

## MEASURING LABORATORY ADMINISTRATION SYSTEM SATISFACTION : A CASE STUDY

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### ABSTRACT

*In university, the needs of information system, especially regarding the laboratory administration is needed to achieve continuous improvement and better planning. To achieve the better organization performance, the Information system satisfaction need to be study and measured.*

*This research purpose is to measure the satisfaction of laboratory administration system in Industrial Engineering Department, Telkom University. This research use Successive interval to gain the Weight Average Performance for determining the overall satisfaction from the information system and finding the gap between the importance and satisfaction, this research also compare the result from our previous research regarding the laboratory information system. From the result, we can conclude that there are needed more improvement for the labwork administration system. The model that is developed in this model can be used as tool or guidance to measure or assess the laboratory administration system quality by using the dimension that are explained in this research.*

*Further research can be conducted to improve the laboratory administration system based on the gap analysis that identified in this research.*

*Key Words: Laboratory Administration System, Satisfaction Measurement, Weight Average Performance, Successive Interval, Gap Analysis*

## 1. INTRODUCTION

The needs of information system that meets all stakeholder expectation is important, especially in service industries such as college institution. In college institution, the needs of information system is vital for institution competitive advantage, thus to meet the expectation all activity that can be done automatically are preferred. Labwork activity is one of example in college institution where the administration often needs a lot of attention. Activity in the laboratory process such as scheduling, administration, labwork activities and other else can be done quickly with the help form information system so the administration can be done quickly and the laboratory can focus on improving the delivery or content of the labwork activities.

Industrial engineering study program in Telkom University use integrated information system for all laboratory to manage the information processing across laboratory

and enhance the administration process. The purpose of this initiation is to minimize inefficient activity such as administration bureaucracy in order to gain competitive advantage and quick response service for laboratory assistant and college student so the faculty can gain the service excellence.

To make sure the laboratory administration system that implemented in the industrial engineering study program meets the stakeholder expectation, an analysis of satisfaction from all the user of information system need to be done. This research is based on previous research from Soesanto et al (2015) in evaluating and asses the laboratory information system by comparing the result.

## 2. THEORETICAL BACKGROUND

2.1. Management Information System  
Management information system is the integrated system that supports operational, management, and the function of decision

making from organization (Turban et al 2005). Management information system is an integrated system that provide information for supporting operational, management and decision support activities from an organization (O'Brien, 2005).

2.2. Dimension of Quality

The concept was defined by Garvin (1987). The dimensions consist of 8 critical dimensions. Understanding the trade-offs desired by customers among the dimension of quality can help build a competitive advantage for an organization.

2.3. Successive Interval

Hidayat (2011) defined method of successive interval is a method to raise the measure of ordinal scale into interval.

2.4. Weight Average Performance (WAP)

Dorf (1998) stated that weighted average performance (WAP) is a method to calculated a measure or value for several option by giving criteria, the estimation process of the importance of the criteria are used to weight ratings.

3. RESEARCH METHOD

This research purpose is to measure the satisfaction of laboratory administration system using dimension of quality based on Soesanto et al (2014) and compare the result with our previous research regarding the satisfaction of the labwork management information system by Soesanto et al (2015).

The first step is conducted by finding the literature of quality dimension for management information system / laboratory administration system in journal, proceeding, books, etc. from the literature study. The base model from Soesanto et al (205) are elaborated with finding from the literature study which are from Hasan and Abuelrub (2011), Orehovacki et al. (2013), Moturi and Mbiwa (2015). In this research, the maintainability dimension is added based on the elaborated model. The next step is to create the instrument to validate the model using questionnaire, the quality dimension specifically design for laboratory administration system are put into

questionnaire question. This research using customized Likert scale from 1 to 4 for each satisfaction and importance question in the questionnaire. The next step is to determine the respondent for this research, 131 respondent were chosen from laboratory assistant who are currently using the laboratory administration system. The next step is collect the respondent data and test the validity and reliability of the data. To find the value of WAP, the first thing to do is to raise the data which is ordinal scale into interval scale and find the average of importance and satisfaction from each indicator. After obtained the WAP value, the next step is to find the gap from importance and satisfaction from each indicator and compare the result with our previous research. Microsoft Excel Software is used to calculate the WAP value.

4. RESULT AND DISCUSSION

4.1. Reliability

Reliability is a dimension that determine a reliable of an management information system. From the result, overall satisfaction for reliability dimension are met, this result shows that the laboratory administration system are reliable from the laboratory assistant point of view.

Table 1. VOC from Reliability

No.	VOC	Technical Characteristic
1	Services performance is reliable	Reliability of Performance Availability of data recovery
2	Fault Tolerance	Availability of error prevention
3	Information is real time	Time Between Information accepted in real situation and Information Updated in system
4	Information is believable	Proportion of correct information

From our previous research there is a slight different between the dimensions. In this research, the dimension are re-examined and there are some dimension that are excluded or included depends on the elaborate process. For reliability dimension,

the dimension from previous research are excluded but enhanced to be more detailed.

Table 2. Reliability WAP

Indicator	Importance	Satisfaction	GAP
Reliability of Performance	4.046	4.107	0.061
Availability of data recovery	3.939	4.092	0.153
Availability of error prevention	4.046	4.099	0.053
Time Between Information accepted in real situation and Information Updated in system	3.954	4.038	0.084
Proportion of correct information	3.931	3.947	0.015

4.2. Efficiency

Efficiency is a dimension that describes whether an information system used the optimal resources. From the result, the overall satisfaction for efficiency dimension are met, this means that the laboratory administration system are efficient based on the laboratory assistant point of view. For efficiency dimension, the dimension from previous research are excluded but enhanced to be more detailed.

Table 3. VOC from Efficiency

VOC	Technical Characteristic
One data entry for all purpose	Number of Data Entry for a purpose
	Time to finish the process in the system

Table 4. Efficiency WAP

Indicator	Importance	Satisfaction	GAP
Number of Data Entry for a purpose	3.977	4.023	0.046
Time to finish the process in the system	3.916	4.046	0.130

4.3. Support

Support is a dimension that support the usage of information system. From the result, the overall satisfaction form the

support dimension are not met, this is because the publication and sounding from the laboratory administration system are not thorough, the top management support, in this case the head of laboratory affair, head of study program, even the dean of faculty play a big role regarding the support of the information system. For support dimension, the dimension from previous research are excluded but enhanced to be more detailed.

Table 5. VOC from Support

No.	VOC	Technical Characteristic
1	Availability of website usage information	Number of media to inform the website usage information
2	Availability of troubleshooting service	Number of media to support troubleshooting service

Table 6. Support WAP

Indicator	Importance	Satisfaction	GAP
Number of media to inform the website usage information	3.985	3.962	-0.023
Number of media to support troubleshooting service	4.031	4.023	-0.008

4.4. Security and Privacy

Security and privacy is an important component in designing an information system in order to secure the information system and the user's privacy. From the result, the overall satisfaction from the security dimension are met, this indicate that the security from the laboratory administration system are secure enough based on the laboratory assistant point of view.

Table 7. VOC from Security

VOC	Technical Characteristic
The Information system ability to safeguard	The Data is encrypted
	User has an account
	User has a limitation of access

Table 8. Security and Privacy WAP

Indicator	Importance	Satisfaction	GAP
The Data is encrypted	4.000	4.008	0.008
User has an account	3.855	3.947	0.092
User has a limitation of access	4.015	4.069	0.053

For security and privacy dimension, the dimension from previous research are included and compared. The gap is improved in the “user has an account”, but the “the data is encrypted” and “user has a limitation of access” is decrease, this happen because the laboratory administration system get major update to comply the regulation given by the faculty.

Table 9. GAP differences

Indicator	Previous Research	Current Research
The Data is encrypted	0,000	0.008
User has an account	-0,480	0.092
User has a limitation of access	0,000	0.053

4.5. Ease of Use

Ease of use of information systems is something that is expected by the user, therefore an information system should be designed to meet the user need. From the result, the overall satisfaction of Ease of Use dimension are not all met, the “information system connected to internet” are below the satisfaction, this is happen because not every time the infrastructure of the information system are on good condition, from the interview with the laboratory assistant, sometimes the information system can’t be accessed from outside the college network. The “Information System support multiplatform” and “The Information System is available in many languages” are equal form the importance and satisfaction, this means that the dimension are met exactly as the laboratory assistant expectation.

Table 10. Voice Of Customer from Ease of Use

No.	VOC	Technical Characteristic
1	The Information system can be accessed everywhere	Type of Connection to the system
2	The Information system can be accessed from other platform	Number of Platform Supported
3	The Newest's information notification is available	Avaliability of Notifications
4	The Information System is available in many languages	Number of Languages Available

Table 11. Ease of Use WAP

Indicator	Importance	Satisfaction	GAP
The Information system connected to internet	4.115	4.076	-0.038
The Information System support multiplatform	3.985	3.985	0.000
The Information System is available in many languages	3.977	3.977	0.000
The Newest information notification is available	4.031	4.069	0.038

For ease of use dimension, the dimension from previous research are included and compared. There is an improvement from the previous research but the “the information system connected to internet” gap is increasing, as mention above, this is happen because not every time the infrastructure of the information system are on good condition.

Table 12. GAP differences

Indicator	Previous Research	Current Research
The Information system connected to internet	0,56	-0.038
The Information System support multiplatform	0,29	0.000
The Information System is available in many languages	0,47	0.000
The Newest information notification is available	0,86	0.038

4.6. Appearance

A display of an information system is influential to the level of user acceptance of information systems. From the result, overall satisfaction from the appearance dimension are not met. The dimension of the image / picture in the application is the main issue because in the development, the image width and height are not set dynamic, this is causing the image on application display are not conforming to be seen.

Table 13. Voice Of Customer from Appearance

No.	VOC	Technical Characteristic
1	The information system is unsightly	The information system has proper color combination
		Picture/images are displayed properly
		The dimension is proper to view
2	The text is easy to read	Proportion of Text Size compare to overall appearance
		The dimension is proper to view
		The information system has proper color combination

Table 14. Appearance WAP

Indicator	Importance	Satisfaction	GAP
The information system has proper color combination	3.962	3.969	0.008
Picture/images are displayed properly	4.046	4.000	-0.046
The dimension is proper to view	3.878	3.901	0.023
Proportion of Text Size compare to overall appearance	4.153	4.023	-0.130

For appearance dimension, the dimension from previous research are included and compared. The “Picture/images are displayed properly” is decreasing bases on this research.

Table 15. GAP differences

Indicator	Previous Research	Current Research
The information system has proper color combination	0.000	0.008
Picture/images are displayed properly	-0,47	-0.046
The dimension is proper to view	0,53	0.023

4.7. Content

Contents of information systems is the main thing that must be considered when designing information systems. From the result, the overall satisfaction of content dimension are not met, the inventory, letter, research and publication menu are not created in the application, this is because the main focus of the first phase implementation are how the user is get used to use the laboratory administration system for daily activity, in this case how the laboratory assistant use the application to input the labwork score and attendance.

Table 16. Voice Of Customer from Content

No.	VOC	Technical Characteristic
1	The information system allow users to access the content easily	Availability of dashboard menu
		Availability of practicum administration menu
		Availability of inventory management menu
		Availability of assistant payroll menu
		Availability of letter management menu
		Availability of research and publication menu
		Availability of user profile menu
		Availability of register account menu
2	Information provided is easy to understand	Availability of a sitemap
		Availability of search menu

Table 17. Content WAP

Indicator	Importance	Satisfaction	GAP
The information system has dashboard menu	3.893	3.947	0.053
The information system has practicum administration menu	3.977	4.137	0.160
The information system has inventory management menu	4.023	3.832	-0.191
The information system has assistant payroll menu	3.939	3.954	0.015
The information system has letter management menu	4.023	3.985	-0.038
The information system has	4.038	3.954	-0.084

research and publication menu			
The information system has user profile menu	3.916	4.000	0.084
The Information system has a sitemap	3.962	3.885	-0.076
The Information system has a search menu	3.947	3.992	0.046

For content dimension, the dimension from previous research are included and compared. There is a slight differences between gap of previous research and this research.

Table 18. GAP Differences

Indicator	Previous Research	Current Research
The information system has dashboard menu	-0,10	0.053
The information system has practicum administration menu	-1,18	0.160
The information system has inventory management menu	0,00	-0.191
The information system has assistant payroll menu	0,14	0.015
The information system has letter management menu	0,00	-0.038
The information system has research and publication menu	0,00	-0.084
The information system has user profile menu	-1,10	0.084
The Information system has a sitemap	0,67	-0.076
The Information system has a search menu	0,19	0.046

4.8. Effectiveness

Effectiveness is a dimension that describes whether the information system could achieve the goal based on stakeholder needs. From the result, the overall satisfaction of the effectiveness dimension are not met, this is because not all the business process are covered in the application. Same as the content dimension, the main purpose of the first phase of the implementation are how the user is get used to use the laboratory administration system for daily activity.

Table 16. Voice Of Customer from Effectiveness

No.	VOC	Technical Characteristic
1	The Information System help organizational business process	Score of User acceptance test
2	The information system cover the business objective	Number of process covered by the system

Table 17. Effectiveness WAP

Indicator	Importance	Satisfaction	GAP
Score of User acceptance test	4.000	3.969	- 0.031
Number of process covered by the system	4.137	4.130	- 0.008

For effectiveness dimension, the dimension from previous research are excluded but enhanced to be more detailed.

4.9. Acceptability

A dimension which is related to the expectations of stakeholders whether it was made according to needs. Form the result, the overall acceptability dimension are not met, this is because the laboratory assistant feels that not all laboratory implemented the application yet and there are no management control form the laboratory supervisor.

Table 18. Voice Of Customer from Acceptability

No.	VOC	Technical Characteristic
1	The Information System meets the objective	Score of User acceptance test
2	the information system suitable for the organization	Score of User acceptance test

Table 19. Acceptability WAP

Indicator	Importance	Satisfaction	GAP
Score of User acceptance test	3.977	3.939	- 0.038
Score of User acceptance test	4.069	3.985	- 0.084

For acceptability dimension, the dimension from previous research are excluded but enhanced to be more detailed.

4.10. Customizable

A dimension which is related to the ease of users and information system, that influences by the change of external or internal factors. From the result, the overall satisfaction of customizable dimension are not all met, only the “User can edit personal data” and “User can find out the data that had entered” are met, this is because to adapt the change in policy, the admin of the application is responsible for changing the system to met the new policy from the college/faculty.

Table 20. Voice Of Customer from Customizable

No.	VOC	Technical Characteristic
1	User can edit personal data	Ability to edit Personal Data
2	User can find out the data that had entered	Ability to find out the data that had entered
3	the information system can adapt change in policy	Ability to adapt to new policy

Table 21. Customizable WAP

Indicator	Importance	Satisfaction	GAP
Ability to edit Personal Data	3.832	3.969	0.137
Ability to find out the data that had entered	3.931	3.977	0.046
Ability to adapt to new policy	4.115	3.962	0.153

For customizable dimension, the dimension from previous research are excluded but enhanced to be more detailed.

#### 4.11. Maintainability

A dimension which is related to the ability of the system to maintain the performance in acceptable level. This is the new dimension that are proposed from the elaborated model in this research. From the result, the overall satisfaction are not met, this is because the error caused by network are not the domain of the administrator or the faculty, but from the information system directory.

Table 22. Voice Of Customer from Maintainability

No.	VOC	Technical Characteristic
1	The information system is stable	Ability to handle error caused by network
2	The information system is easy to maintain	Availability of maintenance mode in the information system

Table 23. Maintainability WAP

Indicator	Importance	Satisfaction	GAP
Ability to handle error caused by network	3.992	3.916	-0.076
Availability of maintenance mode in the information system	4.000	4.023	0.023

## CONCLUSION

From the result of the elaborate model and the gap between importance and satisfaction from each indicator, the biggest gap is on the availability of inventory management menu. The availability of inventory menu is not yet implemented in current system because there is a different standardization of each laboratory and from the faculty, it is needed to standardize the inventory policy in faculty. We can conclude that there are needed more improvement for the labwork administration system. The model that is developed in this model can be used as tool or guidance to measure or assess the laboratory administration system quality by using the dimension that are explained in this research. There are some indicator that need further attention. Further research can be done to break down the technical characteristic of the dimension into critical part or improve the application based on the quality dimension model form this research.

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