158
Age21-25	28.57143	36.84211	26.31579
Age 26-30	30.15873	26.31579	31.57895
Age > 30	33.33333	36.84211	36.84211

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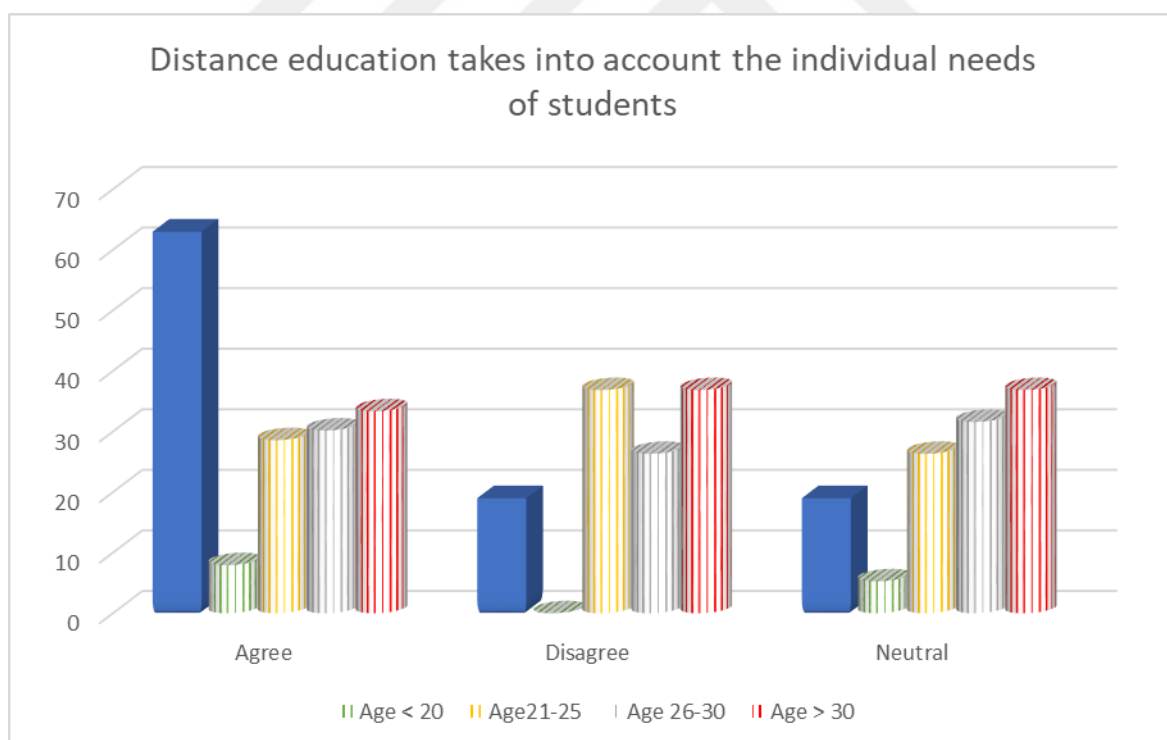


Table 3.10: Also, the Next Question From the Questionnaire (Distance Education Offers Different Strategies and Teaching Methods That Suit the Student. the Results of the Questionnaire Showed That 56% of Them Agreed with a High Standard Average of (7.142857), While 21% of Them Disagreed, While 24% Were Neutral in Their Answer, as in the Table and Figure Below.

Distance education provided different strategies and teaching methods that suit the student			
	Agree	Disagree	Neutral
	56	21	24
Age < 20	7.142857	0	8.333333
Age21-25	23.21429	42.85714	33.33333
Age 26-30	35.71429	33.33333	12.5
Age > 30	33.92857	23.80952	45.83333

Chart 3.10: Also, the Next Question From the Questionnaire (Distance Education Offers Different Strategies and Teaching Methods That Suit the Student. the Results of the Questionnaire Showed That 56% of Them Agreed with a High Standard Average of (7.142857), While 21% of Them Disagreed, While 24% Were Neutral in Their Answer, as in the Table and Figure Below.

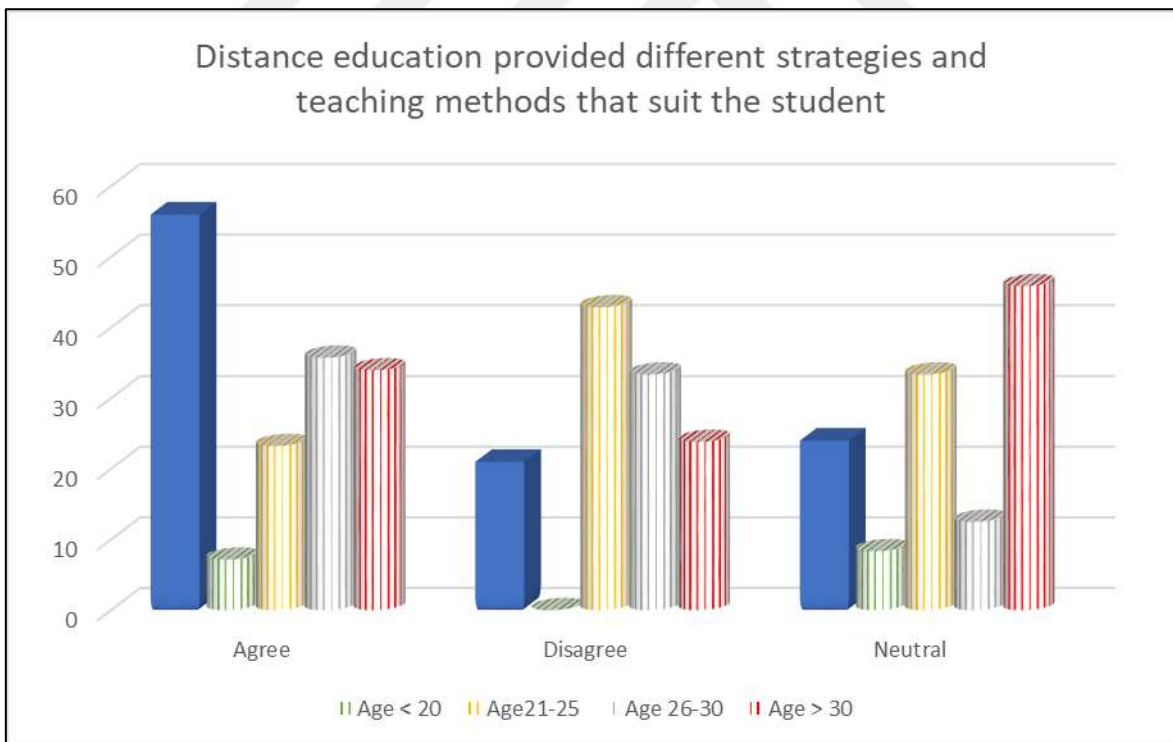


Table 3.11: After we Took a Sample of Students to Conduct a Questionnaire on the Following Question. Distance Education Contributes to Enhancing the Role of the Teacher While Explaining the Content. it Turned out That the Results of the Answer Were as Follows: 49% of Them Answered with Acceptance, While 24% Answered with Rejection, While 28% Were Neutral in Their Answer, as in the Table and Figure Below.

Distance education contributes to strengthening the role of the teacher while explaining the content			
	Agree	Disagree	Neutral
	49	24	28
Age < 20	8.163265	0	7.142857
Age21-25	28.57143	20.83333	39.28571
Age 26-30	28.57143	33.33333	28.57143
Age > 30	34.69388	45.83333	25

Chart 3.11: After we Took a Sample of Students to Conduct a Questionnaire on the Following Question. Distance Education Contributes to Enhancing the Role of the Teacher While Explaining the Content. it Turned out That the Results of the Answer Were as Follows: 49% of Them Answered with Acceptance, While 24% Answered with Rejection, While 28% Were Neutral in Their Answer, as in the Table and Figure Below.

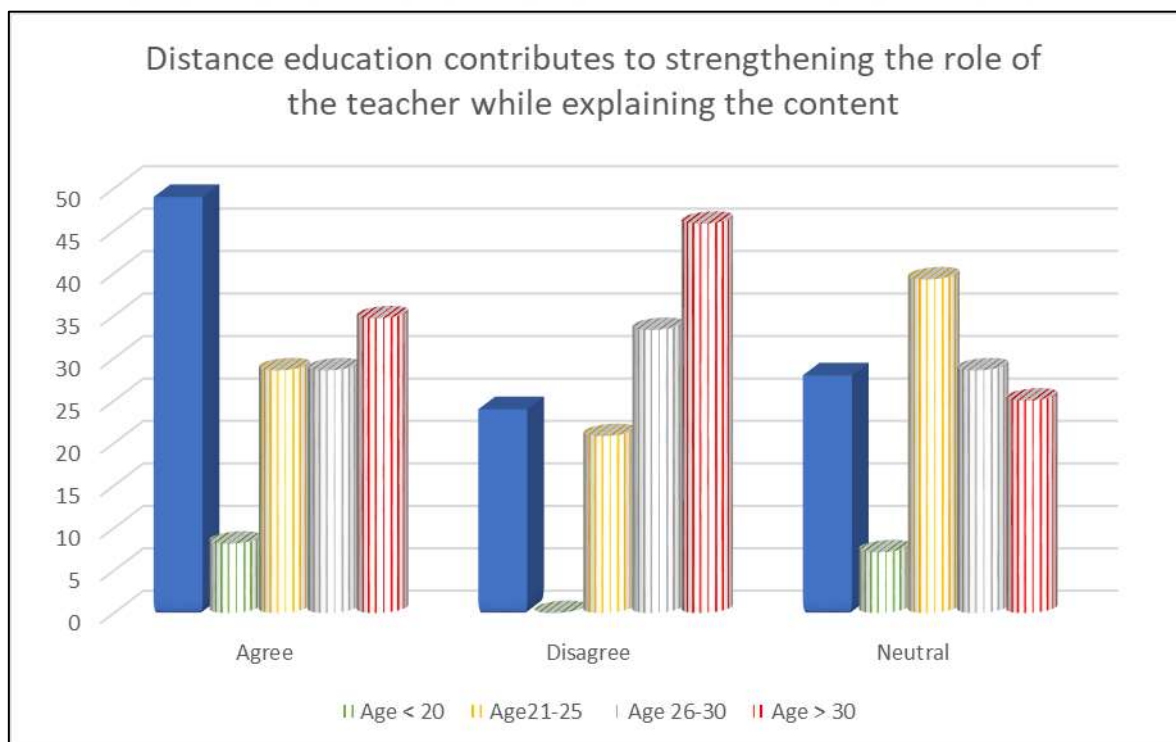


Table 3.12: After we Took a Group of Students on the Following Question (the Distance Education Program Provides the Experiences the Student Needs. it Turned out That the Results of the Questionnaire Were as Follows: 53% of Them Agreed, While 23% of Them Rejected, While 25% of Them Were Neutral in Their Answer, as Shown in the Table and Figure Below.

The distance education program gives the experiences that the student needs			
	Agree	Disagree	Neutral
	53	23	25
Age < 20	5.660377	8.695652	4
Age21-25	32.07547	30.43478	24
Age 26-30	39.62264	17.3913	20
Age > 30	22.64151	43.47826	52

Chart 3.12: After we Took a Group of Students on the Following Question (the Distance Education Program Provides the Experiences the Student Needs. it Turned out That the Results of the Questionnaire Were as Follows: 53% of Them Agreed, While 23% of Them Rejected, While 25% of Them Were Neutral in Their Answer, as Shown in the Table and Figure Below.

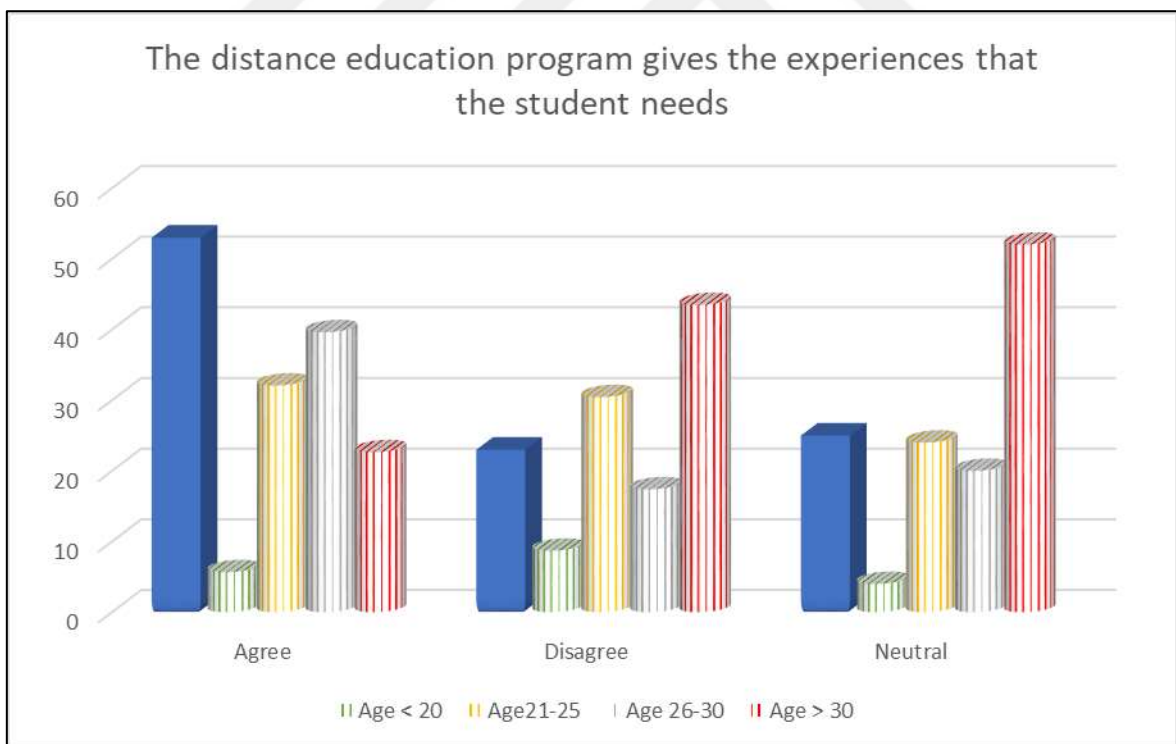


Table 3.13: Among the Questionnaire Samples From Students on the Following Question (Distance Education Provides Easy Access to Resources and Information). it Turned out That the Results of the Questionnaire Were as Follows: 64% Agreed with a High Standard Average of (3.125), While 26% Disagreed, While 11% Were Neutral in Their Answers, as in the Table and Figure Below.

Distance education provides easy access to resources and information			
	Agree	Disagree	Neutral
	64	26	11
Age < 20	3.125	11.53846	9.090909
Age21-25	25	34.61538	45.45455
Age 26-30	39.0625	15.38462	9.090909
Age > 30	32.8125	38.46154	36.36364

Chart 3.13: Among the Questionnaire Samples From Students on the Following Question (Distance Education Provides Easy Access to Resources and Information). it Turned out That the Results of the Questionnaire Were as Follows: 64% Agreed with a High Standard Average of (3.125), While 26% Disagreed, While 11% Were Neutral in Their Answers, as in the Table and Figure Below.

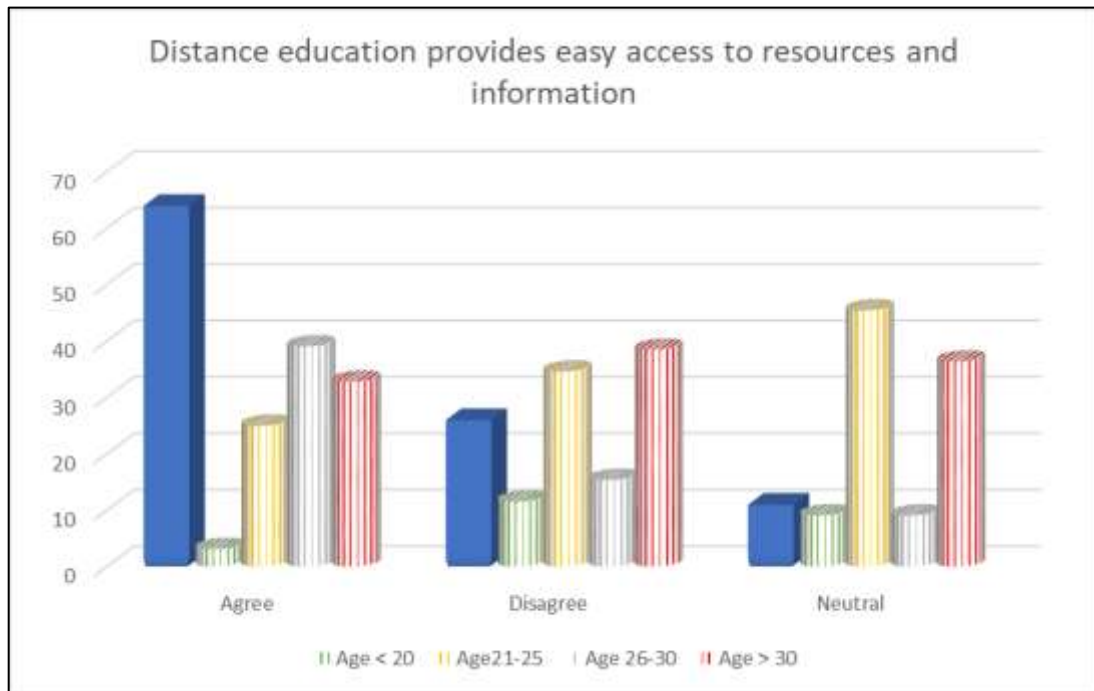


Table 3.14: After we Took a Sample of Students to Conduct a Questionnaire on the Following Question (do you Find it Easy to Deal with Distance Education Tools). it was Found That the Results of the Questionnaire Were 57% Whose Answer was “Agreed” While 27% Were “Rejected” and 17% Were Neutral in Their Answer as Shown in the Table and Figure Below.

Do you find it easy to deal with distance education tools?			
	Agree	Disagree	Neutral
	57	27	17
Age < 20	5.263158	7.407407	5.882353
Age 21-25	29.82456	29.62963	29.41176
Age 26-30	29.82456	25.92593	35.29412
Age > 30	35.08772	37.03704	29.41176

Chart 3.14: After we Took a Sample of Students to Conduct a Questionnaire on the Following Question (do you Find it Easy to Deal with Distance Education Tools). it was Found That the Results of the Questionnaire Were 57% Whose Answer was “Agreed” While 27% Were “Rejected” and 17% Were Neutral in Their Answer as Shown in the Table and Figure Below.

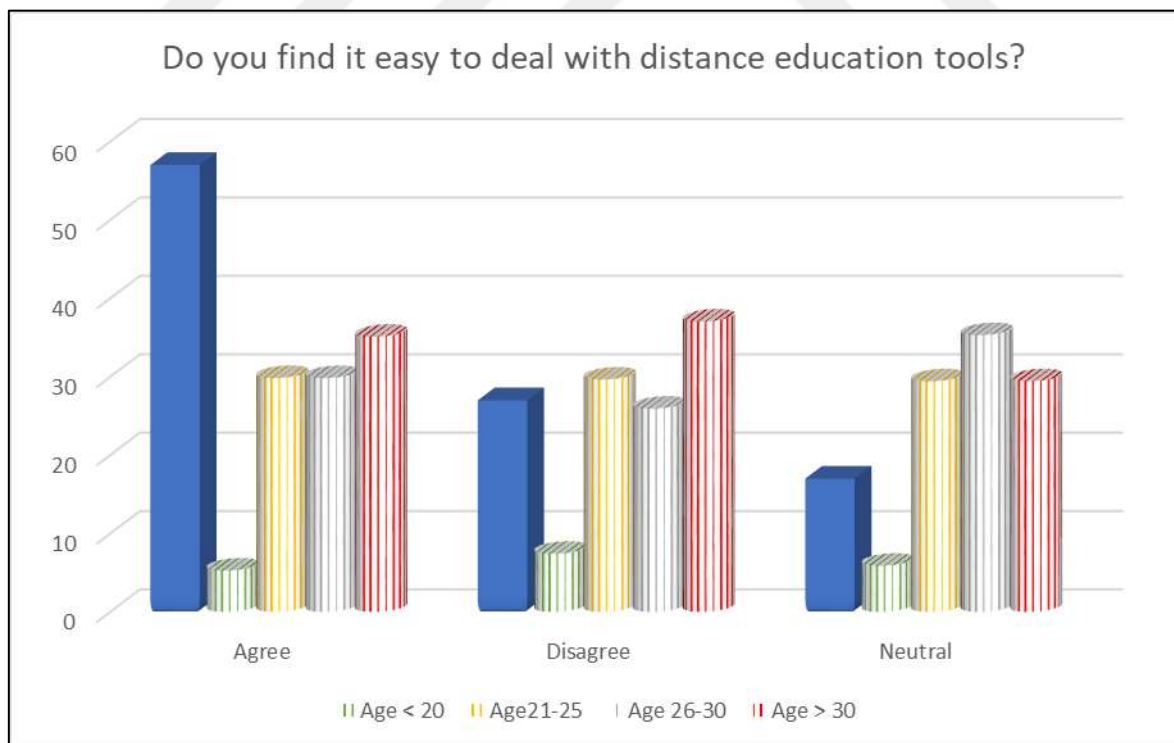


Table 3.15: After we Took a Sample of Students for a Questionnaire on the Following Question (the Distance Education Program Works on the Principle of Neutrality and Equality Among Students). the Results of the Questionnaire Showed That 56% Agreed, While 19% Rejected Their Answer, While 26% Were Neutral in Their Answer, as in the Table and Figure Below.

The distance education program works on the principle of impartiality and equality between students			
	Agree	Disagree	Neutral
	56	19	26
Age < 20	5.357143	5.263158	7.692308
Age 21-25	32.14286	21.05263	30.76923
Age 26-30	30.35714	36.84211	23.07692
Age > 30	32.14286	36.84211	38.46154

Chart 3.15: After we Took a Sample of Students for a Questionnaire on the Following Question (the Distance Education Program Works on the Principle of Neutrality and Equality Among Students). the Results of the Questionnaire Showed That 56% Agreed, While 19% Rejected Their Answer, While 26% Were Neutral in Their Answer, as in the Table and Figure Below.

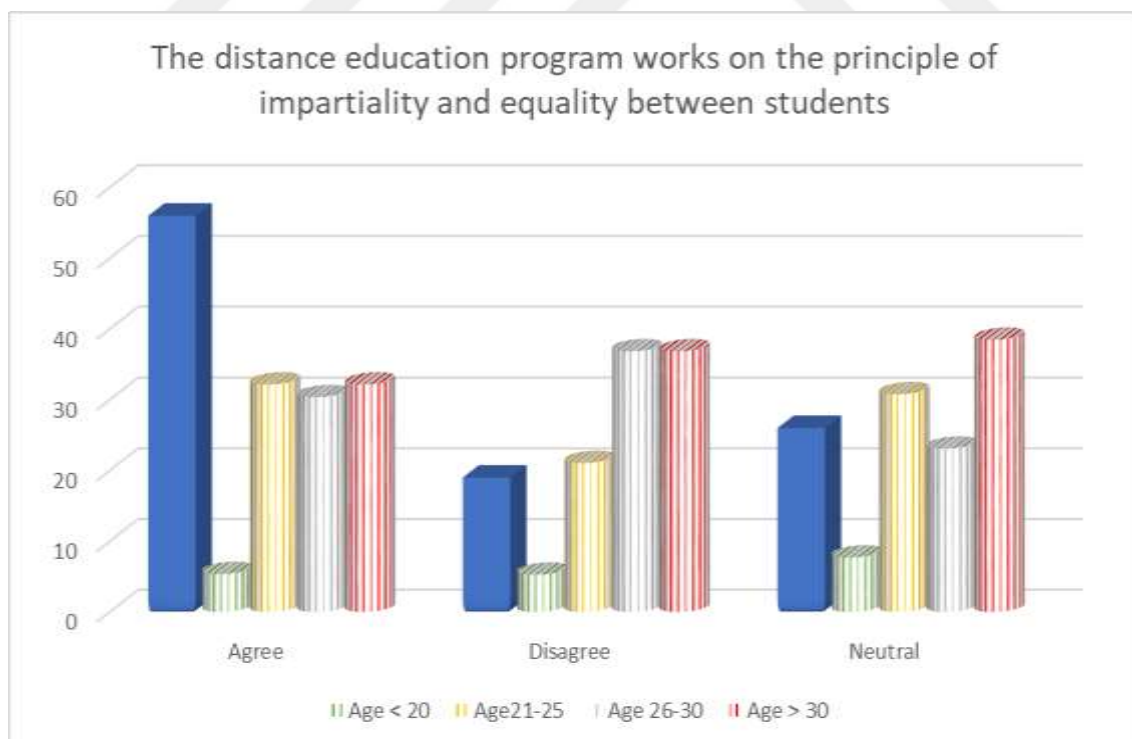


Table 3.16: After we Took a Sample of Students to Take a Questionnaire on the Following Question (is Distance Education Gives Motivation (the Results for the Questionnaire Were as Follows: 52% Answered with Approval, While 28% Preferred to Reject, While 21% Were Neutral in Their Answers, as Shown in the Table and Figure Below.

Distance education gives motivation			
	Agree	Disagree	Neutral
	52	28	21
Age < 20	5.769231	7.142857	4.761905
Age21-25	32.69231	25	28.57143
Age 26-30	28.84615	42.85714	14.28571
Age > 30	32.69231	25	52.38095

Chart 3.16: After we Took a Sample of Students to Take a Questionnaire on the Following Question (is Distance Education Gives Motivation (the Results for the Questionnaire Were as Follows: 52% Answered with Approval, While 28% Preferred to Reject, While 21% Were Neutral in Their Answers, as Shown in the Table and Figure Below.

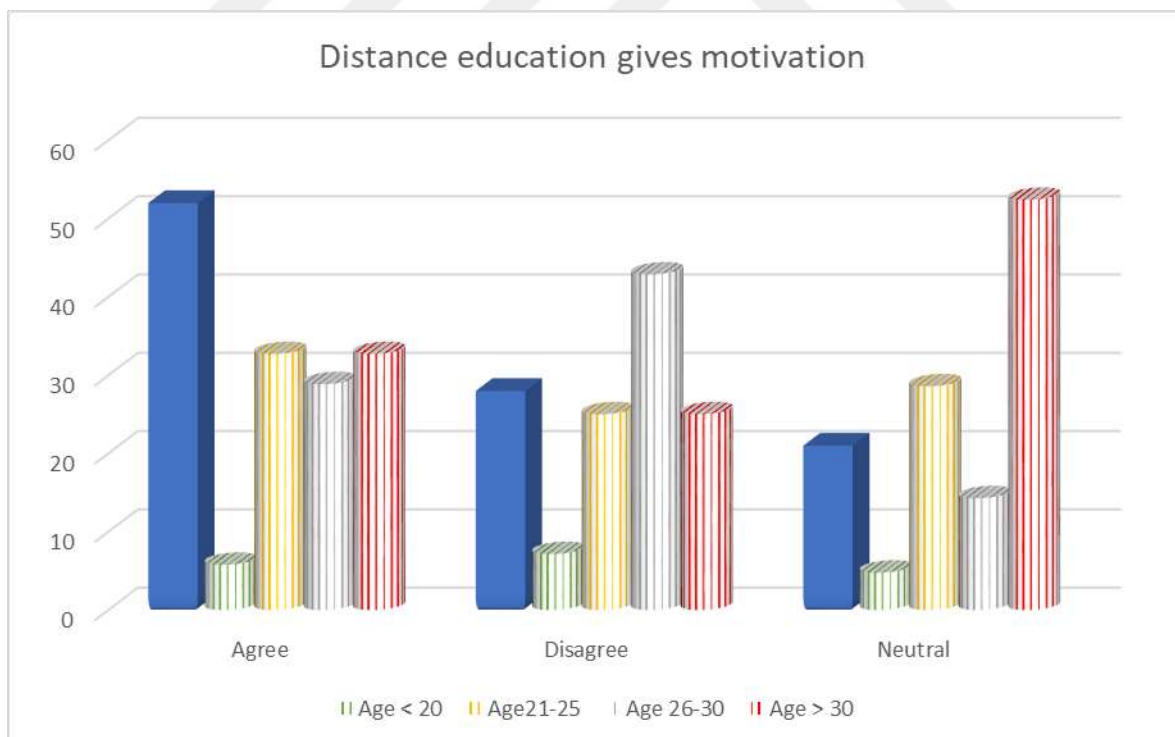


Table 3.17: After Taking a Sample of Students to Conduct a Questionnaire on the Following Question (the Distance Education Program has Created an Educational Environment That Keeps Pace with The Requirements of the Times Technology. the Results of the Questionnaire Showed That 65% Agreed, While 17% Disagreed, While 19% Gave A Neutral Answer, as in the Table and Figure Below.

The distance education program has created an educational environment that keeps pace with the requirements of the times Technology			
	Agree	Disagree	Neutral
	65	17	19
Age < 20	4.615385	5.882353	10.52632
Age21-25	27.69231	29.41176	36.84211
Age 26-30	30.76923	35.29412	21.05263
Age > 30	36.92308	29.41176	31.57895

Chart 3.17: After Taking a Sample of Students to Conduct a Questionnaire on the Following Question (the Distance Education Program has Created an Educational Environment That Keeps Pace with The Requirements of the Times Technology. the Results of the Questionnaire Showed That 65% Agreed, While 17% Disagreed, While 19% Gave A Neutral Answer, as in the Table and Figure Below.

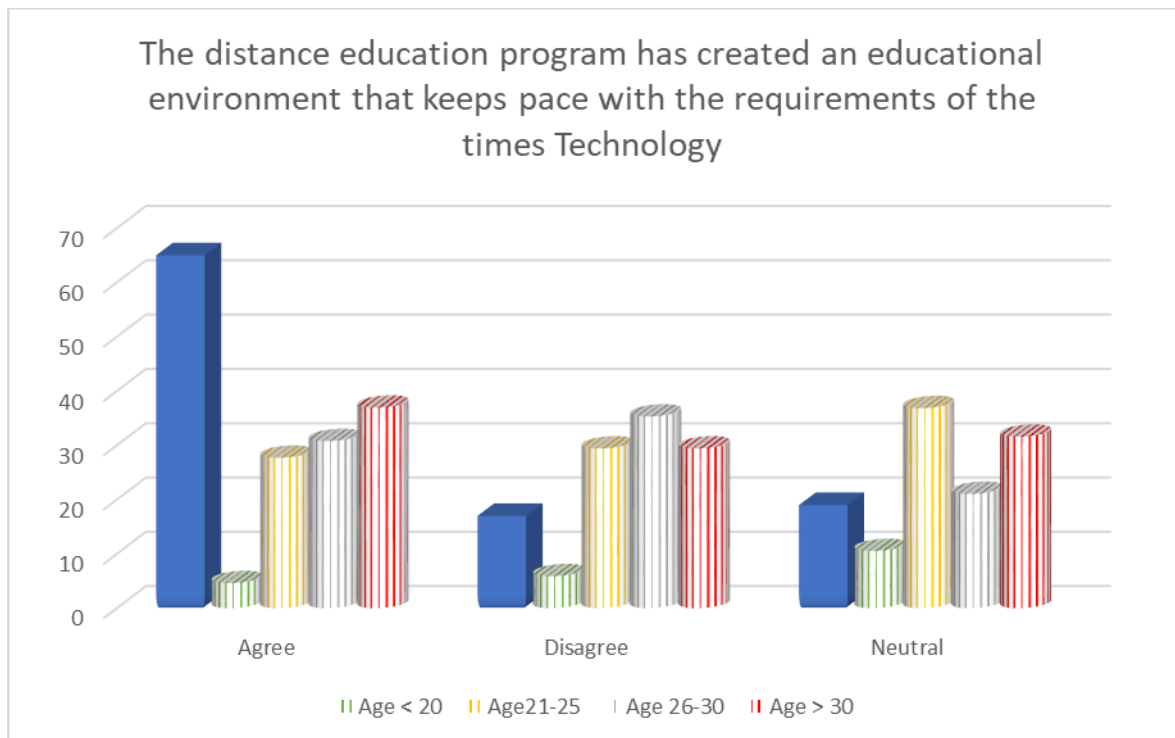


Table 3.18: Regarding the Questionnaire About Developing Thinking and Imparting Skills, the Question was: Does the Distance Education Program Help in Developing Ideas and Skills? the Answer to the Questionnaire was 56% Agreement, While 13% of the Percentage was Disagreement, and 32% was the Natural Answer and the Matter was Accepted.

The distance education program helps in the development of thinking and gives a skill in solving problems			
	Agree	Disagree	Neutral
	56	13	32
Age < 20	5.357143	7.692308	6.25
Age 21-25	26.78571	15.38462	40.625
Age 26-30	37.5	38.46154	12.5
Age > 30	30.35714	38.46154	40.625

Chart 3.18: Regarding the Questionnaire About Developing Thinking and Imparting Skills, the Question was: Does the Distance Education Program Help in Developing Ideas and Skills? the Answer to the Questionnaire was 56% Agreement, While 13% of the Percentage was Disagreement, and 32% was the Natural Answer and the Matter was Accepted.

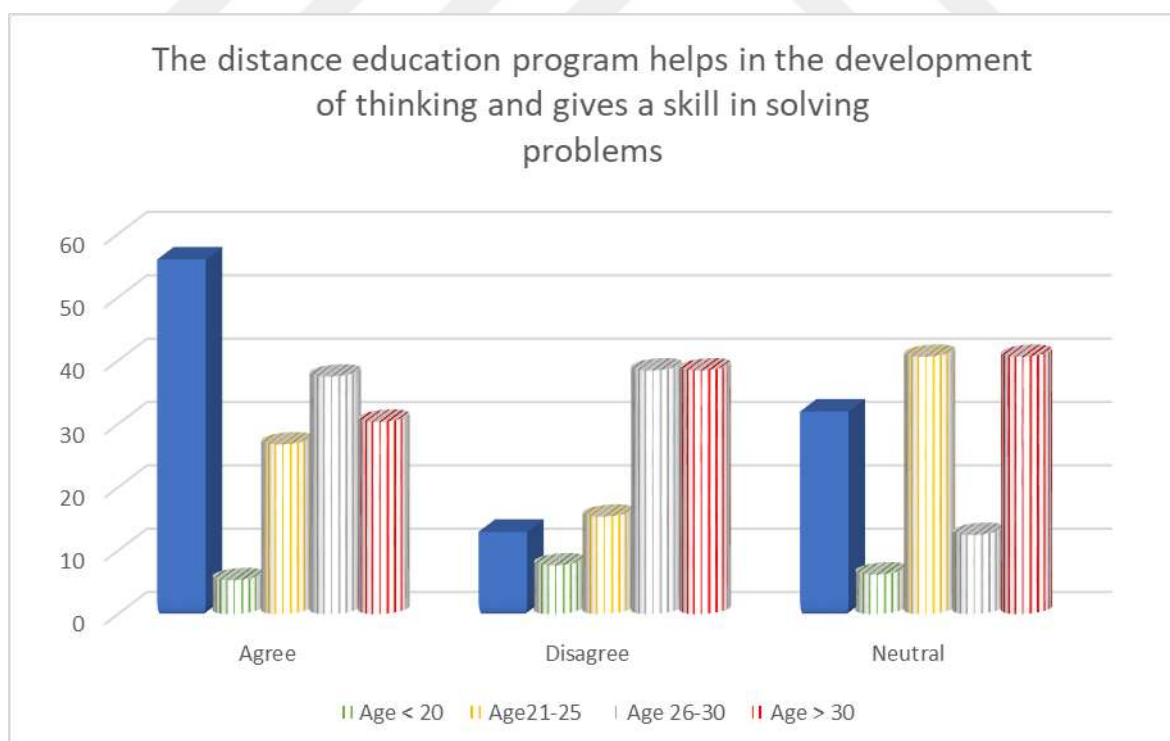


Table 3.19: While the Questionnaire That was Presented in “Does Distance Education Support Resignation in Education” was Also 56%, While it was 16%, and the Percentage is 29%, by Nature and According to the Age Groups Referred to, as in the Figure and Table Below.

Distance education supports resignation in education, gives self-confidence			
	Agree	Disagree	Neutral
	56	16	29
Age < 20	5.357143	6.25	6.896552
Age21-25	28.57143	31.25	31.03448
Age 26-30	32.14286	43.75	17.24138
Age > 30	33.92857	18.75	44.82759

Chart 3.19: While the Questionnaire That was Presented in “Does Distance Education Support Resignation in Education” was Also 56%, While it was 16%, and the Percentage is 29%, by Nature and According to the Age Groups Referred to, as in the Figure and Table Below.

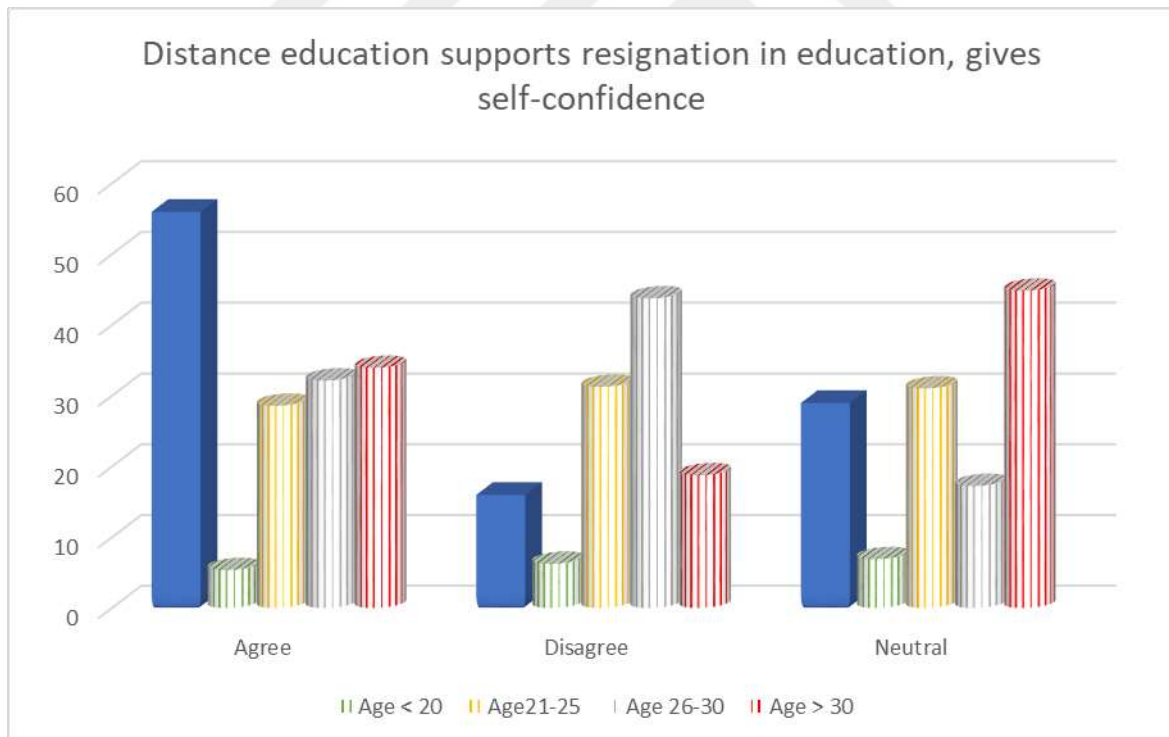


Table 3.20: While the Questionnaire was About Whether Distance Education Increases the Skills of Learners, the Percentage was Also 56 for Acceptance, 18 for Non-Acceptance, and 27 for Normal, as in the Figure and Table Below.

The distance education program increases the technical skills of learners.			
	Agree	Disagree	Neutral
	56	18	27
Age < 20	7.142857	0	7.407407
Age21-25	30.35714	16.66667	37.03704
Age 26-30	32.14286	33.33333	22.22222
Age > 30	30.35714	50	33.33333

Chart 3.20: While the Questionnaire was About Whether Distance Education Increases the Skills of Learners, the Percentage was Also 56 for Acceptance, 18 for Non-Acceptance, and 27 for Normal, as in the Figure and Table Below.

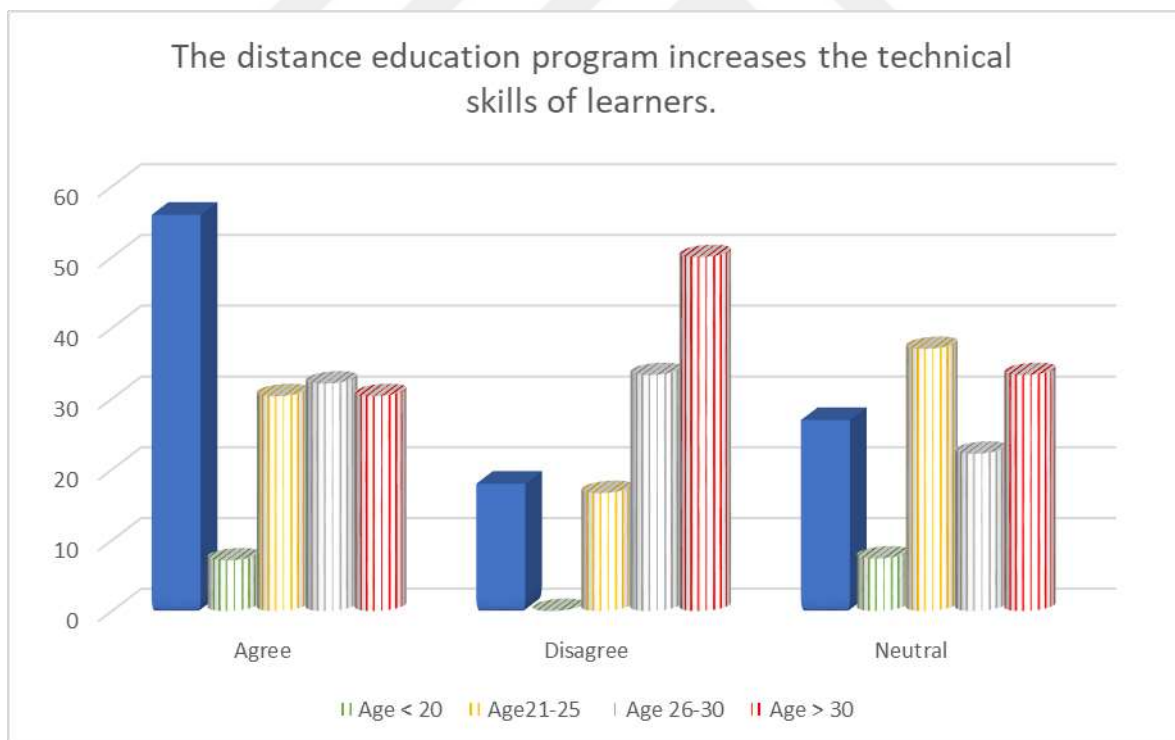


Table 3.21: When Asked About the Freedom of Distance Education in Terms of Times, the Percentages Were as Follows: 62, Which is the Largest Percentage, Welcomed and Loved the Idea of Freedom in Choosing the Times of Distance Education, While 20 Did not Want the Idea of Freedom Regarding Education, and 19 Were Among Those Who Had it Normal and Acceptable to Choose the Freedom of Time.

The distance education program gives the freedom to learn at any time and from any place			
	Agree	Disagree	Neutral
	62	20	19
Age < 20	3.225806	15	5.263158
Age 21-25	29.03226	30	31.57895
Age 26-30	38.70968	10	21.05263
Age > 30	29.03226	45	42.10526

Chart 3.21: When Asked About the Freedom of Distance Education in Terms of Times, the Percentages Were as Follows: 62, Which is the Largest Percentage, Welcomed and Loved the Idea of Freedom in Choosing the Times of Distance Education, While 20 Did not Want the Idea of Freedom Regarding Education, and 19 Were Among Those Who Had it Normal and Acceptable to Choose the Freedom of Time.

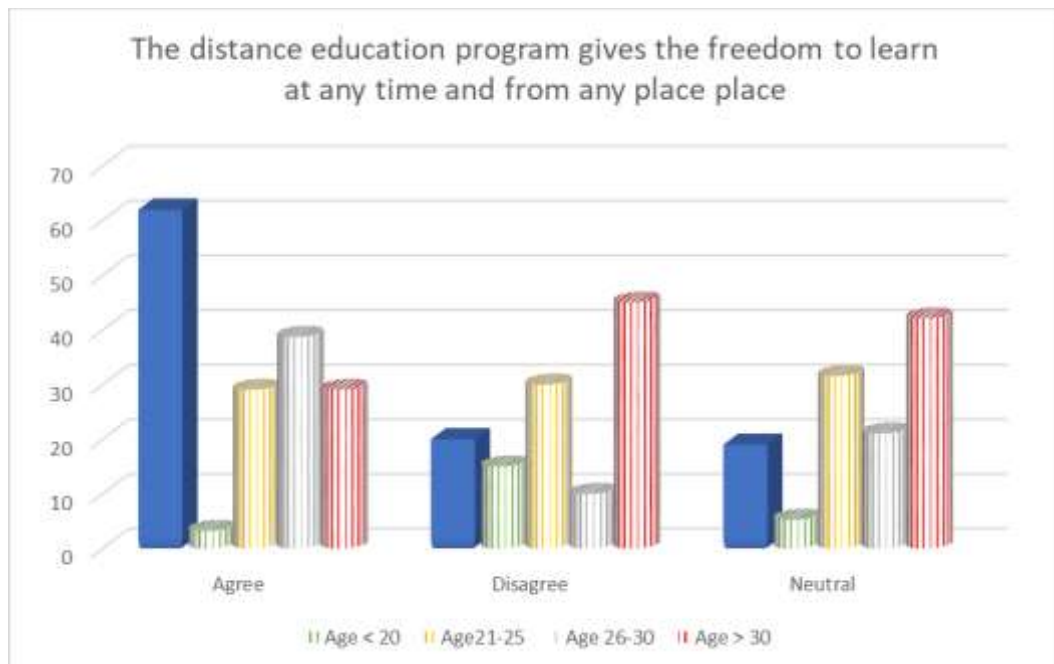


Table 3.22: With Regard to the Process of Individual Development for Distance Education, the Percentage of the Questionnaire was 58 of Those who Agreed and Welcomed This Idea, and The Percentage of Zero was the Most Prominent in This Question of the Questionnaire, While the Normal Percentage and Acceptability was 43.

The distance education program develops the individual learning process and cooperation together			
	Agree	Disagree	Neutral
	58	0	43
Age < 20	12.82051	0	2.325581
Age21-25	41.02564	0	32.55814
Age 26-30	46.15385	0	27.90698
Age > 30	0	0	37.2093

Chart 3.22: With Regard to the Process of Individual Development for Distance Education, the Percentage of the Questionnaire was 58 of Those who Agreed and Welcomed This Idea, and The Percentage of Zero was the Most Prominent in This Question of the Questionnaire, While the Normal Percentage and Acceptability was 43.

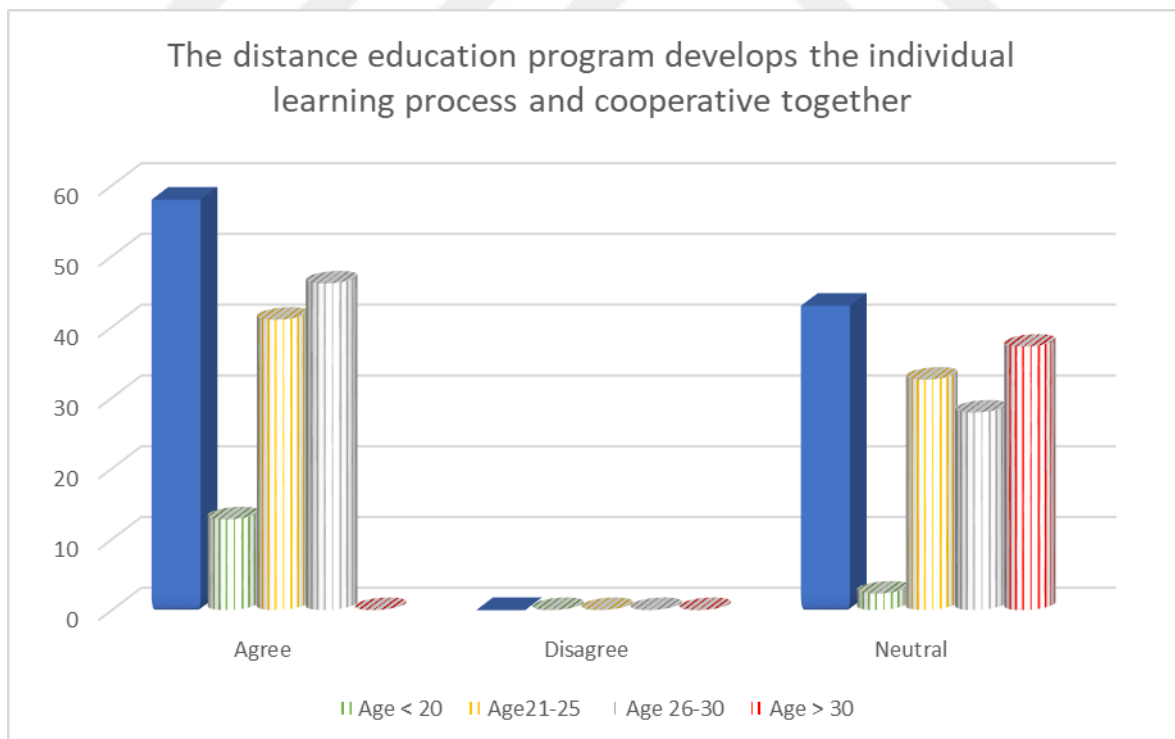


Table 3.23: When Asked in the Questionnaire About the Ease of Studying in Distance Education, the Percentages Were as Follows: 69 of Those who Wanted and Supported That Distance Education is Easier and More Flexible, While 17 of the Students Did not Welcome the Ease of Distance Education, and 15 was Also the Normal and Acceptable Percentage.

Study information becomes easier and clearer with a program distance Learning			
	Agree	Disagree	Neutral
	69	17	15
Age < 20	7.246377	0	6.666667
Age21-25	30.43478	11.76471	46.66667
Age 26-30	30.43478	35.29412	20
Age > 30	31.88406	52.94118	26.66667

Chart 3.23: When Asked in the Questionnaire About the Ease of Studying in Distance Education, the Percentages Were as Follows: 69 of Those who Wanted and Supported That Distance Education is Easier and More Flexible, While 17 of the Students Did not Welcome the Ease of Distance Education, and 15 was Also the Normal and Acceptable Percentage.

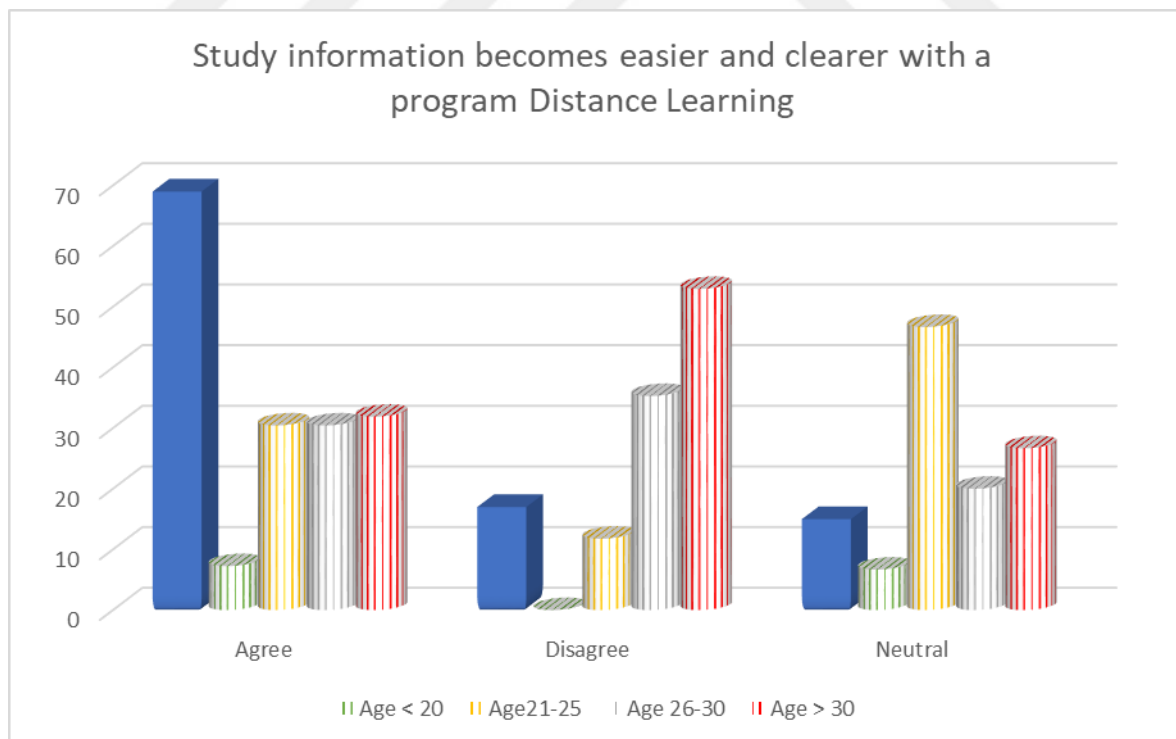


Table 3.24: In the Questionnaire on Modern Technologies, After we Took Several Samples of Students to Answer About the Possibility of Using Modern Technologies by Universities and Schools, the Percentages for the Questionnaire Were as Follows: the Percentage was 76%, Which is the Largest in Terms of Acceptance of use, While the Percentage was 12% Of Non-Acceptance, and 13% was of the Nature and Acceptance of Use.

The university uses information and communication technology software for the purpose of organizing the relationship of computer units with each other.			
	Agree	Disagree	Neutral
	76	12	13
Age < 20	6.578947	8.333333	0
Age21-25	25	33.33333	53.84615
Age 26-30	26.31579	58.33333	23.07692
Age > 30	42.10526	0	23.07692

Chart 3.24: In the Questionnaire on Modern Technologies, After we Took Several Samples of Students to Answer About the Possibility of Using Modern Technologies by Universities and Schools, the Percentages for the Questionnaire Were as Follows: the Percentage was 76%, Which is the Largest in Terms of Acceptance of Use, While the Percentage was 12% of Non-Acceptance, and 13% was of the Nature and Acceptance of Use.

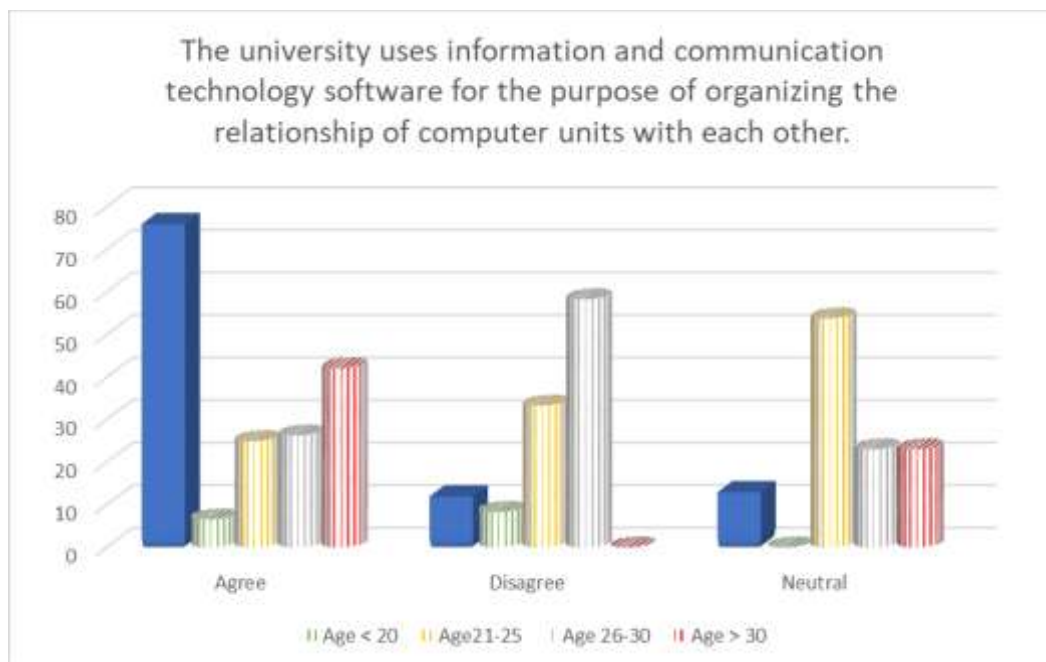


Table 3.25: The Answer Did not Differ Much From the Figure, Table, Conclusion, and Results From the Previous One, as in the Figure and Table Below.

Software is constantly being developed to keep up with what is new			
	Agree	Disagree	Neutral
	73	16	12
Age < 20	2.739726	18.75	8.333333
Age21-25	30.13699	25	33.33333
Age 26-30	30.13699	37.5	16.66667
Age > 30	36.9863	18.75	41.66667

Chart 3.25: The Answer Did not Differ Much From the Figure, Table, Conclusion, and Results From the Previous One, as in the Figure and Table Below.

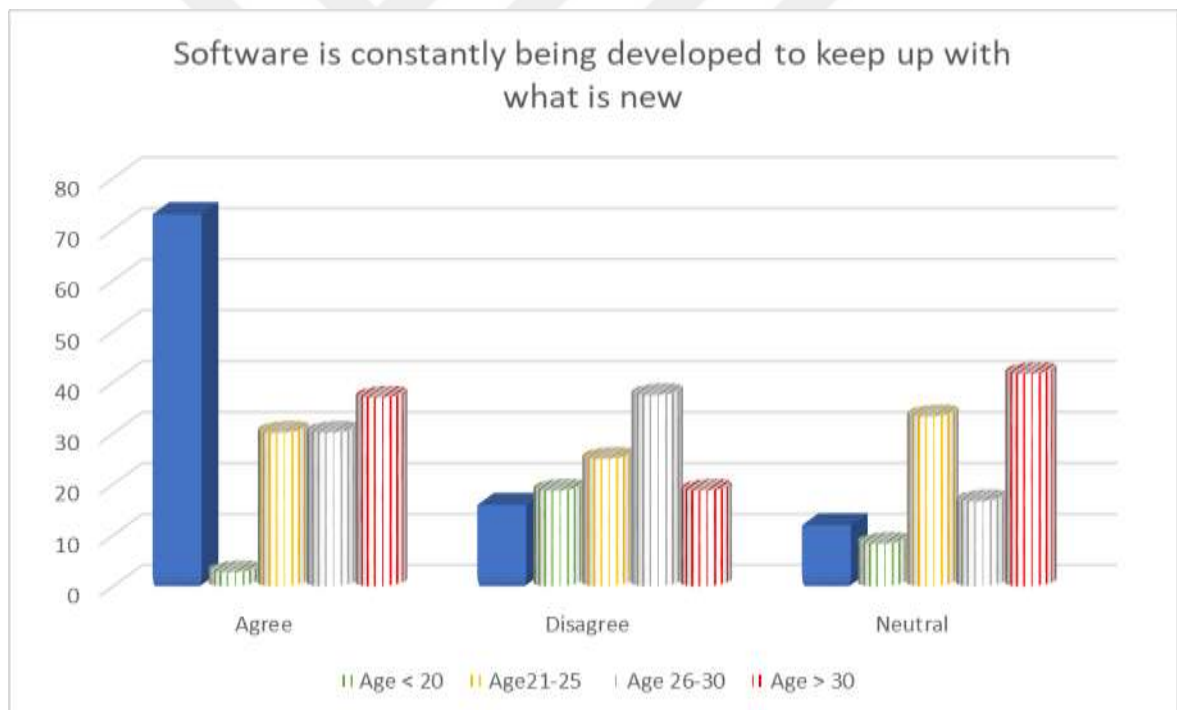


Table 3.26: The University Uses Modern Computer Software in its Work.

The university uses modern computer software in its work.			
	Agree	Disagree	Neutral
	76	0	25
Age < 20	5.263158	0	8
Age21-25	32.89474	0	20
Age 26-30	25	0	44
Age > 30	36.84211	0	28

Chart 3.26: The University Uses Modern Computer Software in its Work.

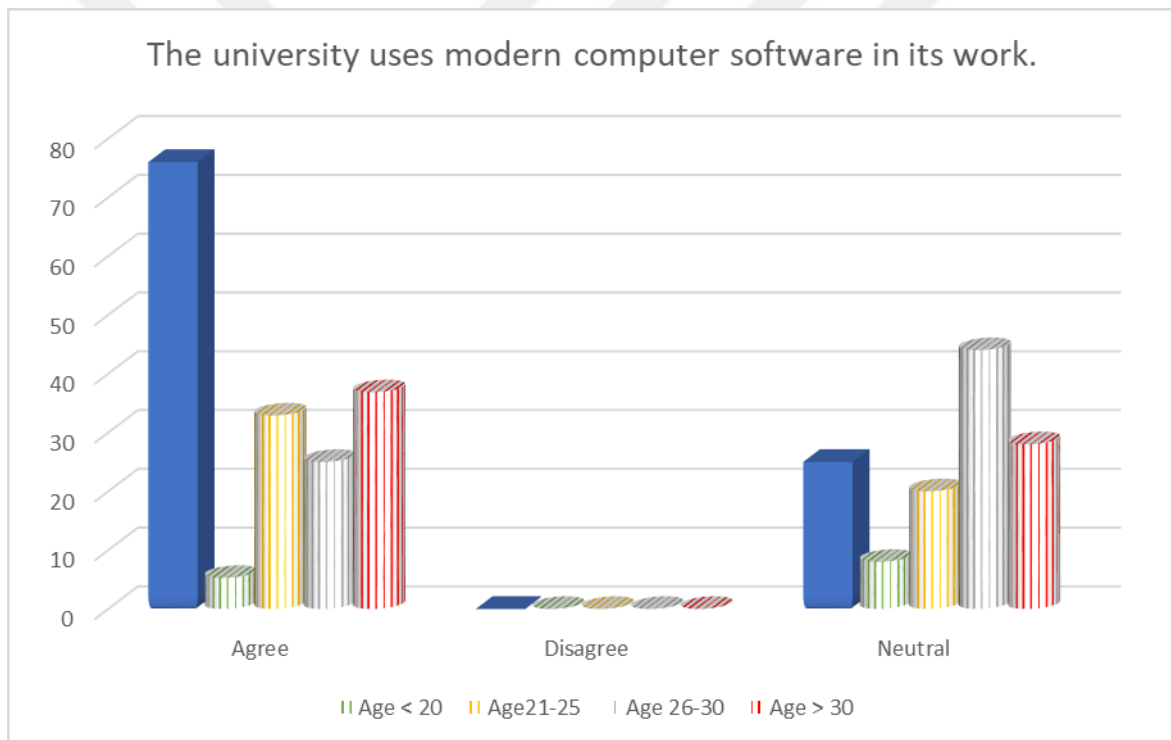


Table 3.27: Data Must be Preserved Using Advanced Technical Means, as Stated in the Questionnaire: 73%, 9% Rejected the Idea of Preservation, and 19% Rejected the Nature of Acceptance.

The university provides advanced automated protection systems to protect university data.			
	Agree	Disagree	Neutral
	73	9	19
Age < 20	8.219178	0	0
Age21-25	28.76712	22.22222	36.84211
Age 26-30	24.65753	66.66667	31.57895
Age > 30	38.35616	11.11111	31.57895

Chart 3.27: Data Must be Preserved Using Advanced Technical Means, as Stated in the Questionnaire: 73%, 9% Rejected the Idea of Preservation, and 19% Rejected the Nature of Acceptance.

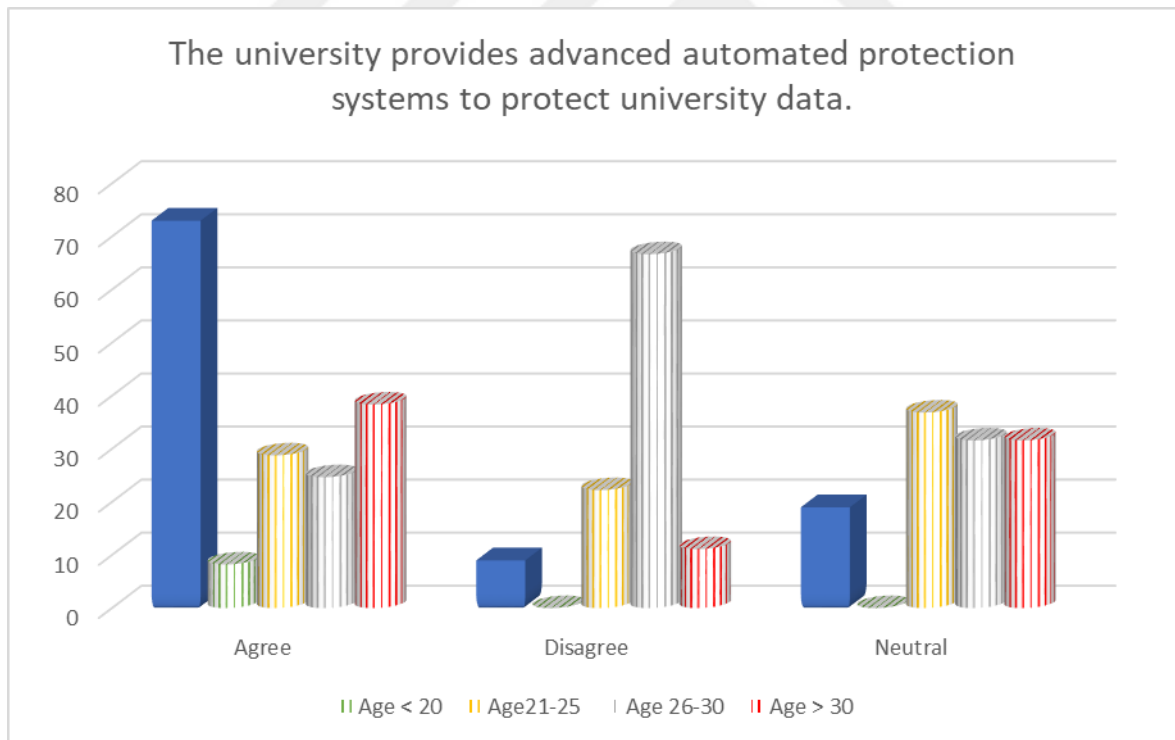


Table 3.28: Regarding the Possibility of Asking About the Possibility of Having an Official Website for the University, the Percentage was 75%, 13% Disagreed, and 13% Responded to the Nature and Acceptance of the Existence of the University's Website.

There is a website for the university on the Internet.			
	Agree	Disagree	Neutral
	75	13	13
Age < 20	5.333333	15.38462	0
Age21-25	28	30.76923	38.46154
Age 26-30	32	23.07692	23.07692
Age > 30	34.66667	30.76923	38.46154

Chart 3.28: Regarding the Possibility of Asking About the Possibility of Having an Official Website for the University, the Percentage was 75%, 13% Disagreed, and 13% Responded to the Nature and Acceptance of the Existence of the University's Website.

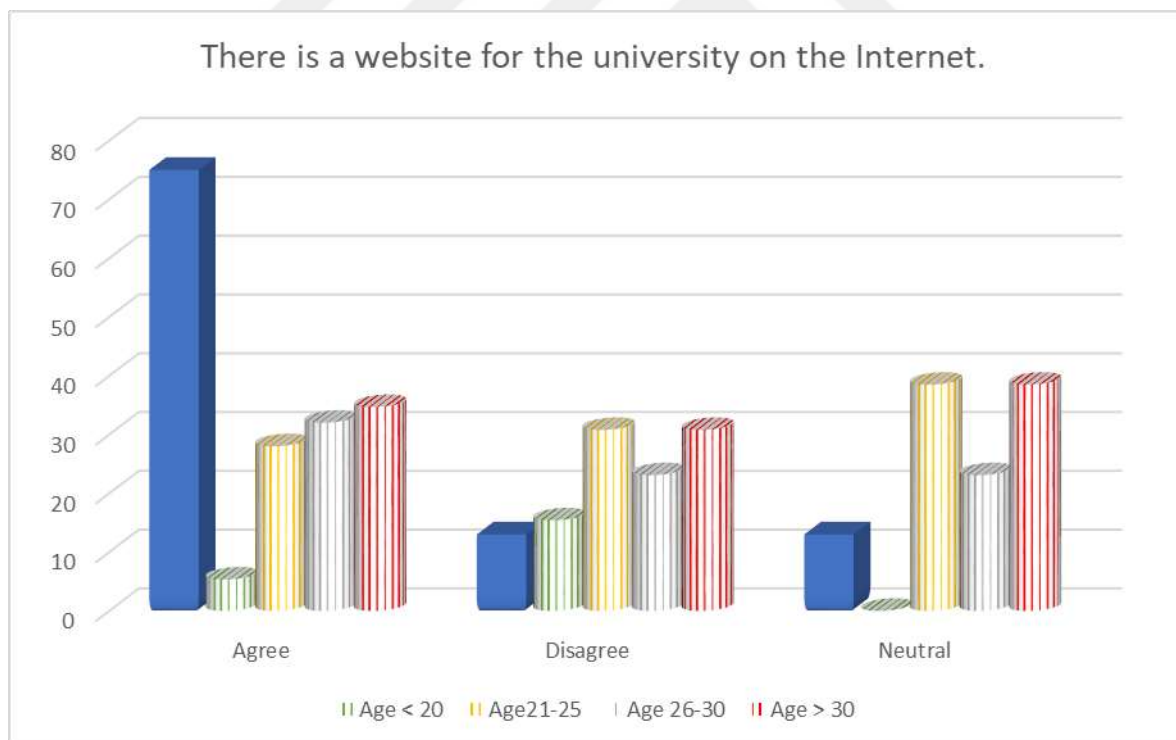


Table 3.29: After we Took Multiple Samples About the Possibility of Having Modern Networks and Communications at the University, the Percentage was 69%, Which is the Largest, with Approval, 12% with Disagreement, and 20%, the Percentage was Normal.

There is a modern and effective communication network to serve the system in the university			
	Agree	Disagree	Neutral
	69	12	20
Age < 20	7.246377	8.333333	0
Age21-25	27.53623	41.66667	30
Age 26-30	20.28986	41.66667	55
Age > 30	44.92754	8.333333	15

Chart 3.29: After we Took Multiple Samples About the Possibility of Having Modern Networks and Communications at the University, the Percentage was 69%, Which is the Largest, with Approval, 12% with Disagreement, and 20%, the Percentage was Normal.

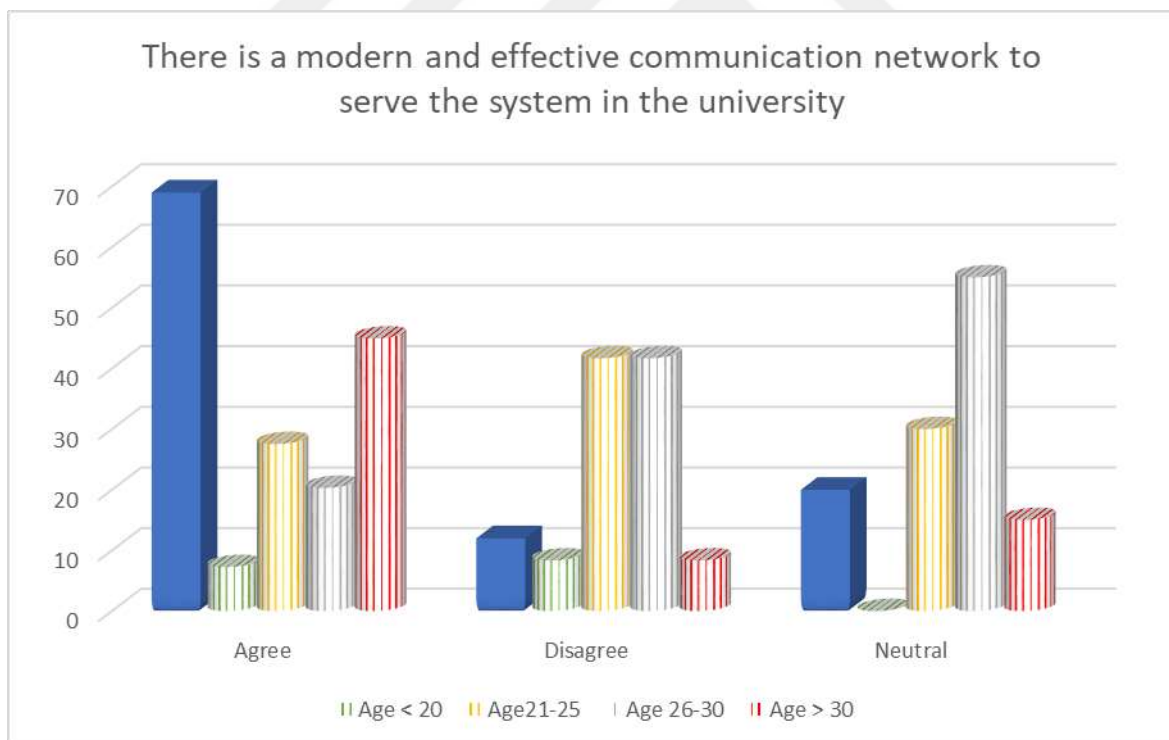


Table 3.30: When Asked in the Questionnaire About the University's Use of Networks Used for Internal and External Students of the University, the Percentages Were 58% Agreeing, 19% Disagreeing, and 24% Accepting the Reason for the Situation.

The university uses information and communication technology networks for the purpose of obtaining Databases for internal and external dealers			
	Agree	Disagree	Neutral
	58	19	24
Age < 20	5.172414	10.52632	4.166667
Age21-25	36.2069	10.52632	29.16667
Age 26-30	20.68966	57.89474	29.16667
Age > 30	37.93103	21.05263	37.5

Chart 3.30: When Asked in the Questionnaire About the University's Use of Networks Used for Internal and External Students of the University, the Percentages Were 58% Agreeing, 19% Disagreeing, and 24% Accepting the Reason for the Situation.

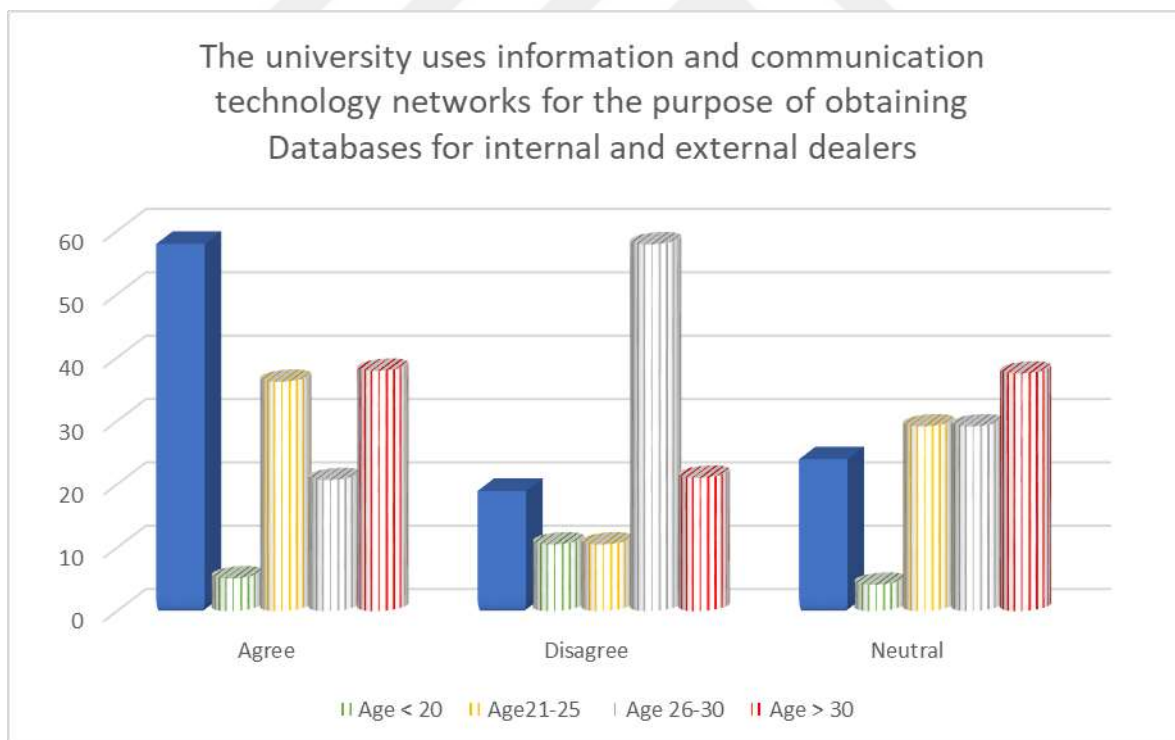


Table 3.31: Regarding Publishing Students' Research and Results, the Questionnaire Came as Follows: 66% Agreed to This Idea, 16% Rejected This Idea, and 19% was of the Nature and Acceptance of the Idea.

The university uses information and communication technology networks for the purpose of disseminating student results			
	Agree	Disagree	Neutral
	66	16	19
Age < 20	7.575758	6.25	0
Age 21-25	24.24242	56.25	26.31579
Age 26-30	33.33333	18.75	26.31579
Age > 30	34.84848	18.75	47.36842

Chart 3.31: Regarding Publishing Students' Research and Results, the Questionnaire Came as Follows: 66% Agreed to This Idea, 16% Rejected This Idea, and 19% was of the Nature and Acceptance of the Idea.

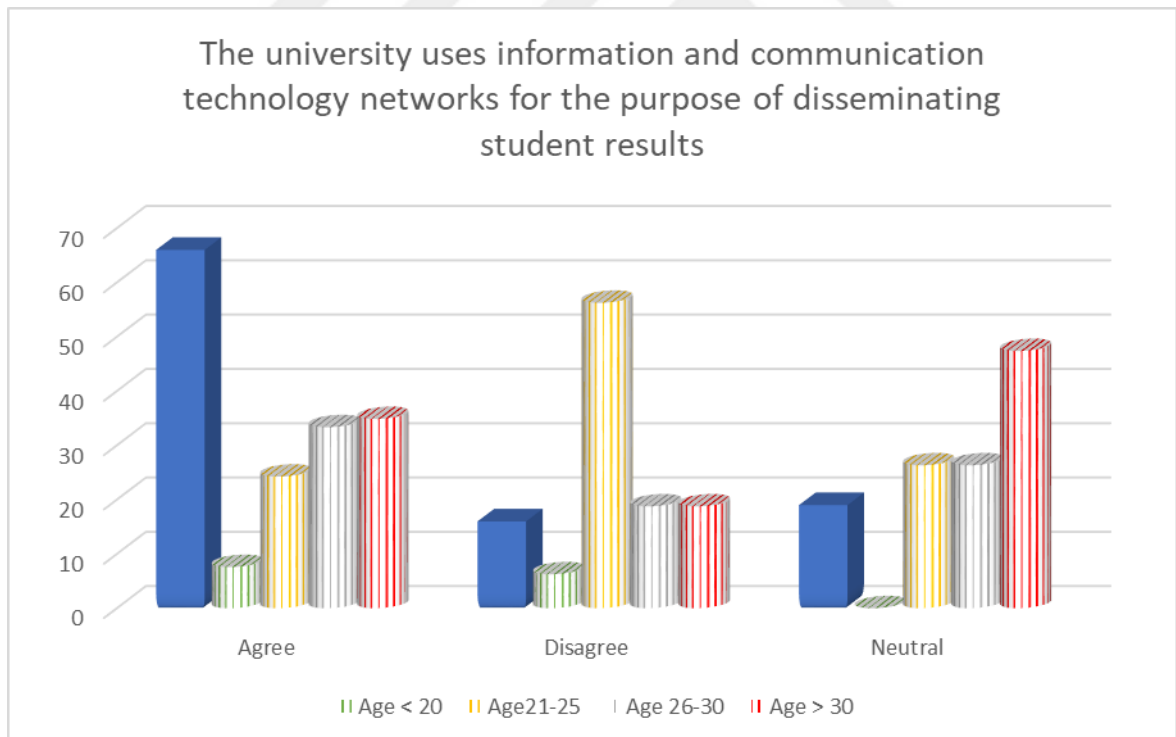


Table 3.32: Regarding the Possibility of a Link Between the University and the Students, the Percentages Were as Follows: 69% Agreed to This Situation, 10% Did not Agree to This Situation, and 22% Responded to the Nature of Acceptance.

There is an electronic link between the university and the students.			
	Agree	Disagree	Neutral
	69	10	22
Age < 20	7.246377	10	0
Age21-25	34.78261	0	27.27273
Age 26-30	26.08696	50	31.81818
Age > 30	31.88406	40	40.90909

Chart 3.32: Regarding the Possibility of a Link Between the University and the Students, the Percentages Were as Follows: 69% Agreed to This Situation, 10% Did not Agree to This Situation, and 22% Responded to the Nature of Acceptance.

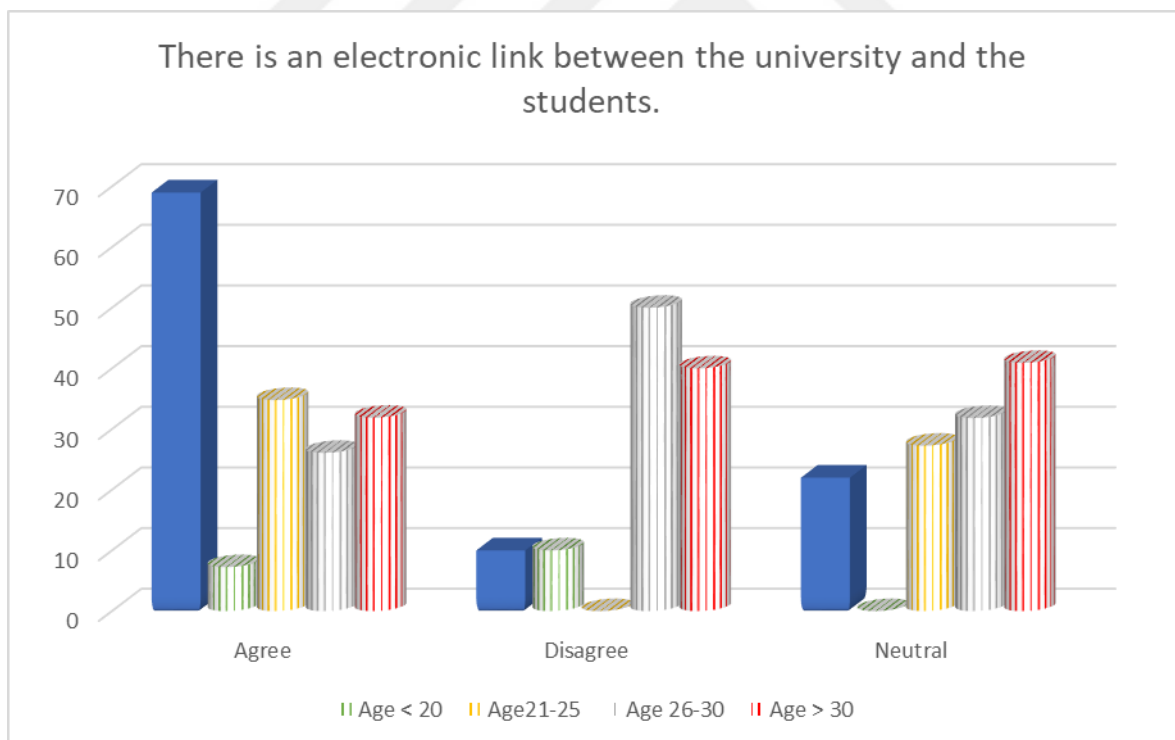


Table 3.33: Regarding This Question in the Questionnaire, the Answer and Results Did not Differ From the Previous Ones with Regard to the Existence of an Electronic Link Between the University and the Professors.

There is an electronic link between the university and the professors			
	Agree	Disagree	Neutral
	68	13	20
Age < 20	7.352941	0	5
Age21-25	26.47059	15.38462	50
Age 26-30	26.47059	53.84615	25
Age > 30	39.70588	30.76923	20

Chart 3.33: Regarding This Question in the Questionnaire, the Answer and Results Did not Differ From the Previous Ones with Regard to the Existence of an Electronic Link Between the University and the Professors.

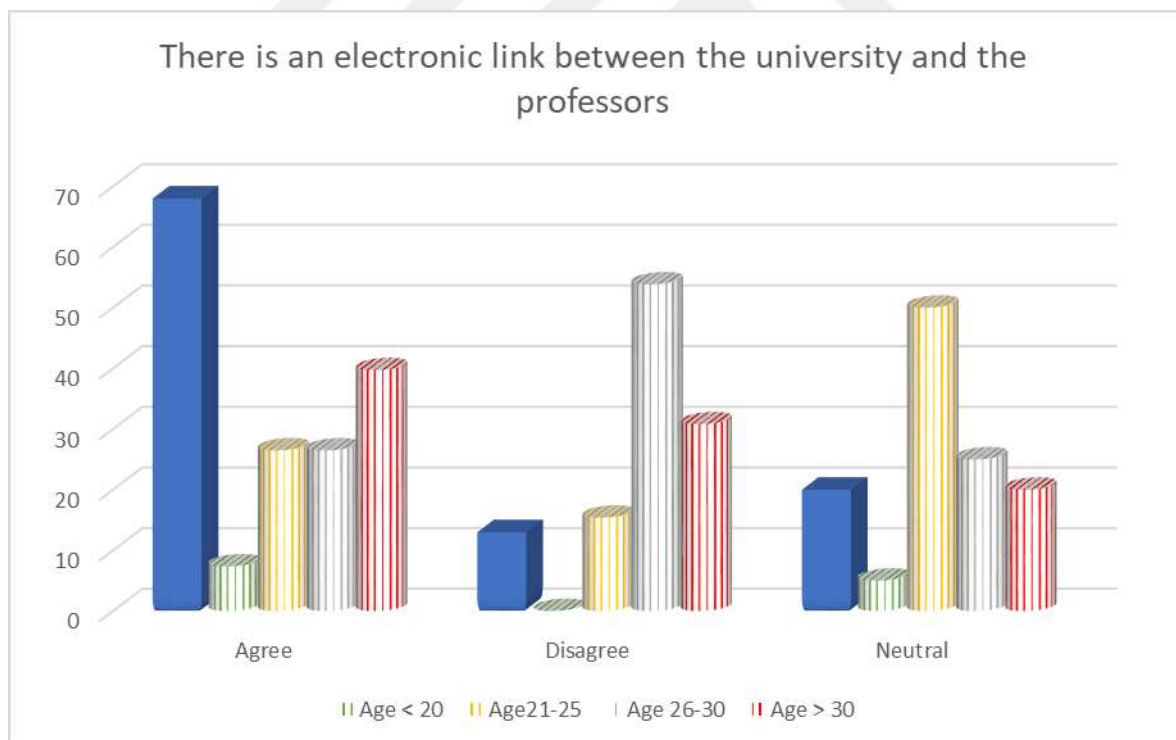


Table 3.34: Regarding the Existence of an Electronic Link Between the University and Research Centers, the Percentages Were as Follows: 60% Agreed, 14% Did not Agree, and 27% Answered, of Course.

There is an electronic link between universities and scientific research centers			
	Agree	Disagree	Neutral
	60	14	27
Age < 20	5	0	11.11111
Age21-25	28.33333	21.42857	37.03704
Age 26-30	30	57.14286	14.81481
Age > 30	36.66667	21.42857	37.03704

Chart 3.34: Regarding the Existence of an Electronic Link Between the University and Research Centers, the Percentages Were as Follows: 60% Agreed, 14% Did not Agree, and 27% Answered, of Course.

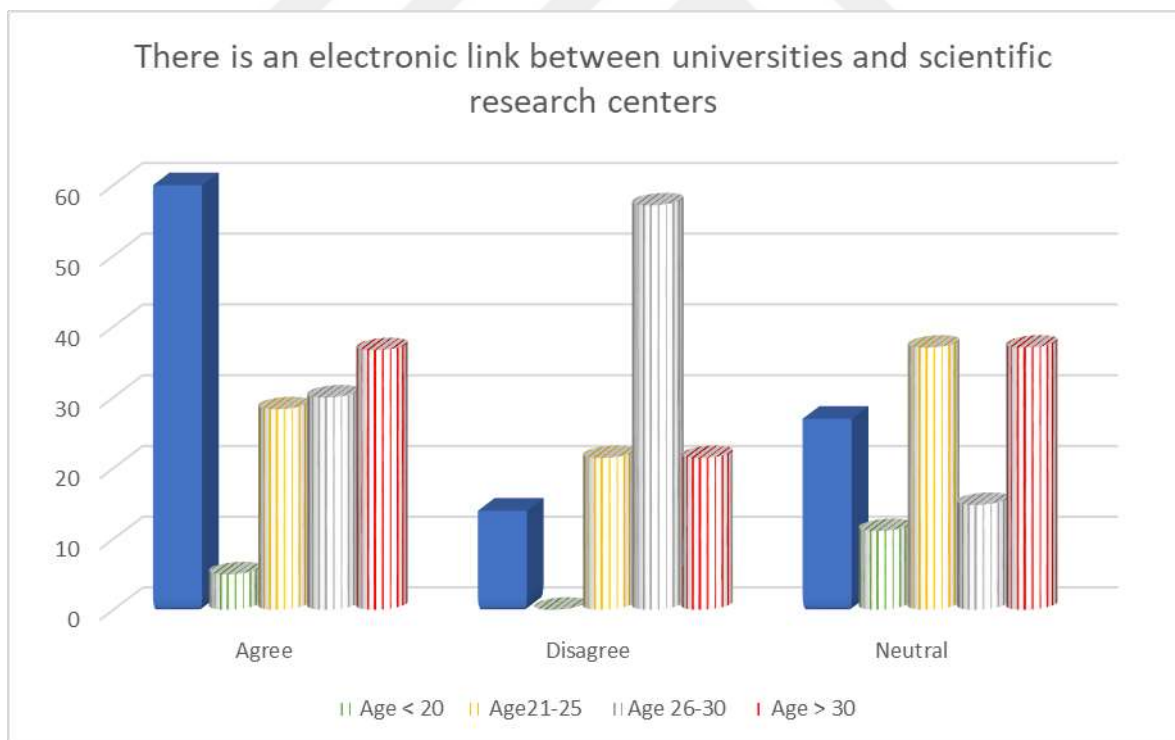


Table 3.35: Similar to the Answer in the Figure and Table Above, with a Slight Change in the Percentages.

There is an electronic link between the university and the Ministry of Higher Education and Scientific Research			
	Agree	Disagree	Neutral
	71	10	20
Age < 20	5.633803	20	0
Age21-25	25.35211	30	45
Age 26-30	29.57746	30	30
Age > 30	39.43662	20	25

Chart 3.35: Similar to the Answer in the Figure and Table Above, with a Slight Change in the Percentages.

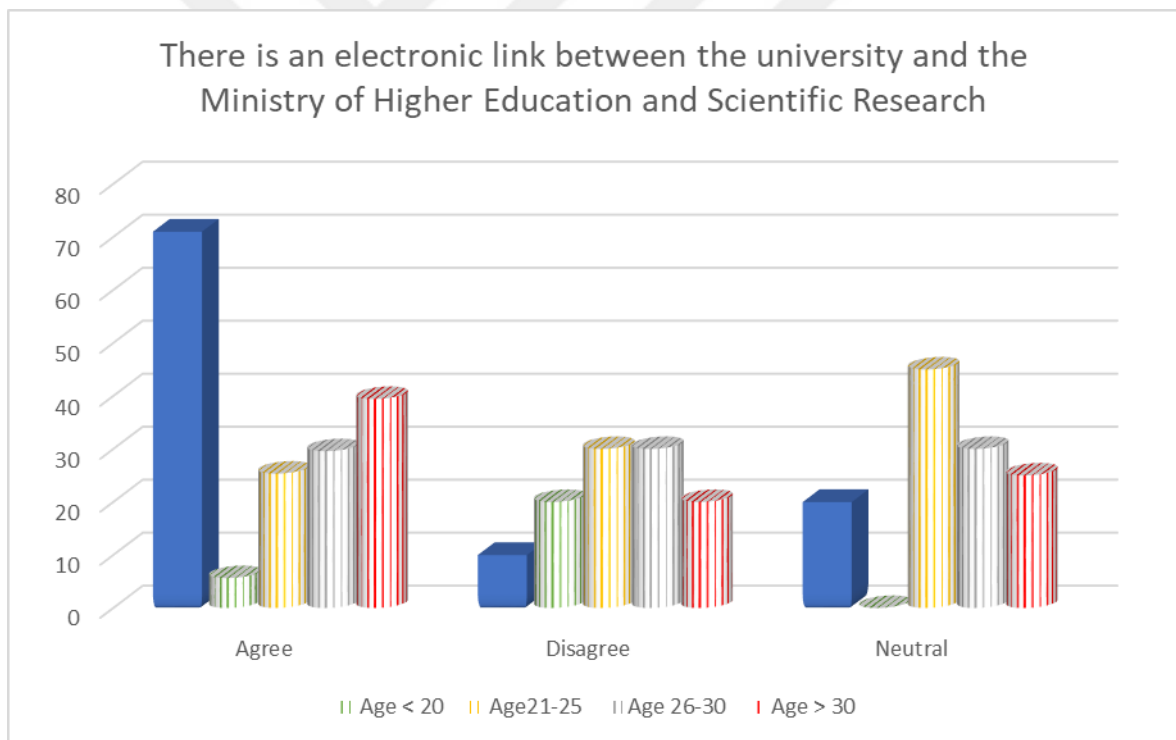


Table 3.36: Regarding the Halls, it was Suggested That There are Separate Halls in Universities, and the Percentage was 76% who Agreed, 12 who Disagreed, and 13%. the Answers and Results Were Natural and Accepting of the Matter, as Shown in the Figure and Table Below.

The university has a detailed database of employees and administrators.			
	Agree	Disagree	Neutral
	76	12	13
Age < 20	7.894737	0	0
Age21-25	23.68421	50	46.15385
Age 26-30	27.63158	41.66667	30.76923
Age > 30	40.78947	8.333333	23.07692

Chart 3.36: Regarding the Halls, it was Suggested That There are Separate Halls in Universities, and the Percentage was 76% who Agreed, 12 who Disagreed, and 13%. the Answers and Results Were Natural and Accepting of the Matter, as Shown in the Figure and Table Below.

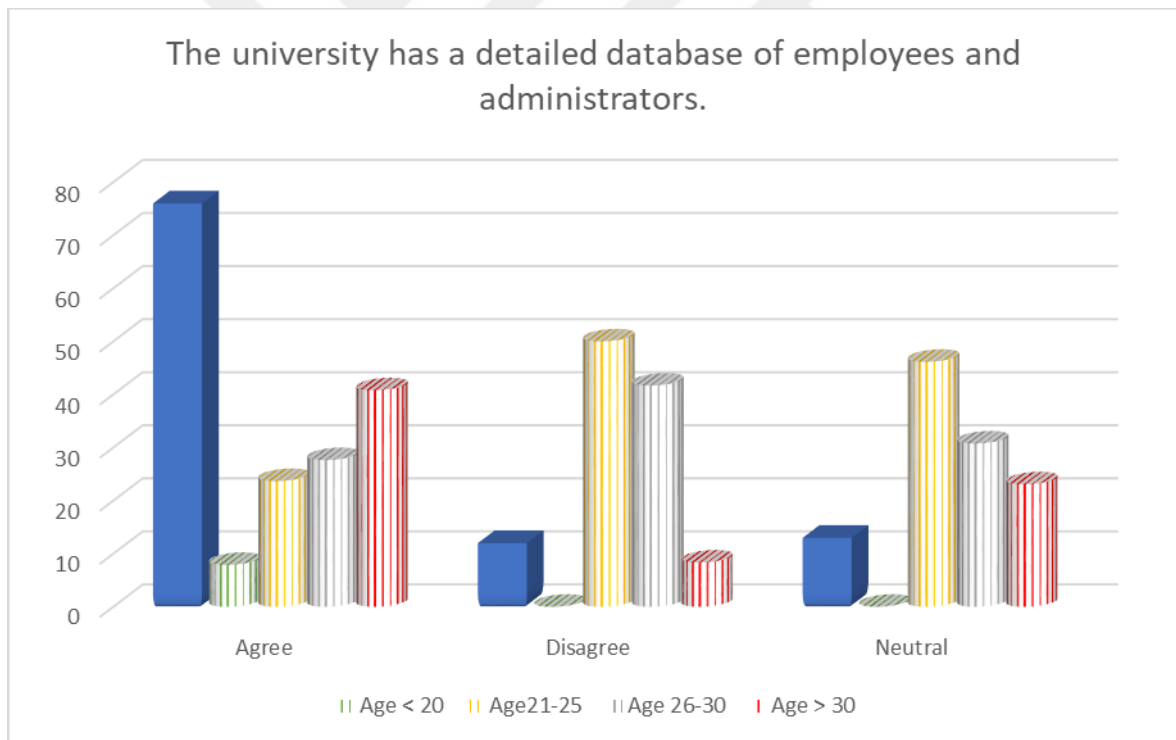


Table 3.37: In What Ways the Separate Halls at the University, the Percentages Were as Follows: 70% Were in Agreement, 13% Were in Disagreement, and 18% Were in the Nature of Acceptance.

The university has a detailed database			
	Agree	Disagree	Neutral
	70	13	18
Age < 20	5.714286	15.38462	0
Age21-25	25.71429	30.76923	44.44444
Age 26-30	31.42857	30.76923	22.22222
Age > 30	37.14286	23.07692	33.33333

Chart 3.37: In What Ways the Separate Halls at the University, the Percentages Were as Follows: 70% Were in Agreement, 13% Were in Disagreement, and 18% Were in the Nature of Acceptance.

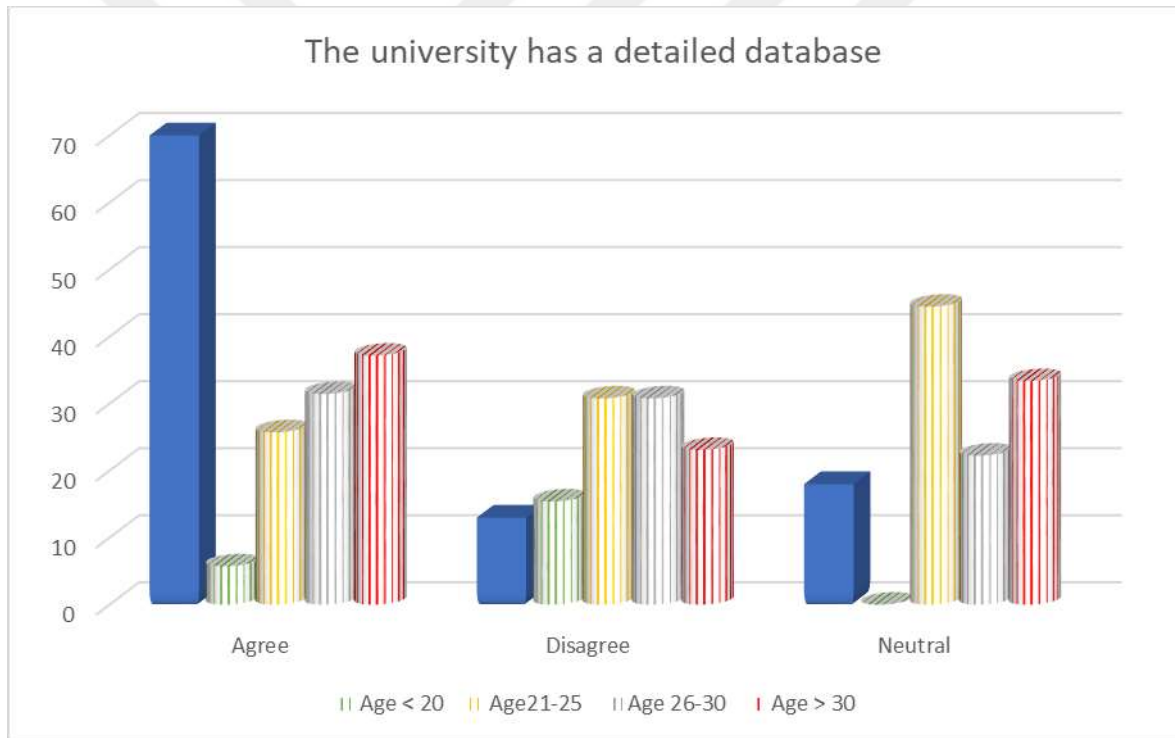
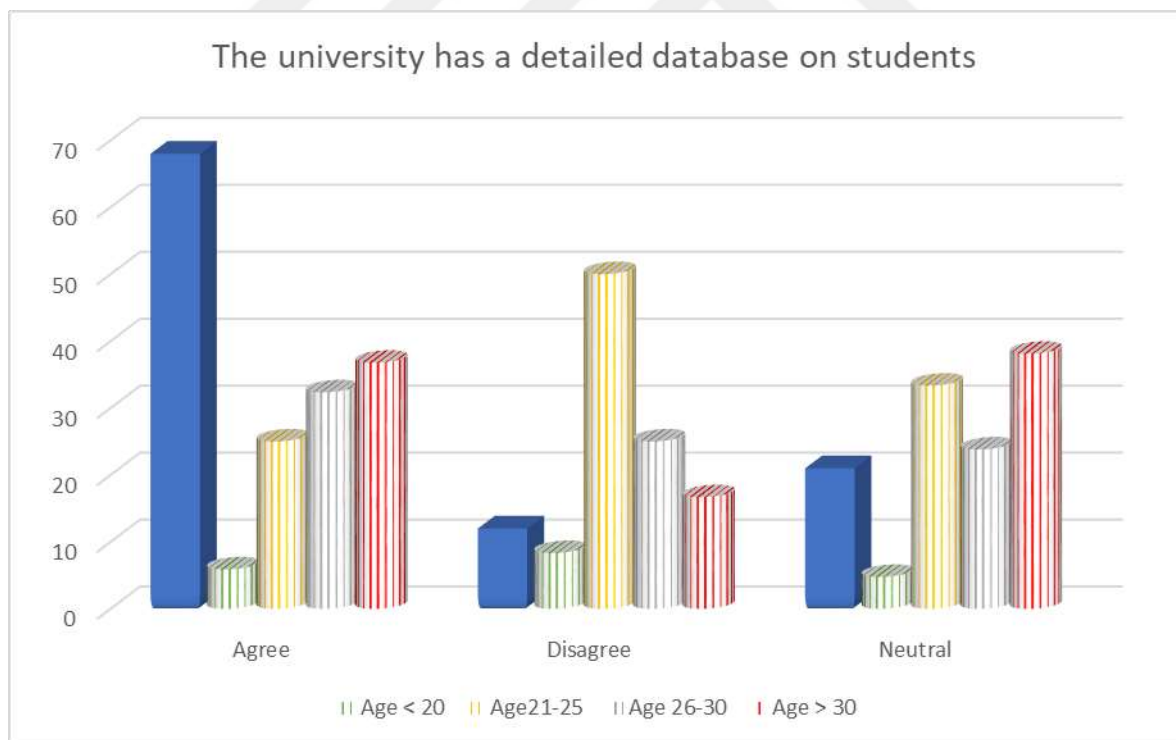


Table 3.38: When Continuing to Collect Samples and Asking About the Possibility of Opening Separate Halls for Students, the Percentage was 68%, 12% Did not Agree with This Opinion, and 21% of the Results Were Normal and the Matter was Accepted, as Shown in the Figure and Table Below.

The university has a detailed database on students			
	Agree	Disagree	Neutral
	68	12	21
Age < 20	5.882353	8.333333	4.761905
Age 21-25	25	50	33.33333
Age 26-30	32.35294	25	23.80952
Age > 30	36.76471	16.66667	38.09524

Chart 3.38: When Continuing to Collect Samples and Asking About the Possibility of Opening Separate Halls for Students, the Percentage was 68%, 12% Did not Agree with This Opinion, and 21% of the Results Were Normal and the Matter was Accepted, as Shown in the Figure and Table Below.



4. THE CONCLUSIONS AND RECOMMENDATIONS

4.1 THE CONCLUSIONS

After completing writing the thesis, it is necessary to highlight the most prominent conclusions from this thesis, as some notable and important points have been summarized in the conclusion of this thesis, the most prominent of which are:

- a. Optical fibers have a major contribution to the development of modern technology tools used in e-learning in the modern era
- b. Optical fiber, or what is called optical cable, is made up of several types in its mechanism of operation and performance and is considered much faster than traditional networks in terms of transmitting Internet speed.
- c. One of the advantages of optical fibers is that they are light in weight and easy to use in terms of their good flexibility in work, as well as the abundance of the raw material silica, from which optical fibers are manufactured.
- d. Modern technologies have a prominent role in developing the distance education process due to the ease that modern technologies provide in connecting people and meeting them without the classical presence, especially in e-learning processes.
- e. Facilitating calculations, transfers, and transfers between individuals through smart and secure application programs that are used in institutions and universities.
- f. Modern technologies have goals in dealing with the forced interruptions that happen to us through the spread of epidemics and diseases or in the event of war. They control the process of distance education through Internet networks and advanced modern devices that are used for educational purposes.
- g. Distance education is not a new idea, but it has increased significantly after the world stopped moving due to the Corona virus, and it has been used since the beginning of the nineteenth century in some countries.
- h. Distance education is characterized by freedom of time and place in terms of not being bound to a specific time and place in attendance, unlike classical education that is restricted in time and place, as well as providing financial abundance in terms of daily expenses of transportation, food, and other obligations, developing and training educated people and increasing their skills in using modern techniques

- i. There are also disadvantages and defects in e-learning, including the difficulty of controlling students by the teaching staff, the lack of vitality and effectiveness of student activities, and the lack of efficiency and integrity in terms of the international level of students.

4.2 RECOMMENDATIONS

- a. Working on developing and using fiber optics instead of the regular Internet network due to the speed of optical fiber performance, its accuracy, and its superior speed in transmitting information and data if it is characterized by speed and accuracy.
- b. Developing modern technical tools and devices used in institutions and universities for the purpose of keeping pace with the development taking place in the infrastructure of modern technologies.
- c. Training, developing and qualifying cadres to increase information and skill in using modern technologies, devices and programs by opening courses and conferences to provide the best scientific level and thus developing the educational process through distance education.
- d. Working to spread the culture of smart use of devices and tools for modern technologies in societies, especially societies that are lagging behind in terms of development, especially developing the age groups targeted for study.
- e. Practicing distance education and not abandoning the distance education method, in anticipation of any emergency that could suddenly stop movement and life activities, as happened in the rapid spread of the Corona virus Covid 19, when it stopped the world at an unexpected speed.

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