

# Decision Support System By Applying Exponential Comparison Method (ECM) In Selecting The Best Village Secretary In Pondok Kelapa Sub-District

Silvia Wahyu Hastuti\*, Liza Yulianti , Lena Elfianty

Universitas Dehasen Bengkulu

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\*Correspondence: Silvia Wahyu

Hastuti

Email: <sup>1</sup>[silviahastuti2006@gmail.com](mailto:silviahastuti2006@gmail.com)

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**Abstract:** The selection of the best village secretary in Pondok Kelapa Sub-District is carried out directly by the sub-district. In determining the best village secretary, Pondok Kelapa Sub-District is considered ineffective, as it is challenging to decide who is suitable to become the best village secretary. The decision support system application determines the best village secretary candidate in Pondok Kelapa Sub-District using the Exponential Comparison Method (ECM). The first step is to assign weights to each criterion, followed by ranking to determine the highest alternative from all available alternatives. This highest alternative is the result worthy of being accepted as a tested village secretary based on the predetermined criteria. This study concludes that the system built can assist the sub-district in selecting a village secretary who meets the standards, thus enabling them to carry out the tasks and responsibilities assigned to the village secretary.

**Keywords:** Decision Support System, ECM, Visual Studio

## Introduction

The development of the field of informatics today allows all areas of human life to be increasingly lightly done with the help of computers. In the current digital era and globalization, where the need for fast, precise, and accurate information is very important. What's more, currently various kinds of public and private agencies will utilize sophisticated technology such as computers as a substitute for human labor.

Decision Support Systems are interactive information systems that provide information modeling, and data manipulation. This system is commonly used in making a decision in a structured or semistructured situation, where someone does not know how the decision should be made. The village secretary or commonly called the Village Apparatus is a staff element that assists the Village Head in making and coordinating

which is contained in the village secretary, and assists the duties of the Village Head in implementing policies in the form of technical implementers and territorial elements.

A common problem that often occurs in the pondok kelapa sub-district of Central Bengkulu Regency is that the selection of the best village secretary is often not in accordance with the criteria determined by the Camat office of Central Bengkulu Regency, therefore based on the deliberations of the village heads in the pondok kelapa sub-district a few months ago in the future the best village secretary will use an application. This research will apply the MPE exponential comparison method in helping decision making for the selection of the best village secretary with the criteria of work experience, education, age, ability. Based on the above background, the authors are interested in raising the title "Decision support system by applying exponential comparison method (MPE) in selecting the best village secretary in the coconut cottage sub-district"

### **Definition Of Decision Support System**

Decision Support Systems are interactive computer-based systems that assist decision-making utilizing models to solve unstructured and semi-structured problems. Actually, the initial definition of a decision support system is a model-based system consisting of procedures in data processing and consideration to assist managers in making decisions.

Decision making is basically a human activity whose task is to make decisions on a problem, such as in a company, company managers must know about the ins and outs of the information needed for decision making, so that their decisions are correct and have beneficial implications for the company. According to Poningsih (2020: 1

### **Definition Of Mpe Method**

According to Winnie Septiani (2021: 98) the Exponential Comparison Method (MPE) is a method of Decion Support System (DSS) which is used to determine the priority order of alternative decisions with multiple criteria, besides that this method is one of the decision-making methods that quantifies the opinion of one or more people on a certain scale. In concept, this method uses exponential calculations, the difference in value between criteria can be differentiated depending on the ability of the person assessing.

### **Calculation Stages Of The Mpe Method**

The MPE method produces alternative values whose differences are contrasting so that it provides an advantage in reducing the usually can occur in the analysis, and in contrast to the Bayes technique, MPE will produce alternative values whose differences are more contrasting. The MPE method formula is as follows:

$$Total\ Nilai\ (TNi) = \sum_{j=1}^m (RK_{ij})^{TKK_j}$$

Description:

TNi: Total value of i-th alternative

RKij : Degree of relative importance of the jth criterion on decision option i

TKKj : Degree of importance of the jth decision criterion, jth :  $TKK_j > 0$ ; round

n : Number of decision options

m : Number of decision criteria

The steps that need to be taken in selecting decisions using the MPE method are as follows:

1. Determination of decision alternatives
2. Compilation of decision criteria to be assessed
3. Determination of the degree of relative importance of each decision criterion using a certain conversion scale according to the wishes of the decision maker.
4. Assess all alternatives against each criterion
5. Calculating the total score or value of each alternative
6. Determine the priority order based on the score obtained

### Village Secretary

According to Yahya Ahmad Zein, et al (2021: 76) Village Secretary or often abbreviated as Sekdes is an assistant to the village head who holds the power of village financial management. The village secretary is an element of the village government staff led by a village secretary who is under and responsible to the village head.

### Methodology

In conducting this thesis research, the author uses a system development method. Where the system development method used by the author is Waterfall. The appearance of the method developed by the author is shown in Figure 3.1 below:

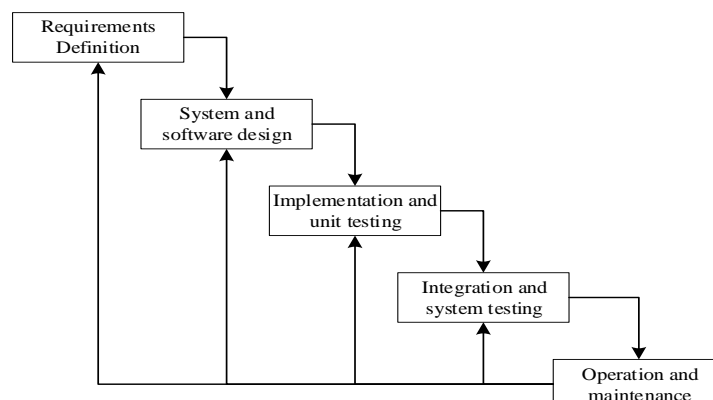


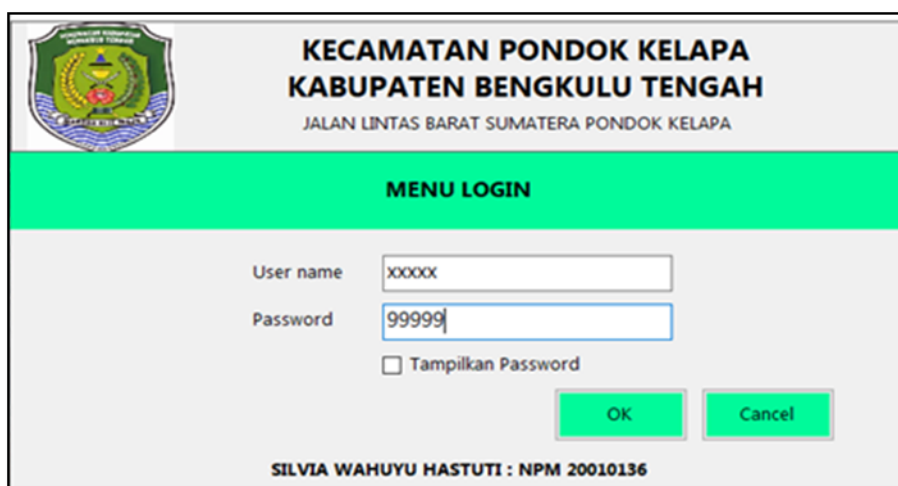
Figure 1. Stages of the Waterfall Method

## Result and Discussion

The decision support system by applying the exponential comparison method (MPE) in the selection of the best Village secretary in Pondok Kelapa District will be made using the Visual Studio 2010 programming language using the Microsoft Access 2007 database as a data processing storage. Where the results and discussion this time there are several menus including the login menu, data input, MPE method, and output, and the exit button on the main menu there is a system that can connect to other menus.

### 1. Login Menu Display

The appearance of the login menu in the selection of the best Village secretary in Pondok Kelapa District is mainly the admin must, enter the correct username and password, which is the appearance of the login menu in the selection of the Village secretary can be seen in Figure 4.1 below:



The screenshot shows a login window titled "KECAMATAN PONDOK KELAPA KABUPATEN BENGKULU TENGAH" with the address "JALAN LINTAS BARAT SUMATERA PONDOK KELAPA". Below the title bar is a green header with "MENU LOGIN". The login form contains a "User name" field with the text "XXXXX", a "Password" field with the text "99999", and a checkbox labeled "Tampilkan Password". At the bottom right are "OK" and "Cancel" buttons. The footer of the window reads "SILVIA WAHUYU HASTUTI : NPM 20010136".

Figure 2. Login Menu Display

### 2. Main Menu Display

The main menu display of the decision support system by applying the exponential comparison method (MPE) in selecting the best Village secretary in Pondok Kelapa District consists of several menus and sub menus, including the main menu, which on the main menu consists of data input, MPE method analysis process, as well as data output and exit menu. The main menu display can be seen in Figure 3 below.

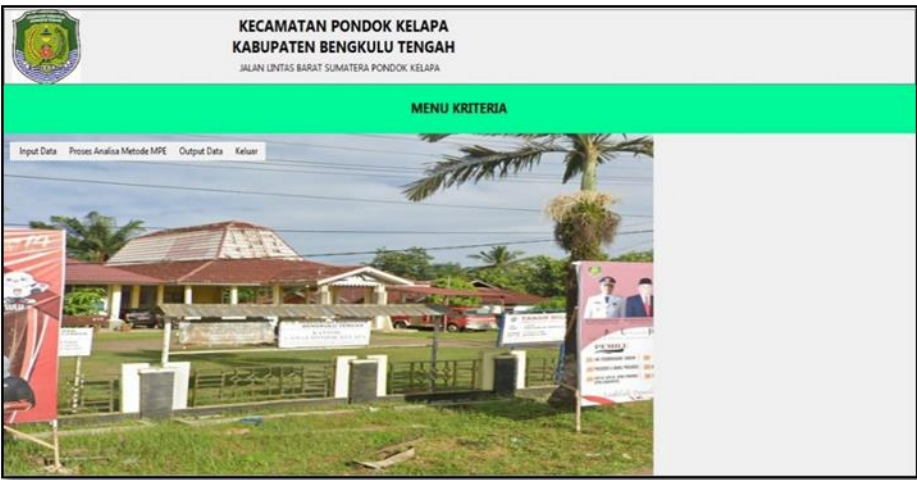


Figure 3. Main Menu Display

3. Village Secretary Data Menu Display

The display of the village secretary data menu in selecting the best village secretary in Pondok Kelapa District using the exponential comparison method (MPE) consists of several menus including nik, sekdes name, address, age, cellphone number, gender, ttl, religion, the display of the village secretary data menu is seen in Figure 4below.

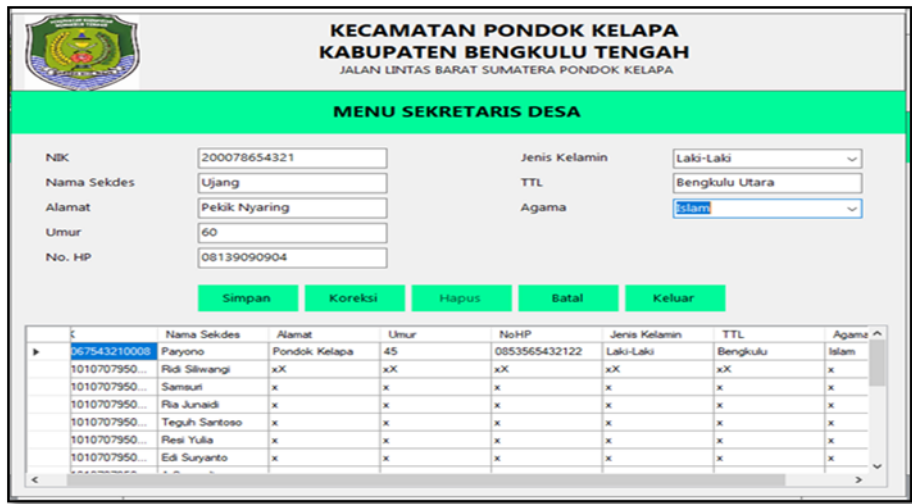
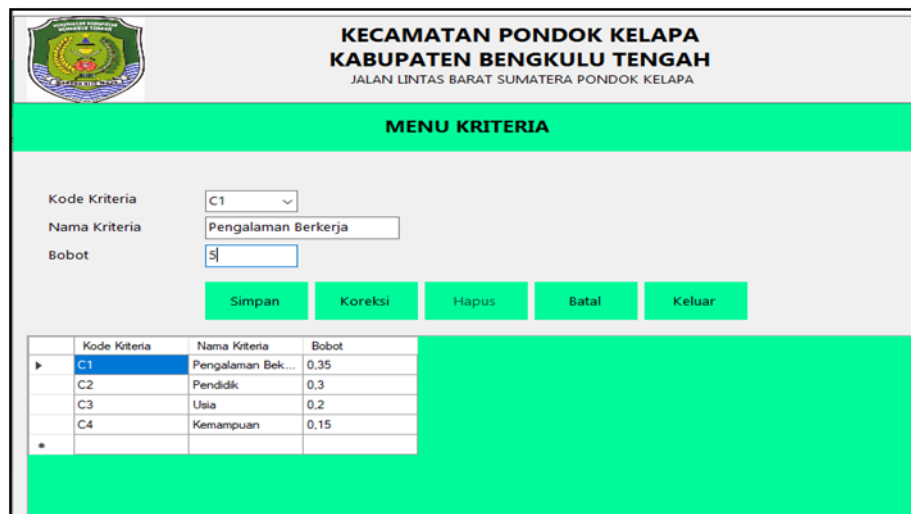


Figure 4. Village Secretary Data Menu Display

4. Criteria Data Menu Display

The display of the criteria data menu on the decision support system by applying the exponential comparison method (MPE) in selecting the best village secretary in Pondok Kelapa District consists of criteria code, criteria name, and weight. The display of the criteria data menu is shown in Figure 5 below:



Kode Kriteria	Nama Kriteria	Bobot
C1	Pengalaman Berkerja	0.35
C2	Pendidik	0.3
C3	Usia	0.2
C4	Kemampuan	0.15

Figure 5. Criteria Data Menu Display

## 5. Assessment Data Menu Display

On the display of the assessment data menu in the decision support system by applying the exponential comparison method (MPE) in selecting the best village secretary in Pondok Kelapa District consists of several menus including assessment id, assessment year, village secretary name, Criteria1, Criteria 2, Criteria 3, Criteria 4. The display of the assessment data menu can be seen in Figure 6 below.



ID Penilaian	Tahun Penilaian	Nama Sekdes	C1	C2	C3	C4
P001	2023	Ris Silwangi	2	4	5	5
P002	2023	Samsul	4	5	5	5
P003	2023	Ria Junaidi	5	4	5	5
P004	2023	Teguh S	5	5	3	3
P005	2023	Resi Yulia	5	5	4	4
P006	2023	Edi Suryanto	5	4	5	5
P007	2023	A. Sumardi	4	5	5	5
P008	2023	Ain	5	4	4	4
P009	2023	Refren S	4	5	4	4
P010	2023	Rio R	4	5	4	4
P011	2023	To M	4	4	5	5
P012	2023	Sinar Siana	3	4	5	5

Figure 6. Display of Assessment Data Menu

## 6. MPE Method Analysis Process Data Menu Display

In the display of the MPE Method Analysis menu in selecting the best village secretary in Pondok Kelapa District, it consists of the assessment year of the analysis

process, village secretary assessment data, and ranking. The MPE method analysis menu display can be seen in Figure 7 below.

Pilih Tahun Penilaian: 2023 Proses Analisa

Data Penilaian Sekretaris Desa Terbaik

	one	two	three	four	five	six	seven
P001	2023	Rid Siliwangi	2	4	5	5	
P002	2023	Samsuri	4	5	5	5	
P003	2023	Ria Junaidi	5	4	5	4	
P004	2023	Teguh S	5	5	3	3	

Matriks X

	one	two	three	N1	N2	N3	N4
P001	2023	Rid Siliwangi	1.274560627319...	1.515716566510...	1.379729661461...	1.273050115546...	
P002	2023	Samsuri	1.624504792712...	1.620656596692...	1.379729661461...	1.273050115546...	
P003	2023	Ria Junaidi	1.756465004946...	1.515716566510...	1.379729661461...	1.231144413344...	
P004	2023	Teguh S	1.756465004946...	1.620656596692...	1.245730939615...	1.179147645681...	

Matriks V

	one	two	three	N1	N2	N3	N4
P001	2023	Rid Siliwangi	1.274560627319...	1.515716566510...	1.379729661461...	1.273050115546...	
P002	2023	Samsuri	1.624504792712...	1.620656596692...	1.379729661461...	1.273050115546...	
P003	2023	Ria Junaidi	1.756465004946...	1.515716566510...	1.379729661461...	1.231144413344...	
P004	2023	Teguh S	1.756465004946...	1.620656596692...	1.245730939615...	1.179147645681...	

Perankingan

	one	two	three	N1	N2	N3	N4	Total
P001	2023	Rid Siliwangi	1.274560627319...	1.515716566510...	1.379729661461...	1.273050115546...	5.443056970837...	
P002	2023	Samsuri	1.624504792712...	1.620656596692...	1.379729661461...	1.273050115546...	5.897941166412...	
P003	2023	Ria Junaidi	1.756465004946...	1.515716566510...	1.379729661461...	1.231144413344...	5.883055646262...	
P004	2023	Teguh S	1.756465004946...	1.620656596692...	1.245730939615...	1.179147645681...	5.802000186935...	

**Figure 7.** MPE Method Analysis Process Data Menu Display


## 7. Menu Display of Best Village Secretary Election Result Report

The report output display on the decision support system by applying the exponential comparison method (MPE) in selecting the best village secretary in Pondok Kelapa District consists of several menus including. Name of village secretary, Criteria 1 value, Criteria 2, Criteria 3, Criteria 4, total and ranking. The best village secretary election results report menu can be seen in Figure 8 below.



**Figure 8.** Menu Display of the Best Village Secretary Selection Result Report

System testing, namely using the Black box testing method or it can also be called Behavioral Testing, is a test conducted to observe the input and output results of the software without knowing the code structure of the software. This test is carried out at the end of making software to find out whether the software can function properly.

No	Components Tested	Test scenarios and results		
		App View	Result	Conclusion
1	Menu Login		The application asks to enter the correct user name and password so that it can display other menus	[√]Succeed []Not successful



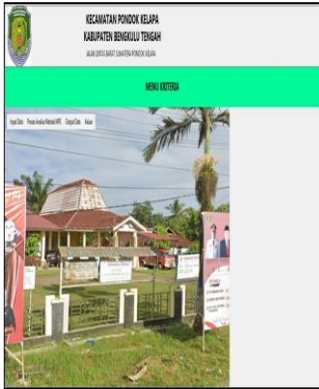


	Menu Main Menu		The application displays the main menu later you can use other menu	[√]Succeed [ ]Not successful
3	Village Secretary Data		The application displays a village secretary data menu which can later input village secretary data	[√]Succeed [ ]Not successful
4	Menu Assessment Data Menu		The application can display assessment data on the best village secretaries based on criteria	[√]Succeed [ ]Not successful

Table 2. Conclusion of System Testing Results

No	Tested Features	Conclusion
1	Login Menu	Succeed
2	Main course	Succeed
3	Village Secretary Data Menu	Succeed
4	Ratings and more	Succeed

## Conclusion

Based on the results and conclusions of the discussion and testing that has been done, it can be concluded as follows:

1. After all stages are carried out in a decision support system by applying the exponential comparison method (MPE) in selecting the best village secretary in Pondok Kelapa District, the best criteria used are work experience, education, age, and ability, so that from 17 samples of existing data it can be concluded that the best village secretary is on behalf of Resi Yulia with a value of 5.93.
2. To build a decision support system using the MPE method, it is necessary to determine the steps in calculating the MPE method.

Based on the conclusion, the author suggests:

1. In order for the new system to run well, for this reason, special training is needed for admins or users in using the application to select the best Village secretary using the Exponential comparison method.
2. The need for maintenance of the program based on the developed method.

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