
# A Statistical Analysis of Teaching Effectiveness

**Submitted By:**

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**academic year 2019**

Title of Research : **A Statistical Analysis of Teaching Effectiveness**

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# Chapter 1

## The importance and the background of the problem

Teaching is a multidimensional process comprising a number of aspects, e.g., instructor attributes, which sometimes are difficult to evaluate. In particular teaching effectiveness, that is an aspect of teaching, is influenced by a combination of teacher characteristics (such as clarity, capacity to motivate the students and to help them in the study of his/her topic, ability to organize the lesson also with exercises, power point and handouts. As teaching effectiveness is becoming even more important in a system of school evaluation, it is necessary to find how to measure it.

Teachers must use research-based strategies to help decrease the learning gap for all students (Kimmelman, 2006). While the use of technology to engage students is a popular tool, how teachers use the technology available to them may determine the effectiveness of the lesson for the students. State assessment scores measure student success and the effectiveness of the instruction they are receiving. Technology may be a means to increase that effectiveness to take more students to a deeper level of understanding. This information could be significant in helping administrators determine successful instructional strategies for our school.

## The objectives of research

The objective of this research study was to assess the quality of teaching (teaching effectiveness) for English Program Students in the Attawit Commercial Technology College.

## Research Framework

**Independent variable :** In this study, 'Teachers' Attitude towards integration of Educational Technology' is considered as the dependent variable

**Dependent variable:** Clarity, capacity to motivate the students and to help them in the study of topics, ability to organize the lessons also with exercises, power point and handouts.

# Chapter 2

# References and Theory

Where in the past teachers would write notes and draw diagrams on blackboards or overhead projectors they now click from slide to slide and include clip-art pictures to display principles. According to their study, Birnbaum and Frey (2002) found that students "preferred PowerPoint lectures over traditional lectures using a blackboard or whiteboard" (p.3). And, to be sure, PowerPoint has many practical advantages for use in the classroom. That being said, it is important that a teacher consider how to use this technology so that it is a great benefit for students. After all, "The primary goal of a teacher is to create conditions in which young people can learn successfully" (Naested, Potvin, & Waldron, 2004, p.180). A teacher must determine whether PowerPoint does, in fact, enrich the learning environment for the students and, if so, how to make optimum use of this technological medium.

Teachers need to remember that "teaching is about fostering student connections to content, not just presenting content to students" (Hlynka and Mason, 1998, p. 42).

Clearly, PowerPoint can be an excellent teaching tool when it is used properly. However, when considering the use of any technology in the classroom, teachers need to consider McLuhan's first principle (McMahon, 2002).

**Static Analysis**

Static analysis, static projection, and static scoring are terms for simplified analysis wherein the effect of an immediate change to a system is calculated without respect to the longer term response of the system to that change. Such analysis typically produces poor correlation to empirical results.

**Standard Deviation**

In statistics, the standard deviation (SD, also represented by the Greek letter sigma, $\sigma$ for the population standard deviation or s for the sample standard deviation) is a measure that is used to quantify the amount of variation or dispersion of a set of data values. A standard deviation close to 0 indicates that the data points tend to be very close to the mean (also called the expected value) of the set, while a high standard deviation indicates that the data points are spread out over a wider range of values.

The standard deviation of a random variable, statistical population, data set, or probability distribution is the square root of its variance. It is algebraically simpler, though in practice less robust, than the average absolute deviation. A useful property of the standard deviation is that, unlike the variance, it is expressed in the same units as the data. There are also other measures of deviation from the norm, including mean absolute deviation, which provide different mathematical properties from standard deviation.

In addition to expressing the variability of a population, the standard deviation is commonly used to measure confidence in statistical conclusions. For example, the margin of error in polling data is determined by calculating the expected standard deviation in the results if the same poll were to be conducted multiple times. The reported margin of error is typically about twice the standard deviation—the half-width of a 95 percent confidence interval. In science, researchers commonly report the standard deviation of experimental data, and only effects that fall much farther than two standard deviations away from what would have been expected are considered statistically significant—normal random error or variation in the measurements is in this way distinguished from causal variation. The standard deviation is also important in finance, where the standard deviation on the rate of return on an investment is a measure of the volatility of the investment.

When only a sample of data from a population is available, the term standard deviation of the sample or sample standard deviation can refer to either the above-mentioned quantity as applied to those data or to a modified quantity that is a better estimate of the population standard deviation (the standard deviation of the entire population).

**Mean**

The median is known as a measure of location; that is, it tells us where the data are. As stated in , we do not need to know all the exact values to calculate the median; if we made the smallest value even smaller or the largest value even larger, it would not change the value of the median. Thus the median does not use all the information in the data and so it can be shown to be less efficient than the mean or average, which does use all values of the data. To calculate the mean we add up the observed values and divide by the number of them. The total of the values obtained in Table 1.1 was 22.5 $\mu$mol/24hr , which

was divided by their number, 15, to give a mean of 1.5. This familiar process is conveniently expressed by the following symbols:

$$\bar{x} = \frac{(\Sigma x)}{n}$$

# Chapter 3

# Research Methodology

## Population

This research has been developed to evaluate teaching effectiveness for Database Management System taught in English program, major in Business computing at Attawit Commercial Technology College. The total 14 students were studying in the class.

## Sampling Group

The sampling groups were clarity, capacity to motivate the students and to help them in the study of his/her topic, ability to organize the lesson also with exercises, power point and handouts.

## Research Implement

The questionnaires have been analyzed by using Statistic Computer software to find the Mean and Standard Deviation. The teaching effectiveness to be evaluated using a questionnaire created by the researcher

## Data Collection

The data has been collected from the 14 students who studied Database Management System in English program, major in Business computing at Attawit Commercial Technology College.

## Research Statistics

The questionnaires have been analyzed by using Statistic Computer software to find the Mean and Standard Deviation.

The teaching effectiveness to be evaluated using a questionnaire created by the researcher, which define the 5 levels such as:

| Satisfactory Level | Quality Level |
|---|---|
| 5 | Very Good |
| 4 | good |
| 3 | Average |
| 2 | Poor |
| 1 | Very Poor |

**Mean or Average**

Mean or average, in theory, is the sum of all the elements of a set divided by the number of elements in the set. Mean could be treated as a collaborative property of the whole set of values. You can get a fairly good idea about the whole set of data by calculating its mean. Thus the formula for mean will become.(Laran Joseph, 2014)

Mean = Sum of all the set elements / Number of elements

$$X^{-}=\Sigma X/n$$

The quality Levels of the PowerPoints are based on the Medium ($\overline{X}$). The reviews are based on recommendations by John. W. Best as shown in Table 3.1.

| **($\overline{X}$) Medium** | **Quality Level** |
|---|---|
| 4.50 – 5.00 | The most satisfactory |
| 3.50 – 4.49 | Very satisfactory |
| 2.50 – 3.49 | Average satisfactory |
| 1.50 – 2.49 | Less satisfactory |
| 1.00 – 1.49 | Very less satisfactory |

**Table 3.1** The quality Levels of the PowerPoints are based on the Medium

**3.2.4.1 Standard Deviation**

The standard deviation $\sigma$ of a probability distribution is defined as the square root of the variance $\sigma^2$,

$$\sigma=\sqrt{\langle x^2\rangle-\langle x\rangle^2}$$

$$=\sqrt{\mu_2'-\mu^2}\ ,$$

where $\mu_x = \bar{x} = \langle x \rangle$ is the mean, $\mu_2' = \langle x^2 \rangle$ is the second raw moment, and $\langle x \rangle$ denotes the expectation value of . The variance $\sigma^2$ is therefore equal to the second central moment (i.e., moment about the mean).

**Acceptable Standard Deviation (SD)**

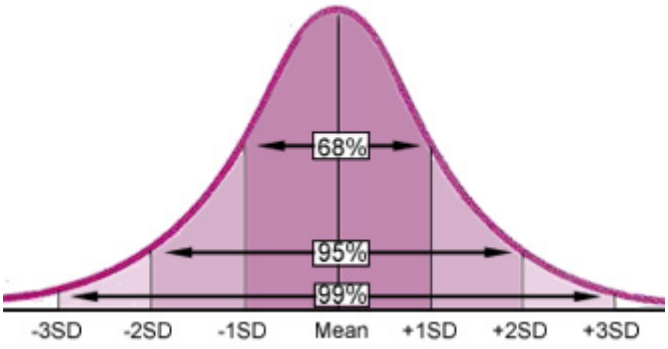


**Fig. 3.3** Acceptable Standard Deviation (SD)

# Chapter 4

## Analysis Result

This research has aimed to survey the students' satisfactory in teaching effectiveness used in teaching for Database Management System language. The survey was taken from 14 students who studied in English Program, Major in Business Computing at Attawit Commercial Technology.

The categories has been set as 5 levels such as:

5 meansthe Most satisfactory.

4 means very satisfactory.

3 means moderate satisfactory.

2. means less satisfactory.

1 means very less satisfactory.

The frequency, percentage, mean value and standard deviation of the questionnaire are shown in the table 4.1.

| No. | Topic of Lesson | 5 | 4 | 3 | 2 | 1 | $\overline{X}$ | S.D. |
|---|---|---|---|---|---|---|---|---|
| 1.1 | The contents are related to the subject. | 13 (92.9%) | 1 (7.1%) | - - | - - | - - | 4.93 | 0.27 |
| 1.2 | These topics are adequately covered. | 9 (64.3%) | 5 (35.7%) | - - | - - | - - | 4.64 | 0.50 |
| 1.3 | The contents cover most of the topics you expected to learn. | 11 (78.6%) | 3 (21.4%) | - - | - - | - - | 4.79 | 0.43 |
| 1.4 | The accuracy of the contents. | 8 (57.1%) | 6 (42.9 %) | - | - - | - - | 4.57 | 0.43 |
| 1.5 | The contents are arranged in a clear, logical and orderly manner. | 10 (71.4%) | 3 (21.5%) | 1 (7.1%) | - - | - - | 4.64 | 0.63 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1.6 | The consistency of the contents of each lesson. | 4 (30.8%) | 2 (15.4%) | 7 (53.8%) | - | - | 4.57 | 0.65 |
| 1.7 | The content explains the knowledge and concepts well. | 5 (38.5%) | 2 (15.4%) | 4 (30.7%) | 1 (7.7%) | 1 (7.7%) | 4.64 | 0.50 |
| 1.8 | The examples shown are good. | 8 (61.5%) | 3 (23.1%) | 2 (15.4%) | - | - | 5.00 | 0.00 |
| 1.9 | The capacity to motivate the students and to help them in the study of topics. | 7 (53.8%) | 4 (30.8%) | 2 (15.4%) | - | - | 4.64 | 0.50 |
| 2.1 | The accuracy of the contents used. | 7 (53.8%) | 4 (30.8%) | 1 (7.7%) | 1 (7.7%) | - | 4.71 | 0.61 |
| 2.2 | The accuracy of the language used. | 7 (53.8%) | 3 (23.1%) | 2 (15.4%) | 1 (7.7%) | - | 4.71 | 0.47 |
| 2.3 | Consistency between lessons with assignments. | 8 (61.5%) | 2 (15.4%) | 3 (23.1%) | - | - | 4.71 | 0.47 |
| 3.1 | The ability to organize the lessons also with exercises. | 7 (53.8%) | 4 (30.8%) | 1 (7.7%) | - | 1 (7.7%) | 4.71 | 0.47 |
| 3.2 | Clear explanation in the lessons | 7 (53.8%) | 5 (38.5%) | - | - | 1 (7.7%) | 4.71 | 0.47 |
| 3.3 | The Power Point used for the lessons | 8 (61.5%) | 2 (15.4%) | 3 (23.1%) | - | - | 4.71 | 0.47 |
| 3.4 | Titles and Headings | 13 (92.9) | 1 (7.1) | - | - | - | 4.93 | 0.27 |
| 3.5 | Handouts used for the lessons | 14 (100) | - | - | - | - | 5.00 | 0.00 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 3.6 | Engagement | 12 (85.7) | 2 (14.3) | - | - | - | 4.86 | 0.36 |
| 3.7 | Examples used for the lessons | 13 (92.9) | 1 (7.1) | - | - | - | 4.93 | 0.27 |
| 4.1 | Engaging multiple learning styles | 12 (85.7) | 2 (14.3) | - | - | - | 4.86 | 0.36 |
| 4.2 | Increasing visual impact | 13 (92.9) | 1 (7.1) | - | - | - | 4.93 | 0.27 |
| 4.3 | Improving classroom focus | 8 (57.1) | 5 (35.7) | 1 35.7 | - | - | 4.50 | 0.65 |
| 4.4 | Providing annotations and highlights | 9 (64.3) | 5 (35.7) | - | - | - | 4.64 | 0.50 |
| 4.5 | Analyzing and synthesizing complexities | 10 (71.4) | 4 (28.6) | - | - | - | 4.71 | 0.47 |
| 4.6 | Enriching curriculum with interdisciplinary | 12 (85.7) | 2 (14.3) | - | - | - | 4.86 | 0.36 |
| 4.7 | Encourage students to respond in lessons | 12 (85.7) | 2 (14.3) | - | - | - | 4.86 | 0.36 |
| 4.8 | Get more understanding in the lessons | 11 (85.7) | 3 (21.4) | - | - | - | 4.79 | 0.43 |
| 4.9 | Easy to follow the lessons | 9 (64.3) | 5 (35.7) | - | - | - | 4.64 | 0.50 |

**Table 4.1** Analysis of the results showed that the Teaching Effectiveness for teaching Database Management System

The quality Levels of the Teaching Effectiveness are based on the Mean ($\overline{X}$). The reviews are based on recommendations by John. W. Best as shown in Table 4.1.

| **($\overline{X}$) Mean** | **Quality Level** |
|---|---|
| 4.50 – 5.00 | The most satisfactory |
| 3.50 – 4.49 | Very satisfactory |
| 2.50 – 3.49 | Average satisfactory |
| 1.50 – 2.49 | Less satisfactory |
| 1.00 – 1.49 | Very less satisfactory |

**Table 4.2** The quality Levels of the Teaching Effectiveness are based on the Medium

Table 4.1 Analysis of the results showed that the Teaching Effectiveness used in teaching Database Management System for First year of English Program students, major in Business Computing at Attawit Commercial Technology College was satisfied by students with maximum mean ($\overline{X}$) value 5.0, standard deviation 0.00, average mean ($\overline{X}$) value 4.71, standard deviation 0.50 and minimum mean ($\overline{X}$) value 4.50, standard deviation 0.65. The quality level as per John. W. Best shown in Table 4.2, the teaching method, technologies and materials used in the classroom have got the most satisfactory as the mean($\overline{X}$)value range has got between 4.50 and 5.00 based on the questionnaires.

# Chapter 5

# Conclusion Content and Recommendation

## Conclusion

The Statistical Analysis of Teaching Effectiveness was based on the collecting data from 14 students who studied Database management System subject in English Program 1, major in Business Computing at Attawit Commercial Technology College. The result showed the satisfactory level.

## Recommendation

Giving changes to students to work as an internship in the companies then let students collect the real data from those companies and build the model database by themselves will be more effective for them to make clear understanding and they will be able to apply the class room knowledge in the real works.