HARMONIZATION OF LINEAR-SEQUENTIAL LIFE CYCLE AND USE CASE DIAGRAM AS DEVELOPING MODELS OF E-TAHFIZ SYSTEM

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ABSTRACT

Developing models are pertinent as basic structure of artificial intelligence system. e-Tahfiz System is a computerized mechanism developed to replace the traditional approach regarding Islamic educational institutional management. The features of this system supports registration and learning implementation process efficiently and effectively. In this project, System Development Life Cycle (SDLC) is used as development framework which applies linear-sequential life cycle model. In order to establish the system analysis database requirement, MySQL and phpMyAdmin are employed. Bootstrap Studio and Brackets are also utilised as web interface design in HTML surroundings. Furthermore, Use Case Diagram is adopted as system analysis illustration to manage the flow of project. There are four main features developed which are Students' Record, Administration, School Fees as well as Students' Subject and Performance. The findings conceded significant acceptance and positive improvement in school registration process from clients of Maahad Tahfiz Al Khairiyah Mersing, Johor (MATAM) in web interface design, perceive ease of use, functionality, database and interactivity of the system usage.To sum up, this research yields benefit to end users and stake holders in the context of academic management. In future, e-Tahfiz will be applied not only in Johor state's Tahfiz school yet generally in other Islamic schools in Malaysia.

Keywords ; e-Tahfiz system, System Development Life Cycle (SDLC), Use Case Diagram, Bootstrap Studio.

1.0 INTRODUCTION

With the significant emanation of web-based system nowadays, it is crucial for the educational institution such as schools or universities to manage their course registration in digital mode (Iskandar et al., 2018). Internet technology has influenced an important role in organizing, managing daily management operation and communication via computer mediated platform (Thurlow, Lengel & Tomic, 2004; Metzger, 2007). Since more than a decade ago, in Malaysian context the integrating of the Information and Communication Technology (ICT) in educational institution has embolden educators to plan students' registration and academic programme with effective instructional strategies (Sharifah Sariah & Che Noraini, 2014). School is one of the places which highly utilized the computers in order to have a systematic management for all operations and processes. Nevertheless, School Management of Maahad Tahfiz Al-Khairiah Mersing, Johor is still using a manual registration method, which will indirectly cause the manual registration more difficulty to manage (Norizan, 2019). Then, e-Tahfiz system is expected to bring benefits to School Management of Maahad Tahfiz Al-Khairiah Mersing in managing students' registration regarding related subjects as well as to minimize the redundant workload of the teachers. Simple yet effective and easy to use the interface of the e-Tahfiz system will definitely make the system pleasant to apply.

In this project, e-Tahfiz has provides three pertinent modules which decided by the management team as the requirements of the organization. In this system, there consists of student module, administrator module and parent module. In this regard, student module allows the learners to

create their own profile for a particular courses provided by the Islamic school. The administrator has total authority to monitor the system organization, maintains all the aspects. They can control and update the major processes in e-Tahfiz system. In addition, administrator have the provision to access the details of their respective students. Moreover, the parent module has several features to implement the process of school registration, fees payment whether online or offline method. Therefore, it is important to develop e-Tahfiz system with the harmonization of System Development Life Cycle (SDLC) and Use Case Diagram (UCD). The development of registration based system is to implement computerized mechanism in order to register school, subject and payment process throughout a year in the enrolled educational institution.

Research Objectives

In this research, there are three research objectives which encompass:

a) To develop the e-Tahfiz school registration system for clients of Maahad Tahfiz Al Khairiyah Mersing (MATAM).
b) To provide pertinent modules of registration system using user, administration and parent for particular enrolled courses.
c) To design system framework using Liner-Sequential Life Cycle and Use Case Diagram as research model.

2.0 LITERATURE REVIEW

In this portion, the analysis of existence systems that yields complementary modules is implemented. For this purpose, it is indispensable to determine the strengths and weaknesses of the existing mechanisms as instruction to develop e-Tahfiz System.

Collaborative learning enhances many students to register for online courses which enable to display the current and previous courses that are available each semester in the institution (Kent, Courtney & Thorpe, 2018). It is to ensure that student can't register more than maximum courses or take the same course twice. For e-School requirement, it consists various software integrates into a single software (Tosheva et al., 2017; Al-Habeeb, Naseer & Samad Monadel Sabree, 2019), meanwhile 1Bestarinet has simple and consistent web interface development yet allows limited user and lack of security (Ghavifekr & Quan, 2020).

The existing system of Hotel Management System (HMS), Hostel Registration System (ORS) and Online Registration System (ORS) with similar concept to the proposed system have features such as security, registration function, status identification and cancellation function (Law, 2019; Kowsalya, Pavithra, Sowmiya & Shankar,

2019; Mcllroy et. Al., 2017). It is denoted in the following Table 1.

Table 1
Comparison of System Features

Features	Hotel Management System	Online Hostel Registration System	Online Lab Registration System
Manage People Information	Yes	Yes	Yes
Manage Subject/Class	No	No	Yes
Manage Examination	No	No	No
Manage People Performance	Yes	Yes	Yes
Manage financial or fee	Yes	No	No

Since, a registration system has many users, the potential users only have visual representation of the system from the point of view of a student. Utilising the Linear-Sequential Life Cycle can allow instructors to make consistent cycle to prepare a course listing, and assign grades to each student in a course. However, the instructors are not allowed to decide which courses which will be offered each semester. This task will be implemented by administrator. Therefore, in this e-Tahfiz system, there are at least three views of a student registration system which is the student's view, the teacher's view, and the administrator's view.

The administrator will check the details of the particular student in order to approve or reject courses requested by the student and he will recommend the possibility of courses which the student may take in that particular semester. e-Tahfiz system eliminates the need for paperwork that has to be filled-out and saved for reference. Once students register online, they will have an account where their information is stored. This will make subsequent business, quick and efficient, because the administrator retrieves student information instantly when they log in. Students will be able to check the status of their account and find their results.

In this regard, it is important to let the users know about the proposed system works. The function of the registration system enables users, teachers at Sekolah Maahad Tahfiz Al-Khairiah, Mersing, Johor to register and update information for their student.

3.0 METHODOLOGY

One of the aspects of development that needs to be considered in system development process is the methodology aspect. In this project, a research design involve mixture approach, using quantitative for survey and qualitative for interview in obtaining feedback of clients. In essence, e-Tahfiz uses System-Development Life Cycle (SDLC) methodology as indicator of overall processes as a linear sequential life cycle model. In a SDLC, each phase must be completed before the next phase can begin and there is no overlapping in the phases (Shylesh, 2017).
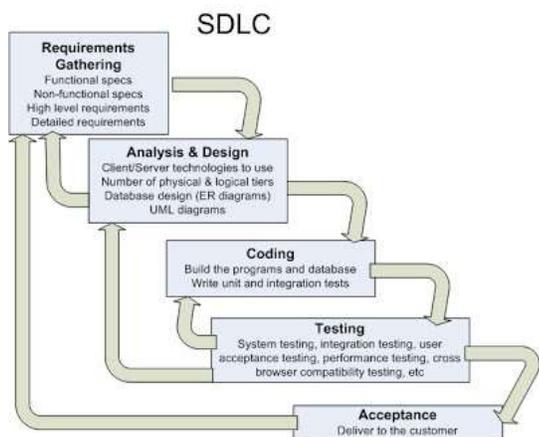

Figure 1. Waterfall Model of System Development Life Cycle (SDLC).

Based on Figure 1, SDLC encompasses five stages which are requirements gathering, analysis and design, coding, testing and acceptance of the software before begin developing (Peterson, Wohlin & Baca, 2009; Lott, 1997). In this regard, e-Tahfiz development stages include analysis of requirement, design, development, testing, maintenance flow similarly as waterfall system. As requirements assembling be a preliminary part it envolves functional and non-functional specifications with detailed and high-level requirements. The life cycle development ensures the smoothness of vital component of system namely system applicability, product reusability, client feedback and surroundings of development (Heisler, 1990).

Nevertheless, a team of experts investigations is required to ensure waterfall model tools and strategies successfully develop the application software and project architecture (Saxena & Upadhyay, 2016). After completion the functional and non-functional development, the process of integration and testing phase will be implemented in the SDLC. For development phase, the developed product will be tested and released into the market. For the purpose of system analysis database requirement, MySQL and phpMyAdmin are employed. The pertinent information of modules encompass students, administration and parents are stored securely with the provided software functionalities.

Meanwhile, Bootstrap Studio and Brackets are also utilised as web interface design in HTML surroundings. Furthermore, Use Case Diagram is adopted as system analysis illustration to manage the flow of project. Therefore, as the life cycle breakthroughs, each stages in SDLC deluges into the following until the completion of the project.

4.0 DATA ANALYSIS

The data of a hundred clients' feedback from students was analysed using descriptive method. A set of questionnaires was distributed to the respondents to gain response about registration encompasses subject that enrolled, academic structure and academic activities throughout the school session in the year. Furthermore, session of structured interview to three teachers as participant and informant among management of MATAM was implemented to obtain response of web interface design, perceive ease of use, functionality and database interactivity of the system usage. Data analysis is important after data collection, implementation of requirement analysis, design and development of the e-Tahfiz System completed.

5.0 FINDINGS

In this portion, the findings of existence systems that provides actual results is implemented. For this purpose, it is appropriate to determine the range of capabilities of e-Tahfiz System. The essential of human computer interface in need to consider simplicity and coherent as well as straightforward to utilize. Furthermore, in this section, the developer has highlighted user-friendly web design element according to the requirement of web interfaces principle as illustrated in Figure 2 to Figure 4. The followings are the related interfaces of web involve student, teacher and academic fees for academic matters in MATAM and e-Tahfiz System.
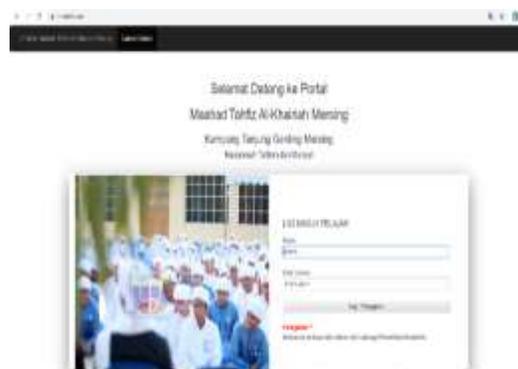

Figure 2. Registration of New Student's Interface.

The module of e-Tahfiz System allows teacher to manage students' registration, academic and payment record to

ensure the smoothness of academic process in the school. Each teacher must have username and a unique password to ease their teaching and learning management. Refer Figure 3.

Figure 3. Registration of Teacher's Interface

The module of e-Tahfiz System allows parents to monitor and check the information of registration, academic and payment record to ensure the accurate amount implemented and future use record. Each parents must have username and a unique password to ease their monitoring management. Refer Figure 4.

Figure 4. Registration of Fees Payment Interface

Moreover, the feedback from students reveal the positive acceptance of e-Tahfiz usage towards their enrolled subjects (40%), academic structure (20%) and academic activities (40%). In this school, there are integrated educational programs such as Hafazan Al-Quran includes all contents from Juzuk One until Juzuk Thirty. Another Diniyah Subjects are encompasses Tauhid, Nahu, Tafsir, Saraf, Fiqh Insya', Mutala'ah and Tahwid. Furthermore, for Academic Subjects all students from Standard One until Standard Six also enrolled Malay Language, English, Mathematics and Science.

For interview session, the researchers gave full attention and made important notes to obtain explanation for specific issues such as web interface design, perceive ease of use, functionality and database interactivity of the system usage. The interview recorded using a smartphone with model of iPhone to obtain feedback regarding five variables which are web interface design, perceive ease of use, functionality, database and interactivity.

Table 2. Findings of Client's Feedback

Number	Variables	Feedback from Informant/Participant	Participant
1	Web interface design	*"Overall the website is very useful interface for teacher to ease the process of teaching and learning."*	First
2	Perceive ease of use		
3	Functionality		
4	Database		
5	Interactivity		
1	Web interface design	*"It is a outstanding experience to use e-Tahfiz due to it helps to manage pedagogical process and monitor school activities throughout a year."*	Second
2	Perceive ease of use		
3	Functionality		
4	Database		
5	Interactivity		
1	Web interface design	*"Good platform for Standard One to Standard Six learners as it can be an exposure to use technology in their learning."*	Third
2	Perceive ease of use		
3	Functionality		
4	Database		
5	Interactivity		

6.0 DESIGN SYSTEM FRAMEWORK USING LINEAR-SEQUENTIAL LIFE CYCLE AND USE CASE DIAGRAM

In this project of e-Tahfiz, a system framework has been developed using model of Linear-Sequential Life Cycle as established structure. As essential, this kind of Life Cycle of SDLC enables developer to define budget, software project's timetable and system's costing (Kan, 2003). In this regard, utilization of this framework allows management system of e-Tahfiz can be organized and monitored in systematic approach.

Furthermore, the Use Case Diagram has been created to indicate roles of three actors involved in e-Tahfiz System. The actors of the system are Administrator, Teacher and Parent. For in depth investigation, the design of this framework has managed to introduce four modules which are Student Record Module, Administration Module, School Fees' Module as well as Performance and Subject Modules. Hence, the combination of actors, modules and process of each modules has successfully developed an overall and comprehensive Use Case Diagram as denoted in Figure 5.
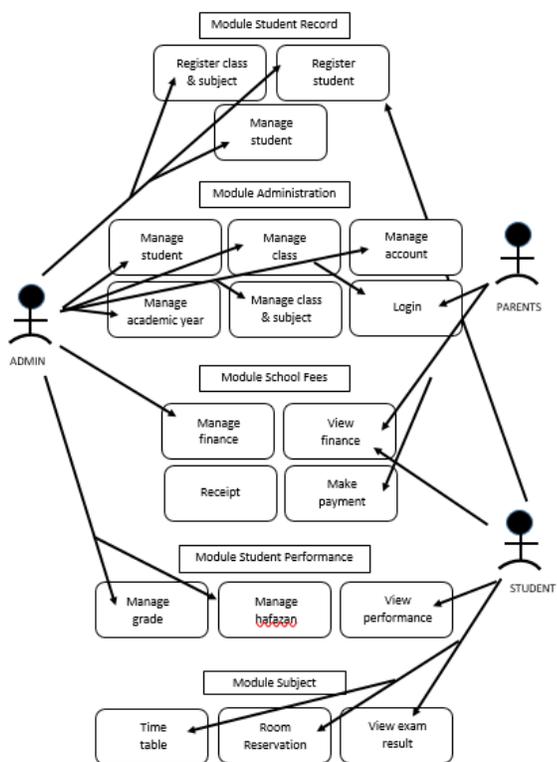
Figure 5. Use Case Diagram for e-Tahfiz System

Suggestion

To emphasize, e-Tahfiz system includes four modules which are module of student record, module of administration, module of school fees as well as module of student performance and subject. The requirements of data consistency and data system follow the requirement analysis, design, develop, implementation and evaluation phase. The database structures are designed based MySQL and phpMyAdmin to activate vital function modules of the system. The comprehensive information and standardization of student registration system will be upgraded to enable clients to use continuously according to the flow of usage, data store and data retrieval for future use. Hence, as technology emerges to alter in future towards requirement of big data challenges, it is hoped that e-Tahfiz system be commercialised to other categories of school not only for Maahad Tahfiz Al Khairiyah Mersing, Johor (MATAM), Mersing, Johor yet various schools in Malaysia.

7.0 CONCLUSION

Software commerce is diversified computer program process imitations for developing vaporware with the merchandise and educational institution success. The impressive deployment of each stages in SDLC implies to fruitful of sotware development. Plan driven SDLC structures are suitable for crucial and significant project which require in resistant surrounding (Escrivao & Silva, 2019). The positive acceptance of e-Tahfiz usage concede the continuous support of educational school towards technology mediated platform with elements of enrolled subjects, academic structure and academic activities conducted throughout the year in school. Moreover, the clients' feedback yields useful interface, outstanding participation and good learning platform to adopt technology in line with the requirement of Industrial Revolution 4.0 pillars. In this paper, it is also discovered and analysed the significant of system framework design using Linear-Sequential Life Cycle as well as Use Case Diagram. The analysed facts prove that it is clear to propose a new SDLC and Use Case Diagram to explain the role of actors, modules and detailed processes in e-Tahfiz system. Therefore, the approach can assist developer to improve the outcomes both clients and educational technology industries.

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