Developing and Implementing a Web-Based Platform for Skills and Knowledge Exchange

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ABSTRACT

The emergence of computer networking, e-mail and computer conferencing for exchange of scientific information encouraged the adoption of a collaborative learning approach to meet the needs of both learners. The platform aims to improve community culture and knowledge by allowing the exchange of skills within the community through a free electronic platform. It aims to shorten the distance between individuals and enrich the content of the platform with new courses including computer science, engineering, programming, artificial intelligence and space sciences. The platform aims to establish partnerships and cooperation agreements with regional and international leading institutions to exchange and develop skills and expertise. Also to improve and facilitate the process of communication between the parties to the maximum extent which ensures the success of the exchange process. The proposed system was developed using the Unified Modeling Language (UML) and Microsoft Visual Studio2010 programming language.

Keywords : Skill Provider, Skill Recipient, Exchange Platform, Skills Exchange, Analysis, Design, Skills.

I. INTRODUCTION

Many individuals who desire to learn have difficulties to acquire skills from the competent authorities because skills are provided to groups more than individuals, in addition to the lack of financial resources for all individuals that enable them to acquire the skill, especially that most of the providers of skills provide it in exchange for money and also it is difficult for some individuals to go to distant areas to gain that skill [1]. Therefore, this project is a free Arab platform that acts as a collaborative medium between individuals, through which the exchange of skills between two parties in an interactive manner.

"Hello Pal" It is a useful application for those who wish to learn foreign languages. Through which people can talk to native speakers and improve personal skills through the direct communication when you sign in to the app, you can then select the language of the speaker and determine the language you want to learn, with country, gender, and other specifications. As a result, you can get a list of people who are willing to communicate with them [2]. Figure 1 shows the main interface for Hello Pal platform. Hello Pal has the following advantages:

- It displays examples of the most common conversation starters.
- Add text chat and share photos with others.
- Send voice messages to correct pronunciation and improve a person's skills.
- This program supports different languages such as Arabic, English, French, Italian, Hindi and other languages.

Figure 1: Hello Pal interface [2].

"Edraak" makes quality education in Arabic accessible to all internet users and promotes lifelong learning, whether for higher education or professional development. Edraak provides a platform for a diverse range of free online courses, offered by top universities and entities [3]. They do this by harnessing regional and global Arab talent to leverage technology developed by the Harvard-MIT consortium, edX. The Edraak platform also serves the important purpose of presenting Arab youth with new regional role models, the disadvantage for this platform that it relies entirely on learning from educational professionals only. Education through a learning platform that relies entirely on learning from educational professionals only. Figure 2 shows the main interface for Edraak platform.
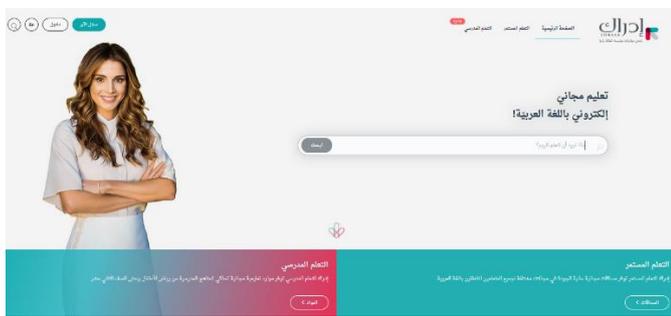

Figure 2: Edraak interface [3].

"Rwaq" is An electronic learning platform that offers free academic subjects in Arabic in all fields and disciplines, offered by distinguished academics from around the Arab world. They are keen to expand the circle of users from their specialized scientific and knowledge stock. They seek to communicate it to those outside the university walls [4]. Figure 3 shows the main interface for Rwaq platform.
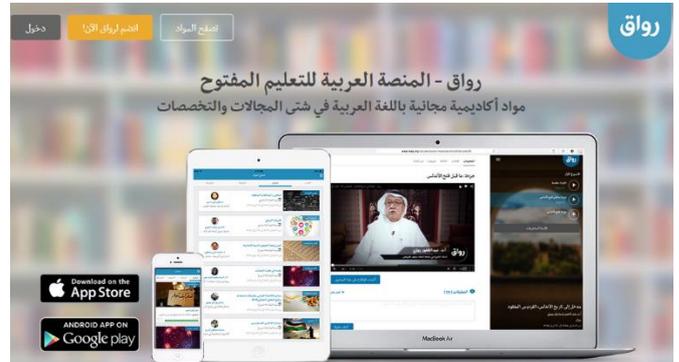

Figure 3: Rwaq interface [4].

The technological revolution influenced everything [5-25], even the methods that aim to improve the community culture and knowledge by allowing the exchange of skills within the community through a free electronic platform. Today, the use of Artificial Intelligence (AI) algorithms is expansive, particularly in providing solutions to challenging problems including patterns recognition and retrieval of information [20, 26-42], image segmentation [5, 6, 16, 43-48], analysis of medical images [49-53], Learning Management System [54-79], nurse rostering problem [80], Healthcare Monitoring system [19, 81], as well as prediction of river flow [82-84]. Accordingly, many researchers have used the Artificial Intelligence as an effective tool for skills and knowledge exchange [85-87].

II. Methodology

The process of system analysis aims to study an existing system to entirely design a new system. System analysis is performed to achieve mainly two aims namely:

- To understand the process or the system clearly. This will assist in the new system design.
- System analysis will help to identify the problems in the existing system; therefore this will help to know the inefficiency reasons.

The Unified Modeling Language (UML) is visualization for the system design, it represents graphical notations which help to describe and design software systems, principally software systems constructed utilizing the object-oriented style [88-92]. The UML was utilized mainly to design the proposed system. The Use-case diagram and the Context diagram are addressed below.

Use Case Diagram

The Use-Case Model depicts system requirements. Use-case captures the communication between system, users and other stakeholders in order to achieve the intended goal of the system. It shows the interaction between the system and external entities [76, 91, 93-95]. The Actors are external entities who represent roles. They could be external hardware, human users or other systems. In this case the actors are the System Administrator, User (Skill Receiver and Skill Provider). Figure 4 shows the use case diagram for the proposed system.
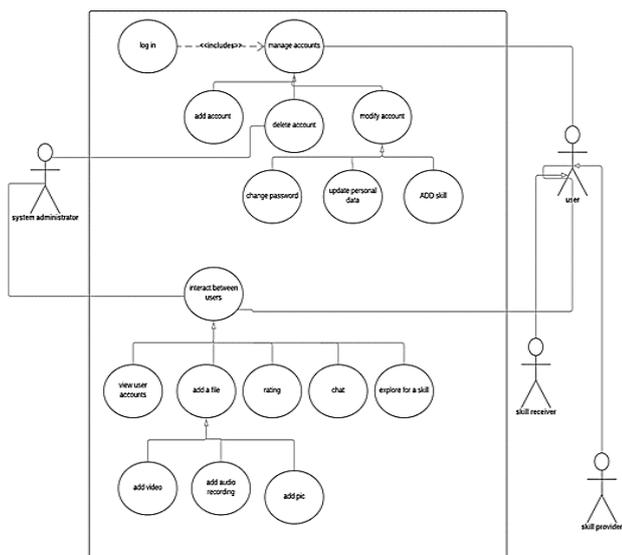

Figure 4: Use case diagram for the proposed system.

Context Diagram

The Context Diagram (CD) is used to establish the boundaries and context of the system to be modeled; where things outside and inside of the system are being modelled, and the relationship of these external entities with the system is also demonstrated [96]. CD sometimes is called a level 0 data-flow diagram, it is drawn in order to clarify and define the boundaries of the software system. It identifies the information flow between the external entities and system [96]. Figure 5 shows the Context Diagram for the proposed system.
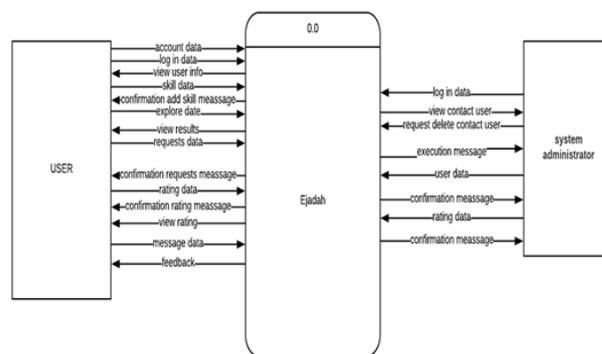

Figure 5: The Context Diagram for the proposed system.

Entity Relationship (ER) Diagram

The ER Diagram, a kind of flowchart demonstrates the way that entities such as concepts, objects, or people are related within a system to each other. ER Diagrams are commonly utilized to debug or design relational databases in the education and research, business information systems and software engineering [97 ,18 ,17 ,14 ,13]. ER diagrams are associated to Data Structure Diagrams (DSDs), which concentrates on the elements relationships within entities rather than the relationships between entities themselves. In addition, ER diagrams are commonly employed along with data flow diagrams (DFDs), which delineate the information flow for systems or

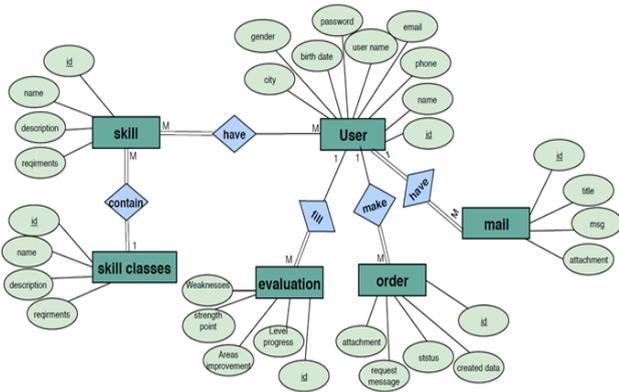processes. Figure 6 shows the ER diagram for the proposed system.

Figure 6: ER diagram for the proposed system

III. Interface Design

The programming language utilized in this work was Microsoft Visual Studio 2010 programming languages. The programming languages are chosen relying on the languages features which make them more suitable for this work. In the proposed system, the user starts with the registration in the system; after that the system offers the user a form for login and the user has to enter the information required. If the information is found correct by the system search in the database, it displays to the user the system homepage and allows the user to make use of the proposed system. However, if it's not valid, the user will be redirected to the login page. The figures below are examples of the designed and implemented interfaces.

Figure 7: Main interface.

Figure 8: Skills provider interface

Figure 9: Review the skills provider interface.

Figure 10: collected data results from the 20 students.

IV. Discussion

This stage highlights the usability of the proposed system. During this stage, the system is evaluated while user satisfaction is ensured. Test was executed on the proposed system by running it on Mozilla Firefox and Internet Explorer using the local host server. For evaluation purpose, 20 students from College of Applied Studies and Community Service at Imam Abdurrahman Bin Faisal University (IAU) were invited to use the prototype. The students were first briefed on the prototype's usage and the user interface. Then, the students tested the system, and answered the survey questionnaire consisting of 10 items formulated to gauge the level of user satisfaction. The usability of the proposed system was also determined. The result as well as the level of usability of the system according to the feedback provided by 20 students can be referred in figure 10. As can be construed by the result, a significant amount of users agrees that system is practical, useful and fulfill the project's primary objective.
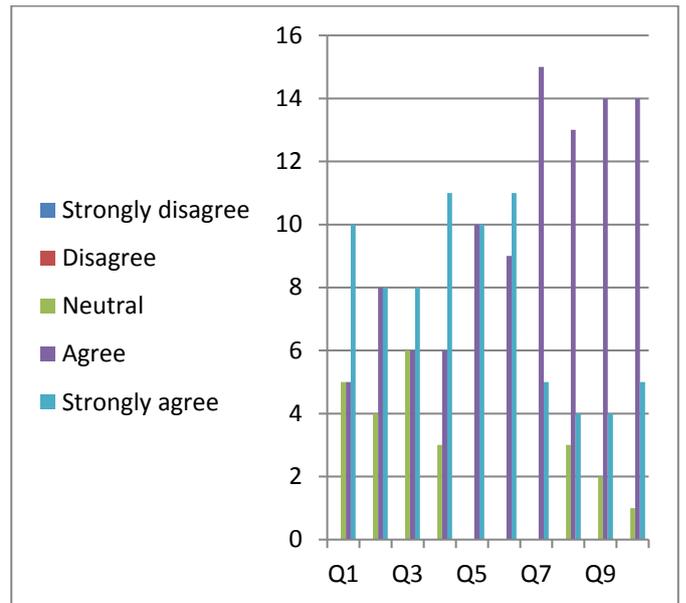
V. CONCLUSION

This paper highlights the best practices in building and designing a free Arab platform that acts as a collaborative medium between individuals. The platform aims to establish partnerships and cooperation agreements with regional and international leading institutions to exchange and develop skills and expertise. Also to improve and facilitate the process of communication between the parties to the maximum extent which ensures the success of the exchange process. The proposed system was developed using the Unified Modeling Language (UML) and Microsoft Visual Studio 2010 programming language.

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