STUDENTS' SATISFACTION WITH THE QUALITY OF THE ONLINE LEARNING PLATFORM IN THE RURAL AREA: A CASE STUDY FROM GILGIT-BALTISTAN OF PAKISTAN

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ABSTRACT
This research aimed to investigate the students' satisfaction with the quality dimensions of online learning in a rural area of Pakistan. The dimensions were System Quality, Information Quality, and Service Quality. Using the quantitative approaches to the investigation, online learning quality was measured through students' satisfaction level on the given three key dimensions. University students in the area who were using online university applications (Learning Management System), were considered. Using a stratified random sampling technique, a sample of 300 students was taken in to fill out a self-developed questionnaire. The strata were considered students with different backgrounds of studies from different faculties to minimize the technical bias that includes the faculty of social sciences, faculty of Natural sciences, and the faculty of Arts and Humanities. Using SPSS, V 23, both descriptive, such as the mean, the median, and SDs, and inferential statistical tools such as t-tests, Anova, the data were analyzed. It was found that the students were moderately satisfied with

the Online learning quality (average rating being between 5 to 6 out of 1-10). However, among quality dimensions, system quality had the highest satisfaction level as compared to IQ and SERQ, whereas Information Quality showed the least satisfaction. No impact of gender on the satisfaction of online learning quality was found. There were variations in satisfaction with online learning quality; however, the difference was only significant for the difference between the faculty of social science and the faculty of natural science. These findings will help policymakers and educationists to bring further improvement in the quality of online learning in the rural areas of Pakistan as well as internationally.

KEYWORDS
Online learning, Student-Satisfaction, Rural areas digitalization

INTRODUCTION

The internet-based learning, specifically, refers to software or an online platform, that enables both educational management teams and teachers to plan, share, engage learners online, and assess their progress and quickly check on other procedures. One of the key functions is the lesson and content delivery, along with monitoring students' engagement and asses their academic performance (Alias & Zainuddin, 2005). Various advanced features of LMS allow users to customize interactive learning with rapid feedback, as well as the establishment of online communities in which students take responsibility for their learning and instructors for academic research (Garrison & Kanuka, 2004).

The use of educational technology, particularly learning management systems (LMS), has expanded dramatically in recent years (Cruz & Catura, 2020). LMS technology is continually evolving, and the question today is how to manage it such that online courses are both effective and efficient. Several educational institutions were forced by circumstances to start the LMS system to boost online learning during the COVID-19 situation. Similarly, in Pakistan and particularly in rural areas such steps have facilitated many students to continue their studies. To enhance quality and to encourage such initiatives more in the future, there is a need to focus on understanding the quality issues of existing systems so improvements can be made. Previous studies also indicate that student satisfaction is given high importance for effective learning management. Haddad (2018) researched the satisfaction of students on the quality dimension of LMS at the College of Applied Studies and Community Service, Imam Abdurrahman Bin Faisal University, Saudi Arabia, and found that as the benefits of students rose their satisfaction increased. Back in 2010 Naveh et al. (2010) found that LMS was used in a variety of ways, with a high degree of satisfaction and a low significant link between use and satisfaction. There are many studies (Nguyen, 2021; Ohliati & Abbas, 2019) quality satisfaction of LMS commonly reported and have

shown that user satisfaction strongly predicts the success or failure of LMS deployment. However, there is no inclusive study to explain the quality in terms of students' satisfaction in the context of rural areas like Gilgit-Baltistan which is scattered in areas with high mountains and difficult terrain where natural disasters are very frequent making it highly probable to use online learning more frequent and dependent for students in the future.

LMS seemed to be inevitable and the online learning resources were to be in access to the university graduates, in the wake of keeping 'social distance' due to Covid. No one seemed to care about the shortcomings of Online learning platforms as indicated in other studies (Dhawan, 2020). The areas of debate include, problems including user activities, the purpose of use, and comfort in usage are extensively discussed in prior literature regarding the use of LMS. Other factors considered in contemporary LMS usage studies include the convenience of use, encouraging requirements for use, success standards for use, attitude toward use, ability to use, and so on (Roslina et al., 2013). Along with the benefits and compulsion to use online learning platforms, regardless of their theoretical implications, when one discusses practical usage, many are in favor. Thus, many studies tend to focus more on the challenges in using LMS, specifically referring to the 'handling' of the LMS for intended use. According to Faizi et al. (2017), students' learning is hampered by challenges in utilizing LMS. This can be attributed to learners' inadequate computer skills competency; the more difficult students judged LMS to be, the lower their learners' motivation and intention to use LMS. When learners' learning experiences are pleasant, their behavioral intention to continue using LMS improves dramatically (Oramas et al., 2016). Despite its immense significance and ICT development (Khan et al., 2020), there have been no studies in the rural areas' context, particularly Gilgit-Baltistan. Hence, the current study was designed to investigate, the student's satisfaction with the quality dimensions of the online learning platform i.e., LMS.

The study of satisfaction with LMS may help us determine the effectiveness in terms of students' satisfaction on various quality dimensions of the LMS. University administration and faculty may be more informed as a result of the findings of the study. The students' satisfaction level would reveal not only the areas of problems and challenges but also the areas of the LMS, which may need further improvement. The study is expected to be a great source of identifying the weaknesses, and usability of this system for the future. It should also expand our understanding of the perception of students; their feedback may play a key role in further improvement of LMSs, as student satisfaction would play a great role as a feedback mechanism, which provides the necessary information to point out the areas to be addressed for effective use of the system

LITERATURE REVIEW

Previous researchers (Delone & Mclean, 2016; Doll et al., 1995; Lin, 2007; Sedera & Gable, 2004; Hwee & Koh, 2020; Yosep, 2015) have studied various key quality dimensions of the LMS in other universities internationally. A review of the literature of those studies revealed that three key dimensions are widely in use. These dimensions include System Quality, Service Quality, and Information Quality. System quality is assessed in terms of both the technology at the user's disposal and the numerous software programs created for their intended purpose and requirements (Yosep, 2015). In LMS research, System Quality has been investigated in terms of technological aspects such as system dependability, response time, accessibility of content, navigation system layout, and speed (Hwee & Koh, 2020). Service Quality refers to the timeliness, correctness, dependability, technical expertise, and empathy of the people staff that system users get from the Information system department and IT support professionals (Yosep, 2015). Information Quality refers to providing users with reliable, comprehensive, and relevant information is the driving force behind information systems applications. Information quality must be a crucial factor in a system's success (DeLone & McLean, 2016). The Information Quality dimension is a significant contributor to user satisfaction, it should be viewed as a success measure distinct from measures of end-user satisfaction (Doll et al., 1995). There is likely to be a lot of variation in "Information Quality" in reality, since information relevance is a key attribute and can vary greatly across systems; as a result, this variation should be taken into account in quantitative IS research (Sedera & Gable, 2004).

LMS Quality Dimensions

Delone and McLean presented the model of information system success for the first time in 1992 to analyze IS success, and it was utilized in approximately 300 research studies. Delone and McLean refined and improved the model in 2003, in response to the evolving role of information systems throughout time. Six aspects are included in the updated D & M model: (1) information quality, (2) system quality, (3) service quality, (4) usage/intention to use, (5) user satisfaction, and (6) net benefits (Lin, 2007). The initial purpose of the IS information system model by Delone and McLean (1992) was to investigate how information systems affect business organizations. It postulates that user satisfaction and continued usage are influenced by the system and information quality of information systems. The model was then updated to include a third component linked to the service quality of technical support (Hwee & Koh, 2020). Delone and McLean's updated model may be used to assess the success of e-learning systems.

LMS studies have employed the three components of the IS (information system) model to analyze students' perception of LMS quality and how it relates to their LMS satisfaction by seeing the LMS as an information system. Wang et al. (2007) applied

the D & M model components for the very first time, for e-learning systems in organizations without examining the interaction between model elements. Lin employed this model for online learning platforms without addressing the overall benefits of the element and without analyzing the interactions between model components, regardless of their relevance (Hassanzadeh et al., 2012; Lin, 2007).

Information Quality

As providing users with reliable, comprehensive, and relevant information is the driving force behind information systems applications, information quality must be a crucial factor in a system's success (DeLone & McLean, 2016). 'Information Quality' is a significant contributor to user satisfaction, and, is used as a success measure distinct from measures of end-user satisfaction (Doll et al., 1995). There is likely to be a lot of variation in "Information Quality" in reality since information relevance is a key attribute and can vary greatly across systems; as a result, this variation should be taken into account in quantitative IS (information system) research (Sedera & Gable, 2004). Information quality (IQ) is a construct used to indicate how well-written an information system's content is. Content is text on any webpage or application, everything written on an LMS application is content, for example, elements displayed on LMS software like Dashboard, profile, etc. The primary variable that affects how effective information systems, particularly e-learning systems, are is information quality. It assesses the effects of these factors as well as the effectiveness of the e-learning system. Previously, information quality has been used to assess system output, such as the quality of the information that the system generates, mostly in the shape of reporting (Yosep, 2015). The adequacy, correctness, and currency of LMS materials are considered indicators of information quality (Hwee & Koh, 2020).

System Quality

An individual's assessment of a system's performance is its System Quality. From the viewpoint of e-learning, the system quality is assessed in terms of both the technology at the user's disposal and the numerous software programs created for their intended purpose and requirements system performance characteristics are often the main focus of measures of system quality (Yosep, 2015). In LMS research, system quality has been investigated in terms of technological aspects such as system dependability, response time, accessibility of content, navigation system layout, and speed (Hwee & Koh, 2020).

Due to the extensive study on the Technology Acceptance Model, "Perceived Ease of Use" is the most popular indicator of "System Quality" (Fred & Davis, 1989). Nevertheless, only perceived ease of use is not enough to measure the "System Quality" construct. Rivard et al. (1997) created and evaluated a 40-item test that assesses eight aspects of system quality: portability, usability, ease of understanding,

usefulness, ease of maintenance, affordability, and validity. Others have developed their measures of system quality based on the original D & M Model's dimensions (Gable & Sedera, 2003). These metrics are availability, response time, system dependability, adaptability, persuasibility, system interaction, and system security, according to a study (Delone & McLean, 1992).

Service Quality

Service quality refers to the timeliness, correctness, dependability, technical expertise, and empathy of the people staff that system users get from the Information system department and IT support professionals (Yosep, 2015). The availability of technical help for the LMS is referred to as service quality. Although it was discovered to have a strong positive link with LMS satisfaction, it was discovered to have a smaller effect on LMS satisfaction than information quality and system quality (Lin, 2007). The findings of the Delone and Mclean (2016) research revealed four primary aspects of system quality: (1) Efficiency; refers to how quickly and easily one can access and use a website. (2) Fulfillment. It refers to how well a website delivers on its promises regarding order delivery and item availability. (3) System availability, which refers to how well a website functions technically. (4) Privacy, which refers to how well a website is secure and protects customer information. Using these studies' data, a conceptual framework for the present study was carved out as shown in Figure 1.

Figure 1: ***Conceptual Framework of the Study***

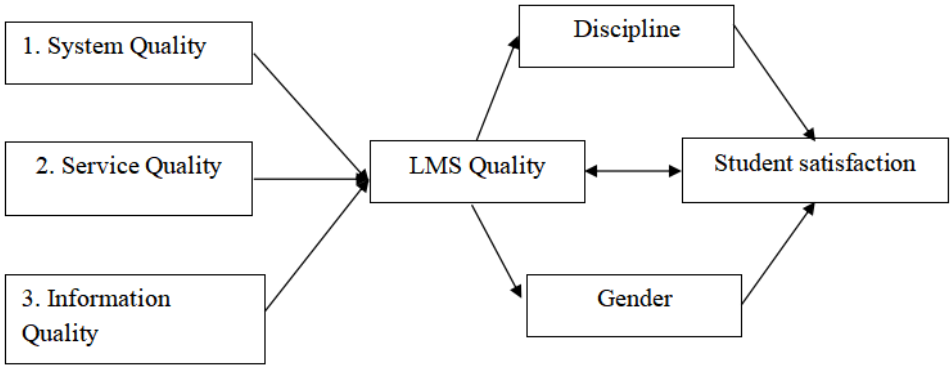


Figure 1. Shows the conceptual framework of the present study based on the theoretical perspective described previously. On the left of the figure are the three quality dimensions leading to the overall quality while Gender and academic discipline may affect students' 'satisfaction', hence playing their role in defining or explaining LMS quality. Student satisfaction works in both ways, as it indicates quality, and quality in return enhances satisfaction level, that's how satisfaction can be used as an indicator of quality.

RESEARCH QUESTIONS

1. To examine students' satisfaction with the overall quality (total score on all dimensions combined)
2. To assess the level and variations of students' satisfaction across the dimensions i.e. (Information Quality, Service Quality, and System Quality) of the online learning platforms, LMS.
3. To investigate variation among male and female students' satisfaction with quality dimensions of LMS.
4. To investigate the variation of students' satisfaction with LMS across disciplines (based on their background studies).

RESEARCH HYPOTHESES

1. Students' satisfaction across the dimension of the LMS significantly varies.
2. Satisfaction of male and female students significantly differs
3. Student satisfaction across different departments significantly differs.

RESEARCH METHODOLOGY

Using a survey method, a self-developed questionnaire, contained three scales apart from the demographic variables. The target population of university undergraduates who took part in the survey study were from different parts of Gilgit-Baltistan. From a total population of approximately 6000 students (existing enrollment at BS), 300 (5 % of the population) students were selected as a sample using stratified sampling of the three faculties. Hence, the major strata were the faculty of social science, faculty of natural science, and faculty of arts and humanities, as per the ratio of these faculties (which is approximately the same), a representative sample was taken to include in the final sample size of 300. LMS quality was measured through students' satisfaction level on the given three key dimensions (System Quality, Service Quality, & Information Quality using a scale of satisfaction to be rated from 1-10 scale). Hence the questionnaire used for the survey consisted of these three scales, along with portions seeking information about participants' characteristics such as the nature of the field of study and gender. Data were entered into SPSS version 23. Cronbach's Alpha test for reliability showed all three scales to be above .7000 (a yardstick many uses for reliability cut-off value (George &Mallery, 2033). Using SPSS, V 23, both descriptive, such as the mean, and the SDs were calculated; and as inferential statistical tools the t-tests, and the Anova were applied for the data analysis, the analysis results have been presented in the following sections.

DATA ANALYSIS AND FINDINGS

H1: Students' satisfaction across the dimension i.e. (Information quality, Service quality, and System quality) significantly differs in our sample.

To explore the variation of LMS quality satisfaction across the three dimensions

(System Quality, Information Quality, and Service Quality), One Way Repeated Measure ANOVA was conducted. The results of the test are shown in table 1.

Table 1: ***Summary Results of Repeated Measure ANOVA***

	Mean	Std. Deviation	Wilk's Lambda	F	P	Eta Squared
Total system quality	71.80	13.68	.20	563.8	.0005	.79
Total information quality	48.77	8.12				
Total service quality	59.82	14.13				

As shown in Table 1, a one-way repeated measure ANOVA was conducted to explore the variation of LMS quality satisfaction across the three dimensions (System Quality, Information Quality, and Service Quality, N= 300). (The researcher has made a 100% return rate of the questionnaire by individually administering the questionnaire and through follow-up communication). The means and standard deviations are presented in Table 1. There was a significant effect, Wilks' Lambda = .20, F (2, 283.0) = 563.8, $p < .0005$, multivariate partial eta squared = .79. Wilk's Lamda is a multivariate test, which does not assume sphericity (Pallant, 2010, p. 277); and it is the most commonly reported test. For effect sizes, the partial eta-squared values were observed. The eta-squared value was .799, showing a large effect size (Pallant, 2010, p. 277).

The result of the analysis of the multivariate analysis (Wilk's Lambda) being significant indicates a statistically significant difference however to locate where the difference lies pair-wise comparison was made, as shown in Table 2.

Table 2: ***Repeated Measure ANOVA Summary of LMS Quality Dimensions***

(I) Satisfaction	(J) Satisfaction	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
System quality	Information quality	23.02*	.72	.000	21.28	24.76
	Service quality	11.98*	1.06	.000	9.41	14.55
Information quality	System quality	-23.02*	.72	.000	-24.76	-21.28
	Service quality	-11.04*	.84	.000	-13.07	-9.01
	System quality	-11.98*	1.06	.000	-14.55	-9.41

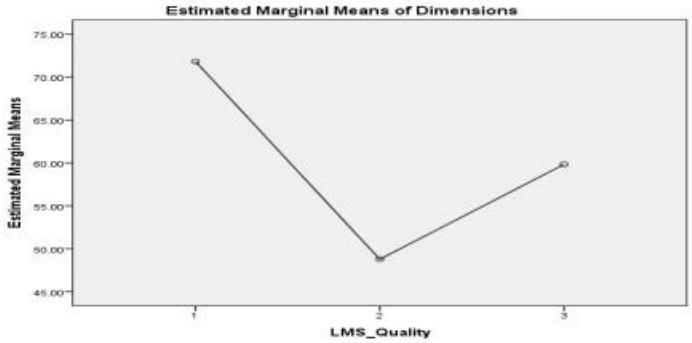
Service quality	Information quality	11.04*	.84	.000	9.01	13.07

Table 2 presents pair-wised comparison of LMS quality satisfaction between quality dimensions (system quality, information quality, and service quality). The result shows that the mean difference (M_d = 23.02) between the System quality dimension and the Information quality dimension was significant (p = .000, 95% C.I. = 21.28, 24.76). The mean of the System quality was higher than the Information Quality, as can be seen in Table 1. Similarly, the mean difference between the System quality dimension and Service quality dimension was also significant (p =.000, 95% C.I. = 9.41, 14.55).

Also, there was a statistically significant difference in the mean values of the Service quality dimension and the Information quality dimension (p = .000, 95% C.I. = 9.01, 13.07). In other words, the mean difference from all three quality dimensions was statistically significantly different, indicating significant variations in the satisfaction on the LMS of the selected public sector university.

The variation of LMS quality satisfaction between three dimensions (Information quality dimension, System quality dimension, and Service quality dimension) is shown graphically in Figure 2.

Figure 2: ***Variation between Three Quality Dimensions of LMS***



In Figure 2, label 1 on the left in the X-axis indicates *System Quality* which has the highest mean value (*M* = 71.8) while label 2 in the figure refers to *Information Quality* which has the lowest mean value (*M* = 48.7), and the value 3 in the X-axis indicated the third dimension, the *Service Quality* (*M* = 59.8).

H2: Satisfaction of male and female students about the quality dimensions of LMS significantly differs.

The results of the independent sample t-tests applied on all three dimensions

together (as dependent variables) and the gender as independent variables has been summarized in Table 3.

Table 3: ***Summary Result of Independent Sample t-Test.***

Measure	*Gender*	*N*	*Mean*	*SD*	*SEM*	*t*	*df*	*Sig.*
Total LMS	Male	144	179.67	27.76	2.31	-.48	283	.63
Quality	Female	141	181.16	24.51	2.06			
Service	Male	146	70.84	12.76	1.05	-1.39	291	.16
Quality	Female	147	73.04	14.22	1.17			
Information	Male	149	48.81	7.38	.60	.39	294	.69
Quality	Female	147	48.44	8.81	.72			
Service	Male	149	59.87	14.84	1.21	.20	294	.83
Quality	Female	147	59.54	12.88	1.06			

In Table 3, the result of the Independent-samples *t*-test shows that in the total LMS quality, the satisfaction of males and females did not significantly differ (M = 179.67, SD = 27.76) and females (M = 181.16, SD = 24.51); t (283) = -.48, p = .63, two-tailed. The magnitude of the differences in the means (mean difference = -1.48, 95% *CI*: –7.60 to 4.62). As we can see from the p-values none of the sub-dimensions of LMS showed any significant difference between male and female LMS satisfaction. The hypothesis stated was not supported by this evidence.

H3: Student satisfaction across different fields of studies significantly differs.

To explore if the satisfaction of different faculties such as the *faculty of social science, faculty of natural science,* and faculty *of arts and humanities* about LMS quality dimensions differ, One Way ANOVA was run on SPSS many times. First, it was run on the Total LMS quality scores. A summary of the results is presented in Table 4.

Table 4: ***Variance of Total LMS Quality Satisfaction between Fields of Studies.***

	Sum of Squares	*Df*	*Mean Square*	*F*	*Sig.* *Eta*
Between Groups	5591.65	2	2795.82	4.17	.016 .02
Within Groups	188893.31	282	669.83		
Total	194484.96	284			

As shown in Table 4, the one-way ANOVA results revealed that there was a statistically significant difference in mean value between at least two groups (F (2, 282) = [4.17], p = 0.16). The eta-squared value was 0.02, showing a small effect size (Pallant, 2010, p. 277). To examine whether the actual difference between any of the two groups was significant or not and to see which two are exactly differing post-hoc

test was conducted shown in Table 5.

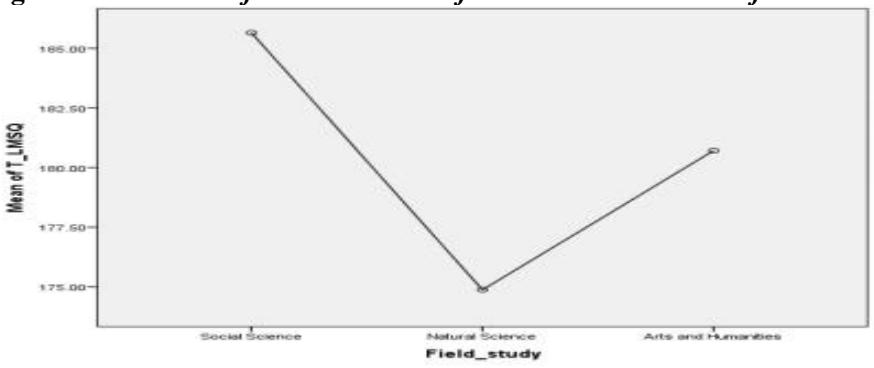
Table 5: ***Multiple Comparison Tables for Total LMS Quality Satisfaction***

(I) Field of study	(J) Field of study	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Social Science	Natural Science	10.78*	3.73	.01	1.97	19.58
	Arts and Humanities	4.94	3.76	.38	-3.92	13.81
Natural Science	Social Science	-10.78*	3.73	.01	-19.58	-1.97
	Arts and Humanities	-5.83	3.76	.27	-14.70	3.03
Arts and Humanities	Social Science	-4.94	3.76	.38	-13.81	3.92
	Natural Science	5.83	3.76	.27	-3.03	14.70

Note: Shows significant difference at alpha level .05 but not for .01

Table 5 shows the Tukey's HSD Test for multiple comparisons indicated that the mean value of total LMS satisfaction was significantly different between social science and natural science (p = .01) for 95% of confidence interval. There was not a statistically significant difference in mean scores between social science and arts and humanities (p = .38) similarly, the difference between natural science and arts and humanities (p = .27) was not significantly different. Hence the hypotheses stated were accepted to conclude that in students' satisfaction difference between social sciences and natural sciences was significantly different. The graphical representation for the variation of total LMS quality satisfaction between fields of studies is shown in Figure 3.

Figure 3: ***Variation of Total LMS Satisfaction between Fields of Studies***

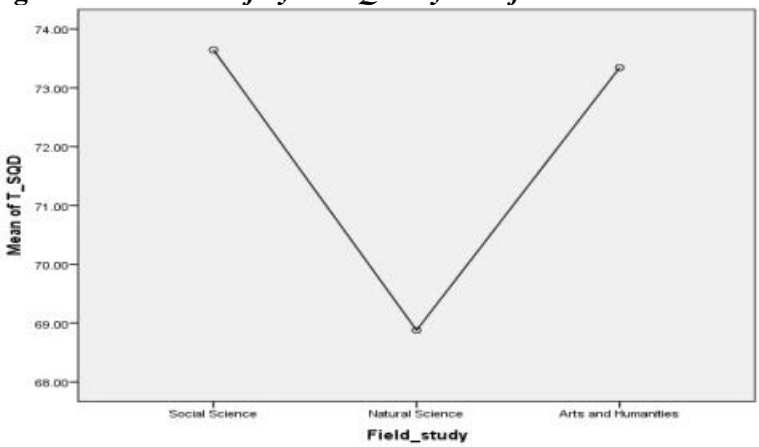


As shown in Figure 3 there is a variation of LMS quality satisfaction between fields of studies. The variation of scores ranged from 175 to 185. Social science has the highest level of satisfaction (M = 185) whereas natural science has the lowest level of satisfaction (M = 174) and arts and humanities have moderate satisfaction (M = 180) as compared to the other two fields of study.

4.1 Comparison of LMS satisfaction in various faculties (In System Quality Dimension)

To explore dimension-wise (system quality, information quality, and service quality) satisfaction of LMS quality the - way ANOVA was applied on each dimension of LMS quality, the results showed that for the first dimensions, SQ (System Quality), there was a statistically significant difference in mean value between at least two groups (F (2, 290) = [3.87], p = 0.02). It is significant only for 95% CI not for 99% of Confidence interval. The eta-squared value was 0.02, showing a small effect size (Pallant, 2010, p. 277). Since the F-value was significant, further the difference was investigated, using Tukey's HSD in the post hoc test, which showed only one significant difference which is the difference between the means of the Social science group (M = 73.6) and the Natural sciences group (M = 68.8), was significant but only at .05 confidence level not at .01 level of confidence as p = 0.03), hence even this difference should be taken into account carefully. The graphical representations for the variation of system quality satisfaction between fields of studies are shown in Figure 4.

Figure 4: ***Variation of System Quality Satisfaction between Fields of Studies***



As shown in Figure 4 there is variation of system quality satisfaction between fields of studies. Social science (M = 73.6) and arts and humanities (M = 73.3) have the highest satisfaction whereas natural science (M = 68.8) has the lowest level of satisfaction.

4.2: *Comparison of LMS satisfaction in various faculties (In Service Quality Dimension)*

The results of the One-way ANOVA for the Service quality (Faculty groups = 3 levels) revealed that there was not a statistically significant difference in mean value between at least two groups (F (2, 293) = [2.27], p = 0.10). Similarly, there was no significant difference between the faculty groups on the third dimension, service quality. Since the F (2, 193) = 1.93, p = .14, indicating insignificant differences between at least any two groups, hence no further analysis was conducted to investigate the specific differences.

From the above results, it was concluded that total LMS satisfaction was significantly different between social science and natural science. Similarly, the system quality satisfaction was significantly different between both social science and natural science; natural science and arts and humanities. Whereas, the students' satisfaction of LMS quality dimensions in other fields of studies was not significantly different. Hence, the initial hypothesis "Student's satisfaction across different fields of studies significantly differs" was true only for one quality dimension (that is System quality) but not for the other two dimensions (Service quality and Information Quality).

DISCUSSION

The first finding comes from the initial descriptive analysis of the overall total satisfaction score (regardless of dimension). It was found from the overall participants' responses that almost all items showed an average response of 6 plus (with only one item showing the highest mean of 6.8, which was related to the System Quality dimension. On the other hand, the item that showed the lowest mean value of 5 was from the SERQ Dimension (service quality dimension); SD = 1.8. None of the values showed above 7, which indicated participants' satisfaction level is slightly above average. The researcher considered values above 7.5 as highly satisfied, between 4.5 and 7.5 as average, and below 4.5 as least satisfied for easy interpretation of each item. Related to the first finding, the mean values of the composite score which was calculated from these individual items showed a mean of 180 (SD = 25) with a maximum score being 276 and a minimum being 112. Participants are satisfied only a bit more than medium satisfaction. These results are consistent with current research on LMS and client satisfaction. The importance of system quality in affecting user happiness and adoption rates was highlighted in research by Chew and Ayub (2020) which looked at customer satisfaction with LMS platforms. They discovered that greater levels of satisfaction and user acceptability are influenced by users' favorable judgments of system quality, such as simplicity of use and dependability.

The dimension-wise comparison shows that the SQ (System Quality) dimension is much better than, other the two dimensions (Information quality dimension, service

quality dimension). Within the Information quality dimension and Service quality dimension, the SERQ dimension showed to be better. On the other hand, Alzaza and Yaakub (2020), which emphasized the significance of service quality factors, such as adaptability and assistance, for affecting user satisfaction and involvement with LMS platforms, is consistent with the lower level of satisfaction seen in the LMS's service quality dimension.

The satisfaction of male and female students with LMS quality was examined for the significance of differences. No significant difference was found. The satisfaction of male and female students on *the system quality* dimension, *information quality* dimension, and *service quality* dimension were also not significantly different. Hence, it was concluded that gender had no significant effect on students' satisfaction according to the present study results. These results are consistent with earlier studies on technological adoption and satisfaction. Gender was not a major predictor of technology satisfaction, according to research by Venkatesh et al (2003) that looked at gender disparities in technology acceptance. Like this, Amasha and Abdelaziz (2017) looked at the satisfaction of male and female students with online educational programs and found no statistically significant gender disparities.

The third significant finding was that there was a statistically significant difference in at least one of the comparison groups. Results of the post-hoc test showed total LMS quality satisfaction was significantly different between the *Faculty of Social Science* and the *Faculty of Natural Science*, indicating that the students from the Faculty of Social Sciences were more satisfied. Within dimensions, System Quality satisfaction was significantly different between faculties of social science and Natural science. Similarly, the satisfaction was also significantly different between faculty of *Natural Science* students, and *the students of Arts and Humanities.* For the Information Quality dimension, there was no significant difference across faculties; and at last, for the Service Quality dimension, there was no significant difference found across faculties. These results are consistent with the Jones and Preece (2006) study, indicating the value of social contact and teamwork in virtual environments for educators and students throughout their lives. The social science faculty might have profited from more robust social networks and teamwork engagements, which may explain their greater levels of LMS satisfaction. This implies that, in addition to the LMS itself, the availability and caliber of helpful online communities may have an impact on satisfaction levels.

In contrast to the findings, and to the shortcomings of the present study, Al-Fraihat, Joy, and Sinclair (2020) emphasize the importance of elements like course design, engagement, and support services in figuring out how satisfied learners are with their online learning settings. Even though faculty type was not particularly taken into

account in their study, these elements may have had a greater impact on satisfaction than faculty type individually. Thus, it is plausible that factors other than faculty type, such as the design of courses or assistance services, may have influenced the degree of satisfaction across various faculties. The research by Hernández-Nanclares, Blasco-Arcas, and Caro-González (2015) also highlights the impact of quality characteristics, such as content, interface, and interaction, on satisfaction levels in the context of e-learning. Although not specifically tied to faculty type, these factors may have influenced satisfaction irrespective of the particular faculty. Therefore, while comparing the levels of satisfaction across various faculties, it is necessary to take into account both the faculty type and the quality characteristics of the LMS.

RECOMMENDATIONS

It was the aim of the study to explore the quality of online learning LMSs in light of the student's satisfaction on three key dimensions. The study's findings have indicated that students in Gilgit-Baltistan seem to be moderately satisfied with LMS quality. In spite of being a recent initiative and other external factors of internet and other electric issues, universities' online learning initiative is a potential success case for students' learning. This is an encouraging sign.

The dimension-wise comparison for Hypothesis 1 showed that the System Quality (SQ) dimension was ranked much higher than the other two dimensions, namely Information Quality and Service Quality. It was discovered that the Service Quality (SERQ) component had greater satisfaction scores than the Information Quality and Service Quality dimensions. These results show that students thought the system's functioning and dependability were substantially better than the caliber of the information presented and the service assistance provided, therefore the first hypothesis is accepted.

Regarding Hypothesis 2, the comparison of the satisfaction levels of male and female students revealed no considerable variations in overall LMS quality satisfaction, as against the hypothesis. The satisfaction with the System Quality, Information Quality, and Service Quality characteristics did not differ significantly by gender. According to the results of this study, it can be said that gender did not significantly affect how satisfied students were with the LMS, therefore the second hypothesis is rejected.

The investigation of satisfaction across several research domains indicated notable variances in Hypothesis 3. The Faculty of Social Sciences and the Faculty of Natural Sciences had considerably different levels of overall LMS quality satisfaction, with students from the Faculty of Social Sciences expressing greater levels of satisfaction. When individual dimensions were analyzed, the System Quality dimension revealed clear divisions across the faculties, particularly between the faculties of social sciences and natural sciences and between the faculties of natural sciences and arts and humanities. Nevertheless, there were no appreciable variations in satisfaction with the Information Quality and Service Quality dimensions across various academic

subjects.

These results provide insight into students' satisfaction with the online platforms in rural areas of Gilgit-Baltistan as a whole and highlight the significance of several aspects, gender-related differences, and field-specific elements in determining satisfaction levels. These findings may be used by educational institutions to improve the layout and functionality of their online learning spaces, adjusting them to better suit the unique demands of learners from a range of academic specializations. It's crucial to recognize the study's shortcomings, which include a major number of students from a specific university as the majority of students in Gilgit-Baltistan go to that university, its an emphasis on dependence on self-reported data. To further evaluate and build upon these findings, future studies may use more varied samples and qualitative methods.

Based on the findings of the study, several recommendations can be made

Keeping in mind the limitations of the current study, it is recommended for future researchers to study other factors, which may contribute to the students' satisfaction as a measure of service quality. These include students' engagement time with LMS, availability of internet, and students' IT Skills. It seems appropriate to recommend future researchers conduct structured interviews of students instead of questionnaires to elicit detailed responses on other possible causes of their dissatisfaction. A longitudinal study of satisfaction should be studied from time to time to identify the areas of improvement and the areas of success as well. Future researchers may find interest in exploring teachers' satisfaction as they are also stakeholders using LMS to manage students' learning as a part of their responsibilities.

The IT support professionals should focus on helping the LMS user. They should be always ready to facilitate and assist the students when they face any difficulty or when they need any technical support while using LMS. The LMS developers should improve the information quality dimension as it shows the minimum student satisfaction. They should make necessary changes in LMS using the feedback of students to make LMS more user-friendly and easier to navigate.

Although, in the present study teachers were not included in the sample, however, it seems appropriate to make some recommendations, as students' satisfaction seems to depend on the content teachers are uploading on LMS as part of the information quality dimension. They should upload reading material on time. Instructors should use the LMS platform more frequently to get students used to the LMS interface.

Data Availability

The datasets generated during and analyzed during the current study are available from the corresponding author upon reasonable request.

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