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Software Quality Evaluation of Developed Learner's Information System

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Abstract *– This study aimed to evaluate LIS used by SDO I Pangasinan for automating records management via LIS. The respondents of the study were the trained and only LIS users from the SDO I of Pangasinan. Descriptive method of research was used in the form of questionnaire to gather data. Frequency and Percentage were used to analyzed the acquired data and ISO 9126 was used as the criteria for system software evaluation. It found out that LIS Users were generally young in age and service, Teacher I and Teacher II employees yet educated and LIS trained. LIS was found of good quality in terms of functionality, reliability, usability, efficiency, maintainability and portability based from ISO 9126. 90% of the users expressed that the main problem of the system was internet lags in opening the System. The study recommended that; (1) older and more experienced government employees may be given the chance to use the system (2) additional system training be conducted (3) the teachers should upgrade or get good ISP to utilize the system in full potential. Over-all, the study recommends the LIS to be utilized by other school's division for automated record management of each learners*.

Keywords *–LIS,,ISO 9126, Cloud Server.*

INTRODUCTION

As the software that automates the administration of training, Learning Information System are used in the higher education institutions. One of the most important features of Learning Information System is to provide an environment for learning and teaching without the restrictions of time or distance [1]. Because the effectiveness of LIS affects the effectiveness of education processes, to use right LIS and to improve it in accordance with the needs of the end-users are very important. As an attribute of "acceptance" of the software [2], usability is a metric to achieve quantified objectives with effectiveness, efficiency, and satisfaction in a quantified context of use. In order to measure the usability of LIS, the researchers use some methods. Of these methods, survey is a popular one to send out inquires and collect data from a large population in a short period of time. The design of a good survey requires skill and time.

The questions need to be correlated to what the evaluators want to find out; able to provide reliable results; and have certain validity to the study. One important thing to note is that what surveys truly measure is user preferences, not product usability. Another problem with surveys is that it is difficult to interpret the results. Despite its low effectiveness rating, organizations still identify survey as one of the most widely used methods because of its efficiency in reaching a large sample size quickly [3].

In this study, a scale that provides to assess LIS according to the user perception was developed. This study is important because it offers a scale that helps both to decide whether LIS can be used effectively and to define features (especially related to interfaces and functions) that must be improved. The rest of the paper is organized as follows: Section 2 explains the background of this study, Section 3 describes the methodology of the empirical study of LIS, and presents results and analysis from this study, Section 4 includes discussion, conclusion, and advices.

OBJECTIVES OF THE STUDY

The study seeks to answer the following questions; (1) the profile of the respondents (in this case the LIS users in the Province of Pangasinan themselves) in terms of their age, sex, highest educational background, position in the office, years of
service and the number of trainings attended related to Disaster Risk Reduction and Management, (2) the quality of the Learners Information System based from the ISO 9126 presented as follows; (a) Functionality which has the sub-characteristics of suitability, accurateness, interoperability, compliance and security (b) Reliability which has the sub-characteristics of maturity, fault tolerance, recoverability (c) Usability which has the sub-characteristics of understandability, learnability and operability (d) Efficiency which has the sub-characteristics of Time behavior and Resource behavior (e)Maintainability which has the sub-characteristics of analyzability, changeability, stability and testability (f) Portability which has the sub-characteristics of adaptability, installability, conformance and replaceability [4] and (3) The problems encountered in using the Learners Information System based from the day-to-day usage.

MATERIALS AND METHODS

The study used descriptive type of research through questionnaires in order to gather data. Respondents of the study were the 236 trained and only LIS Users in Pangasinan. Hence, the questionnaires were divided into three parts corresponding to the 3 problems raised in the study. The first part asked the profile of the respondents.

Table 1. Likert Scale

Literal Rating	Weighted Mean Score	Descriptive Interpretation
5	4.51-5.00	Excellent
4	3.51-4.50	Good
3	2.51-3.50	Average
2	1.51-2.50	Poor
1	1.00-1.50	Very Poor

The second part asked the quality of the system based on the criteria laid down by ISO 9126. Likert scale was used to measure quantitatively the results.

Finally, the last part asked the problems encountered with the system. Generally, frequencies and percentages were also used to analyzed the data and produce the results of the study.

RESULTS AND DISCUSSION

The results of the study simply answered the 3 main problems presented. However, the results were logically presented by the researcher substantiated by scientific studies and other relevant information.

Table 2. Profile of the Respondents

Profiles		**Frequency**	**Percentage**
Age	18-24	8	3.4
	25-54	226	95.8
	55-64	2	0.8
	Total	236	100.0
Sex	Male	191	80.9
	Female	45	19.1
	Total	236	100.0
Highest Educational Attainment	Bachelors Degree	188	79.7
	Master Degree Unit	1	0.4
	Masters Degree	45	19.1
	Ed. D Acad Req.	2	0.8

	Kindeger Garten Teacher	1	0.4
	Teacher I	199	84.3
	Teacher II	6	2.5
	Teacher III	27	11.4
Position	Head Teacher	3	1.3
	Total	236	100.0
Specialization	BEED Gen. Education	209	88.6
	Early Childhood Education	3	1.3
	English	9	3.8
	Filipino	2	0.8
	Math	4	1.7
	Special Education	8	3.4
	TLE	1	0.4
Relevant Trainings Attended	Developing EBEIS And LIS	204	86.4
	Microsoft 365, EBEIS & LIS	32	13.6

As to age, the study revealed that 99.2% of the system users are from ages 18-54. The first 3.4% are ages 18-24 and other 95.8% are ages 25-54. The best possible reason for this is that computer literacy is attributed to the younger generation. Since LIS is basically a computer system, the task of utilizing and maneuvering it was entrusted to the younger government employees in local government units. As to sex, the result of the study revealed that 80.9% of the system users are male and 19.1% are female. We found that gender differences in the perception of IT, wherein most men are more tech savvy to use LIS that women. That's why most LIS users requires more technical skills to use.

As to relevant tranings, the study showed that 100% of the system users has the relevant trainings related to LIS. 86.4% have at least 2 training while 13.6% have 3 trainings. This is probably because of the protocols of SDO regarding how to use the LIS. Orders them for trainings specifically for the teachers. Nonetheless, the study still revealed that most of the system users have indeed relevant training experience which helps them in their inputs to evaluate the LIS system in terms of its reliability and usage.

Table 3. Evaluation Results

ISO 9126 (Evaluation Criteria)	Sub-characteristics	Statistical Results (over-all mean)	Likert Scale
Functionality	Suitability Accurateness Interoperability Compliance Security	4.38	Good
Reliability	Maturity Fault tolerance Recoverability	4.34	Good
Usability	Understandability Learnability Operability	4.37	Good
Efficiency	Time behavior Resource behavior	4.37	Good
Maintainability	Analyzability Changeability Stability Testability	4.33	Good
Portability	Adaptability Installability Conformance Replaceability	4.34	Good

As regards the functionality of the system, the study showed that the result of the over-all mean which was 4.38 when reflected on the Likert scale was Indeed good. When in terms sub-characteristics, suitability over-all mean is 4.47, Accurateness is 4.31, Interoperability is 4.39 and Security is 4.35. In other words, the system was functional as expressed by the respondents.

One thing needs to be pointed out however. The system's interoperability, which described the functions of the system as that which do not act in isolation, was revealed to be on the "average" level by half of the respondents (50%). This meant that the LIS system's functions somewhat acted in isolation. In other words, its keys and buttons at some point, do not interoperate. Now, the most probable reason for the this is that the users have been trained only with the basics of LIS, not its entirety. Since the system is new, there is a need for more exploration regarding its interoperability.

As to Reliability, revealed that the evaluation was good as regards the system's reliability. Its over all mean which was 4.34 reflected on the Likert scale resulted good. This means the software has been already fix its bugs and can easily handle errors even in restoring lost data after system failure. The system's ability to bring back a failed system into full operation, including data and network connection was seems to be so-good. It is a good thing though that the system has back-up process which can restore data and network connection. This explains the reason why majority of respondents rated this part as the system to be reliable as regards system usability, the over all evaluation is good as reflected on the Likert scale based from the over all mean 4.37.. Majority of the respondents rated the system excellent in terms of its sub-characteristics. This is so because during the LIS training, users were able to easily understand, learn and operate the system in a short period of time for they can now operate its basic functions without guidance. This meant that the system is indeed understandable, learnable and operable. The LIS system's basic value relies on its usability. Since the result of the data showed that the system is rated good, then it is indeed a system needed for recording learners information system.

Also, the study showed that in terms of the system's efficiency, the over-all mean 4.37 is reflected as good. This study, based from the result, claims that the system's efficiency is indeed a very valuable aspect of evaluation. It determines how fast and how well the system functions. In the results presented on table 3.5, it can be deduced that majority of the sub-characteristics of the system's efficiency were rated very well. In fact, excellent. This is so because the system delivers output really fast. One can only have problems with this system if there is an absence of plan on how to really operationalize the system.

In terms of the system's maintainability, the over-all mean 4.33 is reflected as good. This study showed that in terms of analyzability, changeability, stability and testability which build up the over-all criteria for maintainability, respondents rated the system good. This is so because the LIS, as a cloud-based system, can be easily upgraded for change through the server. With this, all bugs can be fixed within the system thus the system can be easily maintained Generally, a system needs to be maintainable for it to be used for a longer period of time.

Finally, the Study revealed that the system is rated good by the respondents as seen in table 4.6. the over-all mean 4.34 meant that the respondents believed the system is indeed portable. This belief is probably based on the system's feature of cloud-based where as long as a computer is connected to the LIS Server it can access the system by easily using any devices with the help of internet. These results highlight the importance of portability in accessible environment. And so, once again, it is with the over-all assessment of the respondents that the system is evaluated good

Table 4. Problems with the System

Problems Encountered	Frequency	Percent	Rank
Poor Internet Connection/ Signal	114	48.3	1
System Found Error	21	8.9	2
Bad Gateway, Internet Connectivity	12	5.1	3
There are times that you can't enter the portal	10	4.2	4
Lack of Materials/ Poor signal	8	3.4	5
504 & 505 Error	5	2.1	6
Aside from having poor connection in remote area none so far	4	1.7	7

The study showed that 48.3% of the respondents expressed that the network connection of the system is unstable. Since LIS is a cloud based system it requires network and good sharing points on ISP to smoothly run the system. Generally, this Poor network connection happens yet it can be troubleshooted. It ranked as the number 1 problem of the system. These lags were attributed not to the system itself but to the hardware component. Also, 70% of the respondents agreed that they experience disconnection from server. This was attributed to the network latency experienced in network connection and not to the system itself.

8.9% of the respondents showed that accessing the system is somehow unstable. Having a system found error on the system it basically tells us that there is something wrong with the server or system itself. It might be cause by doing system maintenance and fixing bugs by the administrator. Hence, this wont take long the system usually up and running for just around an hour. System administrator usually put notification on the system upon accessing it.

In addition, Only 5.1% of the respondents experience this errors. This commonly happens when users internet connection is somehow unstable. And also it needs some configuration in terms of IP addresses upon connecting on the internet. This can be easily fixed by reconnecting on the resetting your modem or router before connecting to the internet. Its basically doesn't have errors related on the LIS.

Only 4.2% of the respondents having this type of problem on the system. This actually cause by multiple attributes like. Wrong credential or login details, Mis-spelled username and wrong inputs on passwords. The system has the strong security feature which limits user to put username and password thrice upon attempting to login. Username and password are also case sensitive And, Only 3.4% of the respondents experienced this lack of materials. LIS is actually open for any type operating system like android, iOs, windows and even Linux. It's a very user friendly cloudbase system which can be open everywhere as you have internet connection. Some might be experiencing lack of materials when in terms of proper Search engine to use. LIS cannot support lower versions of Internet explorer and google chrome. Hence it can be fixed by just updating browsers to have the access

on LIS. Finally, only 1.7% of the respondents expressed that they have this problem due to limited access on the internet. Being in a remote area for some teachers are really crucial this affects their productivity in putting date records of the students in the LIS.

Generally, most of the problem has the common errors in internet connection. Where internet connection is having a very crucial part in accessing the system. This can be easily fix by getting an Internet service provider and nothing to do with the LIS system.

CONCLUSION AND RECOMMENDATION

The study concludes that LIS users are generally young. Since they are young, their career in the government service is young as well. They are a balanced of male and female who are college graduates (who have been skilled with basic computer knowledge) and therefore could operate the system with ease. Also, users are generally in the rank and file positions yet trained for Deped SDO I. Hence, the LIS is functional, reliable, usable, efficient, maintainable and portable. Therefore, the system is of good quality.

With these, the researcher recommends the following; (1) In LIS system, all possibilities must be explored in trying to better the efforts of saving information. The researcher therefore recommends that the utilization of the system must be opened also to senior teachers and heads since their experience counts a lot. Also, the study revealed that system users have LIS training but quite limited. Therefore, the researcher recommends that local government units must open more LIS trainings for the system users so as to widen their perspectives and deepen their understanding to the cause they are pursuing. (2) Based from the results of the study, there are still a lot more to be explored on the LIS system in terms of the criteria mentioned in ISO 9126. Therefore, the researcher recommends to have a more training, this time, more in-depth as regards the system's functions and so on. (3) Internet problem and Latency was highlighted as the major problem encountered in utilizing the system. Thus, it was also pointed on in the study that these problems are not caused by the system but by the internet service providers used. Therefore, the researcher recommends that each teachers which utilize the system must invest on getting Good internet connection so as to really experience LIS in its full potential, at an optimum level. The research also recommends that monthly hardware and software maintenance of their devices may be coordinated and done for the protection and prolongation of the system.

Finally, the system was evaluated good. Therefore, the researcher recommends the system to other Schools. Hopefully, they may be able to read this humble work and witness how LIS and investment on technological tools for Deped in general, to ease the challenges in manual record management.

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