Research Article

Exploring Users' Satisfaction towards University's Learning Management System

Nidhi Bansal

Associate Professor, Department of Commerce, Atma Ram Sanatan Dharma College, University of Delhi

Email: nbansal@arsd,du.ac.in

Abstract

Post Covid-19, there has been paradigm shift in the way students and teachers interact with the institutions for their daily tasks. It's a shift from traditional manual interaction to web aided interaction. For this, it is made mandatory by UGC for all institutions to have Learning Management systems (LMS) also referred to as websites in some cases. However, the users' perception of the effectiveness of the LMS depends on how well it is updated and maintained. In Indian context not much literature review is available on satisfaction as regards LMS. Even few studies that have been conducted they focus on students. Teachers and Administrators/Head of institution viewpoint is ignored. Based on literature review, the study identified web architecture, understandability, effectiveness, efficiency, portability, security as s parameters for assessing satisfaction of students, teachers and administrators. The study observed that there is lot of scope of improvement as regards reliability, portability and security aspect. Further analysis revealed that policy makers need to work upon training of not so young teachers, as these people don't find themselves so comfortable with the usage and knowledge of LMS. Only if teachers are apt with e-initiatives usage, they can motivate and make the students use these initiatives.

Keywords: Web architecture, understandability, effectiveness, efficiency, portability, security, LMS.

Introduction

Universities now a days, provide majority services through electronic means. Electronic interface i.e., website is not one way interaction, that is just providing downloadable and informative services. It refers to two-way interaction between the management and all the stakeholders. The LMS is not restricted to completing office procedures. LMS also can help students/teachers gain knowledge beyond books. They can access online journals, e-books and research articles. Students/ teachers/administrators can also do collaborative learning if the system is fully interactive and offers facilities like video conferencing. But this is possible only if the users perceive the system to be effective and beneficial. The more satisfied user is the greater will be the acceptance of the system.

Literature Review

Post Covid-19, learning management systems have become part of education system. Assessing and understanding students' satisfaction of learning management system has been objective of many recent researches. (Balkaya & Akkucuk, 2021; Mehrolia et al., 2021; Camilleri & Camilleri, 2021; Alturki & Aldraiweesh, 2021; Salem Al-Mamary, 2022). Pham et al. (2019) reiterated that student's satisfaction is supreme, students become the customers of

higher education institution. To assess the satisfaction of users of LMS many researches have been conducted worldwide. Mouakket and Bettayeb (2015) researched on factors affecting adoption of LMS by faculty and found perceived ease of use, web design, training and technical assistance as determinants. Ease of use, high-speed access to information, reliability, , attractive features, security and user-friendliness were identified as success factors for LMS (Hassanzadeh et al., 2012; Ramírez-Correa et al., 2017; Costa et al., 2020; Kurdi et al., 2020).

A number of studies have used Technology Acceptance Model (TAM) (Davis, 1989). TAM model focusses on perceived usefulness and perceived ease of use as the main determinants. This model has been criticised by a number of researchers. It was contended though both ease of use and usefulness are determinants of success but are not equivalent to success, other factors also play a role (Petter et al., 2008; Sukendro et al., 2020). In this context, the present research uses a theoretical model which though is comparatively new but is extensive in elaborating the factors affecting the satisfaction of LMS, which is Nguyen's (2021). Bifurcating the factors identified (Nguyen, 2021) in Indian context we get parameters as web architecture, understandability, effectiveness, efficiency, portability and security. In India not much of the research work has been done on assessing satisfaction of students and particularly of teachers and administrators. The type of research is necessary to add value to LMS which has not been discarded after Covid-19 rather has become indispensable part of education system.

Objectives

The research paper intends to achieve the under said objectives:

1. To assess the users' satisfaction towards Learning Management System in the University.
2. To offer suggestions to improve the Learning Management System.
3. Hypothesis

H_0:1: There is no significant difference between different users as regards Web Architecture.

H_0:2: There is no significant difference between different users as regards Understandability.

H_0:3: There is no significant difference between different users as regards Effectiveness.

H_0:4: There is no significant difference between different users as regards Efficiency.

H_0:5: There is no significant difference between different users as regards Reliability.

H_0:6: There is no significant difference between different users as regards Portability

H_0:7: There is no significant difference between different users as regards security

Sampling Design

Population

- Administrators (Head of Institution and Vice-Principal) of Non-Technical (General) and technical colleges of Delhi and NCR at the undergraduate level.
- Faculty in Non-Technical (General) and technical colleges of Delhi and NCR at the undergraduate level.
- Students studying in Non-Technical (General) and technical colleges of Delhi and NCR at the undergraduate level.

Sample Size

Table-1: Number of Non-Technical (General) and Technical Colleges in Delhi (NCT) Uttar Pradesh, Rajasthan and Haryana in 2020-21

States/NCT	Non-Technical (General) Colleges	Technical Colleges
Delhi	93	15
Haryana	554	74
Rajasthan	2282	71
Uttar Pradesh	5449	114

Source: All India Survey on Higher Education Report 2020-2021

Table-2: Number of Colleges Sector Wise in Delhi (NCT) Uttar Pradesh, Rajasthan and Haryana 2020-2021

States/NCT	Private Colleges	Government Colleges	Total
Delhi	75	98	173
Haryana	823	258	1081
Rajasthan	2217	722	3339
Uttar Pradesh	6315	812	7127

Source: All India Survey on Higher Education Report 2020-21.

As can be seen from the tables above, number of general colleges are more than the number of technology colleges. In Delhi NCR more of higher education institutions are in the private sector. Data is available for different categories of institutions as per specialization and ownership for the entire state as a whole. No segregate data is available for number of colleges in individual districts of states. The entire Haryana, Rajasthan and Uttar Pradesh is not part of NCR. Further for sample size determination specific formula (Cochran, 1977) could not be used as the average enrolment ratio is different in all three states and Delhi. So non-probability convenience sampling method is used to select general and technical colleges from both the public and private sector.

Table-3: Number of Institutions Selected as Sample for the Study

States/NCT	Non-Technical (General) Colleges		Technical Colleges		Total
	Private	Government	Private	Government	
Delhi and NCR	7	7	7	7	28

Table-4: Sampling Unit, Sample Size, Sampling Method, Total Sample Size

Unit	Size	Sampling Technique	No. of institutions chosen	Total Sample Size
Students	10	Non-probability Judgement Sampling	28	280
Teaching Staff	5	Non-probability Judgement Sampling	28	140
Administrator	2	Non-probability Judgement Sampling	28	56
Total	17	Total		476

Data Set

The researcher has collected inputs from both primary and secondary sources. Primary data was collected from the stakeholders on quality parameters identified on 5-point Likert scale. For the research stakeholders are divided into three categories: administrator, teachers, students.

Ambit of Study

Data collection has been done from Delhi NCT and Delhi NCR regions.

Data Testing

Data Analysis is carried out using SPSS 22. First normality of data is checked. Kruskal Wallis also referred to as H-test is applied to check the hypothesis.

Normality Test

Foremost assumption for the application of any parametric test is the normality of the data for all categories of independent variable.

Table-5: Normality Test for Students, Teachers and Administrators on Various Quality Parameters

Quality Parameter	Category of Respondent	N	Kolmogorov-Smirnov		
			Statistic	Df	Sig.
Web Architecture	Student	280	.321	280	.000
	Teacher	140	.221	140	.000
	Administrator	56 .254		56	.000
Understandability	Student	280	.332	280	.000
	Teacher	140	.334	140	.000
	Administrator	56	.289	56	.000
Effectiveness	Student	280	.301	280	.000
	Teacher	140	.358	140	.000
	Administrator	56	.360	56	.000

Quality Parameter	Category of Respondent	N	Kolmogorov-Smirnov		
			Statistic	Df	Sig.
Efficiency	Student	280	.310	280	.000
	Teacher	140	.288	140	.000
	Administrator	56	.260	56	.000
Reliability	Student	280	.332	280	.000
	Teacher	140	.289	140	.000
	Administrator	56	.332	56	.000
Portability	Student	280	.306	280	.000
	Teacher	140	.198	140	.000
	Administrator	56	.404	56	.000
Security	Student	280	.270	280	.000
	Teacher	140	.333	140	.000
	Administrator	56	.341	56	.000

As the above table reflects p value is 0.000, which means that null hypothesis cannot be accepted. This indicates it is normally distributed. In case of violation of normality condition, parametric test cannot be applied. Hence, in this case, Kruskal Wallis also referred to as H-test is used.

Kruskal Wallis Test is a non-parametric test based on ranks. It is also known as one-way ANOVA on ranks. The table below gives he ranks on the various quality parameters.

Table-6: Ranks as Per Kruskal Wallis

	Category of Respondent	N	Mean Rank
Web Architecture	Student	280	245.13
	Teacher	140	229.26
	Administrator	56	228.43
	Total	476	
Understandability	Student	280	233.69
	Teacher	140	240.18
	Administrator	56	258.35
	Total	476	
Effectiveness	Student	280	235.21
	Teacher	140	227.85
	Administrator	56	281.58
	Total	476	

	Category of Respondent	N	Mean Rank
Efficiency	Student	280	247.70
	Teacher	140	216.14
	Administrator	56	248.41
	Total	476	
Reliability	Student	280	206.98
	Teacher	140	278.38
	Administrator	56	296.38
	Total	476	
Portability	Student	280	275.59
	Teacher	140	167.75
	Administrator	56	229.94
	Total	476	
Security	Student	280	270.30
	Teacher	140	181.32
	Administrator	56	222.47
	Total	476	

Table-7: Kruskal Wallis Test Statistics

	Web architecture	Under-standability	Effective-ness	Efficiency	Reliability	Portability	Security
Chi-Square	1.867	1.970	8.269	5.896	41.280	64.746	45.072
Df	2	2	2	2	2	2	2
Asymp. Sig.	.393	.373	.016	.052	.000	.000	.000

The above table depicts that for Web Architecture, Understandability and Efficiency dimensions there is no significant difference in quality perception among different users while it varies on other quality parameters.

Post-Hoc Analysis

Further, to find out which category of independent variable differs significantly from which other category Post-Hoc analysis is carried out. The table below lists the post-hoc analysis for each of the quality parameters.

(a) Web Architecture

Table-8: Web Architecture Aspect Hypothesis Test Abstract

Null Hypothesis H_0:1	Test	Significant Value	Result
The Dispersal of web architecture is alike across all groups of Respondent	Independent Samples Kruskal-Wallis Test	.393	Accept null hypothesis

As regards Null Hypothesis H_0:1, significant value 0.393(p>.05), indicates null hypothesis is not rejected i.e. there is no statistical difference between three groups. All the three students, teachers and administrators have almost given similar rank.

(b) Understandability

Table-9: Understandability Aspect Hypothesis Test Abstract

Null Hypothesis H_0:2	Test	Significant Value	Result
The Dispersal of Understandability is alike across all groups ofRespondent	Independent SamplesKruskal-Wallis Test	.373	Accept null hypothesis

As regards Null Hypothesis H_0:2, significant value 0.373(p>.05), indicates null hypothesis is not rejected i.e. there is no statistical difference between three groups. All the three students, teachers and administrators have almost given similar rank.

(c) Effectiveness

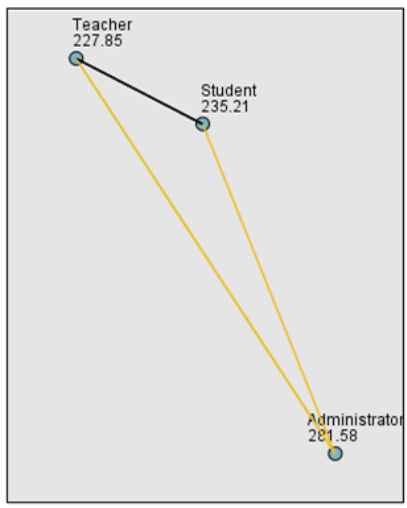
Table 1.10: Effectiveness Aspect Hypothesis Test Abstract

Null Hypothesis H_0:3	Test	Significant Value	Decision
The Dispersal of Effectiveness is alike across all groups of Respondent	Independent Samples Kruskal-Wallis Test	.016	Discard null hypothesis

As regards Null Hypothesis H_0:3, significant value 0.016 (p<.05), indicates null hypothesis is rejected i.e. statistical disimilarity between mean scores of the three groups is observed.

Table -11: Pairwise Comparison on Effectiveness Aspect

Pairwise Comparision of Category of Respondent



Each node shows the sample average rank of Category of Respondent.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig
Teacher-Student	7.364	12.617	.584	.559	1.000
Teacher-Administrator	-53.734	19.273	-2.788	.005	.016
Student-Administrator	-46.370	17.843	-2.599	.009	.028

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is. 05.

As on effectiveness parameter, pairwise comparison reveals that there is not much difference between teacher and student perception on effectiveness of the system used to extend e-Governance initiatives. However, both teacher-administrator and student-administrator differ in their opinion on the effectiveness of the system. The administrators have ranked the effectiveness parameter higher than both teachers and students. i.e. administrators believe that system is meeting the expectations of the users but teachers and students feel otherwise.

(d) Efficiency

Table-12: Efficiency Aspect Hypothesis Test Abstract

Null Hypothesis H_0:4	Test	Significant Value	Result
The Dispersal of Efficiency is alike across all groups of Respondent	Independ-ent Samples Kruskal-Wallis Test	.052	Accept null hypothesis

As regards Null Hypothesis H_0:4, significant value 0.052 (p>.05), indicates null hypothesis is not rejected i.e. there is no statistical difference between three groups. All the three students, teachers and administrators have almost given similar rank.

(e) Reliability

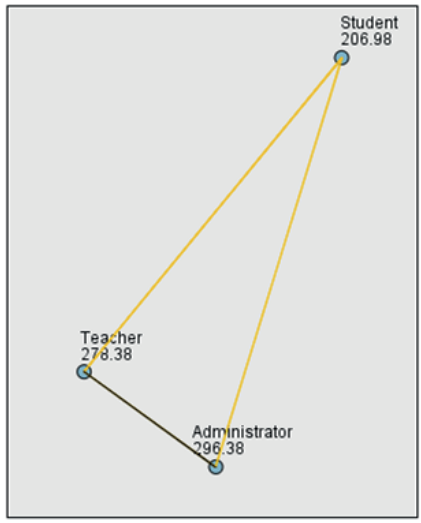
Table-13: Reliability Aspect Hypothesis Test Abstract

Null Hypothesis H_0:5	Test	Significant Value	Result
The Dispersal of Reliabilty is alike across all groups of Respondent	Independ-ent Samples Kruskal-Wallis Test	.000	Discard the null hypothesis

As regards Null Hypothesis H_0:5, significant value 0.000 (p<.05), indicates null hypothesis is rejected i.e. statistical disimilarity between mean scores of the three groups is observed.

Table-14: Pairwise Comparison on Reliability Aspect

Pairwise Comparision of Category of Respondent



Each node shows the sample average rank of Category of Respondent.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig
Teacher-Student	-71.398	13.367	-5.342	.000	.000
Teacher-Administrator	-89.391	18.903	-4.729	.000	.000
Student-Administrator	-17.993	20.418	-.881	378	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is. 05.

Pairwise comparison reveals that both teachers and administrators consider the system to be more reliable than students. Students differ in their opinion from both the teachers and administrators. The reason for this may be attributed to the fact that students are now a days more technology savvy and use number of mobile applications. So, they are comparing the college software to other advanced Apps and in comparison, the college information technology infrastructure is falling short on their reliability expectation.

(f) Portability

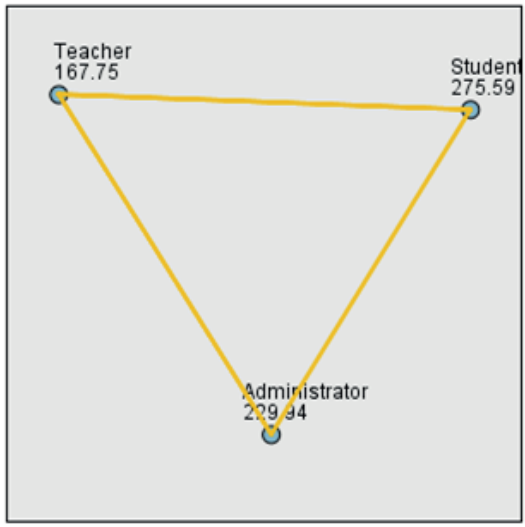
Table-15: Portability Aspect Hypothesis Test Abstarct

Null Hypothesis H_0:6	Test	Significant Value	Result
The Dispersal of Portability is alike across all groups of Respondent	Independent Samples Kruskal-Wallis Test	.000	Discard null hypothesis

As regards Null Hypothesis H_0:6, significant value 0.000 ($p<.05$), indicates null hypothesis is rejected i.e. statistical disimilarity between mean scores of the three groups is observed.

Table-16: Pairwise Comparison on Portability Aspect

Pairwise Comparision of Category of Respondent



Each node shows the sample average rank of Category of Respondent.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig
Teacher-Student	-62.188	20.515	-3.031	.002	.007
Teacher-Administrator	107.838	13.430	8.029	.000	.000
Student-Administrator	45.650	18.994	2.403	016	.049

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.

Asymptotic significances (2-sided tests) are displayed. The significance level is. 05.

Pairwise comparison reveals that all three students, teachers and administrators differ in their opinion on the portability dimension. Students find the system to be highly portable whereas the teachers find it to be the least and administrators fall mid-way. The reason for this may be attributed to technology savvy orientation of the students because of which they find it easier to open the college portal and access its features from any operating environment and across any device. Whereas teachers are not so comfortable with the technology so they encounter problem in accessing it across various devices and operating systems.

(g) Security

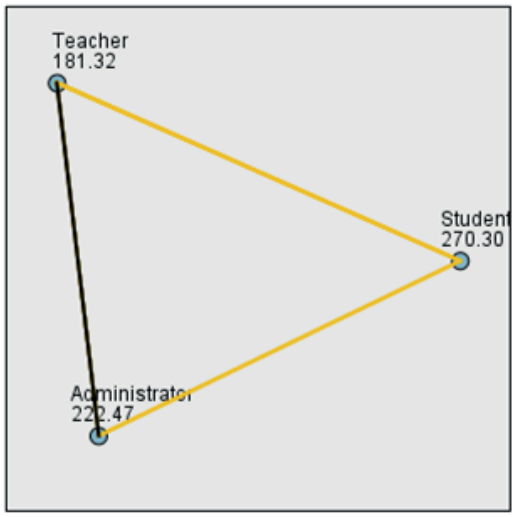
Table-17: SecurityAspect Hypothesis Test Abstract

Null Hypothesis H_0:17	***Test***	***Significant Value***	***Result***
The Dispersal of Security is alike across all groups of Respondent	Independent Samples Kruskal-Wallis Test	.000	Discard null hypothesis

As regards Null Hypothesis H_0:7, significant value 0.000 ($p<.05$), indicates null hypothesis is rejected i.e. statistical disimilarity between mean scores of the three groups is observed.

Table-18: Pairwise Comparison on Security Aspect

Pairwise Comparision of Category of Respondent



Each node shows the sample average rank of Category of Respondent.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig
Teacher-Student	-41.155	20.467	-2.011	.044	.133
Teacher-Administrator	88.979	13.399	6.641	.000	.000
Student-Administrator	47.823	18.949	2.524	.012	.035

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is 05.

Pairwise comparison reveals both teachers and administrators are on the same footing regarding their opinion on security aspect. Out of the three groups students have ranked security parameter highest. Students' opinion differs from both teachers and administrators. As students are using online applications a lot,

they fear the least about security aspect. They are aware that online systems are completely safe. Though teachers are quite apprehensive and fear a lot about leakage/misuse of information. However, their fears seem to be unfounded.

Suggestions

1. Bandwidth must be increased to support increased users which will ensure more reliability,
2. To address security issues, gate walls need to be installed.
3. Different passwords should be allotted to teachers and students to identify potential miscreants.
4. Periodical induction programs, hands on training sessions must be organised to train and update all the stakeholders.
5. A proper feedback mechanism needs to be developed so that grievances and queries of the users are addressed timely.

References

Al Kurdi, B., Alshurideh, M., Salloum, S., Obeidat, Z., & Al-dweeri, R. (2020). An empirical investigation into examination of factors influencing university students' behavior towards elearning acceptance using SEM approach.

Al-Mamary, Y. H. S. (2022). Why do students adopt and use learning management systems?: Insights from Saudi Arabia. *International Journal of Information Management Data Insights*, *2*(2), 100088.

Alturki, U., & Aldraiweesh, A. (2023). An Empirical Investigation into Students' Actual Use of MOOCs in Saudi Arabia Higher Education. *Sustainability*, *15*(8), 6918.

Balkaya, S., & Akkucuk, U. (2021). Adoption and use of learning management systems in education: The role of playfulness and self-management. *Sustainability*, *13*(3), 1127.

Camilleri, M. A. (2021). Evaluating service quality and performance of higher education institutions: a systematic review and a post-COVID-19 outlook. *International Journal of Quality and Service Sciences*, *13*(2), 268-281.

da Costa, R. D., de Souza, G. F., de Castro, T. B., de Medeiros Valentim, R. A., & de Pinho Dias, A. (2020). Identification of learning styles in distance education through the interaction of the student with a learning management system. *IEEE Revista iberoamericana de tecnologías del Aprendizaje*, *15*(3), 148-160.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

Hassanzadeh, A., Kanaani, F., & Elahi, S. (2012). A model for measuring e-learning systems success in universities. *Expert systems with Applications*, *39*(12), 10959-10966.

Long, P., Limbu, Y. B., Bui, T. K., Nguyen, H. T., & Pham, H. T. (2019). Does e-learning service quality influence e-learning student satisfaction and loyalty? Evidence from Vietnam. *International Journal of Educational Technology in Higher Education*, *16*(1), 1-26.

Mehrolia, S., Alagarsamy, S., & Sabari, M. I. (2021). Moderating effects of academic involvement in web-based learning management system success: A multigroup analysis. *Heliyon*, *7*(5).

Mouakket, S., & Bettayeb, A. M. (2015). Investigating the factors influencing continuance usage intention of Learning management systems by university instructors: The Blackboard system case. *International Journal of Web Information Systems*, *11*(4), 491-509.

Nguyen, N. T. (2021). A study on satisfaction of users towards learning management system at International University–Vietnam National University HCMC. *Asia Pacific Management Review*, *26*(4), 186-196.

Petter, S., DeLone, W., & McLean, E. (2008). Measuring information systems success: models, dimensions, measures, and interrelationships. *European journal of information systems*, *17*, 236-263.

Ramirez-Correa, P. E., Rondan-Cataluña, F. J., Arenas-Gaitán, J., & Alfaro-Perez, J. L. (2017). Moderating effect of learning styles on a learning management system's success. *Telematics and Informatics*, *34*(1), 272-286.

Sukendro, S., Habibi, A., Khaeruddin, K., Indrayana, B., Syahruddin, S., Makadada, F. A., & Hakim, H. (2020). Using an extended Technology Acceptance Model to understand students' use of e-learning during Covid-19: Indonesian sport science education context. *Heliyon*, *6*(11).