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Design an expert system for students graduation projects in Iraq universities: Basrah University

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Article Info	ABSTRACT
	A graduation project is a form or work that the study authority requests from the student to measure what he made during the study. Designed an expert system for students' graduation projects at the University of Basrah for students who are obligated to submit a project that qualifies them to graduate from the university. The system works according to a set of requirements, the most important is first: The student's possession of a high rate that qualifies him for the project. Second: he must possess half of the skills required for the project provided that it includes at least one programming language example (c ++, java, PHP, c #, etc ...). The system has many features that help the Supervisors and Students Committee to manage students' projects efficiently. System is built as a web-based system, with access limited only to the university's local network.

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1. INTRODUCTION

The graduation project is a project that the study authority requests from students before obtaining a university certificate, graduate attributes have been taking momentum since the early 20th century. One of the most commonly used definitions of graduating attributes (GAs) suggested by Bowden *et al*. says: "Graduate attributes are the qualities, skills ,and understandings a university community agrees its students should develop during their time with the institution" [1]. the aim of which is to identify the extent of the student's understanding of what has been studied within the corridors of the university, and to measure his ability to creativity [2], and there are some universities suppor tthe work for more than one student [3], and this must be completed Research in a specific period under the supervision of a university professor [4]. Most computer science programs at the undergraduate level require a compulsory "graduation project" course that students must take in the third or fourth year of study.

In the College of Computer Science and Information Technology, each student is required to develop a project, implement a model system, and write a research report in one semester. The projects are distributed according to mechanisms that depend on points (student average, skills that he owns it in the field of Computer Science and Information Technology) supervisors should assist their students to complete the project, and guide them through the main stages of the graduation project. Thus, supervisors and other participants will be involved to track student work and progress [5-7]. For this purpose, we design an expert system, based on the students' skills the have to make an appropriate decision in distributing projects to students. An expert system is "a computer program that uses knowledge and inference procedures to solve problems that are ordinarily solved through the human expert" [8]. With the rapid growth and unfold of

information and communique technology (ICT), professional systems have evolved that have completely reshaped the web revel in users by supplying meaningful, effective, and personalized advice of services and products to users. Through proper statistics modeling and analysis, recommender systems tend to aid users in selection making strategies by enhancing their capability and first-class of thinking [9, 10].

Expert systems are widely implemented in various fields, including for student career steering on factors of educational guidance, educational assessment, academic career guidance and vocational career steering, such as: recognizing student characteristics [11], student overall performance analysis [12], student overall performance predictions [13], basic assessment of student competence [14], character-based educational assessment [15], and assessment of academic programs [16]. Crucial decisions for a college student are a hard and time-consuming task because many elements make contributions to correct selection making, together with: student grades, personality, talents, skills, preferences, subjects of interest, so students need to get assist from the recommendation system to pick out the proper project [17, 18]. This research was motivated by the idea that successfully being able to develop a Distribution of graduation projects to student's system of this nature, will increase the breadth and scope of students and academic staff problems solved, and subsequently academic activities can successfully be achieved to an excellent level in the university learning process. The system is designed at the University of Basra for students who are obligated to submit a project that qualifies them to graduate from the university. The system works according to a set of requirements, the most important is first: The student's possession of an average that qualifies him for the project. Second: Possesses programming skills required for the project, example (c ++, java, PHP, c #, etc ...).

Literature review for Many researchers presented research, one of them represent Implementing the graduation project management system based on" Moodle software" permit to study the communications between the shareholders of the system [19]. Moreover, an academic project management web-based system is developed by Letouze using JAVA, Javaserver, Primefaces, PostgreSQL, Glassfish and Netbeans. It is additionally defined as "one of the most used and powerful databases on the web today" [20]. Another researcher worked a research program that allows students to register in research in exchange for course credits [21]. Another study the focus of the research of studies associated with the impact of the utility of professional systems in pupil steerage on aspects of educational guidance, educational evaluation and factors of instructional career steering and work guidance [22].

Aim of the research is the importance of the graduation project management system in facilitating communication between the project committee and supervisors, and between students and supervisors, and solving the conflict problem, which is one of the biggest problems in the distribution of projects when selecting more than one group for the same project additionally by another benefit The paper is organized as follows: Section1 presents an introduction & literature review. Section 2 of the graduation project Course. Section 3 describes the method of system Section 4 discussion and result.

2. METHOD OF SYSTEM

To the better of our knowledge, software for managing graduation projects is an incredibly new idea. A tremendous deal of studies of an exploratory and descriptive nature is needed, as shown in Figure 1 representing the overall system structure for the distribution of graduation projects to students.
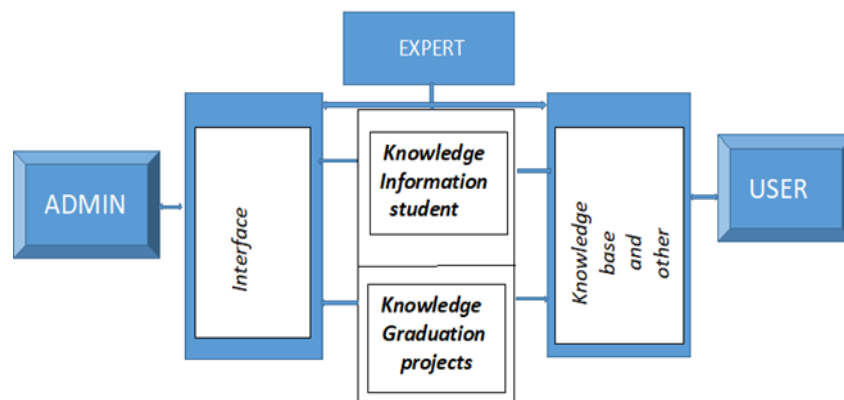

Figure 1. Structure of the knowledge base system

The main components of the system are the knowledge base, inference engine, and a workspace. The knowledge base of the system performs a key role in the method of decision-making by efficiency storing the domain knowledge and student Information. Temporary results may be stored in the workspace. The inference engine is a program, which infers the knowledge available within the knowledge base [23-25]. Distribute student projects, the system intends to represent a common framework that implements a generally accepted basic structure of academic projects. Steps to make the system:

2.1. Steps of students' registration for the projects
2.1.1. Student registration
Each student logs into the system through the student number and the password that he receives through the system administrator, where he is a number. The student is made up of (7) numbers, such as (1204351), which is the same as the student's ID number, and the secret number is composed of (18) numbers, which are randomly generated by this function such as (435727893387780658) show in Table 1.

2.1.2. Projects proposed by the scientific departments of the college
All graduation projects submitted to the system are presented to the student on the projects page, which contains all the project details these are (name of supervisor, project title, main objectives of the project, brief description of the project, requirements, number of students required for the project).

2.1.3. Student registration process on projects
Before the registration process, if the student is the first time to enter the system, a list of skills will appear in him on the registration page at projects the student must determine the skills he possesses, and these skills are added to the student's information and based on which they are tested with the project's skills. The registration process takes place after the student determines the skills that he possesses. The student can register only by specifying the skills. After specifying the skills, each student is allowed to register on only three projects, and he is not allowed to register on more than three. To ensure the student's right, the student system can print a report that contains the student's name, student number, and projects that have been registered and also contain QR code contains the name of the student and the projects registered on it to prevent fraud and forgery in projects. Show in Figure 2.

University of Basra

College of Information Technology and Computer Science

Graduation projects registered

ID Student: 1400100

Name Student: Majed Ahmed Aziz

choice (1): System of distribution of monitors to the examination
halls

Name Prof: prof. Maysaa Abd UlKareem

choice (2): Implement some commands by distinguishing the hand   gesture

Name Prof: prof. Abbas Hanoun

choice (3): System of distribution of monitors to the examination halls

Name Prof: prof. Zainab Hamid

Figure 2. Student registration document for the project

2.1.4. Amending the projects of the registered person
After giving the administration a period for its students to change their options, the student can enter this page and choose the project where. He who wants to change and replace the project he wants and uses this mechanism with the rest of the projects. After the end of the period, the page is closed, as a student cannot change his options.

2.1.5. Amending student information

The student has the right to only change the skills. As for the rest of the information, it is modified by the administrator, because it is downloaded to the system automatically through a text file on the student registration page and at the same time it can be modified show in Figure 3.
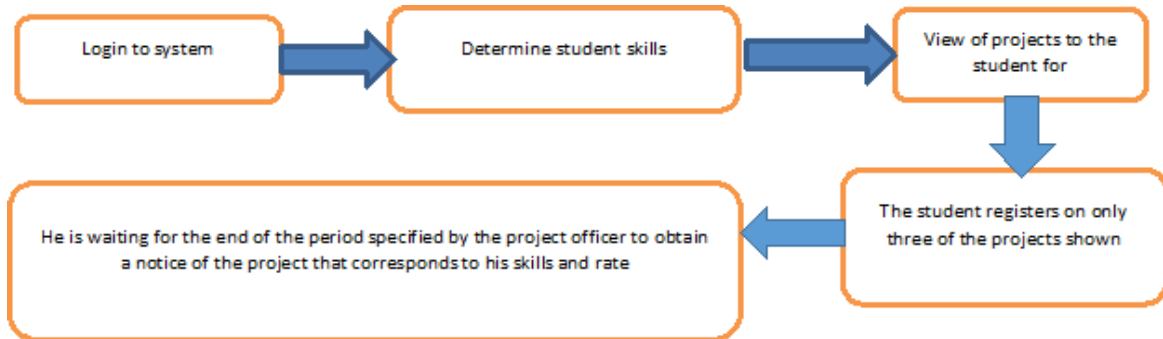

Figure 3. Illustrate the steps for student registration on the project

2.2. The powers of the person responsible for the system and the mechanism for distributing student to projects

2.2.1. Add students

The names of students who are entitled to register on graduation projects are entered, and they are Input process is two ways:

a. The first method: adding his application group as a single payment by receiving an excel file from the concerned authority responsible for sorting students who are entitled to register on graduation projects and transfer it to a text file, where the entry is as a text file and this type is used if the officer wants to enter his request group.

b. The second method: adding a single student, where the entry is by the administrator, he enters all the data manually and uses this type in the case of entering one student.

The student's information entry is in both cases (student number, student name, student average, and his password). Where a number is generated for each student in both ways (a random 11-digit secret number that the student uses with his number to log into the system) show Figure 4.
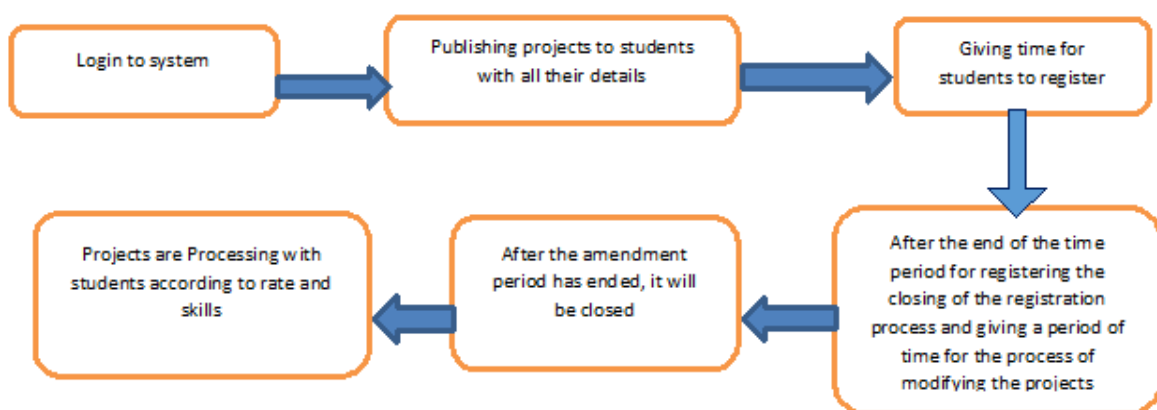

Figure 4. Illustrate the work of administer

2.2.2. Student information

The system contains a database for all student information that the system needs in the process of distributing graduation projects to students and includes (student number, student name, student rate, student password). Enables the system to perform:

a. Performing student information modification or student deletions by clicking on the field you want to delete.
b. Print a report containing all students 'information. Where student numbers and secret numbers are distributed to students through this report, each student takes his password through the student number where (Each student has a unique number, "ID number", whereby a student can enter the system when he obtains the ID number and password from the report at the committee responsible for the projects). As shown in Table 1.

Table 1. Report contains all students 'information

NO	ID	Name student	average	password
1	1509405	Sajad mohammed hassan	74.3	456784329876462534
2	1509489	Hussan alaa jaber	80.4	876543987698457649
3	1508483	Raga Majid Hameed	77	648729754876937694
4	1507848	Alaa Qusai Nuri	86	465937296587557733
5	1508473	Zainab Muslim Ramadan	76	335566775544332299
6	1508574	Zahraa Maitham Abdul-Hussein	66.8	114466448885557744
7	1507584	Majid Ali Majid	64.4	555577744339965544
8	1509371	Ahmed Mohamed Jameel	87	999944447777884466
9	1502343	Sarah Majed Abdul Hamid	89	778888999944466666
10	1509487	Muhammad Qusai Raza	68	555555577777444449
11	1509732	nabaa Muhammad Hassan	75.3	887766994433555577
2	1501230	Ali Abbas Hassan	65.2	777744444333399225
13	1506743	alaa Zuhair Muhammad	74	993336664448855787

2.2.3. Add a project

The system administrator enters graduation projects with full details (project title, professor name, number of students required for the project, project goals, project description, as well as the skills required for each project).

2.2.4. Modifying project information

The project information can be modified by searching on the title of the project to be modified, then correcting the information and clicking on the amendment button, and the project can also be deleted by clicking on the delete button.

2.2.5. Registering students on the project and controlling the process of registering on projects

Every student has the right to register on three projects published by the system administrator. The registration process for projects and the process for modifying projects are controlled through a control panel where a specific period of time is given to the students to complete the registration process on projects. When the specified period ends, the system administrator can lock the registration process as the student cannot register. As well as giving a specific time to students to process the amendment of student options and when the specified period ends the system administrator can lock in the modification process as the student cannot amend the project data.

2.2.6. The process of distributing projects to students

Projects are distributed to students according to controls and conditions, whereby the distribution depends on the student's average rate and the student's second-class skills and number students required for each project. But each of the above conditions depends on the other condition to conduct the project distribution process.

2.3. Steps of project distribution

STEP1: Students are ranked from the highest rate to the lowest rate through the database using language SQL
STEP2: The skills required for the project are compared with the skills that the student possesses, and to achieve the requirement that the student accepts the project that the student chose in the previous entry process, he must possess half of the skills required for the project Provided that it includes at least one programming language example (c ++, java, PHP, c #, etc ...).
STEP3: The required number for each project is examined and based on the required number, students are added to the project and upon reaching the required number the student is transferred to the second project registered on it and so on, the mechanism of action of the system:
1. Students' skills and the skills required for each project are retrieved.

2. Chopping down all skills and storing them in a matrix to facilitate the comparison process through evidence explode.

3. For the comparison process, calculate the number of skills for each student and project.

```
for ($i= 0; $i < $count Project; $i++)
        for ($j=0; $j <$count Student; $j++)
          if ($cut Project[$i] ==$cut Student[$j])
            $counter +=1
```

4. Compare the number of similar skills for a student with the skills required for a project if the number of skills possessed by the student is equal to at least half the number of skills required in the project, provided that only one programming language is available to the student in order to be qualified on the project registered on it. The information is saved in its array.

```
if (($counter/2) >= $count Project) && ($cut Student[$i] == "c++" ||$cut Student[$i] == "c#"
    ||$cut Student[$i] == "php" || …)
        $data [] = array('id'=> $row['id_sudent'],
    'id_project' => $row['id_project'],
    'required number' => $row ['required number']);
```

5. Before adding the student to the project, check the required number for the project. If the required number of the project is incomplete, the student will be added to the project. If it is incomplete, the student will transfer to another project from which the projects are registered.

If (Required Number of project <= Count project in Data)

Add ();

Else Tested on Another Project ();

6. In the last stage before adding any student with his project to the database, check the database with the student not already present to avoid duplication of data. The official can print a report containing the final distribution of projects on students with full details (the name of the supervisor and the student involved with the project and the required number) shown in Table 2.

Table 2. The final distribution of projects on students

No	ID	Name Student	Project of Student	Supervisor	Required Number
1	1509405	Sajad mohammed hassan	System of distribution of monitors to the examination halls	Zainab Hamid	3 OF 1
2	1509489	Hussan alaa jaber	System of distribution of monitors to the examination halls	Zainab Hamid	3 OF 2
3	1508483	Raga Majid Hameed	System of distribution of monitors to the examination halls	Zainab Hamid	3 OF 3
4	1507848	Alaa Qusai Nuri	Student absences system	Talib Abdul Samad	4 OF 1
5	1508473	Zainab Muslim Ramadan	Student absences system	Talib Abdul Samad	4 OF 2
6	1508574	Zahraa Maitham Abdul-Hussein	Auxiliary systems for the unit of registration and student affairs	Alaa Khalaf Hammoud	3 OF 1
7	1507584	Majid Ali Majid	Auxiliary systems for the unit of registration and student affairs	Alaa Khalaf Hammoud	3 OF 2
8	1509371	Ahmed Mohamed Jameel	The Questions Bank	Asaad Abdul Karim	1 OF 1
9	1502343	Sarah Majed Abdul Hamid	Comparative study and analysis of the methods for indexing the DNA database	Rana Majeed	2 OF 2
10	1509487	Muhammad Qusai Raza	System for distributing graduation projects to students	Maysa Abdul Karim	3 OF 1
11	1509732	nabaa Muhammad Hassan	Comparative study and analysis of the methods for indexing the DNA database	Rana Majeed	2 OF 1
12	1501230	Ali Abbas Hassan	Auxiliary systems for the unit of registration and student affairs	Alaa Khalaf Hammoud	3 OF 3
13	1506743	alaa Zuhair Muhammad	System for distributing graduation projects to students	Maysa Abdul Karim	3 OF 2

3.   DISCUSSIONS

The higher education strip worldwide has largely integrated information and communication technologies into general teaching and learning practices. The goal of the system can be discussed in two ways: Firs, The influence of the expert system on student guidance. Second, The expert system's influence on the Projects Committee and its students' supervisors. The expert system can assist students in identifying and taking a decision on the appropriate project and enable the supervising committees to explore students'

understanding, knowledge, directions, intentions, and technical capabilities. This paper presented a web based distribution graduation-project management system. The impulse behind the implementation of such a system has been the realization of the important role of the graduation project for preparing students to the real world, and probe of the number of administrative tasks involved on the part of faculty members and students. For that reason, the manual procedure for distributing graduation projects to students has been replaced by an automated system for managing and distributing projects graduation show in Figure 5.
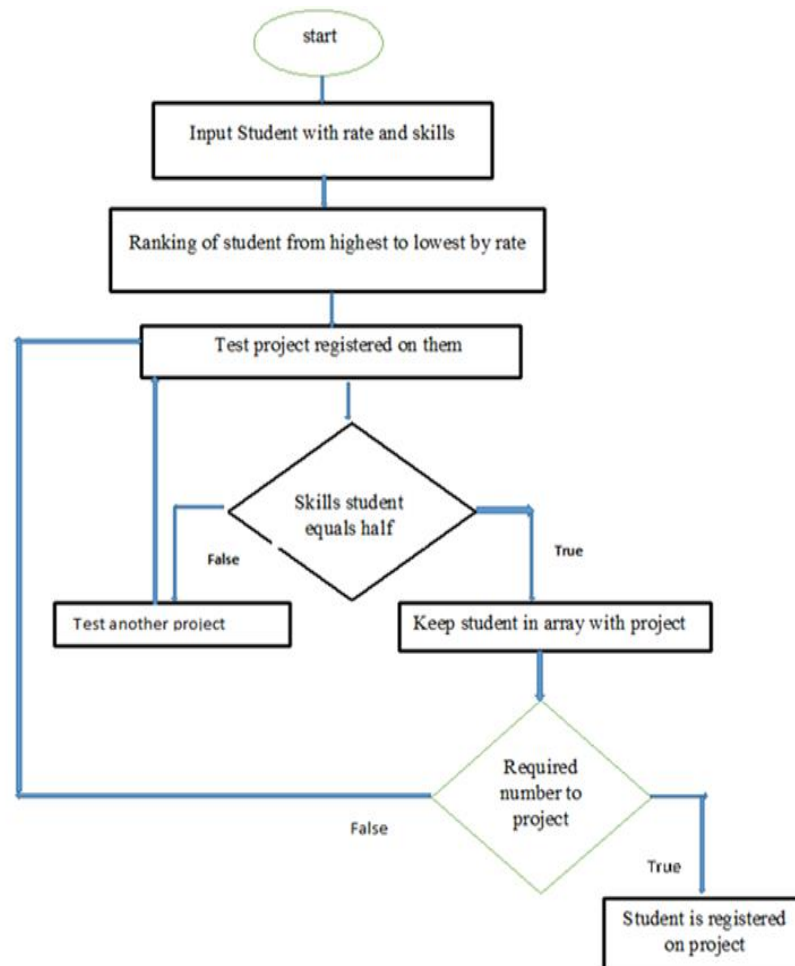
Figure 5. Diagram represents the flow of system operations

This system has some limitations where the students can`t change the project after distributed projects for students via the system and Difficult to Determine the ''best graduation project based on the student's Interests. In spite of this, the system has many advantages due to its importance and urgent need in the university which includes:

a. Coordinating and managing the processes of the graduation project course.
b. Solve conflict in the projects, meaning choosing more than one group for the same project.
c. The system provides security for the student by obtaining a printed report containing the QR code containing the student's personal information in addition to the three options that he chose within the projects presented.
d. Develop Knowledge Base System to distribute graduation projects to students at the University of Basrah Reducing all (administrative) procedures and related processes.
e. Increasing effectiveness and developing performance in technical operations and information services.
f. Easy and fast information management.
g. Eliminate the factor of the direct relationship between the two parties to the transaction or reduce it to the maximum extent possible, which leads to limiting personal effects and influence.

h. It is more economical than it is in the traditional system, as there is no need to print project selection forms and distribute them to students.

i. Reducing time and effort as students do not need to come to college to receive a form to choose graduation projects and deliver them after filling them.

j. Canceling the paper system and replacing it with the electronic system because of its flexibility and the ability to quickly correct the errors that occurred.

4. CONCLUSION

The system is designed at the University of Basra for students who are obligated to submit a project that qualifies them to graduate from the university. The system has achieved the basic idea that depends on the principle of distributing student projects based on the student's programming skills and the student has a rate that qualifies for the project The system performs well. result of the system helped in the following ways: (1) it simplifies interactions with the domain experts; (2) it reduces the complexity; (3) it provides effective modularization. The idea on which the expert system" Graduation Project" is built has sizeable potential, and the opportunity to develop and improve. as future work, you can add social network analysis in competition-based learning. Can develop the system as future work by adding: (1) Add guidelines for college students, wherein the projects committee can post recommendations for students. (2) Permit supervisors to create one listing of tasks, to be used as a template for a multitude of different projects. (3) Add a news bar, wherein the Head of the Graduation Committee could, for example, placed up updates concerning new regulations, or modifications to the undertaking timeline, etc. (4) Allow the Head of Graduation Committee to place up progress evaluations for students and supervisors to fill out and ship lower back over the system; Implement the automated event handler subsystem.

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