

Design and Development of A Web-Based Education Officers' Mentoring Management System (EMMS)

Syazatul Natrah Abdul Rahman*, Hapini Awang*, Massudi Mahmuddin, Nur Suhaili Mansor, Nurul Farzana Anis Ahmad, Pitri Yeni Azwar

Institute for Advanced and Smart Digital Opportunities, School of Computing, Universiti Utara Malaysia, Sintok, 06010, MALAYSIA

*Corresponding Author Designation

DOI: <https://doi.org/10.30880/mari.2023.04.01.014>

Received 15 October 2022; Accepted 30 November 2022; Available online 15 January 2023

Abstract : The Web-Based Education Officers' Mentoring Management System (EMMS) is an online system that is developed specifically to manage information related to mentoring program of education officers and staffs in *Pejabat Pendidikan Daerah Temerloh* (PPDT), Pahang. The system allows its users, namely PPDT officers, administrative staff, mentees, and PPDT authorities to systematically record their activities during the mentoring program. To be specific, EMMS is intended to facilitate school-based mentoring activities by providing an online platform for PPDT officers in managing program information, allowing mentees to provide answers and feedback, and enabling the PPDT chief and the deputy chief education officers to monitor the program. The system is developed to improve the current manual record management that is not just costly, but also vulnerable to human errors. Based on the system prototyping development method, this project started by gathering the functional requirements through a series of meetings with the client. Next, the requirements are referred to design and develop the EMMS. Finally, a field study was done to see how well the prototype worked. The results of the evaluation show that EMMS is simple and easy to use. It is proved to be well-accepted by the respondents through its various useful features.

Keywords: Mentoring Program, Education Management, ICT in Education

1. Introduction

The deadly consequences of the fast-spreading Coronavirus (Covid-19) have forced educational institutions around the world to give in the execution of face-to-face activities, especially those that involve gathering and physical contact [1]. Being in the same situation, the *Pejabat Pendidikan Daerah Temerloh* (PPDT) cannot conduct monitoring, activities, or programs in a physical face-to-face mode.

Hence, there is a forced need for them to plan and implement a paperless and less-contact web-based system that could be used simultaneously by all users. To solve this problem, PPDT has proposed an ICT-based alternative: Web-Based Education Officers' Mentoring Management System (EMMS) to facilitate their mentoring management. This web-based application could facilitate all parties in PPDT mentoring program to get information, generate reports, and do other related activities. Since the 1970s, computer programs have been used to manage schools, and they have been used ever since. During this time, information and communication technology (ICT) was mostly used in schools to improve the efficiency of school offices, such as storing data about staff and students [2]. ICT innovations have made a big difference, especially when it comes to keeping track of all kinds of information in schools. Today, the way educational management is done has already transformed because of the rapid changes in technology. This is not just happening at universities, high schools, or secondary schools. It is also happening at the primary school level.

The PPDT mentoring program is organized by conducting coaching, mentoring, and training activities related to academics, data management, as well as professional development that is delivered by mentors to mentees. Mentors in this program are PPDT officers, and mentees are administrative staff and teachers. The program is vital as obtaining and analyzing data from a variety of sources are important for mentees and education administrators to better understand students' needs, improve mentoring methods, and expand management skills [3]. However, the existing practice of the program is also subjected to several issues. Ironically, its outdated data management practice is the most visible flaw, as mentioned by the client. It is stressful and prone to many types of errors, either caused by humans, or mother nature [4]. As a result, complaints about loss and data complexity were commonly heard among mentors and mentees. Furthermore, the process is also time-consuming; mentors and mentees who wrote a report by hand and use paper-based documents have to wait a long time for the information to be sent between schools and PPDT.

The preceding arguments indicate the need for educational institutions like PPDT to have a systematic way to keep track of mentoring data so that it can be managed in a timely, and stress-free manner. Hence, the proposed system, EMMS is built to improve the way manual data management is done. The system would be useful for such purposes, especially at the PPDT decision-making level. More importantly, EMMS would enable the mentoring program to be monitored by PPDT authorities. It is undeniable that data management is very important in education. Due to the current problems with mentoring program data management, there is a real need for a way to record data quickly. The use of a web-based application is a good way to fill in the gap because it can automatically generate data, which makes the process more efficient and time-saving [5]. In this way, the use of EMMS is meant to assist its users, including PPDT officers, staff, and authorities with data management and the decision-making process. Compared to the manual system, the computerized system would completely change and improve the way data is managed. Therefore, this study looked into how important a web-based application is for managing data in a mentoring program. This study also aimed to design, build, and test the EMMS, which is a web-based application for managing mentoring program data. Accordingly, this study is supposed to provide a better understanding of the system's requirements and serve as a model for how to improve the educational data management system. The next section discusses the previous studies followed by an explanation of how EMMS was developed and how it was tested for usability. Finally, the last section wraps up the study and gives suggestions for future research.

2. Materials and Methods

There are various software development methodologies available like waterfall, scrum, prototyping, extreme programming, and Rational Unified Process (RUP) [6]. However, for the EMMS development, the prototyping methodology has been used. Prototyping lets users try out the prototype before the real product is done. It also helps developers to learn about the unique needs of the users, which might not have been initially thought of. Figure 1 shows the four main stages of the prototyping methodology [7].

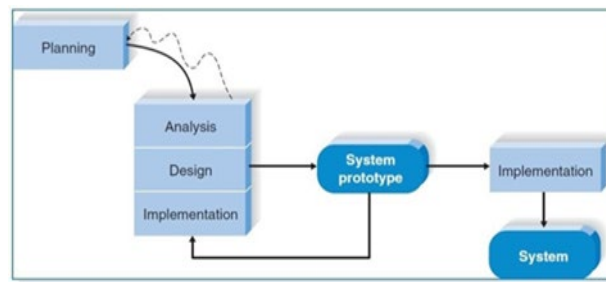


Figure 1: System Prototyping Stages

The planning phase entailed gathering requirements for the web-based EMMS that are used to manage mentoring information and data. The requirements are recorded and illustrated using Unified Modeling Language (UML) diagrams, which include use cases, activities, and class diagrams. UML diagrams provide a standardized method for modelling workflows, as well as a broader range of features that enhance readability and effectiveness [8]. This phase also included a review of prior research on web-based systems. The analysis step enabled this study to develop a list of system needs and functionalities following client consultations. Next, the EMMS's user interface is parallelly designed. Users are involved throughout the design and construction process, providing comments on how to improve the interface and information flow based on client requirements. The implementation phase involved the creation of a low-fidelity prototype. This phase also included the report preparation and presentation to solicit input from the client. Throughout the system prototype phase, the prototype is consistently revised and improved depending on client feedback. Finally, the client platform was used to implement the prototype. The system was thoroughly tested prior to its final deployment. The following sections provide a full explanation of each phase.

3. Results and Discussion

In this study, a prototype of a web-based application called EMMS is developed. It was used to keep track of information and data about the PPDT mentoring program. Visual Code Studio was used to write code, and Laragon was used to manage the database. EMMS is a web-based application, whereby its interfaces are built using web interfaces. Figure 2 illustrates the use case diagram and the communications between the use cases and the actors (Admin, PPDT Officer, PPDT Authorities, Mentee) for the EMMS.

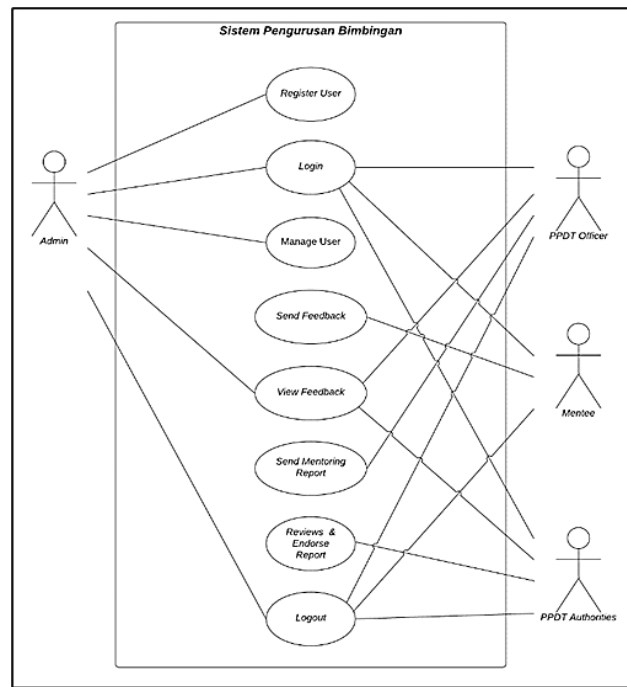


Figure 2: Use Case Diagram of EMMS

3.1 The Evaluation Setting

A usability study was done on 15 respondents, including six Mentees, five PPDT officers, two Admin, and two PPDT authorities. The tools used for the evaluation are the tutorial video, the user manual, and a post-task questionnaire. The post-task questionnaire has seven items in two sections. Section A asked about the user's satisfaction with closed dichotomous questions, which only have two possible answers: "Yes" or "No." On the other hand, Section B asked about the user's suggestions for the system in an open-ended question to get any feedback or suggestions. The respondents are required to watch the tutorial video and read the user manual before filling out the post-task questionnaire.

3.2 The Usability of EMMS

An analysis was done of the responses in Section A of the post-task questionnaire. The EMMS functionality, ease of use, and quality of the system are measured in this part. Table 2 shows that most of the respondents perceived that EMMS is easy to use (n=15, 100%), presents the information well (n=15, 100%), and does a good job of integrating all the necessary functions (n=14, 93.3%). Almost all of them (n=14, 93.3%) want to use EMMS to keep track of mentoring program data. Additionally, most respondents also think that EMMS is easier to use than a manual system for managing mentoring program data (n=14, 93.3%). However, the newly proposed system still needs to be improved especially in terms of how well it works in the future.

Table 1. The Questionnaire of EMMS

The post-task questionnaire items	Yes n (%)	No n (%)
Is all information well-presented?	15 (100)	0 (0)
Is it easy to use this system?	15 (100)	0 (0)
Are all the functions of this system well integrated?	14 (93.30)	1 (6.70)
Do you prefer to use this system in the future?	14 (93.30)	1 (6.70)
Do you satisfy with this system?	14 (93.30)	1 (6.70)

In addition, the results of the evaluation in Section B indicated that EMMS should be updated over time, could add a graph to show the data, and could improve the interface design. Overall, the users who responded said that EMMS is very user-friendly, simple, and easy to use.

4. Conclusion

There's no doubt that mentoring data is important for top-level management to make the right decisions and come up with the right strategic plan to improve the quality of educational management. Therefore, many aspects need to be considered when designing and developing EMMS. This study discussed the design and development of this web-based application for managing the mentoring program. The use of EMMS will facilitate its users, whether mentors, mentees, or PPDT authorities in executing, managing and monitoring the program. Indeed, usability testing has proved that this system is beneficial, effortless, time-saving and cost-efficient. In conclusion, this system was successfully developed to make it easier for admin, PPDT officers, PPDT authorities, and mentees to keep track of information and data about the PPDT mentoring program. However, system development is an ongoing process, which requires constant updates and maintenance over time. In the future, more functions for EMMS will be added to meet the needs of its users. It still needs to be improved to ensure its relevancy in the future.

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