



The Effect of Information System User Satisfaction on Individual Performance (High School Case Study)

Ari Lestari

Program Studi Manajemen Informatika
Sekolah Tinggi Manajemen Informatika dan Komputer Logika

Email: Arilestari79a@yahoo.com

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ABSTRACT

Evaluation that can be used to assess system performance is performance evaluation based on user perceptions. Users in this system include End Users, namely computer operators from all units, and people who use the output of this system (including management and leadership), namely individuals involved with this system. Evaluation of the system according to user perceptions is very important, because they are the ones who should feel the needs and benefits of the system. Perception is a cognitive process experienced by everyone in understanding information about their environment, either through visions, feelings and experiences. To assess whether the applied information system is running as planned, a measurement is needed. This research uses the PIECES method (Performance, Information, Economy, Control, Efficiency, Services) to be able to answer problems. PIECES is a tool in analyzing computer-based information systems, which consists of important points that are useful as guidelines / references in analyzing the system

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1. Introduction

Competition in the world of education is very tight, requiring each school to be able to provide maximum service, if you don't want its market share to be seized by competitors. Various facilities are provided in order to provide satisfaction for customers. For this reason, these schools build an information system. With the implementation of a good information system, system users will find it helpful and really support system users to be able to work effectively and efficiently. The simplicity provided by the information system shows an indicator that the information system is running well, and will be used as a starting point for the development of an organization such as the information system used in a particular agency or institution.

Thus the importance of the existence of an information system in improving the performance of an organization, so many organizations have implemented it, as well as high schools. Information systems at high schools have been in existence since 2002. Along with the development of agency performance, the workload for data collection and processing systems has also increased.

One of the evaluations that can be used to assess system performance is performance evaluation based on user perceptions. Users in this system include End Users, namely computer operators from all units, and people who use the output of this system (including management and leadership), namely individuals involved with this system. Evaluation of the system according to user perceptions is very important, because they are the ones who should feel the needs and benefits of the system.

Users are the main key to the success or failure of a program to be implemented, because no matter how good the programs and systems that are run will not run well without the support of the users. If users think the system is too difficult and hamper their work, they don't use the new system, and ultimately the planning and development of a program is useless. This has happened in various organizations, where management has spent so much on investment and computerized development of a new system, but in the end the system could not run, because there was no support from the users. This is where it can be seen how important it is to know the wants and opinions of the user. (Tan, Robert. S., 1994).

The organization must really be able to organize all sectors in this human sector especially. This is because a system will run very well if it fulfills the characteristics of the system, one of which is the human resource component (Krisnaji, 2002).



Information systems are only tools while those who provide direct services to customers are system users or employees of the organization. The role of system users will ultimately determine whether the organization can compete with other competitors.

To assess whether the applied information system is running as planned, a measurement is needed. Some who can represent to be able to assess an information system include:

- a. Performance
- b. Information
- c. Economy
- d. Security
- e. Efficiency, and
- f. Service

From the indicators above, the PIECES method (Performance, Information, Economy, Control, Efficiency, Services) is used to answer the problems. PIECES is a tool in analyzing computer-based information systems, which consists of important points that are useful to be used as a guide / reference in analyzing the system. By using PIECES as a system analysis tool, a detailed and comprehensive system will receive special attention, so that the strengths and weaknesses of the system can be identified to later be used as a reference for further company progress. (Nurasiah., 2011)

2. Literature review

2.1 Dividend

a. Architectural Modeling

Modeling in a software engineering is something that is done in the early stages. In a software engineering is actually still possible without doing a modeling. This can no longer be done in a software industry. Modeling in software is something that must be done in the early part of engineering and this modeling will affect jobs in software engineering.

Software modification is usually more than 60% of the total cost of creating software. This percentage continues to grow as more software is produced and maintained. Software creation is generated and maintained. Making software for a change is important. The software process is complex and involves many activities. Like products, processes have attributes and characteristics such as:

- 1) *Understandability* that is, the extent to which processes are explicitly defined and how easily defined processes are understood.
- 2) *Visibility*, whether process activities reach an end point in clear outcomes so that the progress of the process can be seen.
- 3) *Supportability*, that is, the extent to which process activities can be supported by CASE.
- 4) *Acceptability*, whether the process that has been determined by the designer can be accepted and used and able to be responsible during the manufacture of software products.
- 5) *Reliability*, whether the process is designed in such a way that process errors can be avoided before a product error occurs.
- 6) *Robustness*, can the process continue even if unexpected problems occur.
- 7) *Maintainability*, can the process evolve to keep up with need or improvement.
- 8) *Rapidity*, how the speed of delivery of the system can completely meet the specifications.

Information gathering is also called fact-finding techniques. The method is as follows:

a. Documentation Check

Documentation checks are very useful when trying to gain insight into how database requirements arise. If there is a problem with the system, then you can immediately check the documents, forms, reports and files related to the existing system so that they can be understood quickly on the system.

b. Interview

Interviewing is a technique that is often used and is the most useful because it is carried out directly with the individual concerned. Some of the objectives of the interview are finding facts, checking facts, explaining facts, generating enthusiasm, engaging end-users, identifying needs and gathering ideas and opinions.

Advantages:

- 1) Allows the interviewee to respond more freely and openly to the questions asked.
- 2) Allow the interviewee to feel part of the project.
- 3) Allows the interviewer to respond to comments given by the interviewee.
- 4) Allows the interviewer to adapt to the questions during the interview.
- 5) Allows the interviewer to observe the sign language of the interviewee.

Disadvantages:

- 1) It takes a long time, is expensive and may not be practical.
- 2) Success depends on the interviewer's communication skills. In addition, it may also depend on the willingness of the interviewee to participate in the interview activity.
- 3) Observation of company operations
- 4) Observation is the most effective technique among other techniques to know and understand clearly about the system.

Advantages:

- 1) It is possible to check the authenticity of existing facts and data.
- 2) Observers can clearly see what has happened.
- 3) Observers can also obtain explanations of physical environmental data from a task.
- 4) Does not require a large fee.
- 5) Observers can measure the results of their work.

The disadvantages:

- 1) People may or may not know the difference when it is being observed.
- 2) Can lose observation assignments.
- 3) It's not practical.

c. **Research**

Every research is always triggered by a problem that you want or need to solve. In the context of research, a problem can be interpreted as a gap between desired conditions or performance (Sinulingga, S., 2011)

Advantages:

- 1) Save time when there is a solution.
- 2) Researchers can see how others have solved the same problem or the same needs.
- 3) Keeps researchers up-to-date with current developments.

Disadvantages:

- 1) It takes a lot of time.
- 2) Requires access to appropriate sources of information.
- 3) There may be absolutely no help in solving the problem, because it is not documented.

d. **Questionnaire**

A questionnaire is a document with a special purpose that allows data to be combined from a very large amount of data.

Advantages:

- 1) People can finish and return easily.
- 2) A relatively easy way to collect large amounts of data.
- 3) People are more able to provide the true facts because the respondent's personal data is kept secret.
- 4) Responses can be arranged in lists and quick analysis.

Disadvantages:

- 1) The number of respondents may be low.
- 2) Questionnaires may be returned incomplete.
- 3) Does not provide an opportunity to change the question that was incorrectly submitted.
- 4) Not being able to observe and analyze the respondent's body language.
- 5) Can spend time preparing questionnaires.

System Development Life Cycle (SDLC) includes:

- 1) Plan
- 2) Analysis
- 3) Design
- 4) Implementation (Implementation or Realization of Design)

From the above activities, the system analysis stage is carried out after the planning stage and before the design stage. The system analysis stage is a critical and important stage because errors in this stage will also cause errors in the next stage.

Steps in the system analysis stage:

- 1) *Identify* namely identifying the problem as a desired question.
- 2) *Understanding* namely understanding the work of the existing system by studying in detail how the existing system operates.
- 3) *Analyze* namely analyzing the system based on data that has been obtained from the results of research that has been done.
- 4) *Report* namely making reports on the results of the analysis.

In conclusion, analysis is a process to understand existing systems, including diagnosing existing problems and providing solutions and solutions to problems faced in the system. The notion of system analysis can be viewed as an activity that aims to determine the weaknesses and deficiencies of the existing system and then find alternatives for improvement of the weaknesses and deficiencies of the system (Ladjamudin. A., 2006)

2.2 Performance

Performance comes from the notion of performance, often interpreted as the result of work or work performance. But actually performance has broader facts, not only the results of work but including how the work process takes place.

According to Mangkunegara (2005: 67) defines performance as "the work results in quality and quantity achieved by a person in carrying out his duties in accordance with the responsibilities given to him".

From this definition it can be concluded that performance / work performance places more emphasis on the results or those obtained from a job as a contribution to the organization.

2.3 Pieces

To identify problems, analysis must be carried out on performance, information, economy, application security, efficiency and customer service. James Wetherbe developed a useful framework for classifying problems. this framework is known as PIECES analysis, where each letter is a separate category. These categories are (performance, information, economy, control, efficiency and service). (1994,196-199) From this analysis, several main problems are usually found. This is important because usually what appears on the surface is not the main problem but only a symptom of the main problem.

There are several parts to the PIECES approach, namely:

a. Performance Analysis:

Apek performance has sub-assessments, namely:

- 1) *Throughput* is how much output is produced by the system.
- 2) *Response time* is how long it takes the system to process the job.
- 3) *Audibility* is does it match the work functions performed by the system with the established standards.
- 4) The prevalence is how easily the interface can be understood by the user.
- 5) Completeness is how complete the work functions performed by the system.
- 6) Tolerance is show much damage occurs when the system goes wrong.

b. Information Analysis

The Information aspect has sub-assessments, namely:

- 1) *Accuracy* is what is the accuracy of the computation process that occurs on a running system.
- 2) *Relevance* is already according to the information generated with the needs.
- 3) Presentation of information is already according to the information presented with the needs.
- 4) Flexibility is how is the difficulty if the information is tailored to the needs.

c. Economy Analysis

The Economy aspect has sub-assessments, namely:

- 1) *Reusability* is how many programs can be used again in other applications.
- 2) Resources are berapa many resources needed in the operation of the system running.

d. Control Analysis

The Economy aspect has sub-assessments, namely:

- 1) Integrity is whether it is in accordance with the access restrictions used by the running system.
- 2) Security is how safe the system runs in ensuring data security.

e. Efficiency Analysis

The Efficiency aspect has sub-assessments, namely:

- 1) *Usability* is how the user difficulty level to learn and operate the system running.
- 2) *Maintanability* is how difficult it is to find and correct errors that occur in the running system.

f. Service Analysis

The Service Aspect has sub-assessments, namely:

- 1) Accuracy is how the accuracy of the system in processing work.
- 2) Reliability is whether the system is running can be trusted to do the job.
- 3) Simplicity is how complicated the system is running can be understood by the user.

2.4 Research Design

This type of research is descriptive analysis, which emphasizes the discussion of data and research subjects by presenting data systemically and not concluding the results of the study.

The data used in this study are primary data, namely data obtained from research conducted from the first source. The data is obtained directly from respondents who are the object of research by distributing

questionnaires. This questionnaire is closed, that is, an alternative answer has been given, which is filled out by the employee. There are several stages used, namely:

- a. Data collection stage
At this stage, observations, interviews, document collection and literature methods will be used
- b. Information Needs Analysis
Perform data analysis and process activities
- c. Evaluation Method
Planning problem identification (PIECES) and analysis of interim process results
- d. Evaluation stage of the process results after testing

2.5 Analysis Technique

This qualitative descriptive analysis technique is needed in this study because it has the aim of providing an overview of the extent to which the administration system in this high school can be used and useful for parties who have an interest, especially the employees themselves to improve individual performance and also as end-users. This analysis is also an analysis that is not stated in quantitative calculations but rather processes and reveals and describes problems one by one according to the PIECES Framework method, which is a statement and conclusion.

Validity testing is carried out to measure whether the measuring instrument used is valid or not. The results of the research are valid if there is a similarity between the data collected and the actual data occurring on the object under study, while the results of the research are reliable if there are similarities in the data at different times. By using valid and reliable instruments in data collection, it is expected that the research results will be valid and reliable. A good instrument must be valid and reliable. Valid instruments must have internal and external validity. Research that has internal validity, if the data generated is a function of the design and instruments used. Research that has external validity is if the research results can be applied to other samples or the research results can be generalized. (Sugiyono, 2009: 172-174)

3. Research Results and Discussion

Based on the test results from the collected respondent data, processing is carried out using SPSS 16.0, the following information is obtained:

To determine whether an item is feasible or not, the correlation coefficient significance test is used at the 5% significance level. Data processing uses SPSS software, (Statistical Product and Service Solution) which is one of several computer application programs to analyze statistical data, with the validity testing technique using Pearson's product moment correlation, which is by correlating each factor score with the total score. If the correlation coefficient is equal to 0.3 or more (at least 0.3), then the instrument item is declared valid, and vice versa if the test results in a correlation of less than 0.3 then the instrument item is declared invalid. From table 4.2. above, it can be seen that the corrected Item Total Correlation value has an average value above 0.3,

The criteria for a research instrument are said to be reliable using the Cronbrach 'Alpha technique, if the reliability coefficient (r_{11}) > 0.6. The value of r table is sought at the 5% significance level. If the Cronbrach's Alpha value is greater than the r table value, then this research variable is reliable and vice versa if the Cronbrach's Alpha value is smaller than the r table value, this research variable is not reliable. From table 4.3 above, information can be taken that the cronbrach's Alpha value is greater than 0.6, so that the list of questions answered by the respondent is declared reliable.

3.1 User Perception of Information Systems

The questionnaire was distributed to employees and the leadership. Here's an overview of users:

- a. Description of User Perception Based on Educational Background
This question leads to the respondent's experience with the respondent's educational background.

Table 1.

User's Educational Background

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Computer	2	20.3	20.3	20.3
	Non Computer	59	79.7	79.7	100.0
Total		61	100.0	100.0	



From the table above, it can be seen that the number of respondents 276 with the background distribution of respondents from the field of computer science consisted of 2 people with a percentage of 20.3%, while for non-computers consisted of 59 respondents with a percentage of 79.7%.

b. Description of User Perception Based on Gender

The questions lead to the choice of the gender of the questionnaire filler. The information generated from the processed data is obtained:

Table 2.
Respondent Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Men	45	75.4	75.4	75.4
	Woman	16	24.6	24.6	100.0
	Total	61	100.0	100.0	

From the table above, information is obtained that the number of respondents with male gender is 45 people (75.4%), while for female respondents as many as 16 people (24.6%).

c. Description of User Perception by Age

The questions lead to the choice of the respondent's age. The information generated from the processed data is obtained.

Table 3.
Respondent Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21-25	7	6.5	6.5	93.5
	26-30	29	84.2	84.2	96.7
	31-35	9	9.3	9.3	100.0
	Total	61	100.0	100.0	

From the table above, information is obtained that respondents who have ages between 21-25 years are 7 people (6.5%), 29 people aged 26-30 years (84.2%) and 9 people aged 31-35 years (9.3 %).

d. Description of User Perception Based on Experience

The questions lead to choices regarding the respondent's experience with using computers so far. The information generated is as follows:

Table 4.
Respondents' Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<2 years	7	11.5	11.5	11.5
	2-5 years	21	34.4	34.4	45.9
	> 5 years	33	54.1	54.1	100.0
	Total	61	100.0	100.0	

Based on table 4 above, it can be concluded that the experience of using computers by respondents consists of less than 2 years as many as 7 people (11.5%), for 2-5 years as many as 21 people (34.4%) and for experiences over 5 years as many as 33 people (54.1%).

3.2 User Perception Based on Performance Aspects

User perceptions based on performance aspects will be processed using multiple linear regression analysis. This test is used to determine the level of significance of the effect of the independent variable on the dependent variable, user participation and user understanding of the Content (Performance and Information).

Tests were carried out using the help of the SPSS version 16.0 application program and the method used was the Enter method so that the influence of these variables could be determined. There are two hypotheses used, namely:

- a. H0: User Perception Based on Performance and Information Does Not Affect User Participation and User Understanding
- b. H1: User Perception Based on Performance and Information Affects user participation and user understanding

Table 5.
Performance Aspect F Test Results

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	38,177	2	19,089	578,384	.000a
	Residual	9,010	59	.033		
	Total	47,187	61			

a. Predictors: (Constant), Average User X2, Average Answer For X1

b. Dependent Variable: Average Performance (Y1)

The results of the F test produce an indication of the significance level of the test where the p-significance or p-value (0,000) < α (0.05), which means that the null hypothesis is rejected. In other words, user perceptions of performance and information affect user participation and understanding of information systems.

Table 6.
Performance Aspects Regression Table

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized	t	Sig.
		B	Std. Error	Coefficients		
1	(Constant)	.198	.109		1,819	.070
	Average Answers for X1	.167	.111	.164	1,503	.134
	Average User X2	.772	.114	.739	6,774	.000

a. Dependent Variable: Average Performance (Y1)

By looking at the SPSS output table above, the regression equation can be obtained as follows: $Y = 0.19 + 0.167X1 + 0.772X2$. The constant value of 0.198 in the regression equation above shows that Performance and Information will increase by 0.19 because of the influence of user participation and understanding.

3.3 User Perceptions Based on Economic Aspects

User perceptions based on economic aspects will be processed using multiple linear regression analysis. This test is used to determine the significance level of the effect of the independent variable on the dependent variable, user participation and user understanding with accuracy (Economic).

Tests were carried out using the help of the SPSS version 16.0 application program and the method used was the Enter method so that the influence of these variables could be determined. There are two hypotheses used, namely:

- a. H0: User Perception Based on Accuracy Does Not Affect User Participation and User Understanding
- b. H1: User Perception Based on Accuracy Affects user participation and user understanding

Table 7.
Economic Aspect F Test Results

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	39,327	2	19,664	426,196	.000a
	Residual	12,596	273	.046		
	Total	51,923	275			

a. Predictors: (Constant), Average User X2, Average Answer For X1

b. Dependent Variable: Y2



The results of the F test produce an indication of the significance level of the test where the p-significance or p-value (0,000) $\alpha (0.05)$, which means that the null hypothesis is rejected. In other words, the user's perception of the Economic (accuracy) affects the user's participation and understanding of the information system.

Table 8.
Economic Aspects Regression Table

Model	Coefficients ^a				
	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
1 (Constant)	.161	.128		1,250	.212
Average Answers for X1	.382	.131	.358	2,910	.004
Average User X2	.568	.135	.519	4,215	.000

a. Dependent Variable: Y2

By looking at the SPSS output table above, the regression equation can be obtained as follows: $Y = 0.161 + 0.382X1 + 0.568X2$. The constant value of 0.161 in the regression equation above shows that the Economic (accuracy) will increase by 0.161 due to the influence of user participation and understanding.

3.4 User Perception Based on Control / Security Aspects

User perceptions based on control aspects will be processed using multiple linear regression analysis. This test is used to determine the significance level of the influence of the independent variable on the dependent variable, user participation and user understanding with control (Presentation Format).

Tests were carried out using the help of the SPSS version 16.0 application program and the method used was the Enter method so that the influence of these variables could be determined. There are two hypotheses used, namely:

- H0: User Perception Based on Control of the System Does Not Affect User Participation and User Understanding
- H1: User Perception Based on Control of the System Affects user participation and user understanding

Table 9.
Control Aspect F Test Results

ANOVA ^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37,434	2	18,717	270,777	.000a
	Residual	18,871	59	.069		
	Total	56,304	61			

a. Predictors: (Constant), Average User X2, Average Answer For X1
b. Dependent Variable: Y3

The results of the F test produce an indication of the significance level of the test where the p-significance or p-value (0,000) $\alpha (0.05)$, which means that the null hypothesis is rejected. In other words, user perceptions of system control affect user participation and understanding of information systems.

Table 10.
Control Aspect Regression Table

Model	Coefficients ^a				
	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
1 (Constant)	.248	.157		1,576	.116
Average Answers for X1	.480	.161	.431	2,982	.003
Average User X2	.445	.165	.390	2,699	.007

a. Dependent Variable: Y3

By looking at the SPSS output table above, the regression equation can be obtained as follows: $Y = 0.248 + 0.480X_1 + 0.445X_2$. The constant value of 0.248 in the regression equation above shows that system control through the presentation format will increase by 0.248 due to the influence of user participation and understanding.

3.5 PIECES Method Analysis Results Based on the Average Value of Respondents

The PIECES framework is used to evaluate systems in high schools. The PIECES framework is a framework used to classify problems, opportunities, and directives contained in the scope definition section of system analysis and design.

Table 11.
Results of Respondents' Answers Based on Average

		Statistics						
		Average Answers for X1	Average User X2	Average Performance (Y1)	Y2	Y3	Y4	Y5
N	Valid	276	276	276	276	276	276	276
	Missing	0	0	0	0	0	0	0
	Mean	3.9191	3.9147	3.8741	3.8822	3.8696	3.9022	3.9058
	Median	40000	40000	40000	40000	40000	40000	40000

Based on the results of the answers from the respondents after clustering the answers, it can be concluded that user participation has an average value of 3.9191 which means that the results can be categorized in the Agree position, likewise for the user's understanding of the use of the system has an average value. 3,9147 in the agreed category.

For the Y1 variable, which is representative of performance and information, it has a value of 3.8741 in the agree category which means that the performance and information in the system is still in the good category. can still be used by existing resources (no need to replace or add personnel). For the Y3 variable which is a representative of the control variable it has a value of 3.8696 in the agreed category which means that system control and security are still in accordance with the authority of the operating system or program used. For the Y4 variable, it is a representative of the service variable, which has a value of 3. 9022 in the agree category which means that the system is easy to understand and has high accuracy in carrying out a data processing process. And for the Y5 variable, which is a representative of the efficiency variable, it has a value of 3.9058 in the agreed category, which means that the system has ease in terms of use and processing can be done in a short time.

4. Conclusion

- a. The application of information systems in high schools in general has been implemented based on Windows, but has not been done in all parts. Information systems develop based on user needs.
- b. The perception of users based on the performance aspect shows that the system according to respondents is in a good category, that the current system can respond to user needs in terms of performance. The results obtained are in good category.
- c. The perception of users based on the information aspect shows that the system providing information to users is still in a good category, so that in terms of information the system is able to provide the reports needed by the user. The results obtained are in good category.
- d. The perception of users based on economic aspects shows that the system can be executed properly on the existing system (resource). This means that there is no need for renewable devices and systems. The results of respondents were in good category.
- e. Based on the control aspect, the system is still in the good category with a value of 3.86 which means that in terms of system execution security. Security for system user authority based on authentication provided in the form of user and password.
- f. Based on the efficiency aspect, the system is in a good category, which means that system execution requires relatively fast time in processing data and providing information to the user.
- g. Based on the service aspect, the system is in a good category which means that the services provided by the system to users are easy to understand and easy in terms of providing information and processing accuracy based on user needs.
- h. Based on the seven points above, information system user satisfaction has a positive effect on individual performance in high schools



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