Enhancement the Educational Technology by Using 5G Networks

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Abstract—With the spread of global markets for modern technical education and the diversity of programs for the requirements of the local and global market for information and communication technology, the universities began to race among themselves to earn their academic reputation. In addition, they want to enhance their technological development by developing IMT systems with integrated technology as the security and fastest response with the speed of providing the required service and sure information and linking it The network and using social networking programs with wireless networks which in turn is a driver of the emerging economies of technical education. All of these facilities opened the way to expand the number of students and solve the problem of accumulation, collection and analysis of data by storing it with large, expanded and automatically interconnected databases between university places and departments to provide services adapted to the desire of demand. This research dealt with a sample from of the academic's opinions and students. The sample is 319 questionnaires. It concluded that each of the infrastructure, devices, Internet of things, smart classrooms, and administrative database, with the presence of the fifth-generation network and its equipment, have a statistically significant correlation with technical education technology.

Keywords—educational material, educational strategies, systems and applications, produce, educational devices

1 Introduction

AI and 5G networks have been identified as critical areas of innovation and creativity necessary to enable smarter and more proactive technology communities. The next generation is the fifth generation technology, the generation of virtual technology with mobile communication standards equipped with applications and services of the Internet at its new speed, which showed a significant improvement in the performance of technical education technology, which enhanced confidence between the user and the technological investor by sensing the magnitude of data, managing and coordinating

network resources, and providing connected and independent smart systems [1]. Therefore, higher and technical education institutions have embarked on the process of shifting to automated education, including an automated electronic teacher and virtual reality, including virtual classrooms, smart boards, 3D artificial intelligence laboratories, and high-resolution photographic sensor cameras. Coding and numbering university students and benefiting from the advantages of the Internet of Things and remote sensing by supporting them with the fifth generation networks FG-ML5G, modern computers and mobile devices, and a team specialized in studying cases, services, requirements, interfaces, protocols, algorithms, and network architecture for machine learning and data formats [2]. Education or teaching is the intentional organized design of the experience that helps the learner to achieve the desired change in performance, targeted learning outcomes. Learning is a subjective activity carried out by the learner, with or without the supervision of the faculty, with the aim of acquiring knowledge or skill or changing behavior. Learning is everything that a person acquires through practice and experience, and it is the other side of the education process and its product, and it is associated with it so that one cannot be separated from the other. When talking about education, it is necessary to shed light on learning to form a clear and complete picture on the subject. Teaching differs from learning in that teaching is an activity undertaken by a qualified person; To facilitate the learner's acquisition of the required knowledge and skills, while learning is the self-efforts made by the learner to acquire the knowledge and skills he seeks to acquire [3]. Teaching strategy is the strategies used by a faculty member to improve student learning. It can be defined as a set of general rules and outlines that concern the means to achieve the desired goals of teaching. It refers to the methods and plans followed by the faculty member to reach the learning objectives. It is the set of activities or mechanisms used (presentation – coordination – training – discussion) in order to achieve specific teaching objectives. Thus, it includes two components, namely, the method and the procedure, which together form a total plan for teaching a lesson, unit, course, or other. That is, a faculty member may go according to his own style of teaching, approaching any teaching method. He chooses it, but it does not deviate from a general framework that has its general teaching procedures. It includes teaching objectives and the movements that a faculty member makes and organizes; to walk according to her in his teaching. Organizing the classroom environment and managing the classroom. Learners' responses to stimuli presented, planned, and organized by the faculty member [4, 5]. Learning strategies are the behaviors and actions a learner engages in that aim to influence how you process information and learn different tasks. It is also defined as the behavioral patterns and thinking processes that learners use and affect what has been learned and the treatment of learning problems. Learning is strategic when learners are aware of the specific skills and strategies (specific procedures and methods) that they use in learning, and control their attempts to use them [6–8].The current era is characterized by expansion in all different fields and to ensure keeping pace with this expansion Knowledge, scientific development and technical employment, the role of education becomes the development of the learner in the aspect Cognitive and skillful, through multiple teaching methods and methods, instilling in the learner the direction of employment technology in everyday life. Accordingly, teaching aids represent a set of devices, tools, and materials that a faculty member uses to improve the teaching and learning process. Among the

devices that helped in this computer, which contributed in many ways to teach, including educational games, and a problem-solving environment [9, 10]. Instructional "educational" material can refer to the rate of development or progression of a student's cognitive development, abilities, interests, and other aspects. It allows the student to develop strategies for assessing, planning, and organizing his or her own learning. The characteristics of the educational material vary according to the objectives, characteristics of the students and conditions of study, as well as infrastructures and access to technologies. You can design educational material for different contexts in such a way that your design sparks interest and curiosity about the issue. So that it is a source of information and directed to motivate. It can be adapted for use with or without teacher assistance. It can be used individually or in combination. That is, it is multi-use [11, 12].

1.1 Educational devices, systems and applications

The use of smart devices and harnessing their capabilities in the service of teaching and learning is one of the necessities of this age, and diversity in teaching methods is one of the priorities of the teacher of this century. It is also necessary to address challenges and facilitate ways and means, so there must be material and human support, training and management to introduce this technology and work on it in the educational field [13, 14]. Due to the widespread use of smart technologies, most universities have been keen to invest in supporting the educational process from various aspects by using the options provided by these technologies such as SMS, mobile learning management systems and applications to attract learners to integrate into the electronic environment they provide. Most of today's learners who are involved in university education have become familiar with the use of mobile devices of all kinds, especially mobile phones and tablets. As most students are younger than the tablets or stationary computers they use in their daily lives, that is, they have grown up with computer technologies that have enhanced and enhanced many aspects of their lives, including: Education [15].

So Educational technology is based on a theoretical basis of principles, ideas and theories based on it, and it falls within an applied scientific field in which ideas and theories are put into practice and scientific practice. It is based on the entrance of systems, meaning that it is an integrated system that includes man, machine, ideas, practical methods, and management [16, 17].

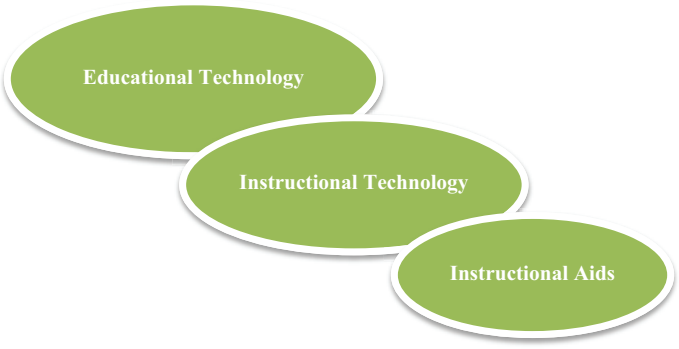

Fig. 1. The difference between educational technology and instructional technology

1.2 Educational technology

It is difficult to ignore the growing role of educational technologies in the integrated e-learning adopted by most universities, as these technologies have contributed to transferring teaching and learning to a new level in which learning resources are easily accessible when needed. It also provided an educational environment in which the teaching and learning processes are conducted by the teacher and the learner, through mobile devices and wireless networks wherever they are and at any time they want to. This environment is characterized by its wide spread as it is not restricted by place or time and gives a special character to teaching and learning activities and emphasizes self-directed learning in which educational applications play an important role in achieving it [18, 19]. Technological progress has led to the emergence of new methods and methods for indirect education, which depend on the employment of technological innovations to achieve the required learning, including the use of computers and its innovations, satellites and satellite channels, and the international information network, in order to provide learning throughout the day and night for whoever wants it and in the place that suits him [20], Through various methods and methods supported by multimedia technology with its various components, to provide educational content through a combination of written and spoken language, static and animated visual elements, and various audio-visual effects and backgrounds, which are presented to the learner through the computer, which makes learning interesting and enjoyable, and achieved with the highest efficiency, With the least effort, and in the least time, which leads to the quality of education [21, 22]. Educational technology has also witnessed wide changes due to the launch of social media, information storage and transmission, the use of visual and audio media, the production of its educational outcomes and it's sharing among students. The role of technology has expanded from being a mere tool for study and inquiry to an integrated approach and use in technical education. Technical education specialists are responsible for educating and guiding their students in the optimal and beneficial use of their studies [23, 24]. In the sixties of the last century, the exploration of the possibilities of self-service based on technology began to complement or replace the personal services provided to the student category and performed by the staff of the Student Affairs Division at a time when services were considered less important in creating economic value and financial returns from student registration, and with the growth of technology and consumer desire Because of the technology interfaces and their available capabilities to facilitate the student's task and complete his treatment as quickly as possible, educational institutions have tended to move forward with the advanced technological reality [25, 26]. Educational technology as any activity or benefit based on technologies provided by service providers so that customers can perform the service or parts of the service themselves, in the field of educational technology applications, the service provider is a machine that the customer uses to perform the service himself, which facilitates The process of replacing student affairs personnel who were necessary in the provision of the traditional service [27, 28]. Other similar authors have suggested terms such as self-service technologies, which are defined as technological interfaces that enable customers to produce a service independent of the

involvement of direct service personnel [29]. Research has recognized the benefits of education technology to clients including time and cost savings, greater control over service delivery, reduced waiting time, higher level of personalization, convenience of location, and enjoyment of using technology, efficiency, flexibility, greater satisfaction and mental innovation .There are quick ways to transfer information (Super High Way Information) from one place to another, and the emergence of the international information network (World Wide Web) known as the Internet, and its employment in all walks of life, shows the importance of information As a commodity that is bought and sold [30, 31].

1.3 ET tools

1. Educational material: the professor, the educational content, the student [32, 33].
2. Educational strategies: interactive education, educational content diversification, educational investment, simulation, cyber security, reality virtual, program integrated [34].
3. Systems and applications: artificial intelligence programs such as the automatic teacher system, the human senses simulation system and addressing its educational problems, intelligent platforms, smart network protocols and algorithms, data management base, fog computing, cloud computing, internet of things, machine learning [35].
4. Produce: economic investment, social investment, educational investment [36].
5. Ed. devices: laptop computer (tablets), course projector, digital camera, smart boards, digital interactive whiteboards, communication network, digital projectors, intelligent career path driver, high frequency equipment, sub band wireless coverage, fiber optic cables, millimeter wave radio links and relays, robotics, real time system, distributed real time system, network security [37, 38]; as noted in Figure 2.

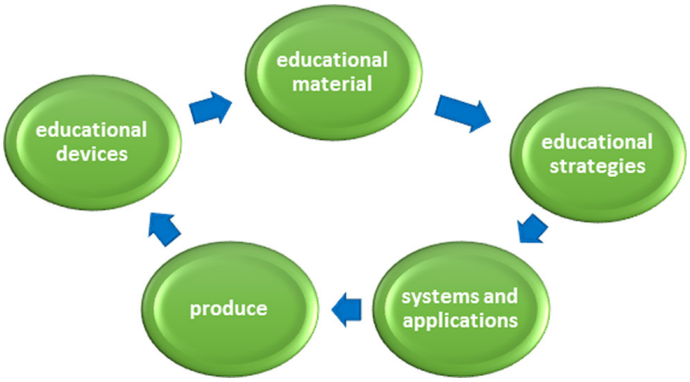

Fig. 2. Educational technology tools

2 Literature review

The research dealt with a group of previous research that dealt with educational technology and fifth generation networks. It was presented in table to show the similarities and the most important aspects that it touched upon.

Table 1. Presentation of the most important research papers that dealt with educational technology and fifth generation networks

Authors	Objectives	Conclusions
[39]	It focuses on interactive learning during lectures while discussing and evaluating various applications of educational technology in the field of medical education. Medical schools regularly use lectures and other group learning sessions. It is well recognized that encouraging interactive learning in big groups can be difficult. The development of technology to improve engagement and communication is a promising addition to interactive lectures.	Education in the medical field now includes a variety of educational technologies. To maximize learning results, technology use and integration should be guided by educational needs. Prerequisites for the best success include a specific job and objectives. Selected technology can promote interactive learning in educational activities. To increase students' involvement and participation in lectures and other group learning sessions, many technology applications have been deployed. To find or develop the proper technological tools for effective instruction based on educational theories, collaborative and ongoing efforts are needed.
[40]	This paper dealt with the possibilities offered by the fields of artificial intelligence and their use, and the process of evaluating exam results.	Many faculty members have struggled to use this technology because of their extensive knowledge and the students' limited understanding of it.

The current study aimed at the extent of the impact of the fifth generation networks with their mobile devices, and the 5G network as a technology that brings by its nature aspects such as high speed, extremely low latency, high bandwidth and wireless network communications that contributed to the establishment of the Internet of Things as an important part in technical education, facilitated a major paradigm shift The educational process, in which users interact with big data, and what huge data warehouses provide, has reinforced the goal of educational investment, entering the labor market, and offering educational products through social media and websites, as well as dealing with artificial intelligence applications to enter the technical field as robots and smart language programs.

3 Methodology

To describe the study sample, a random sample was selected and the opinions of the academic staff and students were taken. The site of the current study is the Northern Technical University. The electronic questionnaires were collected, which numbered 319 valid questionnaires for analysis. The confirmatory factor analysis was chosen that

deals with issues of validity and reliability in measurement by examining the validity and reliability of the scores. On the variables used within 9 criteria set to measure the extent to which the hypothetical model matches the analytical model. Given an acceptable level of validity and reliability of the result, scores are used in statistical analysis to model structural equations, correlated factors, and observed variables that measure each factor. To explore the number of factors, present, whether the factors are interrelated, and the observed variables that seem to measure each factor better. For the study variables and using the Amos v26 analysis system, the questionnaire contained 17 questions that were adopted as variables and divided into independent dimensions (x1, x2, x3, x4, x6, x7, x8, x9, x10, x11, x12) variables represented the educational technology variable and its axes of internet of things, database management, artificial intelligence, smart education system, while the variable is the fifth generation, the dimensions of the dependent were calculated (y1, y2, y3, y4, y5), as shown in Figures 3 and 4.

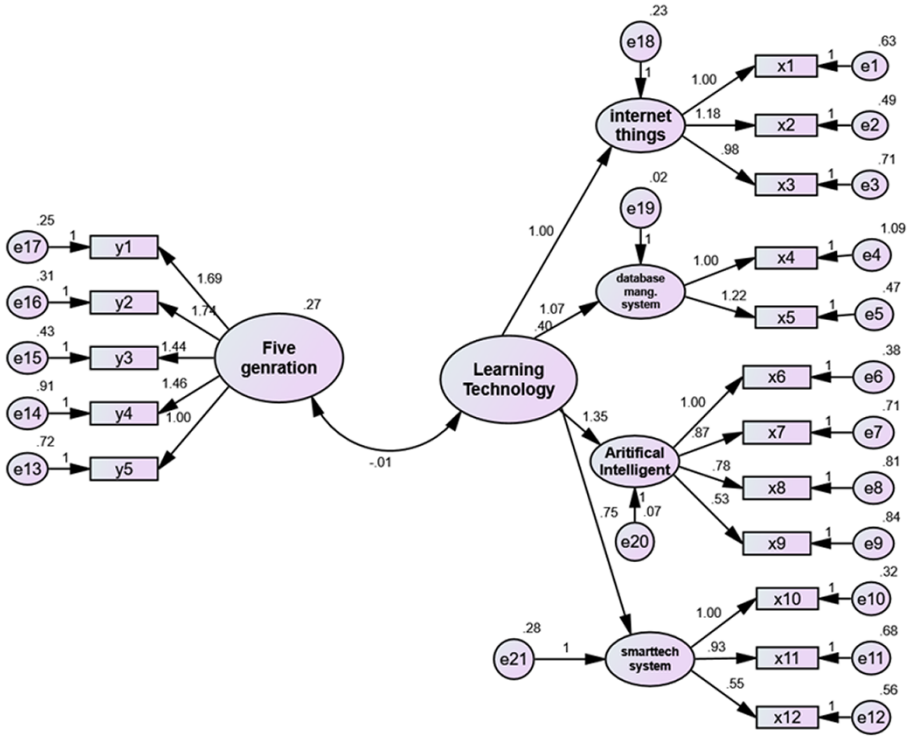

Fig. 3. Confirmatory factor analysis (untenderized system)

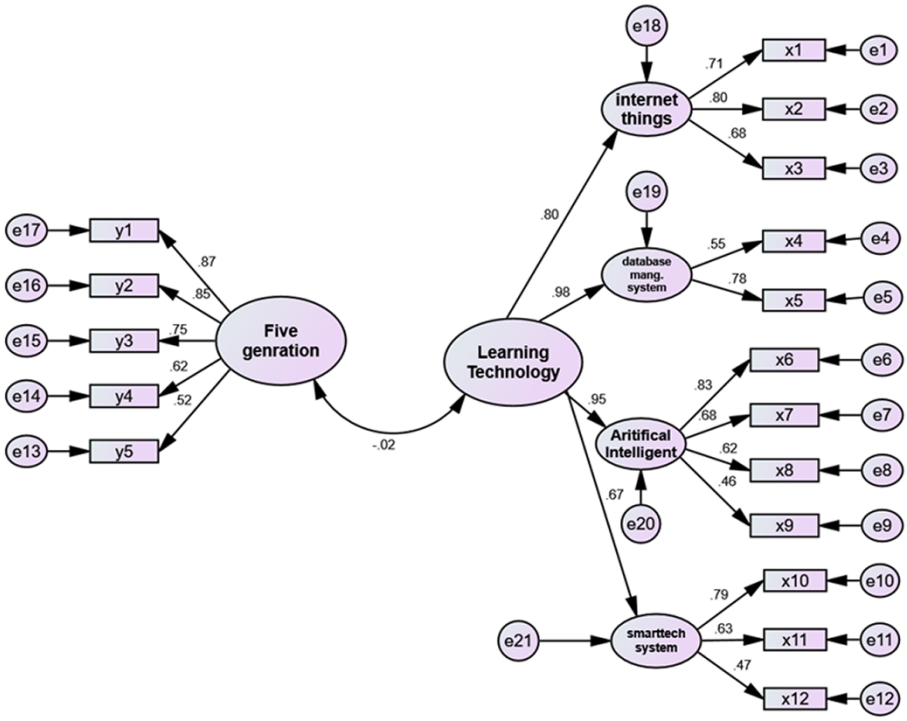

Fig. 4. Confirmatory factor analysis (standardized estimate)

Source: Prepared by researchers based on the results of the analysis (Amos V26).

4 Results and discussion

Table 2's computation of degrees of freedom demonstrates how Amos determines degrees of freedom as the difference between the number of distinct sample moments and the number of distinct parameters requiring estimation. Variances and covariances are always included in the count of distinct sample moments. When you estimate means and intercepts, it also includes sample means. Multiple parameters that are forced to be equal to one another count as a single parameter when calculating the total number of different parameters to be estimated. Fixed parameters with unchanging values have no effect.

Table 2. Degrees of freedom computation (default model)

Number of distinct sample moments:	153
Number of distinct parameters to be estimated:	39
Degrees of freedom (153–39): DF	114
minimum chi-square CMIN:	316

When calculating the probability ratio/(degrees of freedom) CMIN/DF, a value of 2.8 appeared, which is a value between 2 and 5, which means that the value of the

chi-square did not exceed the upper bound and as calculated by equation No. 1, the minimum chi-square is divided by the degrees of freedom.

$$CMIN/DF = 316/114 = 2.8... \quad (1)$$

Chi-square, which is the ratio between the value of the number of sample moments, which must be from 2 in the case of an exact match, and less than 5 in the case of acceptance of the model.

We note in Tables 3 and 4 the imposed model is identical to the data, which is compared with the saturated model at 0 degree of freedom, which has no value to be done through only theoretical calculations. In Table 3, we see the minimum variance to be chi-square estimation is a method of estimation of unobserved quantities based on observed data. In certain chi-square tests, one rejects about a population distribution because a specified test statistic is too large. One effect of its application is that the test statistic does indeed roughly follow a chi-square distribution. The number of degrees of freedom for each parameter evaluated using this method is typically reduced by 1.

Table 3. RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.066	.895	.859	.667
Saturated model	.000	1.000		
Independence model	.333	.414	.341	.368

Table 4 shows the root mean squared (RMR), is a statistical measure of the values of varying quantities. It is especially useful when the values vary into positive and negative, Goodness-of-fit (GFI) establishes the discrepancy between the observed values and those expected of the model in a normal distribution case, The adjusted goodness of fit index (AGFI) corrects the GFI, which is affected by the number of indicators of each latent variable, The modifications are made to penalize less parsimonious models and favor simpler theoretical processes over more intricate ones. The fit index decreases as model complexity increases. PGFI is a parsimonious fit index (based on the GFI).

Table 4. Baseline Comparisons

Model	NFI Delta1	RFI rho1	PCFI
Default model	.856		.756
Saturated model	1.000	.829	.000
Independence model	.000		.000

The normed fit index (NFI) examines the difference between the null model's chi-squared value and that of the hypothesized model. Relative Fit Indices, also called the incremental fit, includes a factor that represents deviations from a null model; so these are sometimes called comparative indices.

Table 5 showed that the data were collected in a random way, and that the sample size is large, reaching 319, and the presence of (connectivity) in the sense of the

dependent variable as a continuous variable, with moderation between the approved variables and random error, no abnormal values appeared in the statistical analysis, a problem appeared. There is a multiplicity of linear relationship between the independent variables, so we relied on the unweighted least squares method for the free scale.

Table 5. The most important indicators of good conformity and the limits of its acceptance

Acceptance Limits	Pointer
It was 2.8 which is less than (5) accepts the assumed model	**Likelihood ratio (degrees of freedom) CMIN/DF**
the value is 0.895, which is greater than or more (0.90), which means a good match	Goodness of Fit Index **GFI**
Its value is 0.859 which means production quality matching	Adjusted Goodness of Fit Index **AGFI**
Its value is 0.856, which indicates the good quality of the model	Normative Fit Index **NFI**
Its value is 0.756, which indicates the good quality of the model	Parsimony Goodness of fit index **PGFI**
Its value of 0.829 indicates the good quality of the model and its conformity with the data	Relative Fit Index **RFI**
Its value is 0.066 This indicator indicates a good fit of the model	Root Mean Square Residual **RMR**

Diagram (1) shows the linear regression equation for the independent study variable fifth generation networks and the study variable approved by the technical education technology and the matching ratio for the hypothetical model is $R^2 = 0.998$, and the linear equation No. (2) represents the effect between the variable X and the Y variable.

$$Y = 3.31E\text{-}4 + 0.4*x \ldots \quad (2)$$

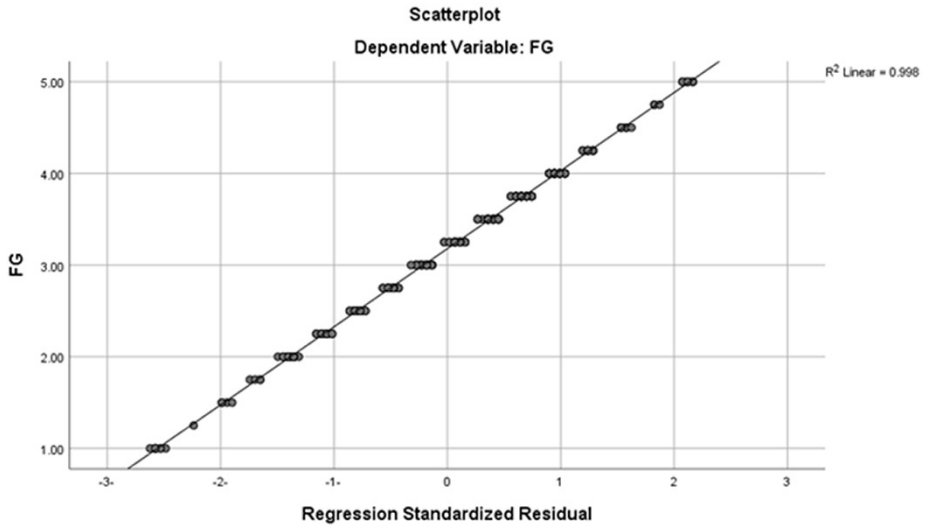

Fig. 5. It shows the regression equation between the variables

5 Conclusions

The conclusions represent an analytical outcome and are summarized as follows:

1. All opinions were directed by all academics to gain the experience and competence necessary to create interactive lectures that enhance participation between professor and student, which improved the outcomes of technical education.
2. The methodological content contributed to changing the strategies of teaching methods and the reliability of providing correct and accurate information to the student.
3. Adopting smart teaching systems that enhance the creativity and innovations of both the professor and the student.
4. The availability of high-frequency equipment accelerated the delivery of information and in a short period of time, reduced the wages of studies, and did not rely on private lessons for the spread of lessons and lectures through easy-to-use study channels and platforms.
5. The educational technology industry using wireless coverage with sub-bands with offers and incentives for commercial applications between public and private universities, encouraging scientific competition and increasing scientific research activity.
6. Opening new markets for technical education technology, which contributed to increasing the professor's degree and scientific activity, which reflected positively on raising his financial level.
7. Encouraging pilot projects for the purpose of testing them and then engaging them in the labor market.
8. The values of the correlation coefficient between each approved base variable of the fifth-generation networks and the approved variable of technical education technology at the level of the surveyed institution was identical with a ratio of $R^2 = 0.998$, which is an integrated and comprehensive percentage of the trend towards the use of technical education technology.
9. There are parameters whose results matched the results of the study, which made the default model identical to the standard model. The relative probability indicators, the matching quality index, the standard congruence index, the economic conformity quality index, the relative matching index, and the root mean index of the residual squares were all identical.

6 Recommendations

1. The necessity of empowering workers regarding modern technologies and evoking the technical culture in conjunction with the requirements of the technical transformation process without making huge mistakes that reflect a negative result that leads to the rejection of the digital transformation process and the preservation of the old traditional system.
2. Working to secure common opinions for the advancement of technical education to higher levels and to come up with solutions and results that contribute to the strengthening and continuation of the work of the technical education technology system.

3. Avoiding the idea of technical control in the field of work, but must secure ways to ensure the success of its use and find ways to support it.
4. The necessity of choosing reliable infrastructures and devices that can be relied upon to transition to technical education technology for administrative matters that would expedite the tasks of the professor, student and administration, and preserve data and information and not lose it.
5. Adopting modern thought and innovations and motivating innovators to reach the goals of technical education technology and sustain their achievement.

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