

Internet of Things: Web-Based Questionnaire for University Evaluation

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Abstract:

Recently, questionnaire-based web-pages are getting popular around the world due to its simplicity in terms of management by databases as well as collecting more opinions than the paper-pages base. The motivation is to measure the degree of students' satisfaction with a number of educational, social, and environmental aspects of the university, with targeting to assess quality, performance, productivity, and innovation then send the information to the university management by Internet. In this paper, students' satisfaction questionnaire based on web-pages is elaborated in terms of design and implementation. This questionnaire detail has been collected officially from the department of quality assurance of Ninevah University as a case study. As an implementation, Spiral model with an iterative flow is selected as the methodology by using web programming tools to construct the online form pages, which are HTML, CSS, JavaScript, and PHP. In other words, this research proves that university evaluation cycles can be completely done by using the Internet to be one of the applications of Internet of Things (IoT), which is considered as the contribution of this paper. In which it is done by setting up a client-server network connection as TCP/IP protocol. The result shows a promising mechanism to provide the university with useful statistical information effortlessly and accurately.

Keywords: Internet of things (IoT), digital survey invitation, web-based questionnaire, Internet surveys.

المخلص:

في هذه الأيام، عملية الاستبيان بالاعتماد على صفحات الويب تنتشر بسرعة حول العالم لما لها من سهولة التنفيذ والإدارة بواسطة قواعد البيانات بالإضافة إلى أخذ كمية أكثر من الآراء مقارنة من الاستبيان بالورق الاعتيادية. الهدف هنا لقياس درجة رضى الطلبة من ناحية التعليمية، الاجتماعية، مظاهر البيئة للجامعة مستهدفة النوعية والعطاء والانتاجية والابتكار و من ثم إرسال هذه المعلومات إلى الجامعة بواسطة الانترنت. في هذه الورقة العلمية، استبيان رضى الطلبة بالاعتماد على صفحات الانترنت يتم شرحها تفصيلاً من حيث التصميم والتنفيذ. تفاصيل هذا الاستبيان تم أخذه رسمياً من قسم ضمان الجودة من جامعة نينوى كحالة دراسية. بالنسبة للتنفيذ، نموذج الحلزوني مع التدفق التكراري تم اختياره كطريقة باستخدام بعض أدوات برمجة الويب لبناء صفحات الانترنت وهي HTML, CSS, Javascript PHP. بكلام آخر، هذا البحث يبرهن إمكانية قيام بتقييم الجامعة تماماً باستخدام الانترنت وكونه

1. Introduction

The quick development of the Internet has made Web-based users popular and become a strong facility in a survey by using the Internet[1][2] to be an application of the Internet of Things (IoT), in which some physical objects are connected among each other. IoT can be defined as a mesh network of hardware objects resulting in useful information. In this regard, different types of sensors can be exploited to input information of our environment such as: smart buildings, cars, smart phones, Laptops[3]. IoT eventually is able to give facility in terms of system management characterized a slow-cost, high-resolution data about the real world[4]. In 2005, IoT was introduced as a novel topic that connects the things around us by the Internet using either wireless or wired networking to achieve desired aims. Also, IoT technology is able to add value so as to respond urgent operations, which are related to efficient collaboration, situational awareness accurately, and resource visibilities[5]. Also, it can be defined as Internet of Things as a interconnection between digital and physical world [6, 7], which perform data quality collection [8].

One type of IoT applications is the ability of doing survey operations by Web-based, which certainly can affect positively on the survey process, here, two things are required firstly, skills related to web page design and secondly, knowledge with computer programming, however, survey respondents encounter various difficulties in completing a Web-based survey[9]. Nowadays, one of the most important points consolidating the university ranking and reputation is driven by students' feedbacks and comments. It is an essential and urgent matter to let students contribute to enhance university services. Globally, many universities have developed their own systems to let their students evaluate the offered services and operations. Consequently, the problem of lacking in measuring the degree of students' satisfaction through their feedback, that may produce a bad relationship between student and university, which might lead to tail the list of the university ranking. Another problem, in case doing the questionnaire by using paper-based which takes much time rather than by the Internet, that will be faster for getting the result. This is crucial to maintain or enhance university services and reputation. In this paper, we design and develop an online web-based questionnaire to capture students' feedbacks and subsequently the system measures the satisfaction degree. To achieve this target, firstly the data is collected from the department of quality assurance and academic performance, and then select a suitable methodology, and finally, web-based application tools are used to set and organize the questionnaire online. Furthermore, spending money on papers and packaging, moreover, spending much time and effort for extracting the final result of each category. To overcome these obstacles, this project develops a system to avoid the aforementioned problems. The objectives of this paper are first to collect required data about the services and facilities offered by the university in which Ninevah University is considered as a case study. , to design a questionnaire as a web-based form based on the collected data by using HTML with CSS and JavaScript. Thirdly, setting up a client-server network (LAN/WAN) and develop an application to take students' comments for submitting to the server and extract the required statistical useful results, here, PHP and MySQL database environment have been exploited in this research. In the end, students become able to evaluate the university services by just filling in some information. Then, the administrators will be able to identify the university's weaknesses and strengths. Thus, the university will maintain its strengths and take action to cope with the weaknesses. Over time, the university will be able to provide services at the optimal level, consequently, its ranking will be improved gradually. This paper has six sections organized as following: Section Two is dedicated to the literature review of previous works. In Section Three, a data collection method is discussed. In Section Four, the research

methodology design is fully elaborated. Then, in Section Five, the result and discussion are presented. Finally, in Section Six, the conclusion is presented tailed with the possibility of future work.

2. Literature Review:

There is growing attention on the Internet-connected to things through Web sites. One of these things is web-based questionnaire, in which a lot of questionnaire operations have been fulfilled by using Internet exploiting web-based design and programming field, which allows the survey designer to choose from many types of item formats such as text input, drop-down list, fill in the blank spaces, buttons, radio buttons, and slider that are types of the item formats used in the web-based surveys.

In this subsection previous researches, which have been exploited the Internet as a web-based questionnaire, are discussed and reviewed. In this research [10], which is conducted related psychology research, a graphic user interface (GUI) based on web pages have been created due to its cheapness and suitability of collecting the required information. The major outcome in this paper that Internet-based questionnaires (web-based namely online questionnaires) is better than existing paper-based measures.

Another research is done in terms of tourism field by creating a web page surveys for the company advertising, cost, here, the goal of this study was to run an automated, a low-cost, Internet-based survey methodology in order to know the level of interesting of a tourism promotional Web site. In this survey, the number of persons as visitors is 833 who have participated by using either-mails and webpage surveys for data collection[11] [12].

It is worth to mention that, some of the decisions regarding colors, fonts, image placement and other design elements have been made in consultation with web-site graphic designer experts. In 2008, research used for measuring the social networks on the web has been conducted using questionnaire design issues, which is presented [13]. In this research the questionnaire layout is deemed very important for achieving cooperation and quality of information, in which three major components of the questionnaire web page have been checked: firstly, the number of input boxes, secondly, style of the question for assessing characteristics, thirdly, number of name interpreters. Web-based development is also beneficial in terms of purchasing and selling items to review and survey the required product, in [14] a managing system used for purchasing orders for proposal and responses by exploiting a web site interface, which lets users request specific information for goods and services from the desired vendors. Another work-related to web-based questionnaires dedicated to epidemiologic data collection is presented in [15], it is claimed in this research that in the near future, practical application by web-based questionnaires can fulfill customer's needs. However, the point of view of this searcher that the design issues of the questionnaires may have an impact on data reliability, response and completion rates. Other researches as in [16][17][18] used a web-based survey for university students to collect health risk behavior and data. Those students are selected randomly and assigned to emails and web pages for the survey. Also, a work of questionnaire and data-gathering tool as a form of Web-based for information collection is detailed in [19], which can be defined as an application that has the following tips data entry, data instrument design and management, as well as data tables inside database required to store the results for the future reference.

In terms of web-based pages, the questionnaire can be constructed using the form in HTML, in which the information will be submitted to the server and stored inside database such as using MySQL through server scripting language named PHP, in which this work is fully described in [20] to save Web-collected information into MySQL database environment. Another work in [21] is explaining a web-based questionnaire for computers and tablets, by using HTML and PHP scripting language to store the information inside the database. In this research, 80% of the users felt comfortable with web-based questionnaires and tablet because the operation was easy to input the information that are just text input created by HTML Form.

A special type of questionnaire is depending on Web-based, which is a fast-growing and promising methodology. By receiving an e-mail or message for instances by the social media requesting to click on a URL address that will direct the person to a website to fill in a questionnaire form. The interview is also another type of questionnaire, which having a form of listening with talking to people, which is certainly deemed another way to record data from persons [22][23]. Observation is a systematic data collection approach. It is worth to mention that all researchers use all of their possible methods to examine people in natural situations in order to gain ways to check for nonverbal expression of feelings, also, determine who interacts with whom, or grasp how participants communicate with each other [24].

3. METHODOLOGY

The overall system architecture, as shown in Fig. 1, it consists of various clients' communication means such as smart-phone, tablet, laptop, Internet, and router, as well as the database on the server. In other words, it means that the end-user can either give his/her feedback by computer or Mobile. In the case of Mobile, a wireless router must be connected to the network to provide a connection to the mobile for adding more flexibility to the user regarding the questionnaire. It is worth to mention that, all information will be stored in a single table that contains all the information for all levels, groups, departments and colleges of the university.

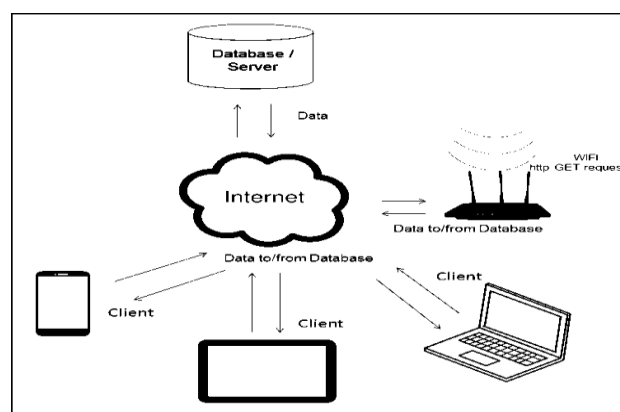


Figure 1: Proposed Client-server System Architecture.

Filtering operation will be used in case required some statistical information which are related to a specific level or department or college of that university. The filtering operation of information is based on SQL (Structural Query Language). After storing this information in the database, an administrator of the web database can send the report to the head of the university either by email or by any online device, in order to know the weakness points and powerful points so as to tackle with these obstacles, which leads to improve the university services as overall. This is the meaning of the IoT, in which the thing here is considered the feedback information send by students through the Internet as shown in Fig. 2, and then some processing happened to the information to be received by the head of the university. First, HTML is used to display the content for the questionnaire form, while CSS is to format the presentation of the page content, in addition to javascript is exploited to perform required calculations at the client-side. As shown in Fig.3, the process starts by filling in the information of the different questionnaire sections. Then, by using Javascript is used to determine the number of radio input (P) for each section and make validation check that all radio points are selected before moving to the next section of the questionnaire.

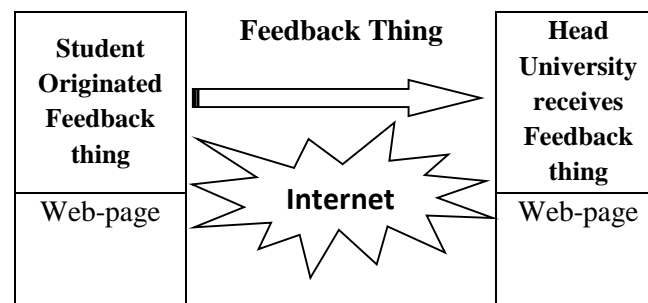


Figure2: IoT block diagram of the proposed work.

Here, seven sections exist in this questionnaire, which has been taken from Ninevah University as a case study. After assuring and checking all radio inputs for all the seven sections, which is done by JavaScript, submitting operation is done for this information from the client-side to the server-side by using PHP in order to perform some statistical operations and store these moved data in the Database server. Here, MySQL Database is exploited in this project. Finally, calculate the average of all sections and store it in the DB to be used later by admin via submitting quires using MySQL. More details of the proposed flowchart are depicted in Fig.3.

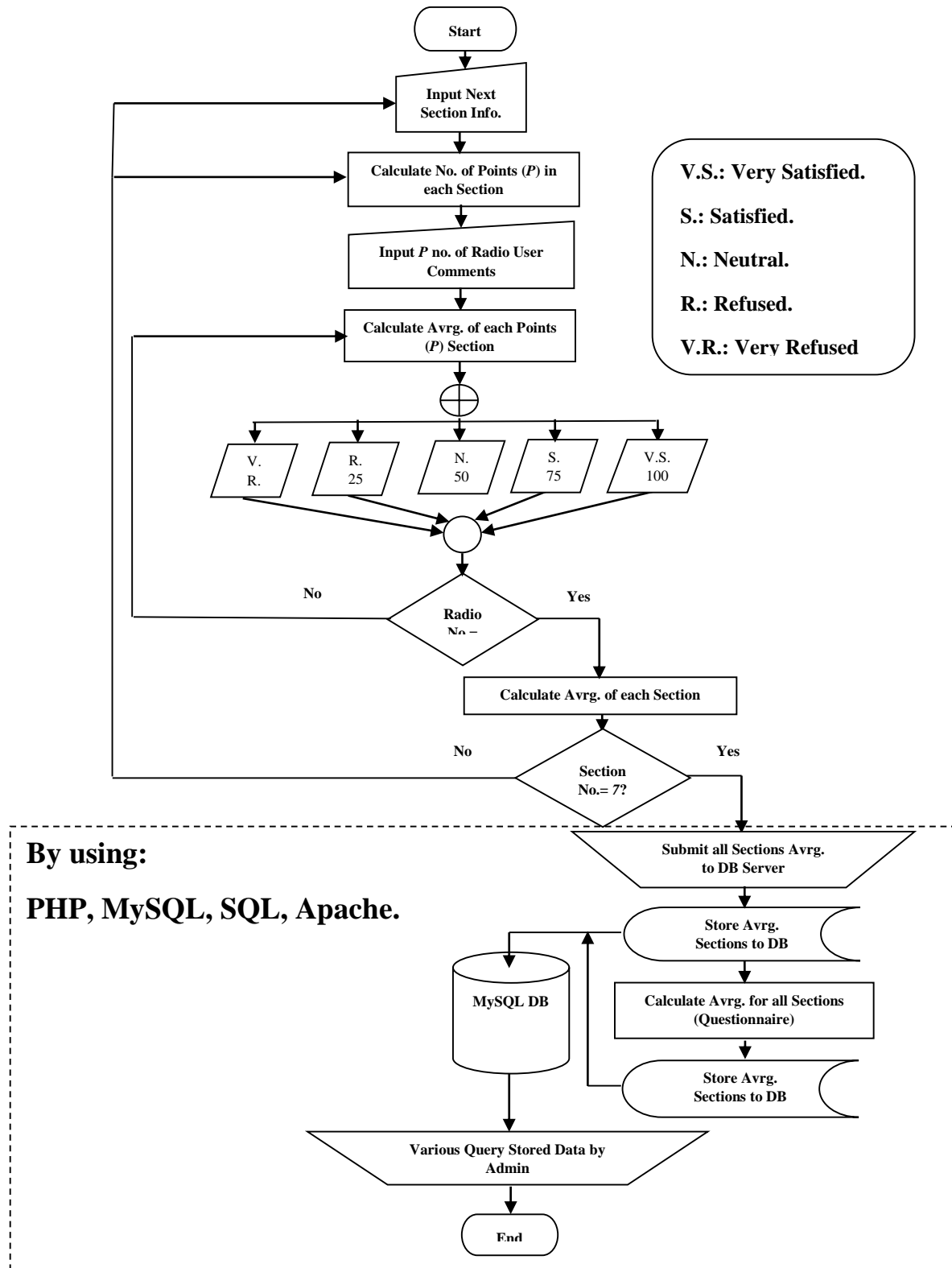


Figure 3. Flowchart of the Proposed Methodology



4. Questionnaire Items

There are a set of questionnaire types related to the university quality, however, this study has been obtained from the Ninevah University. It is taken from the department of quality assurance and academic performance, which consists of seven items (sections) and each item consists of several points (questions) as shown in below Table 1. For adding simplicity to feedback operation for each item, there are a set of points, which have been designed as a radio-input type of the web-based form. In other words, just to put a mark (tick) on the satisfied grade according to the user mentality. Then, JavaScript will undertake the whole task to compute the given grade as a percentage for each item.

Table 1: Questionnaire Items

Item	Question
Registration and Student Support	University Information and its Programs on WWW
	Registration of the 1 st year students
	Academic Guidance
	Student registration application and issuing identities
Learning Resources	Labs and teaching Halls
	Level of lecturers
	Library and its services
	Internet of the University
	Teaching ways and learning
	Technology diversity in teaching
University Environment and offered services	Safety and security system in the university
	Activities
	Medical services
	Transportation and Parks for cars
	Religion activities
	Services of food, water and entertainment
	Accommodation
	General Live in University
Learning Operation	Lecturer Organizing
	Syllabus contents and their goals
	Suitability of theory with practical parts
	The attention of the academic staff for their student's learning.
	The relationship between academic staff and students
	The relationship between staff and students
	Level of the academic staff
	Quality of the academic programs
	Learning output
	Suitability of the learning output for jobs

	Graduation projects, researches, and scientifically reports
Examinations	Coverage of the examination questions
	The question of the exam originated from the academic lectures.
	Time suitability regarding the examination question.
	Students comfortable in the examination halls
	Invigilating dealing with a student inside the examination halls
Student Evaluation and Motivations	Ways of doing examination (theory, practical, short, lab report)
	Justice in evolution
	Motivations and punishments
	Students satisfaction
General Evolution	Overall of the student's satisfaction for the university
	Overall of the student's satisfaction for the college
	Overall of the student's satisfaction on the field study
	Joining friends and relatives to study at the university
Suggestions	-----

5. RESULTS AND DISCUSSION

User and Admin Interfaces

The developed online questionnaire platform involves two actors Student and Admin. The student must fill his/her particulars such as college, department, year, gender, and academic Year, then, assess each questionnaire item by evaluating the given questions in Table 1 and finally can view and submit information to be stored in the database. The admin can view overall results, filter and view specific results, compare the results of different academic years by using SQL.

In terms of testing, the process starts when students access the questionnaire web-page to evaluate and submit the web-page. Each evaluation contains five scales and each scale has value as shown below:

Value	Evaluation
100	= Very satisfied
75	= Satisfied
50	= Neutral
25	= Refused
0	= Very refused

The student can see the average of each questionnaire item of his/her evaluation only using the following average formula:

$$\frac{\sum_{x=1}^n evlQ_x}{n} \quad (1)$$

Where $evlQ_x$ represents the evaluation value of a particular question, $x = 1, 2, 3, \dots, n$, the evaluation value is between 0 and 100 based on the evaluation scale, where n is a total number of questions.

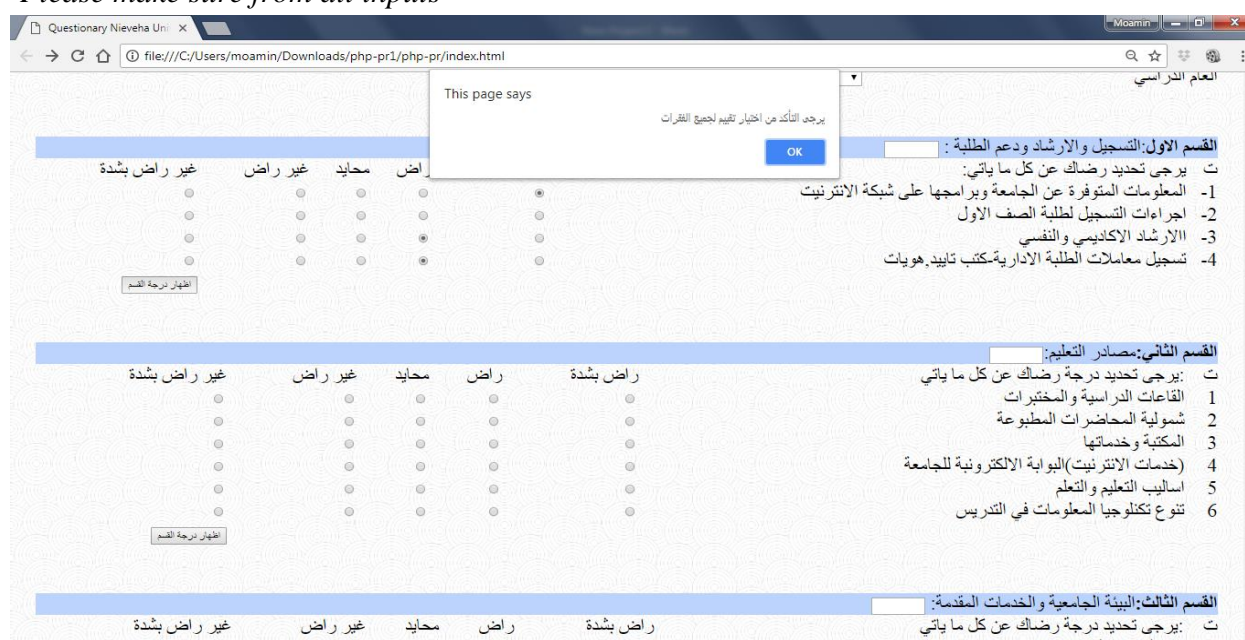
When the number of students submits their evaluations, the admin can see the average of each questionnaire item of all students as shown in the following average formula:

$$\frac{\sum_{s=1}^m \left(\frac{\sum_{x=1}^n evlQ_x}{n} \right)}{m} \quad (2)$$

Where s is the average evaluation of a particular student and m is the total number of evaluator students.

In this section, we conduct several experiments to test the functionality of the developed system for both: students and admin. First, about the students, we test the student's interface functions. The students can evaluate a specific questionnaire item and view results, then, view the complete evaluation of all items and submit the results. As shown in Fig.4, the student will not be able to view the result of a specific questionnaire item if not all questions (points) are evaluated (ticked). As a result, a snapshot message will be appeared telling the user:

“Please make sure from all inputs”



The screenshot shows a web browser window with a URL: file:///C:/Users/moamin/Downloads/php-pr1/php-pr/index.html. The page displays a questionnaire titled "العام الدراسي" (Academic Year). It contains three sections: "القسم الأول: التسجيل والإرشاد ودعم الطلبة" (Section 1: Registration and Guidance and Student Support), "القسم الثاني: مصادر التعليم" (Section 2: Sources of Education), and "القسم الثالث: البيئة الجامعية والخدمات المقدمة" (Section 3: The University Environment and Services Provided). Each section has a list of questions with radio buttons for evaluation. A message box is displayed in the center, stating: "يرجى التأكد من اختيار تقييم لجميع الفقرات" (Please make sure to select evaluation for all paragraphs). The message box has an "OK" button.

Figure 4: Incomplete Fields appears a snapshot message

If all questions are evaluated as shown in Fig.5, the student will be able to see the result as 62,5% of that item as highlighted with the black bracket in Fig.5.

Figure 5: Result of a Particular Evaluation

“Please make sure from all inputs”

Figure 6: Incomplete Information for all sections

If all information and user comments in completely, then the student will be able to view the complete evaluation report as shown in Figure 7.



Figure 7: Final Evaluation Report

Secondly, in terms of admin as the main admin function is to filter and view the report in different categories. As shown in Fig. 8, the admin can view the complete result of specific settings. The various settings are shown below:

1-Academic Year	2016 & 2017
2-College	Electronics
3-Department	Communication;Computer;Control;Electronic
4-Year	All years
	First-year students (Year 1); Second-year students (Year 2); Third-year students (Year 3); Four-year students (Year 4)

For the following sub-sections, 4 tests have been implemented on the designed web-pages and showing the resulting query that has been done on MySQL database:

Test 1:

The query set is as follows:

1-Academic Year:	2016 & 2017
2-College:	Electronics
3-Department:	All
4-Year(level):	All

The result as shown in Fig.8, it is clear that the result of test1-query has extracted all the scores for all items in both 2016 and 2017 years. For instance, the general evaluation of the University of the Year 2016 is up to 58%, which is better than in 2017 as it scored 49%.

الاحصائيات التفصيلية (القسم : كل الاقسام - المرحلة : كل المراحل)		
القسم	كل الاقسام	المرحلة
السنة الدراسية		
2016		
التسجيل والارشاد ودعم الطلبة:	78.68	
مصادر التعليم:	68.38	
البيئة الجامعية والخدمات المقدمة:	67.65	
العملية التعليمية:	58.82	
الامتحانات:	75	
تقويم الطلبة وتحفيزهم:	54.41	
التقييم العام:	58.46	
السنة الدراسية		
2017		
التسجيل والارشاد ودعم الطلبة:	77.57	
مصادر التعليم:	64.71	
البيئة الجامعية والخدمات المقدمة:	64.34	
العملية التعليمية:	60.96	
الامتحانات:	62.35	
تقويم الطلبة وتحفيزهم:	56.62	
التقييم العام:	49.63	

Figure 8: Result done by admin for Test 1 setting.

Test 1 SQL Query as:

Select * from eval_table where 'Year_time'='2016&2017' and 'College'='هندسة الالكترونيات'

Test 2:

The query set is as follows:

1-Academic Year:	2016 & 2017
2-College:	Electronics
3-Department:	All
4-Year (level):	1

The result is as shown in Fig. 9, it is clear that the result of test2-query has extracted all the scores for all items in both 2016 and 2017 years where level 1 only among the 4 levels. For example, the general evaluation of the University of the Year 2016 is up to 56%, which is worse than in 2017 as scored 65%.

الاحصائيات التفصيلية (القسم : كل الاقسام - المرحلة : الاولى)		
القسم	كل الاقسام	المرحلة
السنة الدراسية	2016	
التسجيل والارشاد ودعم الطلبة:	90.63	
مصادر التعليم:	64.58	
البيئة الجامعية والخدمات المقدمة:	75	
العملية التعليمية:	84.66	
الامتحانات:	66.25	
تقويم الطلبة وتحفيزهم:	53.13	
التقييم العام:	56.25	
السنة الدراسية	2017	
التسجيل والارشاد ودعم الطلبة:	85.94	
مصادر التعليم:	52.08	
البيئة الجامعية والخدمات المقدمة:	68.75	
العملية التعليمية:	58.52	
الامتحانات:	51.25	
تقويم الطلبة وتحفيزهم:	37.5	
التقييم العام:	65.63	

Figure 9: Result done by admin for Test 2 setting

Test 2 SQL query as:

Select * from eval_table where 'Year_time'='2017&2018' and 'College'='هندسة الالكترونيات' and 'Class_no'='الاولى'

Test 3:

The query set is as follows:

1-Academic Year:	2016 & 2017
2-College:	Electronics
3-Department:	Communication
4-Year:	All

The results related to testing 3 are as shown in Fig. 10. Here, filter conditions are the same as test1 except for the department field, which is the query-based only on the “communication Department”. The average score for all items in the year 2016 is up to 60%, which is damped to 43% in 2017.

Test 3 SQL query as:

Select * from eval_table where 'Year_time'='2017&2018' and 'College'='هندسة الالكترونيات' and 'Class_no'='الرابعة' and 'department'='Communication'.

الاحصائيات التفصيلية (القسم : الاتصالات - المرحلة : كل المراحل)		
القسم	كل الاقسام	المرحلة
السنة الدراسية	2016	
التسجيل والارشاد ودعم الطلبة:	75	
مصادر التعليم:	77.08	
البيئة الجامعية والخدمات المقدمة:	67.19	
العملية التعليمية:	70.45	
الامتحانات:	82.5	
تقويم الطلبة وتحفيزهم:	59.38	
التقييم العام:	60.94	
السنة الدراسية	2017	
التسجيل والارشاد ودعم الطلبة:	87.5	
مصادر التعليم:	66.67	
البيئة الجامعية والخدمات المقدمة:	91.41	
العملية التعليمية:	65.91	
الامتحانات:	78.75	
تقويم الطلبة وتحفيزهم:	62.5	
التقييم العام:	43.75	

Figure 10: Result done by admin for Test 3 setting

Test 4:

The query set is as follows:

1-Academic Year:	2016 & 2017
2-College:	Electronics
3-Department:	Electronic
4-Year:	3

The result of test 4 is as shown in Fig.11. In test 4, filter conditions are as following fields: the Academic year is both “2016” and “2017”, college is “electronics engineering”, the department is only “electronic” and only third level. According to these query filtering, the average resulted in a score for the year 2016 is up to 50%, then slightly rose to 53% in 2017.

الاحصائيات التفصيلية (القسم : لالكترونيك - المرحلة : لثالثة)		
القسم	كل الاقسام	المرحلة
السنة الدراسية	2016	
التسجيل والارشاد ودعم الطلبة:	75	
مصادر التعليم:	62.5	
البيئة الجامعية والخدمات المقدمة:	50	
العملية التعليمية:	25	
الامتحانات:	75	
تقويم الطلبة وتحفيزهم:	68.75	
التقييم العام:	50	
السنة الدراسية	2017	
التسجيل والارشاد ودعم الطلبة:	62.5	
مصادر التعليم:	64.58	
البيئة الجامعية والخدمات المقدمة:	46.88	
العملية التعليمية:	47.73	
الامتحانات:	60	
تقويم الطلبة وتحفيزهم:	43.75	
التقييم العام:	53.13	

Figure 11: Result done by admin for Test 4 setting

In terms of MySQL database, two tables have been created inside the database named “*nineveh university*”. These two tables named “*eval_table*”, which is responsible for storing user information of the evaluation, and “*users*” table which is responsible for holding user-name and password of the admin. The database and two tables are depicted in Fig. 12 as in red color.

Test 4 SQL query as:

Select * from eval_table where 'Year_time'='2017&2018' and 'College'='هندسة الالكترونيات' and 'Class_no'='الثالثة' 'Department'='الالكترونيك'

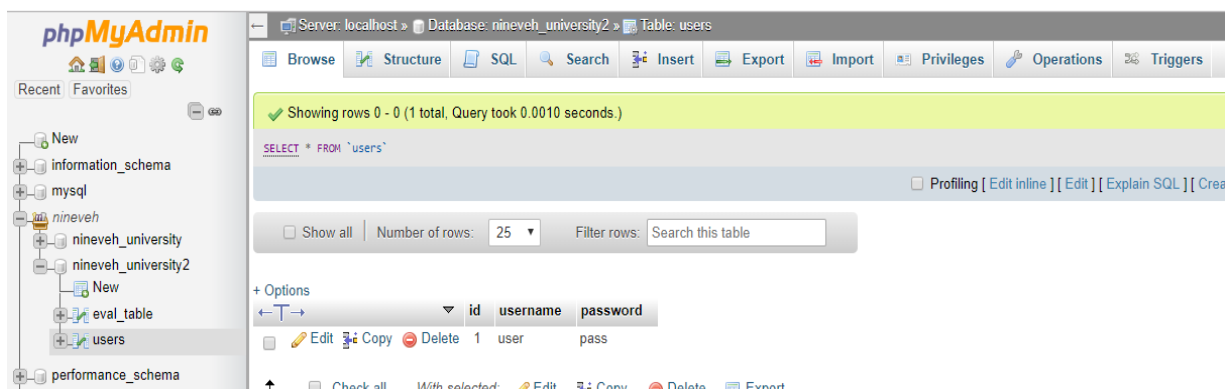
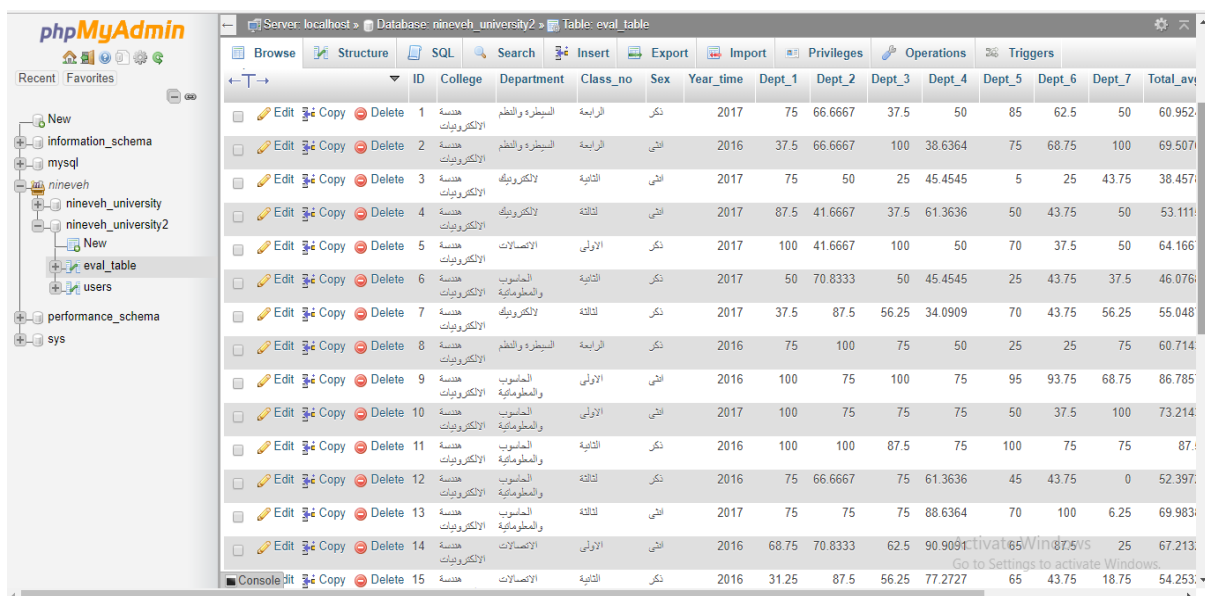


Figure 12: MySQL Database showing DB and tables name.

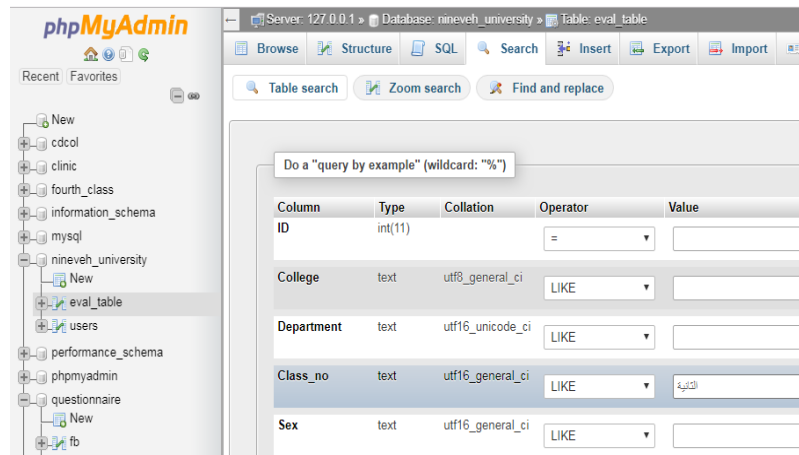
In Fig.13, the table structure is depicted. Specifically, “*eval_table*” fields are shown in the Fig. 13, as well as containing a set of records that have been entered in the table.



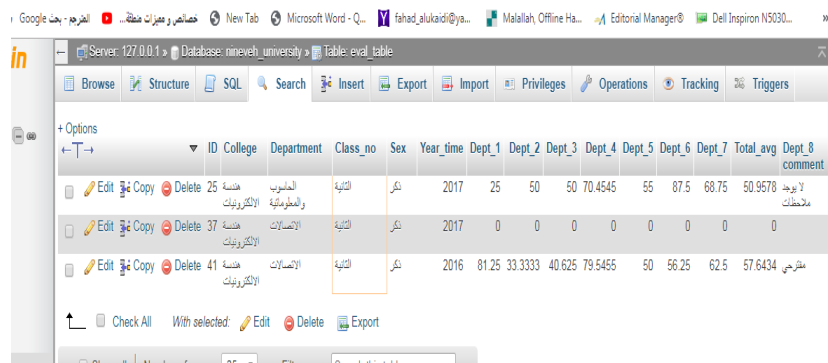
ID	College	Department	Class_no	Sex	Year_time	Dept_1	Dept_2	Dept_3	Dept_4	Dept_5	Dept_6	Dept_7	Total_avg
1	هندسة الالكترونيات	البيطرة والنظم	الرابعة	ذكر	2017	75	66.6667	37.5	50	85	62.5	50	60.952
2	هندسة الالكترونيات	البيطرة والنظم	الرابعة	انثى	2016	37.5	66.6667	100	38.6364	75	68.75	100	69.507
3	هندسة الالكترونيات	الالكترونيك	الثانية	انثى	2017	75	50	25	45.4545	5	25	43.75	38.457
4	هندسة الالكترونيات	الالكترونيك	الثالثة	انثى	2017	87.5	41.6667	37.5	61.3636	50	43.75	50	53.111
5	هندسة الالكترونيات	الاتصالات	الاولى	ذكر	2017	100	41.6667	100	50	70	37.5	50	64.166
6	هندسة الالكترونيات	الحاسوب والمعلوماتية	الثانية	ذكر	2017	50	70.8333	50	45.4545	25	43.75	37.5	46.076
7	هندسة الالكترونيات	الالكترونيك	الثالثة	ذكر	2017	37.5	87.5	56.25	34.0909	70	43.75	56.25	55.048
8	هندسة الالكترونيات	البيطرة والنظم	الرابعة	ذكر	2016	75	100	75	50	25	25	75	60.714
9	هندسة الالكترونيات	الحاسوب والمعلوماتية	الاولى	انثى	2016	100	75	100	75	95	93.75	68.75	86.785
10	هندسة الالكترونيات	الحاسوب والمعلوماتية	الاولى	انثى	2017	100	75	75	75	50	37.5	100	73.214
11	هندسة الالكترونيات	الحاسوب والمعلوماتية	الثانية	ذكر	2016	100	100	87.5	75	100	75	75	87.5
12	هندسة الالكترونيات	الحاسوب والمعلوماتية	الثالثة	ذكر	2016	75	66.6667	75	61.3636	45	43.75	0	52.397
13	هندسة الالكترونيات	الحاسوب والمعلوماتية	الثالثة	انثى	2017	75	75	75	88.6364	70	100	6.25	69.983
14	هندسة الالكترونيات	الاتصالات	الاولى	انثى	2016	68.75	70.8333	62.5	90.9091	65	87.5	25	67.213
15	هندسة الالكترونيات	الاتصالات	الثانية	ذكر	2016	31.25	87.5	56.25	77.2727	65	43.75	18.75	54.253

Figure 13: Showing table structure fields and records.

In order to test query by example (QBE) Figure 14(a) shows the query by example that has been done by using PhpMyAdmin using MySQL database environment, the example has been entered to search in 'الثانية' in the field named 'Class_no'. It is noticed the result will be appeared in Figure 14(b).



(a)



(b)

Figure 14: Depicting the QBE query in (a) and the result of the query in (b).

In terms of securing the stored data (records) inside table 'eval_table' in the database MySQL environment, a password is set to protect DB for login manners. Furthermore, php cannot connect with the database unless it verifies another password, which is set between PHP and DBMySql.

Pertaining to database performance, the main category is *work* metrics, which assess the health of the database, which are throughput, success, error, and performance.

Throughput is the number of transactions or queries per second. Success is the rate of successfully executed work. Error represents a rate of errors per unit of time. Finally, performance as a latency, which represents the time required to finish a unit of work. Latency can be as an average as a percentile, such as "95% of requests queried within 0.2s."

It is worth to mention that the performance of the current work is taking the same characteristics and options of MySQL DB environments in terms of the aforementioned metrics.

The proposed design consists of 2 tables, in the case of comparing with other work existing in the literature review, which have more than one table, logically, the proposed work is better in terms of performance and latency of time access. So in other words, it is a trade-off between a number of tables in the database and the performance of the database.

6. CONCLUSION:

University ranking improving among world universities is deemed as a major goal of every university, in which one of the most important factors used for that, is the Students' satisfaction questionnaire. In this paper, it is proved that IoT can consolidate university ranking by performing university student feedback by using the Internet. The methodology of the proposed work has exploited the advantage of computer networking, as well as web development tools such as HTML, CSS, JavaScript, PHP, and MySQL with Apache server. Actually, questionnaire detail has been taken from Ninevah University as a case study and formulated as a web-page based, where the user input type is designed to be a radio-input form for adding simplicity to the questionnaire operation then stored in the database after certain processing operations such as average calculation. The proposed algorithm is explained in the methodology section. The testing shows a potential platform to provide the institution with statistical information about students' satisfaction in an organized manner, less time and cost, less paper documentation, less effort and accurate data. In the Future Work, this work might be developed to comprise more services such as student registration and so on.

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