### POLITEKNIK MERLIMAU MELAKA

# DEVELOPMENT A SIMPLE PROGRAM TO CALCULATE STANDARD DEVIATION AND VARIANCE

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#### **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 BACKGROUND**

In probability and statistics, the standard deviation of the probability distribution of the random variables or population or a lot of set value is a measure of the dispersion value. It is often represented with the letter  $\sigma$  (lowercase sigma It is defined as the square root. To understand standard deviation, bear in mind that the variance is the average of the squared difference point data with min. Standard deviation, which is the square root of the quantity, then measures the dispersion data on a min, measured with the same units with the data.

Generally, the standard deviation is the root mean squared deviation of the value of their arithmetic mean. For example, in a population of  $\{4, 8\}$ , min is 6 and the deviation from the mean is  $\{-2, 2\}$ . The deviation and became power of two $\{4, 4\}$ , average (variance) is 4. Thus, the standard deviation is 1. In this case, 100% value in the population is at one standard deviation, standard deviation, min measurement is common to the dispersion measure its width value in a set of data. If most of the data points close to the mean, then the standard deviation is small, If many data points are far from the mean, then the standard deviation, is great. If all data is the same, then the standard deviation is zero.For a population, the standard deviation can be estimated by modifying standard deviation (s) for samples. The formula is given below.



Figure 1.1:Formulae of standard deviation

In probability theory and statistics, the variance is a conflict of expectations in the context of a random variable. Each random variable has a value expectation. Of variance introduced in order to explain how the value is distributed (or grouped) between anticipated. Therefore the variance is obtained by adding the value of squared differences between individual values (observed) values and expectations. This means that the value of the variance is always positive. For example, if a coin is tossed twice, the number getting head is 0: with probability 0.25, 0.5 and 1 with 2 probability with probability 0.25. Therefore the variance is  $0.25 \times (0 - 1) 2 + 0.5 \times (1 - 1) 2 + 0.25 \times (2 - 1) 2 = 0.25 + 0 + 0.25 = 0.5$ . Variance can be power of two ( $\sqrt{}$ ) to get the standard deviation.

The term variance was first introduced by Ronald Fisher in his work in 1918 entitled The Correlation Between Relatives on the Supposition of Mendelian Inheritance. The use of variance and standard deviation is to obtain the degree of revenue data observations that much.



Figure 1.2: Formulae of variance

Notes:

- 4 S<sup>2</sup>-varians
- 4 S Standart deviation
- $\int \sum (\overline{x} x)^2 \text{sum of residual}$
- ♣ N observation

#### **1.2 PROBLEM STATEMENT**

In this study a subject or course adjustments, variance and standard deviation calculated from a set of observations extensive survey work. Therefore, students need a long time to get the variance and standard deviation if using manual calculation methods. Students often make mistakes in getting the variance and standard deviation in the manual calculation method.

Earlier studies have been conducted to prove the problem exists among students taking the course survey adjustment. The study analysis found that 72% of students who have taken the survey of adjustment difficult to memorize formulas related subject only to adjustment. In addition, 79% found that students take longer to calculate the standard deviation and variance. The third problem has been found no program to calculate the standard deviation and variance of the questionnaire and also found no student ever find a program to calculate the variance and standard deviation and all students expect to have a program that will be developed to calculate the variance and standard deviation.

It is expected that the VSd program will be developed that is able to assist students in obtaining the variance and differences in standards deviation without need to memorize formulas and to save calculation time. VSD program that will be developed is also expected to help the students to obtain the variance and standard deviation easily and minimize error.

### **1.3 OBJECTIVE**

- a) a) to develop a program that is based on Microsoft Excel to determine the variance and standard deviation.
- b) to save time calculations and help students who have taken the survey of adjustment.

### 1.4 STUDY SCOPE

The scope of this study emphasize to students, especially students Politeknik Merlimau in Diploma Land Surveying and Geomatic who has taken the survey of adjustment.

# CHAPTER TWO LITERATURE REVIEW

Refer to the study titled development of physical learning programs using Microsoft Excel 2010 in the main policy rate and momentum (Dwi Kurnia Nugroho, 2015) which aims to determine the steps that have been prepared based learning program Microsoft Excel 2010 on the subject of pulses and momentum, as well as knowing the possibility of study programmes have been developed. This study is to gather all the programme refers to the model of development which is ADDIE analysis, design, development, implementation and evaluation. The program is then tested by program experts and users to test the force test viability based on the criteria.

Research data management based on Microsoft excel (Dr Azmi Mohd Tamil, 2000) which aims to make the test statistic can be done using Microsoft excel. However it is difficult to do the tests in comparison to excel for statistic software such as SPSS EpiInfo. This study would like to test the hypothesis "mothers in the control group had a first trimester weight more compared with mothers in the Group case". Cases and controls specified in a variable GROUP and group cases are coded.

Refers to the study design analysis of reinforced soil walls (Kim Tan Soon, 2009). One method to create a spreadsheet using Microsoft Excel program to speed up the process of analysis and design. A spreadsheet program is a tool for the design of structures involving recurring calculations. However this program should be examined by the calculation manually to avoid errors. The goal of this project is to develop a program for analysis and design of reinforced soil walls by the rear wedge method for binding the reinforcement of flexible and gravity method for rigid reinforcement.

Research on the production of the program transfer calculation using data tidal datum (Muhammad Zulkifli bin Ishak, Nik Mohd Fadhil bin Nik Abdul Nasir et al. 2013) produce calculations using Microsoft excel to facilitate students making calculations quickly and accurately. This programme is focused on six-semester students and can be use as material to teach in Politeknik Merlimau. The analysis performed shows that the program is essentials for use by students of sixth semester

Refer to the study of the use of the spreadsheet (Microsoft excel) in the design of steel connections based on EUROCODE 3 (EC3) (Siti Khadijah binti Mahmod, 2008) which aims to produce an application program design of steel connections using Microsoft Excel 2007. The program is produced because the software Microsoft excel is much cheaper compared to other software e.g. EC3. The program built by offering three types of connection construction design, namely pin connections such as double angle web cleats connection , the connection plate end plate connections and flexible fin only in these three types of connection there are two parts, namely a connection beam to beam and beam to column connections. However, the project is only committing to the development of application program for the design of steel structure connection.

#### **CHAPTER THREE**

#### METHODOLOGY

#### 3.1 INTRODUCTION

Methodology of the study is a rigorous planning in terms of our final journey. For the smooth running of this final project, methodology should be compiled with as soon as possible so that the project will not be excluded from the track has been set or more exactly, the end result of the study will be to the needs of each process that there is a problem within the structure of the methodology.

Methodology needs to be done is to get all the information related to the development of the program, data such as data observation distance, making the study questionnaire to determine the problem statement and finally the implementation of the production program. Figure 3.1 shows the flow chart methodology review for production of programmes from the beginning of development programmes to programmes produced and final report completed.



Figure 3.1: flow chart work

				Р	roje	ct pr	oces	S									
	week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Selection of project title																
	Objective of the study, review of prefixes, statement of the problem.																
Activities	Literature review and research methodology																
	The production programme																
	Analysis program																
	Preparation for final																
	report					-											
	presentation																

Table 3.1 Program development plan VSd

### **3.2** Summary of activities the VSd development

Although the plan has been made, some daily activities also need to we follow as per the table 3.2. The given time within 14 weeks has acted with as soon as possible and prepare the final report, as set out.

WEEK & DATE		ACTIVITY
1	1.	The selection of supervisors.
20/6/-24/06/16	2.	Meeting the supervisor to discuss the title.
	3.	Ask for the opinion of the selection of project from supervisor.
2	1.	Meeting the supervisors.
27/06-01/07/16	2.	Project title specified.
	3.	Delegation of tasks to group members for a final report.
	4.	Ask for ideas related to writing the final report.
3	1.	Meeting the supervisors.

Table 3.2: Schedule development of VSd program

11/07-15/07/16	2.	Discuss the objectives of the study.
	3.	Production of programmes carried out.
	4.	Ask for ideas related to writing the final report.
4	1.	Meeting the supervisors.
18/07–22/07/16	2.	Distribute questionnaires to identify problem statement.
	3.	The production of the programme continued.
	4.	Improve the final report.
	- 1	
5	1.	Meeting the supervisors.
25/07–29/07/16	2.	Do a preliminary analysis.
	3.	Identify problems faced by students.
	4.	Improve the final report.
6	1.	Meeting the supervisors.
01/08-05/08/16	2.	Prepare draft report (Chapter 1).
	3.	Send the draft report (Chapter 1).
	4.	Improve the final report.
7	1.	Meeting the supervisors.
08/08 -12/08/16	2.	Improve the program have been developed.
	3.	Improve writing related final report.
	4.	Ask for views and advice relating to the development of the
		program and writing a final report
8	1.	Meeting the supervisors.
15/08 –19/08/16	2.	Send a final report (Chapter 1).
	3.	Discuss relevant research literature and methodology.
	4.	Show the programme
	5.	Improve the programme
9	1.	Meeting the supervisors.
17/08 -22/08/16	2.	Send the draft reports (Chapter 2 and Chapter 3).
	3.	Improve writing.

	4.	Shows the programme supervisor.
10	1.	Meeting the supervisors.
29/08-02/09/16	2.	Improve the program.
	3.	Improve the writing a final report.
	4.	Meet with people who are well versed with the subject of survey
		adjustments to ask for their views and opinions.
11	1.	Meeting the supervisors.
05/09 –09/09/16	2.	Send a final report (Chapter 2 and 3).
	3.	Ask for the views of supervisors in relation to programs produced.
12	1.	Meeting the supervisors.
19/09–23/09/16	2.	Discuss relevant writing analysis program.
	3.	Improve programs developed.
13	1.	Meeting the supervisors.
26/09–30/09/16	2.	Send a final report (Chapter 4).
	3.	Improve the final report and the programme before the
		presentation.
	4.	Prepare presentations materials.
	1.	Meeting the supervisors.
14	2.	Final project presentations.
03/10–7/10/16		
15-16	1.	Meeting the supervisors.
00/10-21/10/15	2.	Improve the final report.
	3.	Send final report

### 3.3 Procedures to produce VSd program using Microsoft Excel 2010

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8. to obtain the average number of values, use the "autosum".

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9. Construct a space for "V" which is the value of the residuel. To get the value of the "V" enter minus formula = sum (B5-D5).



10. Repeat step 9 to get the value of the "v" for each observation.

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11. Next get the value of the number "v" by clicking the "autosum" = sum (D5: D25).

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12. Construct a space for "v2". To get the value of the "v2" use multiplication = sum (D5 \* D5).

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- 13. Repeat the step 12 to get the value of the "v2" to all the observations.

14. sum the value of the "v2" by using the multiplication formula = sum (E5: E54).

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15. Build a space to get the standard deviation.

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16. Input the formula to obtain the standard deviation for each data observations. = SQRT (E55/(A6-1).

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17. to obtain the value of the standard deviation for all amounts by the observations, repeat the step 16.

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#### 27. to get average data $\rightarrow$ click the box that needed



28. Choose formula....



29. Click at the "autosum" and choose "average".



30. Colour that box needed with choose all box tersebut and click at "fill colour"



31. Make one space for program instruction



### 32. Full result to develop program



### 3.4 Allotment of duties

NAME	DUTIES					
MOHAMMAD AIZAT BIN MISMAN	<ul> <li>✓ Desingning and explorer Microsoft excel research for programming</li> <li>✓ Print screen each of method that produced programming</li> <li>✓ Find the idea for chapter one</li> </ul>					
MOHAMAD HAFIZUDDIN BIN MOHMED ZIN	<ul> <li>Desingning and explorer Microsoft excel research for programming</li> <li>Print screen each of method that produced programming</li> <li>Find the idea for chapter one</li> </ul>					
MUHAMMAD FATHI HELMIE BIN NOR AZNI	<ul> <li>✓ Handle the quationnaire and test for calculating in mannualy</li> <li>✓ Make the analysis for quationnaire.</li> <li>✓ Analysis data</li> </ul>					
MUHAMAD BADRUN BIN JOHARI	<ul> <li>✓ Find research methodology for chapter three</li> <li>✓ Research for literature review</li> </ul>					

Table 3.3 table of duties

### **3.5** Conclusion

This chapter describe how the study was conducted based on the procedure that have been discussed . This study is descriptive research to see if the evaluation of lecture or the parties involved on the programming that has built. The study examined the extent to which a program of system that has been developed to help students in use of this programming .

### **CHAPTER 4**

### ANALYSIS AND DISCUSSION

### 4.1 INTRODUCTION

In this chapter we explain the relates to the successful development of the program that we have made over the time period specified. This program successfully developed despite the problems that arise during the production of the program be made. In this chapter we also make analysis on Microsoft Excel-based program development and analysis of the use of the program in terms of time. Next, describe how to use this program and its advantages



### 4.2 SUCCESS IN PRODUCING PROGRAMS

#### Figure 4.1: Iimage full program

In the production program there are some aspects that were taken into account in the success of the program. Among the aspects involved are the problems encountered in manual calculations to find the standard deviation and variance. The next objective of the study was also involved in the production of this program.

In this project the production assistance of experts also played an important role as a reference to develop this program. Reference from outside also be important in the production program.

Problems were also encountered in the success production of this program. Among the problem is are not a skilled in using Microsoft Excel program. In terms of time as well as one of the causes of problems in the production program as an example of a hectic work schedule, so the program can not be produced regularly.

#### 4.3 ANALYSIS OF PROGRAM

This analysis explain the ways and methods to use the program to calculate the standard deviation and variance. The data required is the distance from the observed data works trilateration.

#### **4.3.1** The method and how to use the program

1. Open program with "click" twice



Figure 4.2: how to open

2. Display program will be show...



Figure 4.3: display program

3. Put the data that needed at box ...

				PR	OGRAM VARIAN	5, STANDARD DEVIATION	2 - Microsoft Exce		
age Layout	Formulas	Data	Review	View 1	Nitro Pro 10				
<i>f</i> <sub>x</sub> 1									
			PENG	IRAAN D	ατα σεράθ	AN RAGI VARIAN	IS AND STAN	DARD DELILATION	
			F ENO	ע אהחאוי			יהוכ עאה כא	DAKD DEVIATION	
		CEI	RAPAN	Х	V	$V^2$	JUMLAH V <sup>2</sup>	SISIHAN PIAWAI	
			1	1	-4.4000	19.36000000	7880.360000	9.421857131	
			2	23	23.0000	529.00000000	7880.360000	88.771391788	
			3	4	4 000	16.00000000	7880.360000	62.770853109	
			4	5		25.00000000	7880.360000	51.252186945	
			5	1		1.0000000	7880.360000	44.385695894	
			6	3	3.0000	9.00000000	7880.360000	39.699773299	
			7	45	45.0000	2025.00000000	7880.360000	36.240768940	
			8	36	36.0000	1296.00000000	7880.360000	33.552432315	
			9	46	46.0000	2116.00000000	7880.360000	31.385426554	
			10	11	11.0000	121.00000000	7880.360000	29.590463929	
			11	23	23.0000	529.00000000	7880.360000	28.071978911	
			12	34	34.0000	1156.00000000	7880.360000	26.765581698	
			13	1	1.0000	1.00000000	7880.360000	25.626093473	

Figure 4.4 :insert data



4. Value of variance and standard deviation automatically calculate.

Figure 4.5: result the calculation

### 4.3.2 The advantage of using a program developed

- **4** Minimize the error calculation
- 4 Save the time

### 4.4 COMPARATIVE ANALYSIS OF TIME

Comparative analysis of time is the analysis we have done to calculate manually and use a program that we produce. As figure 4.6 shows a respondent had to manually calculate the observed data to get the variance and standard deviation values. Figure 4.6 also shows time beginning of the calculations performed and recorded the last time the respondent is ready to count.



*Figure 4.6:start calculation manually* 

Figure 4.7: end calculation manually

Figure 4.7 also shows the last recorded time to get the variance and standard deviation which is 1:02:00 minutes. In Figure 4.8 also shows that the respondent counts the observed data to get the variance and standard deviation. The time recorded by the students to get the variance and standard deviation is 00: 1: 20 minutes



Figure 4.8: calculation using programmme from start until end

#### **CHAPTER FIVE**

#### **CONCLUSION AND RECOMMENDATION**

Program to calculate variance and standard deviation is made using Microsoft excel and data obtained from the existing data surveying for subject survey adjustment. This program is specially made for student diploma land surveying who took course survey adjustment in polytechnic Merlimau, Melaka.

According to objective program to calculate standard deviation and variance to save time of variance and standard deviation calculation and also to help student who have taken the subject of survey adjustment.

We have made an analysis of a program that has produced namely program to calculate the variance and standard deviation with carrying out tests on a survey of students taking the subject of survey adjustment. The test was be made by asking students to counts the distance of 50 observation data to obtain the standard deviation and variance manually and by using the program. The length of time taken when the test is be made. In conclusion calculations manually rather take a long time compared to using the program developed.

From these tests we have achieved our primary objective to save time students in calculating the standard deviation and variance. This program can be used while in the classroom to assist learning and teaching.

Finally we prospects for this research will be continued by other student and this excel programming continuously used by student or maybe lecture for their teaching lesson in future because every body can use it.