

## **Design and Development of SysPK: A Web-Based System for Managing Audit Documents**

**Azmeera Asfarina Azman<sup>1\*</sup>, Nur Liyana Mohd Rusli<sup>1</sup>, Hapini Awang<sup>1</sup>, Ahmad Suki Che Mohamed Arif<sup>1</sup>, Nur Suhaili Mansor<sup>1</sup>, Nurulhuda Mohd Salim Lim<sup>2</sup>, Koh Shiau Ling<sup>2</sup>**

<sup>1</sup>Institute for Advanced and Smart Digital Opportunities, School of Computing, Universiti Utara Malaysia, Sintok, MALAYSIA

<sup>2</sup>Pejabat Pendidikan Daerah Cameron Highlands, Tanah Rata, MALAYSIA

\*Corresponding Author Designation

DOI: <https://doi.org/10.30880/mari.2023.04.01.004>

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

**Abstract** : The method of audit document submission has become a major concern for the officers in Pejabat Pendidikan Daerah Cameron Highlands (PPDCH). Currently, the PPDCH officers use email to send documents to be reviewed by PPDCH internal lead auditor which is difficult because some documents sent via emails could be missed. Besides, it is considered inconvenient and risky, particularly when confidential documents are involved. Moreover, the documents need the feedback status or approval from the head officers before could be audited. Thus, the PPDCH proposed the development of a system that would make document management and record-keeping easier which allows secure document retrieval and could improve work productivity. Hence, the “Sistem Penarafan Kecemerlangan” (SysPK) is developed and aims to provide an online document management system for PPDCH. SysPK is developed to manage audit documents and will be used by officers in PPDCH. This system is an online web application. The auditors and PPDCH officers can submit the documents and check the status, whether being checked or not. In addition, the PPDCH will be able to view and give feedback on the submitted documents. The design and development of the web system followed the waterfall development methodology. First, the requirements were gathered through an online interview with the officer of PPDCH. Then a SysPK prototype had been developed based on the gathered requirement and a field study was carried out to evaluate the usability of the prototype. The results of the evaluation revealed that SysPK is useful and easy to use. The respondents are satisfied with the functions of managing documents provided by the SysPK. The study contributes towards an improvement of the previous method of managing, gathering and checking documents. The implementation of SysPK could improve the quality of managing documents while retaining the same process of workflow.

**Keywords:** Document Management, Education Management, ICT in Education

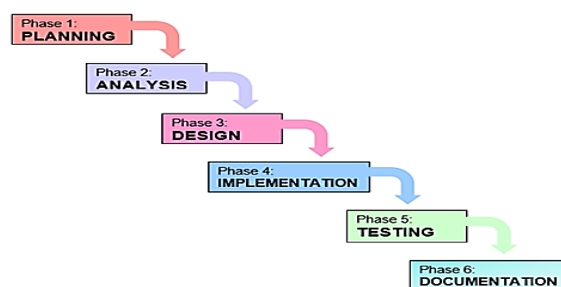
## 1. Introduction

An electronic document management system (EDMS) is a computerized system that facilitates the creation, capture, organization, storage and retrieval of documents in the electronic format [1]. Based on the previous study, producing better quality documentation is important as improper document management can produce poor and erroneous documents [2]. A good quality document management allows for consistent performance when carrying out processes, regardless of the time, location or person [3]. Therefore, the implementation of EDMS is essential to improve document management effectively and efficiently. In Malaysia, the EDMS is implemented since 2013 to strive for a paperless environment, enhance the delivery of services and record-keeping as well as improve the transparency of government via the use of Information Communication and Technology (ICT). EDMS offers a wide range of benefits such as reducing paper usage, speeding up public records access, avoiding loss of records, and facilitating the transfer of records to archives [4]. EDMS implementation also provides potential solutions to enhance the efficiency of the public sector and electronic records management, improve services, reduce storage space and integrate or eliminate duplication of work in government [5].

According to the authority of Pejabat Pendidikan Daerah Cameron Highlands (PPDCH), their method of audit document submission has become a major concern for the PPDCH officers. Presently, PPDCH uses email to submit documents to the internal lead auditor, which is considered inconvenient and less secure. Moreover, the document reviews need feedback status or approval from the chief officer before could be audited, which is regarded as difficult because some documents submitted via email could be overlooked. Triggered by this issue, the online EDMS to manage audit documents of PPDCH is proposed. The emergence of technology in the organization provides an effective and efficient way of managing the enormous number of documents. Hence, the Sistem Penarafan Kecemerlangan (SysPK) is developed to overcome the problem faced by the current method by improving the previous process of managing, gathering and checking documents. The SysPK aims to solve the problem of improper document management that is done via email. The proposed system also could improve the quality of managing documents while retaining the same process of workflow. This article discusses the process of designing and developing a web-based system for managing audit documents, called SysPK. The SysPK is developed and evaluated to improve the productivity of managing documents. In sum, the study contributes toward a better understanding of system requirements and could be a benchmark for developing better EDMS.

## 2. Materials and Methods

The Waterfall methodology was used to develop this SysPK prototype. It is the first methodology in the software development lifecycle (SDLC) to be introduced by Dr Winston W. Royce [6]. Six phases are included in the Waterfall methodology which are planning, analysis, design, implementation, testing and documentation. Each phase is required to be completed before proceeding to the other phase. Furthermore, the Waterfall methodology does not exhibit overlap or iteration. **Figure 1** depicts the flow of the Waterfall model.

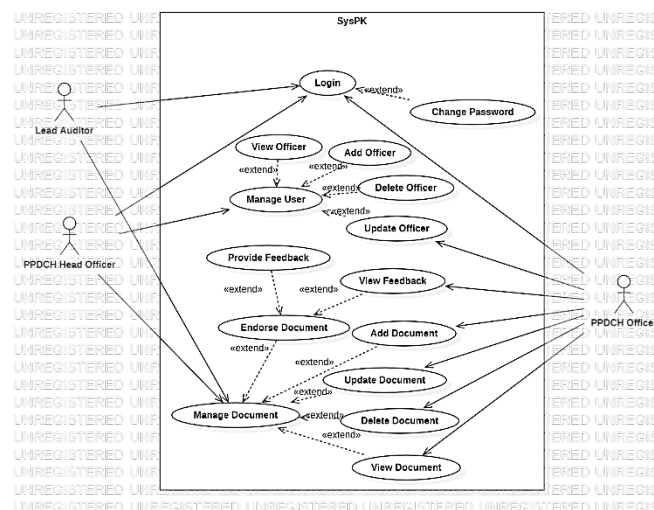


**Figure 1: The Phases of Waterfall Methodology**

In the analysis phase, the developer met the supervisor and client from PPDCH to gather the requirements of the SysPK. This activity allows the developer to understand the design and flow of the system. The requirement gathered are documented and illustrated using Unified Modelling Language (UML) diagrams including a use case diagram, sequence diagram and class diagram. Next, in the design phase, a low-fidelity prototype is developed and in the implementation phase, the web development is performed using suitable programming languages that are PHP, HTML, CSS and JavaScript, along with MySQL database. The system was developed using Adobe Dreamweaver. During the testing phase, the system was evaluated to ensure that system meet the requirement needed. The users were involved in the testing phase to gather feedback and make an improvement to the system. Lastly, the system development is reported in the documentation phase.

### 3. Results and Discussion

In this study, a prototype of the web-based system for managing PPDCH audit documents called SysPK. The high-fidelity prototype is developed using the Adobe Dreamweaver. Besides, PHP, HTML, CSS and Javascript along with MySQL database are used to develop the SysPK prototype. **Figure 2** depicts the use case diagram of SysPK.



**Figure 2. Use Case Diagram of SysPK**

#### 3.1 The Evaluation Setting

A usability evaluation was conducted on 30 respondents including the lead auditor, chief officer and officers of PPDCH. The evaluation was conducted using a questionnaire based on the online survey method. Respondents are required to read the SysPK user guideline and watch the demonstration video. The purpose of the usability testing is to ensure the system developed meets user requirements and feedback received is gathered to aid in the improvement of the system by reducing constraints and errors. The questionnaire has 18 questions and was divided into five sections, consisting of Section A: Demography Respondents, Section B: Usefulness of SysPK, Section C: Ease of Use of SysPK, Section D: Security of SysPK and Section E: Satisfaction of SysPK.

#### 3.2 Demographic Information of Respondents

Analysis of the respondents' demographic revealed that 54% of them are female and 46% more are male. The age of respondents who took part in the evaluation depicted that 50% of them are 40 years old and above, 37% are in the range of 31 to 40 years old and 14% more are in the range of 20 to 30

years old. The position of respondents in PPDCH showed that 92% of respondents are officers, 4% of them represent the lead auditor and the other 4% represent the chief officer of PPDCH.

### 3.3 The Usability of SysPK

Statistical analysis was conducted on the responses in sections B, C, D, and E. The sections measure the usefulness, ease of use, security and satisfaction of using the SysPK. **Tables 1 - 4** illustrate the frequency and average of the responses. The Likert scale used in this evaluation consists of a 5-point scale, 1: strongly not agree, 2: not agree, 3: neutral, 4: agree and 5: strongly agree.

**Table 1: Usefulness of SysPK**

Questions	Likert Scale					Average
	1	2	3	4	5	
SysPK increases productivity in managing document	0 (0.0)	0 (0.0)	2 (6.7)	16 (53.3)	12 (40.0)	4.3
SysPK is convenient in managing document	0 (0.0)	0 (0.0)	1 (3.3)	16 (53.3)	13 (43.3)	4.4
SysPK saves time in managing document	0 (0.0)	0 (0.0)	0 (0.0)	19 (63.3)	11 (36.7)	4.4
Generally, SysPK is efficient and effective	0 (0.0)	0 (0.0)	5 (16.7)	18 (60.0)	7 (23.3)	4.1

**Table 2: Ease of Use of SysPK**

Questions	Likert Scale					Average
	1	2	3	4	5	
SysPK is easy to use	0 (0.0)	0 (0.0)	0 (0.0)	20 (66.7)	10 (33.3)	4.3
SysPK is user-friendly	0 (0.0)	0 (0.0)	1 (3.3)	22 (73.3)	7 (23.3)	4.2
SysPK is flexible to use	0 (0.0)	0 (0.0)	6 (20.0)	16 (53.3)	8 (26.7)	4.1
SysPK is easy to understand	0 (0.0)	0 (0.0)	4 (13.3)	17 (56.7)	9 (30.0)	4.2
SysPK does not have inconsistencies	0 (0.0)	1 (3.3)	8 (26.7)	13 (50.0)	6 (20.0)	3.6

**Table 3: Security of SysPK**

Questions	Likert Scale					Average
	1	2	3	4	5	
SysPK allows an authenticated user to use it	0 (0.0)	0 (0.0)	1 (3.3)	16 (53.3)	13 (43.3)	4.4
SysPK allows password changes	0 (0.0)	0 (0.0)	2 (6.7)	16 (53.3)	12 (40.0)	4.3
Prefer to use SysPK	0 (0.0)	0 (0.0)	5 (16.7)	15 (50.0)	10 (33.3)	4.2

**Table 4: Satisfaction of SysPK**

Questions	Likert Scale					Average
	1	2	3	4	5	
Satisfaction in using SysPK	0 (0.0)	0 (0.0)	3 (10.0)	15 (50.0)	12 (40.0)	4.3
SysPK is pleasant to use	0 (0.0)	0 (0.0)	7 (23.3)	16 (53.4)	7 (23.3)	4.0

The outcomes of the evaluation depict that SysPK is useful and easy to use. The implementation of the SysPK is perceived to be beneficial in saving time and increasing productivity in document management. Next, it is shown that SysPK is user-friendly and flexible to use. However, SysPK is suggested to be improved in terms of system consistency. In addition, the evaluation also revealed that the SysPK have decent security features, which the system only allowed authenticated user and password changes. Overall, the respondents were satisfied with the features of this web-based system and stated that sysPK allowed PPDCH officers to manage audit documents effectively and efficiently.

#### 4. Conclusion

This paper discussed the design and development of a web-based system for managing audit documents of PPDCH. Efficient document management delivers constant performance when carrying out processes, regardless of the time, location or persons, which is why EDMS are important in the management field. Previous studies stated that the implementation of EDMS offers prospective ways to improve services, enhance the efficiency of record management and eliminate duplication of works. Thus, SysPK is developed to help PPDCH in managing audit documents more efficiently. Generally, respondents are satisfied with the SysPK yet the system has few limitations in terms of consistency. In the future, the SysPK should be improved in the aspects of interface design and functionality of the system. Besides, the SysPK should allow feedback on the document to facilitate users in providing feedback on specific pages. Some past studies also suggested using the cloud-based system for the EDMS as it enhanced disaster recovery capabilities. There are other studies suggested that incorporating artificial intelligence (AI) with the intent of making finding, organizing and utilizing content efficient and faster. The implementation of AI in EDMS also enhances the optimization of managing documents and improves the decision-making process.

#### References

- [1] S. F. M. Yatin et al., "Electronic Document Management System: Malaysian Experience," *Aust. J. Basic Appl. Sci.*, vol. 9, no. 3, pp. 82–89, 2015.
- [2] H. Awang, N. Suhaili, F. Mat Yamin, Y. Mat Rahimi, and M. F. M. Yaakob, "The Dilemma of Unsystematic Remedial Education Data Management," in *Proceeding of the 7th International Case Study Conference, 2022*, no. September, pp. 32–37.
- [3] S. Senaratne and J. Mayuran, "Documentation management based on ISO for construction industries in developing countries," *J. Constr. Dev. Ctries.*, vol. 20, no. 2, p. 81, 2015.
- [4] N. S. Azni, H. Awang, R. Mustapha, N. M. S. Lim, K. S. Ling, and I. U. Haruna, "Sistem Pengurusan Data Program Pemulihan Khas (SPD): Enhancing the Remedial Education Data Management," *J. Contemp. Soc. Sci. Educ. Stud.*, vol. 2, no. 1, pp. 96–100, 2022.
- [5] A. Ab Aziz, Z. M. Yusof, U. A. Mokhtar, and D. I. Jambari, "The implementation guidelines of digital document management system for Malaysia public sector: An expert review," *J. Adv. Sci. Eng. Inf. Technol.*, vol. 10, no. 1, pp. 198–204, 2020.
- [6] A. Powell-Morse, "Waterfall Model: What is it and when should you use it?," 2016. <https://blog.airbrake.io/blog/sdlc/waterfall-model>.