



## Automatic Enrollment System for Student Dormitory

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### Abstract

The Directorate of Dormitories at the University of Kirkuk offers full accommodated rooms to the male and female students. However, the directorate registers and assigns the accommodations manually. Therefore, a visiting has been made to the directorate to identify the problems of this system. It is found that the manual system suffers from several issues such as wasting time, losing data and extra charges in documenting students' information. Additionally, delays in replying to students' enquiries, and ignoring their discipline in distributing them among the accommodations. This paper proposes using an e-governance system to tackle the identified problems. The proposed system permits the student to register online and provides him/her with an id card. The id card consists of a serial number, ISBN and student's room information in the accommodation. To design the system, a number of programming languages is used: (PHP, HTML, JAVA SCRIPT and CSS). Furthermore, SPSS software has implemented to evaluate the system. The evaluation has shown significant merits in terms of the reliability and speeding up of assigning rooms to the students among the accommodations. The distribution of the students is according to students discipline. Furthermore, the system determines the capacity of each accommodation precisely. Moreover, decreasing in time wasting and tiredness that may students face in the traditional manual system. Additionally, reducing the physical contact between the students and the employees. Consequently, the proposed system gathers students' information in an electronic archiving which may lead to easiness in importing their information in the future.

**Keywords:** E-Governance, E-Service, PHP, HTML, JAVA SCRIPT, CSS

## نظام التسجيل الاوتوماتيكي لطلبة الاقسام الداخلية

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### الملخص

مديرية الاقسام الداخلية في جامعة كركوك تقوم بتقديم الخدمات المتكاملة لجميع الطلبة والطالبات. ولكن، المديرية تستخدم النظام اليدوي في تسجيل و توزيع الطلبة في بنايات الاقسام الداخلية. لذلك قمنا بزيارة المديرية لتحديد المشاكل التي تواجهها. حيث وجدنا ان النظام اليدوي يعاني من عدة مشاكل منها ضياع الوقت و البيانات و اضافة اعباء اقتصادية للمديرية في جمع بيانات الطلبة. اضافة الى هذا فان النظام يؤدي الى التأخير في الاستجابة على الرد لمعاملات الطلبة وعدم توزيعهم الى الغرف بشكل متناسق واهمال مجال التخصص. في هذا البحث قمنا باقتراح استخدام الحوكمة الالكترونية في التغلب على المشاكل المذكورة انفا. النظام المقترح يسمح للطلاب بالتسجيل الكترونيا ويقوم بتزويده بهوية خاصة له. هذه الهوية تحوي على الرقم التسلسلي للطلاب ورقم ISBN والمعلومات الخاصة بمكان اقامته. ولتصميم النظام، قمنا باستخدام عدة لغات برمجية (بي اج بي، اج تي ايم ال، جافا سكربت، سي اس اس). فضلا عن ذلك تم استخدام برنامج SPSS وذلك لفحص كفاءة النظام. أن فحص النظام اثبت ان له عدة مزايا من ناحية الوثوقية العالية جدا والاسراع في تخصيص الغرف للطلبة بين بنايات الاقسام الداخلية. حيث ان التوزيع تم حسب مجال التخصص للطلاب. اضافة الى هذا، اثبت النظام كفاءة في تحديد القدرة الاستيعابية للقسم الداخلي. وكذلك تقليل ضياع الوقت و اعباء السفر التي يواجهها الطالب في النظام التقليدي. والنظام المقترح ادى الى تقليل الاحتكاك بين الطلبة والموظفين. وبالتالي، النظام المقترح يقوم بتكوين ارشفة الكترونية للأقسام الداخلية مما يؤدي الى سهولة استيراد بيانات الطلبة في المستقبل.

**الكلمات المفتاحية:** الحوكمة الالكترونية، الخدمة الالكترونية، بي اج بي، اج تي ايم ال، جافا سكربت، سي اس اس.

## 1. Introduction

E-Governance indicates to use the information technology (IT) and internet by managers and supervisors for executing various functions effectively such as planning, supervising, coordinating, organizing, and staffing [1]. The major issue that has been faced the e-governance is the lack in the information sharing among staffs in institutions which implies the unavailability of information in all institutions' departments [2]. E-government is the delivery of local and global government information and services to citizens, businesses, or other governmental agencies through the various digital media and communication technologies [1], and it is become a critical aim for governments' agencies all over the world [3].

The typical model of e-government is sophisticated from primary stages of information promulgation by simple web applications existence to more evolution stages, where, many transactions and electronic participation in government activities are achieved by citizens interact with government agencies [4]. Therefore, information and communication technology (ICT) is utilized to accomplish reformation by supplying transparency, removing distances and other gaps between citizens and governments, and encouraging individuals to participate in the decision making processes that affect their lives [5]. Though the vogue, force, and preciseness of e-government, it has stilled remaining unknown and for many countries in terms of applying e-governance at the lowest level of the governance system [6]. E-government is a portion of the other closely relevant efforts in digital government. The term e-governance refers to consecration the efforts to use ICTs for Pedagogical, civilian, and political purposes as well as political activities organization in countries. The issues and challenges of executing e-government systems will also be related to applying ICTs to support e-governance in order to build electronic systems [7].

The purpose of this paper is to prevent the issues usually associated with the Prevailing traditional registration system. Therefore, an electronic system for students' registration in the dormitories directorate in Kirkuk University and distributing them to the rooms is designed depending on degree of kinship and specialization of students. The proposed system allows users to provide the required supplements for students' registration in the dormitories via the Internet. This led to facilitating the registration process without spending much time. In addition, it helps the personnel to access the students' data as fast as possible which lead to

facilitate the process of paper transactions that the dormitories directorate deals with it by providing the electronic achieving.

## **2. System Analysis**

Through a survey about the dormitories directorate in Kirkuk University, it has been discovered many problems that facing the directorate during routine enrollment process which are:

- 1- It has been noticed the consumption of time and effort and the high cost of completing manual paperwork.
- 2- Also, noticed the difficulty of documents retrieving and information.
- 3- The difficulty of informing more than one employee on the same transaction at the same time.
- 4- Low efficiency in business performance.
- 5- The queues of students for registration that lead to confusion at work and wasted in time and effort.
- 6- Frequent errors during recording information.
- 7- Possibility of loss information.
- 8- Presence of manual paper archive and difficulty of retaining large number of documents.
- 9- Difficulty of information collection into the database precisely.
- 10- Difficulty of sending and publishing documents for concerned sides.

Therefore, an electronic registration management system for the students in dormitories directorate has been designed to manipulate the constraints and disadvantages which lead to reduce the time and effort involved in completing the work and also to keep pace with the rapid and consequent changes in the administrative information technology field.

One of the most important issues that have been manipulated are the improvement in management performance and the ability to fast completion, countries' experiments that have benefited from the evolution of administrative information technology indicate to the emergence of modern techniques and advanced standards for efficiently fast and accurate management work and also led to reducing efforts in the institution.

The problems that have been handled are providing data and information for beneficiaries immediately, eliminating the geographical and timing dimensions problem where the student registers without travel burdens and loss of time, reducing errors like non-registration of some

students or Shortages in the information provided by the student to the employee where the electronic system less prone to errors, as well as reducing friction between employees and students.

The system also provides all information about laws and administrative regulations to students by providing educational video about how to use the registration program through visiting Kirkuk University website, as well as eliminating manual archiving and replacing it with an electronic archiving system. The proposed system characterizes with flexibility in dealing with documents, the ability to correct errors quickly, publishing documents for more than one side at least possible time and benefit from them at any time.

Finally, one of the e-government aims is to confirm the public quality principle in its modern concept. Therefore, the e-government comes to affirm the importance of realizing the work needs in as fast as possible.

### **3. System Design**

After diagnosing problems and disadvantages in the process of enrollment in directorate of dormitories during analysis phase; in this phase, an electronic system of enrollment in dormitories directorate is designed for eliminating the negative points and problems that have hampered the smoothness and ease of work flow. The designed system consists of the following components:

- Student.
- Mediator "special device or Website".
- Employee of the dormitories directorate to oversee the booking and processing hub operation.

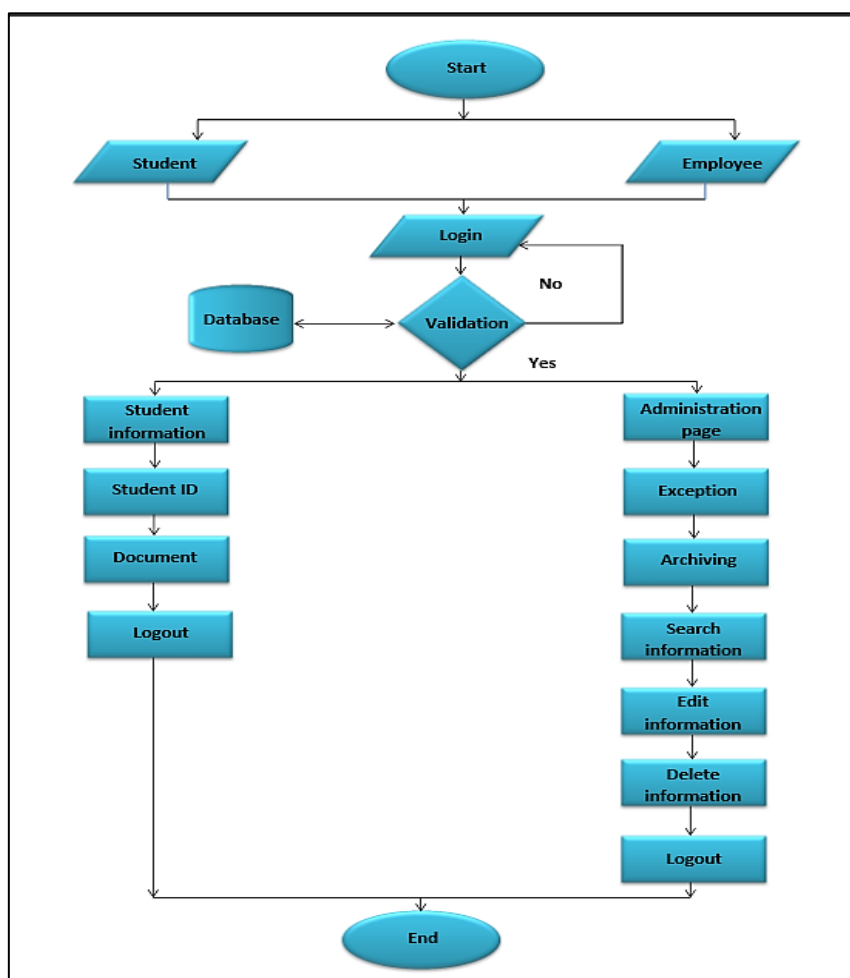
For designing this system, the necessary hardware requirements include the use of local server software (XAMPP) on a computer with a normal specification for testing and getting experimental results and then uploaded to a real server for implementation. The use of Barcode Reader for the student enters to dormitories departments.

The needed software requirements is the website including (Apache network server (XAMPP), MySQL database, PHP programming language) and (CSS with Bootstrap framework for design, JavaScript with jQuery library used to enables to create dynamically updating content).

The system program consists of two basic parts:

- a. The student part consists of (Student Login and - About the Website - Student Guide - Site Evaluation - Registration Forms -
- b. The employee part consists of (Employee Control that contains Exception Form - Archiving Form - Search by Barcode Form - Update Student Information Form).

The flow chart shown in Fig. 1 illustrates the components of the designed system and its work mechanism as well as the implementing phases of both student part and employee part.



**Fig. 1:** the Flow Chart of the Proposed System

#### 4. System Implementation

To implement the proposed system based on Fig. 1, two phases are done and mentioned in the following subsections:

#### 4.1 Data Collection and Database

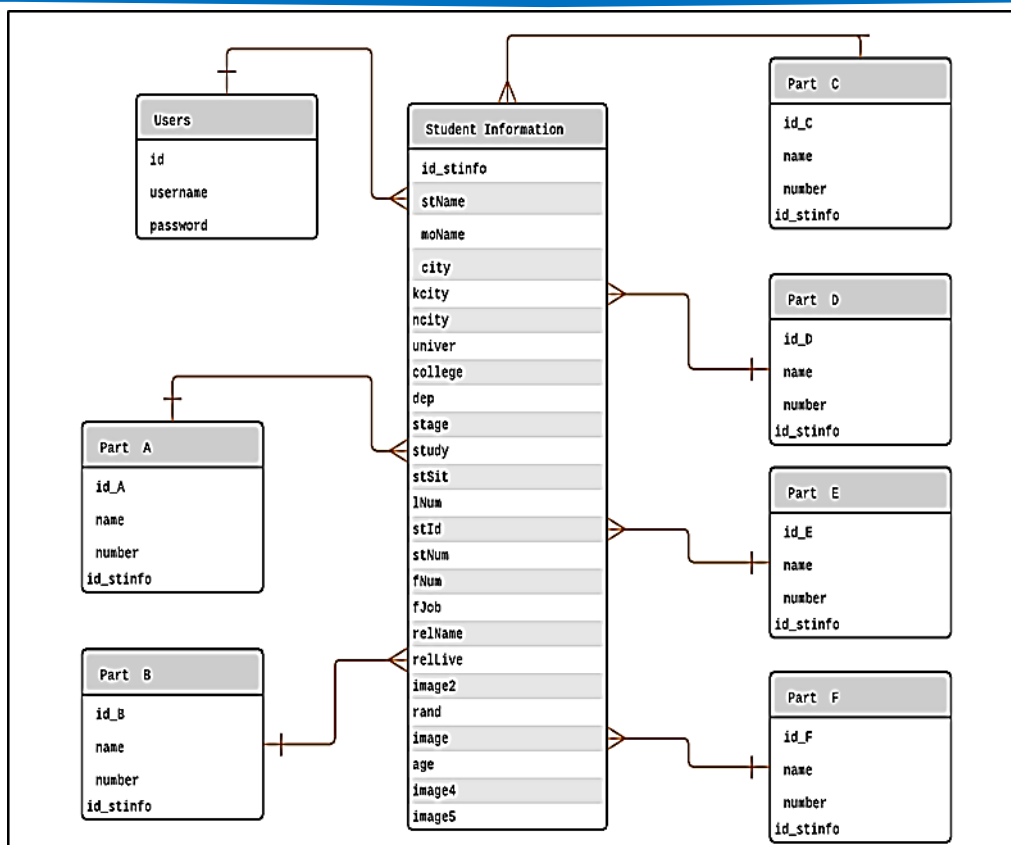
The data is collected by entering the students their information to the database using special ease to use system interfaces. To facilitate the registration process for students to enroll in the dormitories, the recording process is done in the following three steps:

**Step I:** it includes entering the student special and occupational data which are (quadruple student's name, triple mother's name, country, city, university, college, department, and class) as well as uploading a photo of student.

**Step II:** it includes entering the second part of student studying information which is (a type student study and a student situation from the school year).

**Step III:** it includes entering the security information of students which are (Iraqi nationality identity, identity card number, mobile number, alternative mobile number, the parents' occupation, workplace of parents, surname, near housing point name) in addition to uploading the images of required documents.

The database is designed by using MySQL database management systems (DBMS). It consists of eight entities which are (Student Information, Users, Part A, Part B, Part C, Part D, Part E, part F). Student Information is a fact major entity that contains all the student information in a 25 attributes. A User is a dimension entity that contains the username and password of the intended employee. Part A, Part B, Part C, Part D, Part E, part F are dimension entities. Each one of them contains number and names of the students in one of the six scientific departments Science College in Kirkuk University. Dimension entities are connected to the fact entity by (1:M) relationships. The database design detail is shown in **Fig. 2** demonstrating entities' attributes and the relationship type among them.



**Fig. 2: The ER-Relationship of the System Database**

#### 4.2 Data processing

After the completion of registration process and data collection, the system creates serial number which will be appeared to student. Also, an identity card will be appeared contains the student information and a barcode that used for student entry to and exit from dormitories building as shown in Fig. 4. This barcode contains all the information that the student has recorded by filling in the web page portions of registration. With this barcode, the employee can easily access student information. The pseudo code of barcode programming with student information is shown in Fig. 3.

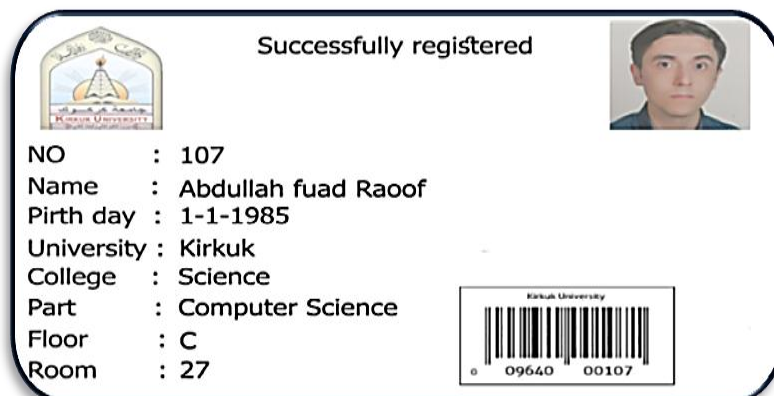


```

$this->padding=$barwidth*15;
$this->mapcode=array(
'0'=>'0001101', '1'=>'0011001', '2'=>'0010011',
'3'=>'0111101', '4'=>'0100011', '5'=>'0110001',
'6'=>'0101111', '7'=>'0111011', '8'=>'0110111',
'9'=>'0001011', '#'=>'01010' , '*'=>'101' );
$this->rightmap=array(
'0'=>'1110010', '1'=>'1100110', '2'=>'1101100',
'3'=>'1000010', '4'=>'1011100', '5'=>'1001110',
'6'=>'1010000', '7'=>'1000100', '8'=>'1001000',
'9'=>'1110100', '#'=>'01010' , '*'=>'101');
if(is_numeric($this->code))
{
    $checksum= 0;
    for($digit=0; $digit <strlen($this->code) ; $digit++)
    {
        if($digit%2 == 0)
        {
            $checksum += (int)$this->code[$digit] *3;
        }
        else
        {
            $checksum += (int) $this->code[$digit];
        }
    }
    $checkdigit =10 - $checksum % 10;
    $this->code .= $checkdigit;
    $code_display = $this->code;
    $this->code ="*" .substr($this->code ,0,6)."#" .substr($this->code,6,6)." ";
    $this->width = $this->barwidth*95 + $this->padding*2;
    $this->barheight = $this->barwidth*95*0.75;
    $this->height = $this->barheight + $this->padding*2;
}

```

**Fig. 3: Barcode Programming Pseudo Code**



**Fig. 4: Student Access Identity Card**

### 4.3 Sections Distribution Mechanism

In this phase, the enrolled students in the dormitories directorate are distributed to the sections and their rooms. The mechanism of sections distribution came to life after making a field trip to dormitories directorate and having an idea of how they ordinarily distributed their building for students. Together with a statistics of pervious years come to conclusion to make a mechanism that will cover all students without facing any issues regarding housing them as shown in Fig. 5.

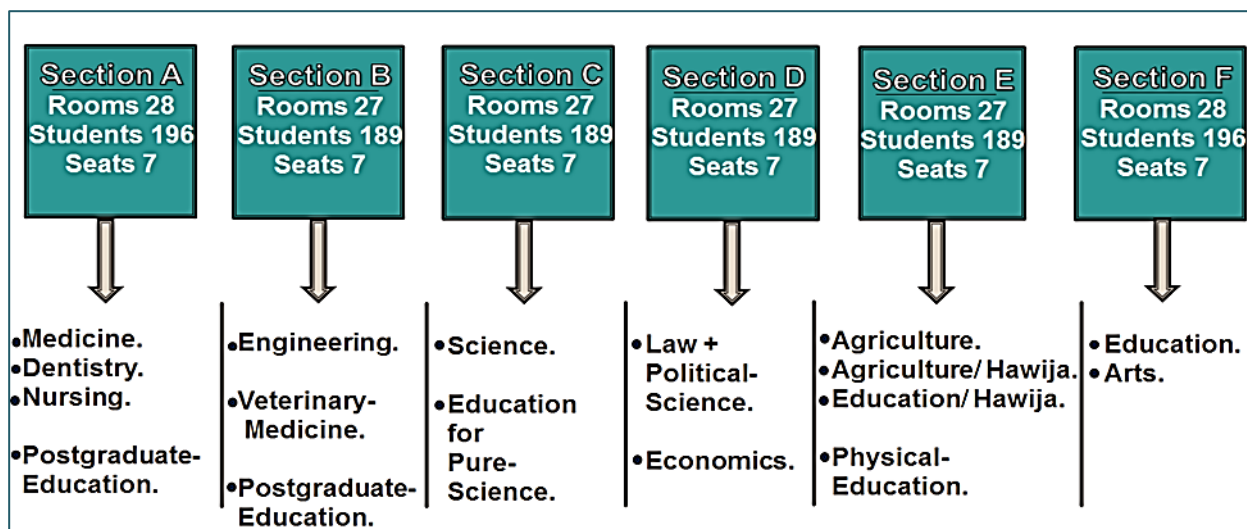


Fig. 5: Diagram of Distribution Mechanism

There are six sections with rooms, total students count and seats numbers. Each section is assigned to certain faculties depending on the level of education mostly. Section A and F have slightly more space to house students due to that extra room with seven seats in the building itself.

### 5. Results and Discussion

The results have been gotten by testing and evaluating the proposed system. For testing and evaluating the system, it has been applied and experimented on 70 students in Science College of Kirkuk University that are enrolled to the dormitories directorate. It has been used questionnaire forms to evaluate the system by enrolled students and employees relied on 16 standard criteria which are system availability, usability, Efficiency, usefulness, facility, processing speed, ease to data access, information quality, reliability, safety, adaptation, satisfaction, technical integrity, cost and effort of institute, cost and effort of student,

transparency [8] as shown in Fig. 6. It is used the Statistical Package for the Social Sciences (SPSS) program for calculating and interpreting the results. Where, the resulted ratios of standard criteria are calculated by using the simple weighted equation shown in Eq. (1).

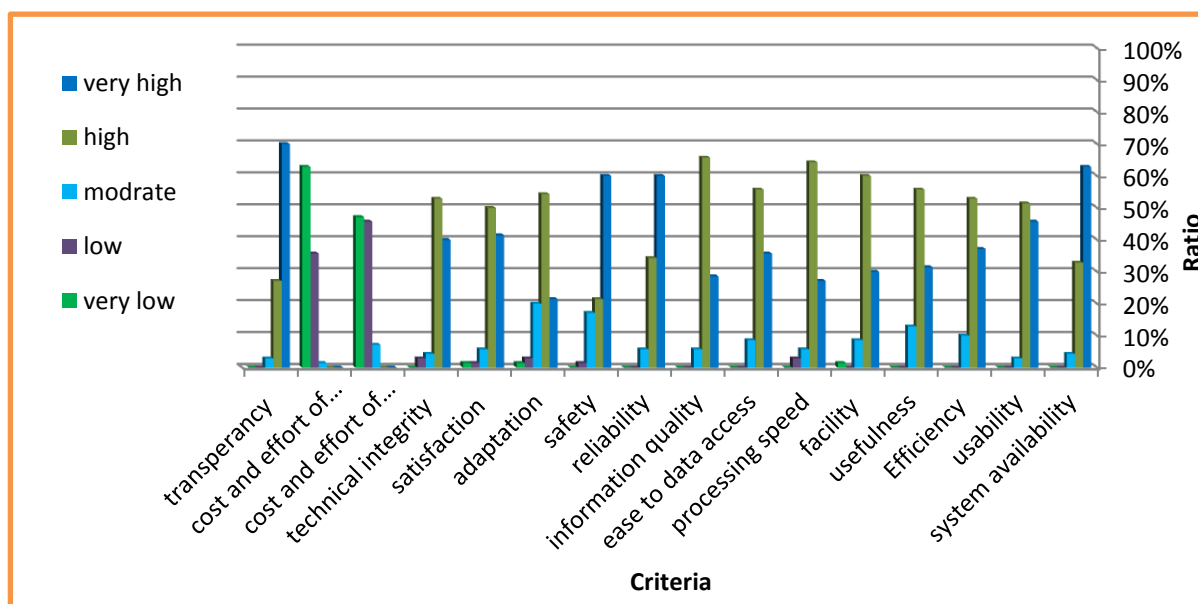
$$\text{Criteria Ratio} = \frac{\text{count of weights for each criteria}}{\text{count of evaluation forms}} * 100 \quad (1)$$

- Weight of each criteria = criteria index where  $I \geq \text{criteria index} \geq 16$
- Count of evaluation forms = 70

The results of system evaluation shown in Fig. 6 proved that the system availability is very high which refers to providing online information for students without restricts. It has proved the very high security and reliability of the system due to database encryption by using Blowfish algorithm and the use of barcode for student access to dormitories building that contains student information. This electronic system has led to decrease the costs and efforts exerted by employees and the students down to very low ratios, whereas it increases the transparency between the student and the dormitories directorate to very high ratio. It is also distinguished by high ratios of efficiency, usability, usefulness, facility. The test and evaluation results proved the ability of searching about information easily and in a high quality as well as obtaining the output of information processing in a high speed. It also, emerged high satisfaction of both employees and students to the proposed system by getting their ready to high adaptation with it. Finally, the system is supplied by information and communication technology in a high ratio as shown in Table 1 which explains the various percentages ratios resulted from evaluation phase for each standard of the system in detail.

**Table 1: The Results of System Evaluation**

Criteria	Very High	High	Moderate	Low	Very Low
system availability	63%	33%	4%	0%	0%
usability	46%	51%	3%	0%	0%
Efficiency	37%	53%	10%	0%	0%
usefulness	31%	56%	13%	0%	0%
facility	30%	60%	9%	0%	1%
processing speed	27%	64%	6%	3%	0%
ease to data access	36%	56%	9%	0%	0%
information quality	29%	66%	6%	0%	0%
reliability	60%	34%	6%	0%	0%
safety	60%	21%	17%	1%	0%
adaptation	21%	54%	20%	3%	1%
satisfaction	41%	50%	6%	1%	1%
technical integrity	40%	53%	4%	3%	0%
cost and effort of institute	0%	0%	7%	46%	47%
cost and effort of student	0%	0%	1%	36%	63%
transparency	70%	27%	3%	0%	0%



**Fig. 6: The Results of System Evaluation**

## 6. Conclusions

In this paper, a proposed system has been proposed for the Directorate of dormitories at the University of Kirkuk. The main aim of the system is to transfer the tasks of registering and rooms assigning from a manual system to be electronically. The proposed system is based on electronic governance. To design the system, a number of programming languages is used. As shown in the evaluation the system has overcome a number of issues that the old system is suffering. Furthermore, the system can provide important services to directorate by keeping students data in an electronic archiving. Accordingly, the suggested recommendation is adopting this system in the directorate of dormitories at the University of Kirkuk.

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