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A novel framework of web-based information system for determining the necessity of faculty members: An university perspective

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ABSTRACT

Organizations develop information systems to meet significant business objectives, such as improving competitiveness, increasing productivity and efficiency, accelerating growth, supporting innovation, and reducing costs. In this paper, a novel framework that is designed and can be used at Shaqra University in order to determine the necessity of faculty members in this university is proposed. This web-based system could provide various information and details about the faculty members, their teaching hours, and also the information about majors in which the faculty members are teaching. The main objective of the proposed system is to decrease the cost and help the higher-level managers to make decisions and also to reduce the time and effort exerted to determine the needs of Shaqra University. The primary purpose of this work is to describe the benefits of the system. It highlights the problems and reasons for developing and adopting the policy. The idea about the proposed framework is explained by an analysis that uses an acceptance model to assure the adaptability of the proposed system in Shaqra University.

1. Introduction

Shaqra University is one of the new universities in the kingdom of Saudi Arabia. It is located in the middle of the kingdom. It is one of the most prominent Universities in the Arabic Gulf region in terms of geographic area, and it has nine campuses within the central part of the kingdom (Mahmoud and Osman, 2019). This university consists of twenty-four faculties and ten deanships (Osman and Osman, 2019). The colleges are distributed over nine cities in which each college and faculty has many departments and units, and each department has many faculty members and employees. The proposed framework is designed for supporting the decision-maker in determining the necessity of faculty members and also to save the time taken in paperwork for the process of determination.

In general, faculty members can use the proposed framework to fill their information. Further, it is divided into four sections. The first section is the personal information, including name, phone number, employee number, email, and status. The second section is about the qualification, which includes the information about his/her degree's he/she attained, in which primary and the grade in that particular degree. In this section, the faculty member can also upload his/her certificates in a PDF format. The third section consists of academic information, which includes the college where he/she is working, which department he/she belongs to, his/her position in the department, and his/her publications along with the textbooks. The fourth section includes all the information about the faculties teaching hours and also the number of managerial works given per semester.

After the faculty member filled all his/her information, the proposed system will not allow him to fill his/her data again. Also, the privileges for editing the already filled data are not there. Editing these privileges is only available for the Deans of the respective college and administrator of the system. The deans will also have options to show the details of faculty members present in his/her respective college only. He/she can generate different types of reports. For example, he/she can show the faculty member about his/her hours, major, departments, nationalities, academic position, degree, etc. The Vice Rectorate of academic affairs and the administrator of the system can also access all these reports, and also they can show the reports to faculty members depend on college. The proposed method can also

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provide a statistic report based on the number of the faculty members in the department to which major they belong to and even the college. The higher management can use this information to determine the necessity of faculty members for the University.

Active Members in the system

- Faculty members
- Deans of colleges
- Administrator
- Employee of Vice Rectorate for academic affairs

Features of the proposed system

- Support different platforms
- Availability of entering an unlimited number of faculty members
- Supports attachment of files in various types such as (pdf, doc…)
- Ease of use

Objectives of the proposed system

- Decision support system for higher management in the university.
- To reduce the time and effort exerted in accessing faculty member information.
- To reduce the cost resulted from a lack of information.
- To get reports at the appropriate time with the least cost and effort.
- To develop performance and to support the university in its orientation towards electronic administration.

2. Literature review

The practice of analyzing the necessity of faculty members in higher education, through their details of lecturing and in which department they belong to is now very widespread, to the extent that it is rare to find the faculty members and their role in a university (Kember and Leung, 2011). An analysis is an organized process of gathering, evaluating, and description of information, to determine to what extent aims are likely to be achievable until the decision-making process based on the evaluation (Kamran et al., 2012). To generalize the above definition, determining faculty members' success in achieving educational goals can be attributed to their assessment (Bazargan, 2008).

Based on Kamran et al., (2012), analyzing the necessity of a faculty member is a process that is applicable to promote the quality of learning and education and also in the decision-making of jobs, including selection, job stability, and promotion. Therefore, there is no doubt that evaluation is mainly required and beneficial. Teacher evaluation is one of the numerous educational and complex assessments, and its complexity is in bearing with the lack of validity and precision in terms of the tools and measurement methods because no information source or mentioned method provides any essential or unbiased information that is necessarily needed for appropriately executing the assessment. However, the finding of this evaluation is also indispensable. For the success in the assessment, two types of information are necessary, the educational achievement criteria and an index of success rate to achieve a determined measure. The assessment criteria consist of related items that are confirmed to judge the desirability of the evaluating things.

Furthermore, unanimously selecting a criterion is one of the most pivotal aspects of the evaluation process (Bazargan, 2008). Nowadays, for validity and performance, evaluation is considered as an effective factor. Hence, to evaluate the quality of the teachers' performance and get information on their strengths and weaknesses, a lasting evaluation must be conducted. There are several identified methods to assess teacher educational practice. One of them is student evaluation of teaching, which is commonly used in Universities, in recent times. The most common sources of evaluation data have been students, peers, and teachers themselves (Li et al., 2009; Valle et al., 2004; Kamran et al., 2012) in this evaluation. We analyze the students' opinions in terms of teachers' behavior and educational practice will be analyzed by using a multiple-choice or an extensive questionnaire (Bazargan, 2008; Kamran et al., 2012).

Evaluation, however, is logically and necessarily beneficial, as it helps to find the positive and negative program aspects, but to achieve this goal, applying an appropriate system, with sensitive and precise tools, is required. In this manner, an evaluation would adequately be done, and its adverse outcomes would also be diminished. A decrease in staff satisfaction and motivation, lack of accountability, and system outcomes are caused by poor evaluation (Shakurnia et al., 2005; Kamran et al., 2012). Teaching evaluation can identify common problems existing in teaching and help provide solutions for them. In this process, the evaluators ask students about issues they experienced in their education and report these problems to the appropriate administrative officers, mainly when students are reluctant to report the problem or when they do not know who to say the issues to Wen et al. (2011), and they also serve as a basis for decision-making concerning hiring, contract renewal, incentives, and promotions (Gimbel et al., 2008; Bland et al., 2002; Jahangiri et al., 2008; Williams et al., 2001). Although many studies have been published about teaching evaluation in medical education, most of them provide only descriptions of the evaluation system. A few studies published focus on the tools for the assessment, which extracted from students' opinions (Fu et al., 2008; Wen et al., 2004).

3. Proposed methodology

In general, methods can be used to develop a system. In the recommended way, a prototyping life cycle model is used, which is shown in Fig. 1 to

create and implement it. The prototyping model is a Systems Development Method (SDM) in which a prototype, which is an early approximation of the final system or product can be built, tested, and then reworked until an acceptable prototype is finally achieved from which the complete system or product can be developed.

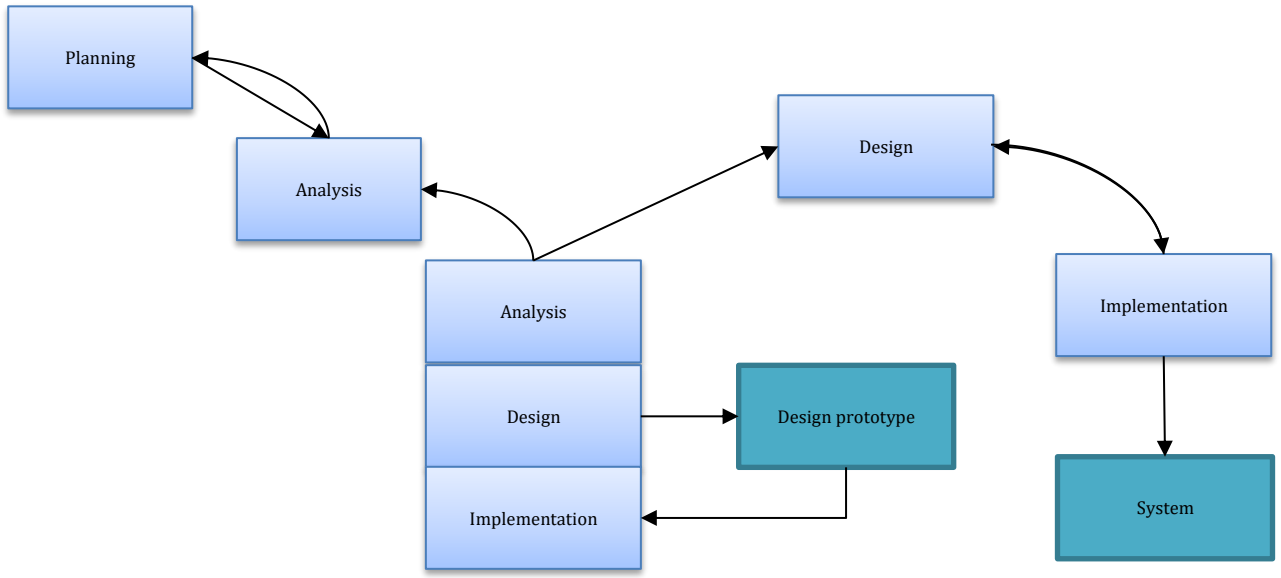

Fig.1: Prototype of a life cycle model

The proposed system is developed to provide three privileges, which are shown in the use case diagram with various functions of an actor in the system and what he/she does in it.

3.1. Use case diagram

The use case diagram shown in Fig. 2 has three actors. The first factor is the Admin of the system who supervises the system and can work in the office of Vice Rectorate for academic affairs. The admin can log in to the system before any transactions have been done. He/she can manage the faculty members by adding new faculty member or update or delete their information. He/she can also lead various majors, colleges, nationalities, academic year, users, employee status, etc. He/she can show a different type of report about a faculty member, which faculty member belongs to which significant or nationalities, teaching hours, degree position, and college. He/she can also generate the statistical reports for all the faculties working in the whole University.

The second factor is the Dean of the college. He/she must log in firstly for managing the faculty members in his/her college by adding new faculty member or update or delete the faculty's information. He/she can also succeed majors in his/her college, display different types of the report about a faculty member, display the faculty member in his/her college depends on major or nationalities, or teaching hours, or degree or position, etc. He/she can generate a statistical report, which shows the number of faculty members. The third factor is a faculty member who can only enter all his/her required information in the system.

4. Results and discussion

The main interface of the faculty member as a user is shown in Fig. 3. This interface allows the user to fill his/her information, which can be distributed into four phases. The first one is necessary information, which includes the name, email, mobile no, sex, date of birth, ID, etc. The second one is the qualification phase, which includes certificates, date of its issuance, name of the university, academic degree, etc. The third phase is the details about educational data, which include the number of publications, the status of the employee, college, department, etc. The fourth phase is the employee data, which consists of the date of hire, number of teaching hours, number of committees, managerial work, salary, etc. After filling the information mentioned above, he/she can save it.

Fig. 4 shows the main Interface of an administrator when the admin inserts his/her email and password correctly as user credentials. This window shows all the transaction which can be performed by the administrator, for example, manage the college and majors, faculty members, and from this interface he/she can access to all type of reports.

Fig. 5 show the interface of managing college. Only the administrator can access this interface to manage the colleges by adding new colleges, editing the existing college, or deleting the college, etc. Fig. 6 shows the interface for reports. The administrator and dean can generate these reports for different faculty members. It can show faculty members based on the departments, scientific degree, status of the employee, nationalities, majors, teaching hours, grade, etc.

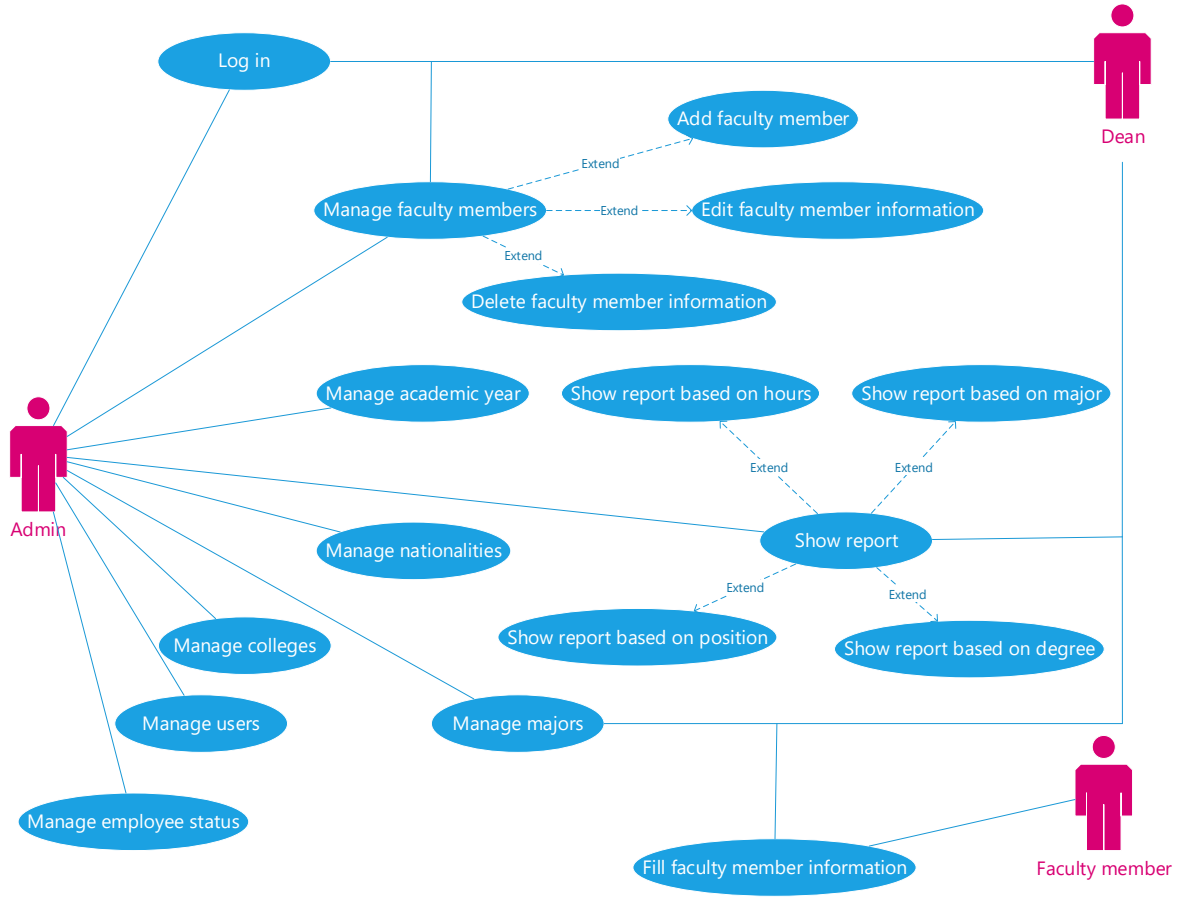

Fig.2: The diagram for the proposed information system

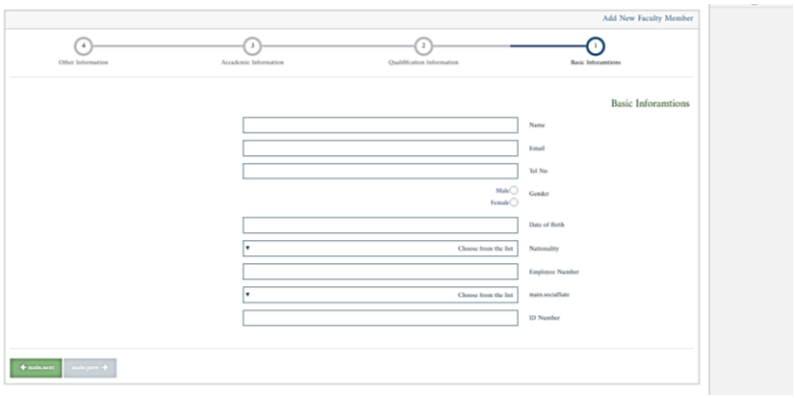

Fig. 3: Main interface for the faculty member user

Fig. 4: Main interface for the administrator

Fig. 5: Interface for managing colleges

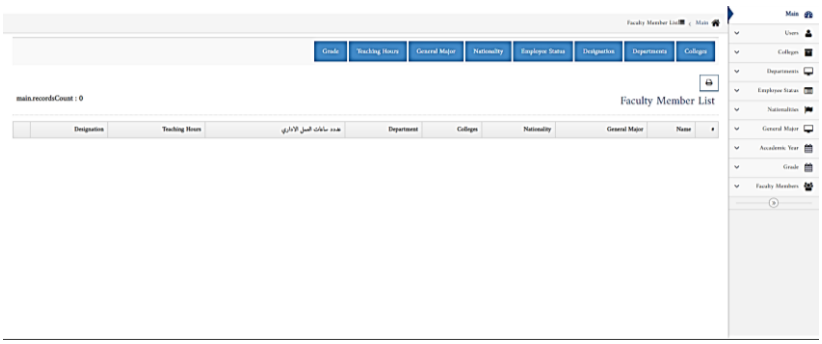

Fig. 6: Interface for reports

5. Conclusion and Future enhancements

This study proposes a novel framework that can be used at Shaqra University in order to determine the necessity of faculty members. This paper aimed to meet the critical objectives such as faculty members, their teaching hours, and also the information about majors in which the faculty members are teaching at the University. A complete idea about the proposed framework, outline of the proposed system, and various interfaces are explained. The proposed framework aimed to find the necessity of the staff members working in the university based on their role. Using this proposed system, various staff-related activities such as monitoring of teaching, improving their performance, etc. can be attained. The results have helped the higher-level managers to find the staff and their roles. It also enables the team in the process of increasing efficiency. Future enhancements can be the implementation of the proposed system.

Compliance with ethical standards

Conflict of interest

The authors declare that they have no conflict of interest.

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