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Enhancement of educational services by using the internet of things applications for talent and intelligent schools

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ABSTRACT

This study deals with the issue of improving educational services for schools of talent and intelligence. The availability of devices, equipment, sensors, and the Internet of things applications led to a direct contribution to improve the level of student education. In addition, the students can complete the tasks and homework easily. The talented and intelligent students are more efficient, skilled, and active. In addition, they are Deeping to understand virtual reality and coexist with it with awareness and consciousness of the development period of information, the spread of equipment, and smart devices. Educational entities achieved their goals by graduating intelligent students who can join the labor market and contribute to the development of the country. In this research, the important features of the Internet of things that are available in the educational environment were studied, and how to get the benefit from them in developing educational services and scientific research service. The Developing of artificial intelligence capabilities, building the right management strategies and creating comprehensive (security, health, and economic) databases that can be relied upon with complete reliability.

Keywords: IoT (Internet of Things), Educational Services, Security and Privacy, Smart Classroom

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1. Introduction

The term Internet of Things generally refers to the scenarios in which the network is connected, as well as the ability of the electronic cloud and its proprietorship of smart technologies, which allows these devices to create, exchange and consume data with the minimal human intervention [1]. Five major areas of IoT have been examined to discover some of the most pressing technology-related challenges and questions. they include; Security, privacy, reliable wireless connection of smart classrooms, administration, school health, and economies. It collects data, automation, processes, and much more through smart devices and influential facilitating technology[2, 3]. The Internet of educational things has a significant effect on the field of education. The Internet of Things is not only transformed the classical learning method but correspondingly it led to variations in the frame of educational organizations. The term "educational Internet of things" is seen as dual sides of the identical coin due to its use as a technological tool to strengthen the school structure and as a topic or course of study for teaching simple ideas of computer science. It is everything that the Internet can recognize through known internet protocols[4].An individual becomes himself (something) if a particular Internet address is attached to him or his environments, such as by adding glasses, watches, bracelets, electronic devices, medical devices , or equipment.[5].The first appearance of this term was likely at the beginning of the twenty-first century, specifically in the year 1999 AD, at the hands of the British pioneer and innovator (Kevin Ashton), whose idea was to develop a computer's data analysis system using sensor technology and linking it together through the Internet [2]. In concept of smart classrooms mean an analytical community packed with knowledge.
Smart classrooms mean an analytical community packed with knowledge. with advanced educational methods based on the latest technologies. The smart devices could be microphones, cameras and many other sensors, that can be adopted for measuring student qualifications with education or those related things. The smart object offers straightforwardness and convenience for classroom management. The use of the Internet of Things in the classroom may provide a better learning and learning environment [6]. The method of communication was built through prepared software platforms, as these platforms receive device requests through the internet or an internal

network between these devices and each other and deal with them, and the collected data are correspondingly relied on facilitating decision-making processes [7].

2. Internet of things (Concepts, specifications, and dimensions)

2.1. The concepts of the Internet of things

A recent practical technique that ambitions to interest things, characterized by sensors and devices, and then join them to the Internet. Consequently, the information of them will be interconnected with each other without hominid interference, and this is automatic if the thing is situated in a geographic area covered by the Internet [8, 9]. The IoT idea had invented by a follower of the Radio Frequency Identification (RFID) in 1999. It has become more appropriate to the applied world mainly in recent times due to the development of mobile technologies, universal communication, cloud computing, and statistics analytics [10, 11]. The Internet of things is defined as a network of physical objects. The internet is not just a system of computers, but it also evolved into a network of the device of all kind and dimensions, cars, smart mobile, home utilizations, toys, cameras, medical tools and manufacturing systems, people, animals, houses joining and communication each other[12-14].

2.2. Specifications and dimensions

AI : IoT principal makes anything "smart" meaning that the data collection power, artificial intelligent systems, and networks, it enhances every aspect of life [15].New networking enabling technologies, precisely IoT networking, means that networks are no longer fixed purely to foremost suppliers.

On a much minor and lowpriced scale, networks can exist while still being practical. IoT creates these small networks between its system devices. Figure 1 shows the relation between IoT and educations.

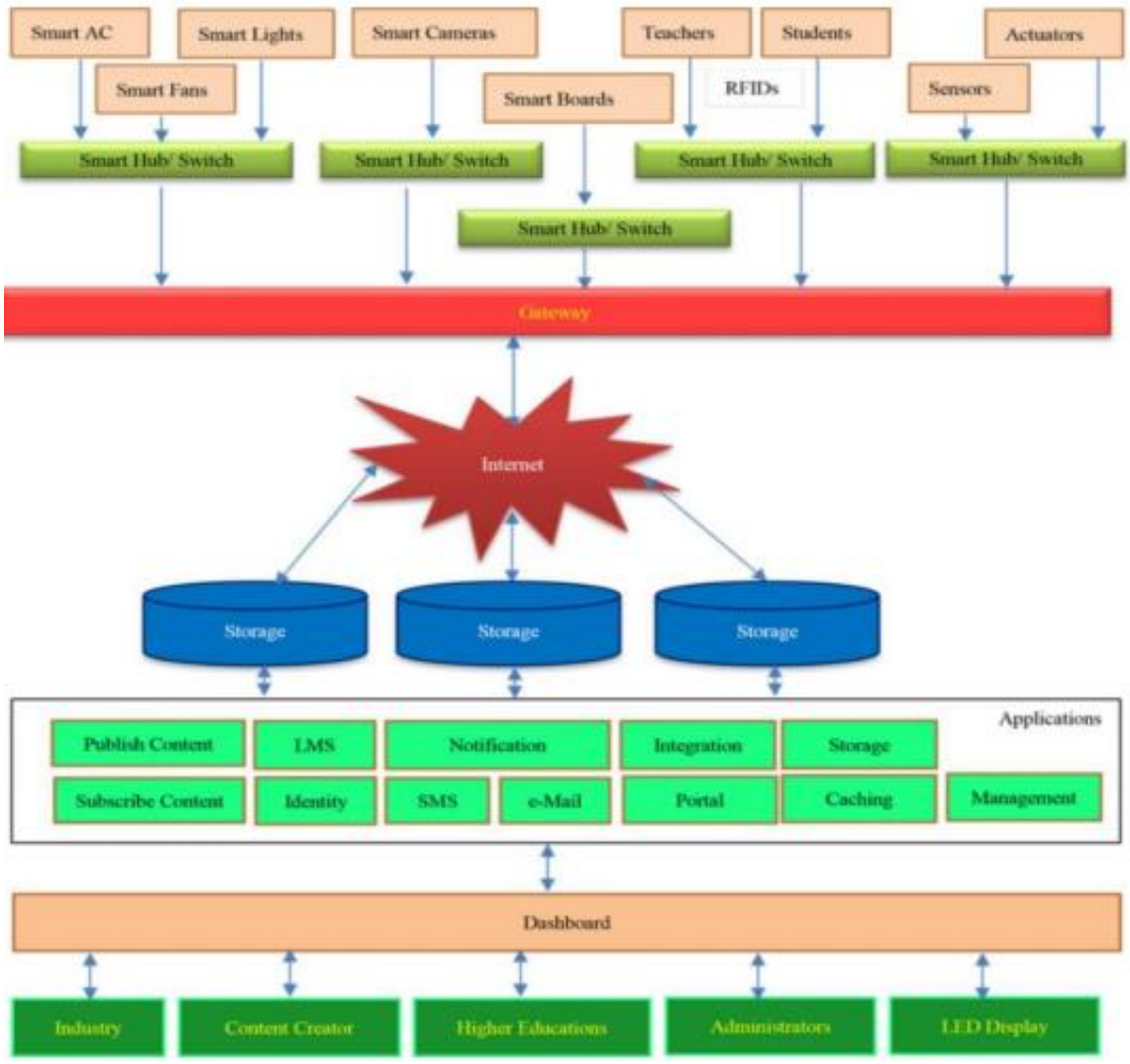

Figure 1. The relation between IoT and educational services.

Without sensors, the IoT loses its fundamental difference. They serve as important procedures that convert IoT from a standard passive device network into an active system capable of real-world connectivity.
Heterogeneity.
The devices in the IoT are heterogeneous, using various platforms and networks of hardware. Through various networks, they can act together with other devices or service programs.
Analytics - These are software systems that analyze data created by IoT devices, and the analysis can be used for many types of scenarios, such as predictive maintenance.

2.3. Educational services

1. Security and privacy in the educational sectors: In the systems that rely on these modern technologies, various data that are transferred through the Internet are preserved. They mainly consist of various devices connected to them, as these devices begin to measure and collect data from students, which exposes the security of the privacy of the student is at risk. Any safety breach can reveal a student's private data associated with an individual's medical record, family economic background, or any other secretive data [16, 17].

2. Reliable wireless connection (Wi-Fi): No one denies the importance of modern technologies for education and the constant need for them without sudden stops or interruptions, and the most important of these technologies is high-speed wireless networks, that make available bandwidth for video and audio issuing of educational classes in an orderly and high-quality manner [18].

3. Smart classrooms: Various reasons may impede educational sectors and institutions to apply this modern technology in their educational institutions due to the incompatibility of some devices and applications, which may be a reason that hinders the institution’s ability to apply and rely on it so that it is presented to all customers, students and teachers, for the effective operation of the Internet Things, the educational organization must ensure that both IT tools and education methods boost using Internet of Things in the virtual classroom. Although potential risks and obstacles are related to technology, informative institutions may gain benefits from exploring and experimenting with IoT options [19].

4. Cost: The complete preparation of the existing educational institution can be these advanced modern technologies with all its devices necessary to create an integrated educational system at an expensive price. Therefore, the cost of devices and equipment represents another challenge for the educational sectors and institutions.

5. Health: Through the spread of surveillance cameras and remote sensors, the sick student can be observed and whether he has a temperature or a shift, so the case can be recorded in the student’s medical record.

3. Study methodology

3.1. The problem of the study

Education schools, in general, suffer from a problem, which is (the effect of using the Internet of things on improving educational services for talented and intelligent schools).

3.2. The goals of the study

The study dealt with the issue of improving the performance of educational, financial, and school health services when the uses of the Internet of things are available, including the communication network, sensors, and electronic sensors, with a focus on their physical quality with the availability of communication devices and supplies of high specifications, and equipping them with support programs and systems, which are the basis for building an educational system. Smart can face difficulties and obstacles to manage its educational resources.

3.3. The importance of the study

The benefits of IoT span across each area of standard of living and education and business. The following is a list of several benefits that IoT has to offer:

1) The study is of great importance on the theoretical side, as it provides an applied study that can be used in the labor market, and which researchers did not discuss previously.
2) Improved student Engagement – Current analytics suffer from blind-spots and significant flaws inaccuracy. IoT converts it to reach better-off and more operative assignation with students.
3) Technology, the same innovations, and data that enhance the success of the student indeed enhance the use of devices and assist in more efficient technology improvements. In the future of a student, IoT reveals a world of vital functions and field data.

3.4 Hypothetical study design

The design is as below:

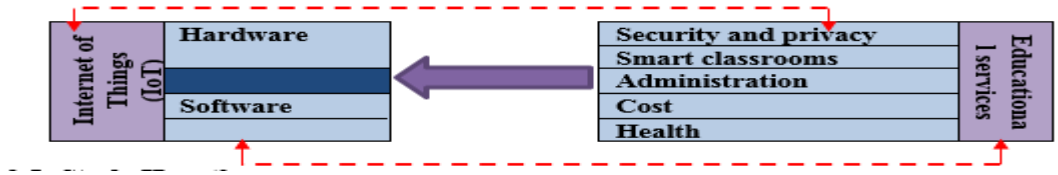

Figure 2. IoT design

3.5. Study hypotheses

The hypotheses are guesses that require verification of their validity and are formulated based on the hypothetical study model, so several major and minor hypotheses were clarified according to the following:

- **The first main hypothesis**

There is a significant correlation between the Internet of Things and (security and privacy, smart classes, administration, cost, health).

- **The second main hypothesis**

There is a significant effect of the Internet of things and (security and privacy, smart classes, administrative, cost, health).

3.6. The study samples

The study model has been selected for testing the axes and the theoretical exemplary in line with the sound scientific foundations of the field of study, to accomplish the goalmouths and orientations of this paper, so model schools of talent and intelligence were chosen. The automated survey form was dispersed to the students of the aforementioned schools, to be retrieved for researchers with (69) questionnaires.

3.7. Manners of data collection

The first and second collected data, which were approved to achieve the study, both hypothetically and virtually, as the second data were selected from bases associated to the variables of this paper for establishing hypothetical frameworks. As for the field side, the principal data axis that was collected by the electronic questionnaire form represented the constituents of things of internet, security and privacy, smart classrooms, administration, cost, and finally the health.

4. Result and discussion

The results of the investigation of the respondents from members of the taster for the axis of the hardware, Table 1 indicate that the mathematics resources for its proportions is (3.06) and that the standard deviation (0.964) while the comparative significance was (61.2%) where the response direction is (agreed). So, section (1) was the most contributing to the enhancement of this measurement.

Table 1. The sample description for the hardware axis of IoT dimension

Paragraphs	Arithmetic Mean	Standard Deviation	Relative importance%
1-Our school has communications that can collect and exchange information and data	3.22	1.11	64.4
2-Our school has accompanying devices and acoustic microphones	3.06	1.08	61.2
3-Our school has remote controls with a control panel and a command	3	1.17	60
4-Our school has sensors and remote-control sensors	2.8	1.08	56
5-Our school has smart devices such as a smart switch or smart hub	3.2	1.22	64
Hardware	**3.06**	**0.964**	**61.2**

Table 2. The model explanation for the software axis of IoT dimension

Paragraphs	Arithmetic Mean	Standard Deviation	Relative importance%
1-Our school has sophisticated software systems that analyze internet data of things	2.99	1.131	59.8
2-Our school relies on interoperable operating systems to deal with the various types of devices available to teachers and students	3.16	1.196	63.2
3-Our school has a database to record the required information for both the teacher and the student	3.68	1.131	73.6
4-Our school has different educational protocols that it uses to recognize and communicate between administration, teachers, and students	3.48	1.244	69.6
5-Our school relies on artificial intelligence applications that facilitate the work of the Internet of things	2.72	1.08	54.4
Software	**3.21**	**0.974**	**64.2**
Internet of Things	**3.132**	**0.912**	**62.6**

The analysis results of the respondents from the members of the sample for the axis of the software, Table 2 indicate that the mathematics resources for its measurements is (3.21) and that the standard deviation (0.974) while the comparative significance was (61.2%) where the reaction path is (strongly agreed). So, section (4) was the utmost contributing to the enhancement of this dimension. The internet of things dimension has got an arithmetic means (3.132) and that the typical deviance was (0.912), while the qualified standing was (62.6). Table 3 explains an explanation for the security and privacy axis of education services dimension. Table 4 explains sample description for the smart classroom axis of education services dimension. Table 5 explains the sample depiction for the administration axis of education services dimension. Table 6 depicts sample description for the cost axis of education services dimension. Table 7 stands for sample description for the health axis of educational services dimension.

Table 3. The explanation for the security and privacy axis of education services dimension

Paragraphs	Arithmetic Mean	Standard Deviation	Relative importance%
1-Our school has a security control dashboard	3.33	1.159	66.6
2-Our school has emergency sensors that are used in the event of accidents	3	1.085	60
3-Our school has surveillance cameras to avoid any security breach	3.74	1.159	74.8
4-Our school has a security record and a database to obtain any security information	3.39	1.153	67.8
Security and privacy	**3.37**	**0.987**	**67.4**

Table 4. The sample description for the smart classroom axis of education services dimension

Paragraphs	Arithmetic Mean	Standard Deviation	Relative importance%
1-Our classrooms have smart displays to provide a variety of e-learning materials	3.46	1.119	69.2
2-Our classes have a smart project for presenting the curriculum	3.29	1.152	65.8

Paragraphs	Arithmetic Mean	Standard Deviation	Relative importance%
3-Our classes have remote control means for lighting and electrical appliances such as fans and coolers	3.33	1.233	66.6
4-Our classrooms have doors that open and close with sensors	2.64	1.272	52.8
Smart classroom	**3.18**	**1.01**	**63.6**

Table 5. The sample description for the administration axis of education services dimension

Paragraphs	Arithmetic Mean	Standard Deviation	Relative importance%
1-Our school has a sophisticated electronic administrative system	3.29	1.113	65.8
2-Our school has electronic attendance and absence records for all teachers and students	3.36	1.188	67.2
3-Our school can change its curriculum to a digital curriculum	3.26	1.159	65.2
4-Our school has smart, remote printers to print books and official accreditations	2.96	1.23	59.2
Administration	**3.22**	**0.972**	**64.4**

Table 6. The sample description for the cost axis of education services dimension

Paragraphs	Arithmetic Mean	Standard Deviation	Relative importance%
1-I think the existence of the Internet will reduce the expenses of educational services	3.8	1.119	76
2-Our school has electronic payment equipment	3.03	1.2	60.6
3-Our school uses the cash coupons available to students	2.88	1.13	57.6
The cost	**3.24**	**0.99**	**64.8**

Table 7. The sample description for the health axis of educational services dimension

Paragraphs	Arithmetic Mean	Standard Deviation	Relative importance%
1-Our school has a smart pharmacy to dispense medication and display product images	2.48	1.038	49.6
2-Our school has an integrated medical file for all its teaching staff and students	2.54	1.142	50.8
3-Our school has sensors to measure body temperature	2.64	1.084	52.8
The Health	**2.57**	**0.985**	**51.4**
The educational services	**3.114**	**0.872**	**62.2**

Table 8. The relations of association

		Security & privacy	Smart classroom	Administration	Cost	Health	IoT
educational services	Pearson Correlation	0.833**	0.825**	0.840**	0.742**	.639**	0.776**
	Sig.(2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000
		69	69	69	69	69	69

** Correlation is significant at the 0.01 level (2-tailed).

The study hypothesis test: The first main hypothesis test: which conditions that there is an important connection between the internet of things and educational services:
H0: There is no important association between cloud computing and distance education, and H1: There has been the significant correlation between cloud computing and distance education. A first main hypothesis was accepted, which statuses that there is an important connection between the internet of things and educational services, and rejected the null hypothesis, as the worth of the Pearson association coefficient was significant and equivalent to 0.766 because of the significant magnitude of sig. It is equivalent to (0.000) and it is lower than 0.01 and with 99% confidence, as shown in Table 8.

Table 9. The illustrative influence of the model

Model Summary				
Model	R	R Square	Adjusted R Square	Std. An error of the Estimate
1	.881[a]	.775	.772	.41664

a. Predictors: (Constant), IoT

Through Table 9, we note that the assessment of relationship (R) was 0.772 and that the illustrative power of the model (R2) is 0.775, which indicates that the internet of things has explained (77.5%) of the modifications that happen to educational services.

Table 10. The impact of the IoT on education services

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.478	.180		2.649	.010
	IoT	.842	.055	.881	15.209	.000

a. Dependent Variable: education services

Table 10 indicates that the effect assessment has reached B = (0.842), meaning that the rise in the internet of things one unit of normal deviancies will lead to a rise in completing the reasonable benefit by 92.6% of the unit of standard deviation.

Table 11. Shows the analysis of contrast

ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	40.153	1	40.153	231.317	.000[b]
	Residual	11.630	67	.174		
	Total	51.783	68			

The results of the F test designate a result of the measurements of the internet of things on improving the presentation of educational services, as displayed in Table 10, where the intended value of F is (231.317) at the moral level (0.05), where the assessment of P-value is equal to (0.000) It is less than 0.05, and this means eliminating the valueless assumption and accommodating the alternate theory and subsequently, there is an influence to eliminate the internet of things to educational services.

5. Conclusions and recommendations

Through the examination of the statistical evidence accompanying the study, several conclusions emerged from it: finding modern security alternatives, providing security and privacy with the presence of surveillance cameras,

databases and security records, expectations of developing financial and economic components through dealing with financial unemployment available to students of talent and intelligent schools and achieving additional income with products (Services (the educational sector, the increase in WiFi, WLAN and Bluetooth connections) A smart generation has emerged that has a promising future that enables them to deal with skills for using the Internet of things, and with the availability of reports and medical records within approved medical databases and records, easy methods of detecting disease among students and the possibilities of reducing it, and the presence of system algorithms Smart, analytical programs and data transfer protocols contributed to raising the administrative level in these schools, to be replaced by electronic administration, finding means and methods to save time spent and reduce effort and investing it in increasing the educational product, the practice of teachers for these schools of smart education and in all study investigations contributed to a simple spread of the use of the Internet of things in directorates Education, as it showed A study on the need to strengthen the smart school environment and the possibility of applying it in a wider and comprehensive manner. There are some concerns among the sample community about violating the privacy of the student, and the lack of an electronic pharmacy in the schools of the talent and intelligent at present reduced the percentage of enrollment in these schools in a small way, so conducting effective studies to find out the obstacles of the Internet of things to be employed in the educational process and ways to overcome them.

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