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WHY BLACKBOARD

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Abstract:
Introduction: *The rapid development of technology, along with the effects of the COVID-19 pandemic, has led to significant changes in education systems and to a current trend towards the widespread use of distance and digital learning environments. A Learning Management System (LMS) has been widely used as an educational platform to provide essential knowledge resources and support for communication, assessment, and learning. The emphasis on digital learning systems, such as LMSs, is supported by many higher education institutions in the Kingdom of Saudi Arabia as they pursue digital and information technology transformation goals.*
Materials and Methods: *This study presents a comparative analysis of 10 widely used LMSs to identify the most appropriate system for higher education in Saudi Arabia. Two different methods were used in the study: (1) comparison of features of the LMS, including courses, assessment, communication, and support; and (2) survey data about the use of the LMS from users to measure satisfaction rates and quality of usability and education support. The framework was designed to evaluate technical support and user perception through the LMS.*
Results: *The study highlights important differences in the usability, functionality, and communication and educational support of the systems. LMS platforms exhibit significant performance variations across core educational and administrative features, influencing Saudi universities' LMS platform choices. The LMS is well-received by faculty members, with positive perceptions of its consistency and administrative management. At the same time, students seem to focus on usability, interaction quality, and accessibility as factors affecting LMS efficiency.*
Conclusion: *The comparative analysis also indicates the individual strengths and limitations of the models used. Conclusions: The study remains a good reflection of the evolution of LMS platforms and the significance of supporting digital education. LMS has proven to be a useful learning platform in Saudi Arabia. Still, there is a need to enhance the LMS system's usability, communication, and focus to create a more effective learning platform. The suggestions in the paper are useful to university administrators and teachers, as well as to policymakers interested in making informed choices about modernising higher education knowledge.*

Key Words*: Learning Management Systems; Blackboard; Distance Learning; Digital Education; Saudi Universities; Higher Education.*

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I. Introduction

Today, amid the rapid pace of the digital world, we are required to use a Learning Management System (LMS) that meets the many needs of teachers and other educational institutions. We are observing a significant, rapid change in the educational landscape (a sudden increase in competition), paving the way for exciting opportunities in academia. As the Internet gains popularity, its use is changing the entire education system by empowering learners and providing access to emerging knowledge and resources in ways that can be put to effective use. Therefore, it has led to a soaring demand for advanced e-learning tools and techniques [1, 2]. MM platforms also support distance education by enabling teachers and learners to access educational content, lessons, and resources from the comfort of their homes. Therefore, to be competitive and improve education, having an LMS is always advantageous [3, 4].

Today, more than 300 commercial vendors offer e-learning platforms, and more than 55 of them use open-source software to enhance the learning process [5, 6]. These open-source LMS provide a universal way to enhance learning efficiency by enabling easy organisation and management of data and content [7, 8]. They provide easy access to educational materials and allow managers to monitor students' activities. By providing automatic marking and report-generation tools, they make the educational process easier, allowing managers to manage it smoothly and effectively. Therefore, selecting any LMS should be done wisely (Vellosillo et al, 2006).

In 2016, the Khan Community Service Institute for Teaching and Learning (KCTLT) focused on LMS in KSA with universities. Studies from different universities in Saudi Arabia showed varied choices, as universities were free to choose among LMS. The Ministry of Education in KSA introduced the Blackboard LMS to standardize its use. The free software was offered to Saudi universities for use; the Ministry of Education recognised the study as a basis for delivering study materials and enabling online and hybrid learning [9].

It is a web-based Learning Content Management System (LCMS) that combines Course Management System (CMS) tools with a Virtual Learning Environment (VLE). The social construction of the system is informed by training analysis and experiences from more than 162 educational programs. It supports online collaboration among teachers and learners, a norm of social constructivism. Its excellent utilisation makes the materials available online, where teachers, administrators, and other staff can easily create striking online courses [10, 11].

This study provides an intensive comparison of 10 learning management systems to determine which is the best option for SAE-related educational needs. Two approaches are used, of which the first is analysing the functionalities of each LMS. The second is collecting the opinions of university professors and students using a survey to assess the LMS, which seemed a suitable choice for developing an interesting and capable learning and teaching environment. Our focus is on evaluating Saudi Arabia's decision to opt for Zabbroad, with the results potentially impacting the future of learning in the country. The result analysis can be relevant to various stakeholders, such as University Authorities, researchers, and instructors, to make optimal use of the discussed systems for better learning.

When this work was designed, the structure was made reader-friendly. The second Section comprises reviews of LMSs and the reasons for selecting the said one, along with its limitations. The third Section compares various LMSs, while the fourth Section presents the major revelations. The fifth and final Section delivers the conclusion.

II. RELATED WORK

Previous Studies

Our study is based on the analysis of 20 open-source and commercial e-learning management systems, each with more than 20 tools for students and teachers. Through our study, we have identified the best open-source, free-of-cost tool, Moodle, which supports more than 100 languages. Chamilo, TotaraLearn, Open edX, and Sakai are other good open-source tools with many features. Many systems, such as Docebo and SAP Litmos, offer well-secured tools. Most tools have gamification features, and most commercial tools offer 24*7 support, while open-source tools like Opigno and TotaraLearn also provide the same [12].

Modern information and communication tools for student training have become widely adopted, with LMSs a must-have. However, courses on various LMS platforms share similar features and functions, making it difficult for users to find the best one. There are methods for assessing e-learning quality, but there is a lack of comprehensive research on modern LMSs. In our study, we have evaluated the usability and functionality of 36 LMS across 3 categories: Learning Skills Tools, Communication Tools, and Productivity Tools. Most systems support multimedia content and the creation of lectures and assignments, but limited communication tools in LMSs push users to use external discussion forums and social networks. The purpose of our paper is to highlight current trends in the design and development of web-based LMS [13].

This paper explores the impact of various LMS structures and interactive tools on user satisfaction, emphasising students' active engagement through learning partnerships in online learning contexts. It offers a comparative analysis of the proprietary LMS Blackboard and the free, open-source LMS Moodle, based on three research works: A Study of Virtual Learning Environments, A Comparative Study of Moodle with other E-learning Systems, and A comparison of Blackboard 9.1 and Moodle 2.0. As both tools are capable of providing similar tools, the comparison of their important functionalities of communication, productivity, and student engagement will prove how both tools can enhance student learning and understanding [14].

This paper compares various LMS available for Use in higher education institutions, such as Moodle, ATutor, Blackboard, and SuccessFactors, based on flexibility, ease of Use, accessibility, and user-friendliness. The purpose of the paper is to educate readers on selecting the most comfortable LMS for their institute [15].

This paper compares three e-learning management systems to identify user-friendly tools suitable for the researcher's needs at the University of Sciences and Humanities. The descriptions of the tools for each platform and the comparative analysis of the three systems are provided to implement the work on the Image Processing Research Laboratory (INTI-Lab) server since early 2020. Online courses facilitate rapid knowledge acquisition and effective knowledge sharing [16].

LMS offers a great scope for knowledge sharing, supports critical thinking, and maintains data continuity and privacy, thereby increasing its importance in university E-learning. The knowledge gathered from 74 interviews of students and teachers at major Australian universities with the Blackboard platform has derived

some important factors to design a simple interface with fewer tools and links to make it simple, data privacy by posting anonymously and flexible options for customising and enabling students to control the usability of the platform [17].

This paper explores various factors influencing learners' perceptions of e-learning during the COVID-19 pandemic. It analyses the major challenges students faced during the COVID-19 pandemic and seeks to understand the real impact of online learning during this phase. It also examined mechanisms to boost student engagement during the pandemic in e-learning sessions [18].

Online course management tools are used in an educational institution to facilitate communication between teachers and students throughout the course. Various LMS have also been ranked on the parameters as Memory, Integrity, User-Friendliness and Tools. The results show that Moodle is the most used LMS, followed by Google Classroom, which offers free G Suite tools and powerful content features. Blackboard has many security features, with content management as the highest. From the survey, we know that more than 80% of students are unaware of LMS tools, and only 20% of users are aware of one or two tools, most of whom are IT students and teachers [19].

The level of ICT integration varies with a country's development, and a country needs national policies for the effective management of the technology and sustainable development. In our study, we have also evaluated the role of technology in education, studied e-learning tools, assessed teachers' acceptance through interviews in Colombia, and analysed the effect of the learning management system on education and development in Colombia [20].

Educational systems emphasise content, presentation, organisation, and teacher-learner interaction, and learners use a wide variety of media resources, such as slides, books, and video demonstrations, to enrich their experiences. In this paper, key e-learning tools will be discussed, their integration into the educational system examined, and existing systems compared. The current e-learning statistics will be presented worldwide, along with our prospects in this field [21].

The present study examined students' knowledge, opinions, and attitudes toward the Blackboard platform for English courses during COVID-19 through surveys and interviews of 179 non-English-major students at a Saudi university. It concluded that most students were satisfied with the Blackboard platform. Students also agreed to the online courses and supported the Blackboard platform. They appreciated the platform's support for self-directed learning and the availability of other materials. For better outcomes, the students recommended diversifying activities and integrating activities across classes, better communication between teachers and students, and reduced Use of English within the content and classes [11].

This study selected three e-learning management systems from the University of Sciences and Humanities to facilitate the research, with the aim of identifying the most user-friendly one for the researcher's training at the Image Processing Research Laboratory (INTI-Lab). The paper introduced the tools for each system and prepared a comparative analysis of the three systems to implement on the server at the initial stage in 2020. The online courses provide the means to acquire knowledge rapidly and share knowledge effectively [16].

Moodle, Canvas, Open edX, and WordPress with LearnDash are a few e-learning platforms that offer unique features for distance learning. We have compared these using nine parameters adapted from FFFOD-1. Training organisation 2. Skills and badges 3. Design 4. Communication 5. Monitoring 6. Usability 7. Collaboration 8. User management and 9. Accessibility and choose the one best suited to the learner's needs, in order to fulfil the educational aim [22].

LMS Platforms

LMS supports a wide range of educational services in the modern education system. It enables the transfer of knowledge through personalised learning. LMS supports a vast amount of educational content. This advantage of the system is not limited to a traditional classroom setting. With its flexibility and collaborative features, an LMS can easily cater to varied individual needs in large organisations and academic institutions. Its adaptability to diverse learning styles has further cemented its importance in e-learning.

The importance of LMS has gone far beyond simple, convenient management and cross-path training, becoming a vital contribution to our companies. It is a tool for cost-effective training, compliance management, and the continuous development of organisations. An LMS is a step toward a better life in a world where knowledge is everything [18, 23].

LMS was developed in the late 1990s and early 2000s. Its primary purpose in this phase has been to manage administrative work and deliver content. Motivated by the advent of Web 2.0, LMS applications have undergone a fundamental transformation in recent times.

Apart from core content delivery, LMSs today also include social learning components that boost knowledge sharing and teamwork. The current transition to cloud-based systems has further increased their acceptance and utility, enabling learners to access e-learning platforms from anywhere and at any time. The

proliferation and growing importance of mobile phones changed the LMS landscape, as smart devices further enabled learners to access their favourite sources on mobile devices.

This has spurred the use of LMSs amid mammoth technological advancements and the demand for flexible, individualised, and effective learning experiences, including the Open Education movement, as John Daniel proclaimed at Purdue University [15, 24]. All stakeholders in the education domain can effectively leverage the benefits of LMSs. This proven tool effectively addresses all training needs within an organisation and makes learning more engaging for students and educators alike.

Bringing an LMS to the workplace increases efficiency by creating an online educational environment where employees can choose courses that interest them and meet their needs. This reduces costs and makes learning more accessible. LMS analytics help HR determine how much people are learning and where their skills gaps and certification requirements lie. An organisation can then work to build and strengthen its workforce, becoming a champion of success and excellence [22].

Benefits and Limitations of Learning Management System

LMS provides a breakthrough with e-learning programs tailored to different users' needs. The COVID-19 pandemic demonstrated the real-world advantages of e-learning, including the know-how to reduce costs and increase efficiency for organisations. Educators and organisations had gained significantly from this by minimising the costs of conducting training courses and assignments, participating in forums, preparing reports, and preparing for exams. The following points outline key features an LMS can provide to advance your training and educational goals.

1. Time-saving: No matter how much time you waste in your conventional learning system in moving from one room to another, in an LMS, a learner can be easily logged on from any location to save time and get trained quickly. Education providers can also reap the benefits of content reuse to make their efforts more time-efficient and productive. Make your learning experience more efficient.
2. Cutting down the costs: LMS can cut down the costs considerably on training, such as the trainer cost and travelling expenses. The implementation of a blended strategy has achieved good results and reduced costs by integrating online and face-to-face channels to improve the learning process. Maximise the value of your training investments and positively influence your organisation's finances.
3. Monitoring data: The valuable data on training processes and learning aftereffects may be very useful to predict the real impact of education. Provide key reports on test results, successes, failures, participation, etc. It is one of the best tool sets for analyzing and assessing the impact of educational investments.
4. Reusability of training material: Training material can be reused forever, and there is time and cost savings. The contents can be updated and modified without incurring unnecessary costs or requiring advanced technical knowledge.
5. Varieties of training methods: We have been enlightened enough by the technology of LMS to know that now it is how you learn that matters. LMS offers all possible ways to learn in the most convenient style for anyone who requires.
6. Integrate the training management: Training up an organization efficiently and effectively is the mantra for dedicated trainers. Easy notifications and learner enrolment in courses, along with certificate issuance, streamline the entire process. It is well managed with automatic enrollments, relevant courses assigned, and progress reports made easily accessible.

LMS has now revolutionised the education process with powerful features that enable a real-time learning experience. Various LMS features have some limitations that educators or learners need to work around, predominantly the following points.

1. Maintenance and upgrade of the LMS: LMS needs good maintenance processes and upgrades to be maintained in the best performance and with unaffected functionality. Lack of proper service of the same can result in loss of time, resources, and trust in the technology.
2. Ongoing costs: Regular renewals in license subscriptions or support and maintenance costs may shoot up if proper foresight is not made.
3. Content reusability: Not much flexibility may be available with some standard LMS content, especially when the source code is not open.
4. Privacy and information security: Keeping the most valuable student data secured becomes mission-critical. A data theft or breach can have a catastrophic negative impact.
5. Technical failure: Technical issues like errors in the system and poor internet connections can hamper the learning process due to access failure in the knowledge resources and the learning environments.

The most popular LMS

This paper will investigate 10 LMS systems considered the best worldwide, as illustrated in Table 1. To identify the best applications of these systems in the education sector in the Kingdom of Saudi Arabia, our aim

is to investigate how these systems will work most effectively in the sector. Below, we summarise some brief notes on the above systems.

Table no 1: Top-Rated LMS That Enhance Educational Success

No	Software	No	Software
	Moodle LMS		Thinkific LMS
	Adobe Captivate		360Learning
	Acorn LMS		Blackboard Learn
	Canvas LMS		Absorb LMS
	Google Classroom		Docebo

Blackboard Learn: It is produced by Blackboard Educational Services in Washington, DC, is one of the best online learning management systems and has a strong impact on the education of teachers and students. The program will be linked to the online lecture, including the available documents and activities that promote interactive communication. It will also promote learning by evaluating outcomes through tools such as quizzes and feedback [30, 31].

Moodle: It is an advanced program for upgrading the learning process. It is used in more than 235 countries at present. 7.5m courses and 72m users use Moodle very often. It is based on the key pedagogic concept where the teachers manage the online learning with great efficiency and can communicate with the students via the available links, like educational lectures, etc., to students and also evaluate the students with the outputs of the quizzes, tests, etc., to be sure about the possible enhancement of student performance in the course [32, 33].

Adobe Captivate: It is also a basic requirement for authors of online interaction content widely used in the industrial field. It provided the virtual classroom, multi-module training courses, and interactive videos. It is recommended for environments that demand higher quality, such as universities and government ministries, where training in high-order multimedia tools is a prime demand [34].

Acorn LMS: Acorn is Australia's fastest-growing cloud-based learning management system. This commercial portal provides a complete set of tools for managing the employee training, education and recruitment products from government and private organisations. Use Acorn to fulfil your workforce development and management needs [35].

Canvas LMS is a free, cloud-based learning management system designed specifically for teachers. It is used by various Governmental Organisations, the non-profit sector, and the private sector to access learning materials easily. The system makes content management very simple; the additional features are used to develop skills, and automated course tracking and the production of various reports will help the LMS organisers [35].

Thinkific LMS: It is the best option for creating and selling online products under its own logo or brand name. Experts in the field use this platform to share their skills and earn extra income through the online concept. Learners who want to acquire skills will find their niche with this system, such as how to fly a plane or play the guitar. Join 25000 content creators with Thinkific and serve the world in 165 countries [37].

Google Classroom: It is very easy to keep learners and teachers together in the classroom and beyond. It will save time and eliminate the regular internal processes. Following the steps of creating the class, providing the assignment, discussing, operating and keeping the comments, etc., will make it look very easy.

Below are some of the advantages of using Google Classroom, as described.

1. easy and speedy assignment and delivery of it.
2. It will be quicker to develop the assignment and its correction as all the activities have been done in one place.
3. Students can find class documents, videos and other saving materials for their knowledge.
4. Google Classroom is presently used by more than 150 million people around the world. It is not so bad, so take advantage of it.

Applying for the following benefits by using Google Classroom.

1. By using Google Classroom, classes can be created very quickly; normal class activities like selecting students, adding members, providing the schema, etc.
2. Very quick to develop and design the assignment and course within the Google Classroom.
3. Students can see and track their assignments very easily, and they are automatically saved to form a part of the course material.
4. It is widely used across the world among 150 million people [38].

360Learning: It is a new use of advanced AI technology that aims to produce experts rather than resources for the learning and development of professionals. It makes the process effective and objective and boosts professional improvement through the culture and practices of strategically using available resources [39].

Absorb LMS: To improve enterprise training, it is recommended to use Absorb LMS, an advanced cloud-based learning management system that provides comprehensive capabilities for upskilling employees, customers, partners, and members worldwide. Since 2003, it has been providing corporate training with attention and care to ensure an effective training process [40]).

Docebo: Docebo is more than a simple program that offers learning management; it is now going towards the shape of the new future of learning with the provision of hot-selling innovative artificial intelligence (AI) based programs. It will increase content production, efficiency, and workflow ease. Experienced trainers will be able to use the program to have a greater impact on the good work with added outcomes [41].

III. METHODOLOGY

The objective of this paper is to compare 10 well-known LMS to help Saudi universities choose the best-suited ones for their needs. The comparison will be conducted in two main parts, focusing on identifying both pros and cons. In the first part, we analyse the capacities of the different LMS tools; in the second part, we distributed an online questionnaire to teachers and students at Saudi universities and obtained satisfactory results with a sufficient margin of confidence. The goal of this research is to help universities make informed decisions about their educational systems and to encourage decision-makers and faculty to choose the appropriate LMS based on objective, comparative criteria.

Learning Management Systems Tools

An LMS provides a plethora of tools to improve the overall e-learning experience, such as content management, quizzes/assessments, and discussion forums. This review evaluates ten popular LMS based on their specific functionality. Based on the comparison, each product has its own advantages, and none can provide everything needed for an optimal LMS.

As no product satisfies the required conditions in all aspects (functional/technical design and budget), finding the best match for your organisation to implement an effective e-learning may require exploring a few factors (as aforementioned) [42, 43]. LMS have several features to boost the e-learning experience. For easier review and comparison, we divided these features into three main stages (as mentioned in tables 2, 3, and 4 below). We named them Learner Tools, Support Tools, and Technical Tools, respectively, with the response Yes or No represented by 1 or 0, respectively. Now we will go through each section with its specific benefits [1, 12, 13, 19, 23, 43, 26, 33, 42, 43]:

Course Management Tools

This chapter also describes three important functional groups of Course Management Tools that the student will use when interacting with this product: 1. Content Collection tools allow users to collect and consolidate useful information for their own use for class; 2. Course Tools facilitate course administration for instructors and enable content sharing; 3.

Orientation and Productivity tools orient users to the system and, for the instructor, facilitate their use of the system; Table 2 indicates the wide range of Course Management Tools in each grouping.

Table no 2. A Comprehensive Comparison of LMS Focused on Course Management

No	1	2	3	4	5	6	7	8	9	10
Product Name / Tools	Blackboard Learn	Moodle LMS	Acorn LMS	Canvas LMS	Google Classroom	Thinkific LMS	360Learning	Adobe Captivate	Absorb LMS	Docebo
Course Management										
Content collection										
Course Content	1	1	1	1	1	1	1	1	1	1
Institution Content	1	1	1	1	1	1	1	1	1	1
Goal Performance	1	1	0	0	0	1	1	0	1	1
Class Collaborate Ultra	1	1	0	0	0	0	1	0	1	0
Course Tools										
Tests	1	1	1	1	1	1	1	1	1	1
Surveys	1	1	1	1	1	1	1	1	1	1
Pools	1	1	1	1	1	1	1	1	1	1
McGraw-Hill Higher Education	0	1	1	0	1	0	0	0	0	0
Mediasite Assignments	1	0	1	1	0	0	1	0	1	1
Achievements	1	1	1	1	1	1	1	1	1	1
Attendance	1	1	1	1	1	1	1	1	1	1
Bookshelf	1	0	0	0	0	1	0	0	1	0

Data Management	1	1	1	1	1	1	1	1	1	1
Board	1	1	1	0	1	1	0	1	0	1
Blogs	1	1	0	0	0	1	1	0	1	0
Journals	1	1	1	1	1	1	1	1	1	1
Rubrics	1	1	0	0	0	0	0	0	0	0
Tasks	1	1	1	1	1	1	1	1	1	1
My Mediasite	1	0	0	1	0	1	1	0	1	0
Goals	1	1	1	1	1	1	1	1	1	1
Wikis	1	1	1	1	1	1	1	1	1	1
Glossary	1	1	1	1	1	1	1	1	1	1
Orientation & Productivity										
Orientation	1	0	0	0	0	0	0	0	0	0
Work Off-line	1	1	0	1	0	1	1	1	0	0
Searching Course	1	1	1	1	1	1	0	1	1	1
SafeAssign	1	1	1	0	1	0	1	0	1	0
File Exchange	1	1	1	1	1	1	1	1	1	1
Calendar	1	1	1	1	1	1	1	1	1	1
Web services	0	1	0	0	0	0	0	0	0	0
Total Tools	29	29	29	29	29	29	29	29	29	29
Total Available	26	25	20	19	22	23	22	20	23	19
Total Missing	3	4	9	10	7	6	7	9	6	10

Table 2: LMS platforms compared by learner tools. In the figure, it's clear that the top three LMS platforms with great learner features are Blackboard Learn (26 and 25 features), Moodle (25 and 26 features), and the only one missing 4 features from the list. Canvas LMS and Docebo were left with 10 features missing, Adobe Captivate and Acorn LMS with 9, and the others with 6-7. The winner here is Blackboard Learn, as each has 26 and 25 features, respectively.

Customization Tools

In this chapter, we're covering three essential categories of customisation tools that will help increase the usability and productivity of our system: Customisation Tools, Evaluation Tools, and Grade Centre Tools. Customisation tools are used to configure the system. These tools help a user get what they need when setting up their system exactly the way they want it to be when it comes time to put their training into the system and use it afterwards.

Evaluation tools are set up to measure success with the user. There is an opportunity to assess and check in to make sure the user is making their mark or hitting the target you have them aiming for. Finally, there are Grade Centre tools.

We are having our instructor, the manager, and the organisation have the ability to grade and review. We have Grade Centre, so if our instructor wants to check their grades, and our manager and the organisation want to make sure our users are getting good marks on their assignments, our users will have the opportunity.

Table no 3. A Comparison of LMS Based on Customisation

No	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Product Name / Tools	**Blackboard Learn**	**Moodle LMS**	**Acorn LMS**	**Canvas LMS**	**Google Classroom**	**Thinkific LMS**	**360Learning**	**Adobe Captivate**	**Absorb LMS**	**Docebo**
Customization										
Customization Tools										
Enrollment Options	**1**	1	1	1	1	1	1	1	1	1
Quick Setup Guide	**1**	1	0	1	0	1	1	1	1	0
Guest and Observer Access	**1**	1	1	0	1	1	0	0	0	0
Tool Availability	**1**	1	1	1	1	1	1	1	1	1
Teaching Style	**1**	1	1	1	1	1	1	0	1	0
Properties	**0**	1	0	1	0	1	0	0	0	0
Authentication	**1**	1	1	1	1	1	1	1	1	1
Authorization	**1**	1	0	1	1	0	0	1	0	1
Evaluation										
Course Reports	1	1	1	1	1	1	1	1	1	1
Performance Dashboard	1	1	1	1	1	1	1	1	1	1
SCORM Reports	1	0	0	1	0	1	0	0	1	0
Retention Center	1	0	0	0	1	0	1	0	0	0
Grade Center										
Needs Grading	1	1	0	0	0	1	0	0	0	0

No	1	2	3	4	5	6	7	8	9	10
Product Name / Tools	Blackboard Learn	Moodle LMS	Acorn LMS	Canvas LMS	Google Classroom	Thinkific LMS	360Learning	Adobe Captivate	Absorb LMS	Docebo
Full Grade Center	1	1	1	1	1	1	1	1	1	1
Course accessibility score	1	1	1	1	1	1	1	1	1	1
Self and Peer Assessment	0	1	1	0	1	0	1	0	0	1
Total Tools	16	16	16	16	16	16	16	16	16	16
Total available	14	14	10	12	12	13	11	9	10	9
Total Missing	2	2	6	4	4	3	5	7	6	7

To assist the different categories in meeting the requirements of their specific users, we have described each tool in more detail in Table 3 below. These Support Tools have been specially designed to: improve the user experience, increase efficiency, reduce user difficulty, and make it easier for users to complete tasks within the LMS. Table 3 below lists various learning management systems and their support tools.

In this respect, the learning management system platform Adobe Captivate has quite a few missing, with Docebo and Absorb LMS missing many as well. Blackboard Learn and Moodle each have just two support tools missing in this comparison. Thinkific LMS is missing three support features, while other learning management systems have between 4 and 6. This supports the high degree of support tools that Blackboard Learn and Moodle possess.

Communication Tools

Here's what we'll go over next - the 5 types of communication tools necessary to communicate best and help every customer:

1. Communicating Tools - Internal and external communication channels.
2. Consumer Services Contact information.
3. Social Support Information.
4. Services Level Agreements - SLA - Responsiveness policies and commitments.
5. Lawyers get in touch with the info.

We will examine the functions of each communication instrument in Table 4.

Table no 4. The Comparison between LMS based on Communication

No	1	2	3	4	5	6	7	8	9	10
Product Name / Tools	Blackboard Learn	Moodle LMS	Acorn LMS	Canvas LMS	Google Classroom	Thinkific LMS	360Learning	Adobe Captivate	Absorb LMS	Docebo
Communication										
Communication Tools										
Discussion	1	1	1	1	1	1	1	1	1	1
Send Email	1	1	1	1	1	1	1	1	1	1
Announcements	1	1	1	1	1	1	1	1	1	1
Course Messages	1	1	1	1	1	1	1	1	1	1
Real-time Chat	1	1	0	1	1	0	1	0	1	0
Video Services	1	0	0	0	1	0	0	0	1	1
Whiteboard	1	1	1	0	1	0	1	1	1	0
On-line Journal	1	1	0	0	0	0	0	0	0	0
Student Tracking	1	1	0	1	1	1	0	0	0	0
Contacts	1	1	1	1	1	1	1	1	1	1
Customer Service Contacts										
Email Support	1	1	1	1	1	1	1	1	1	1
Live Chat Support	0	0	0	1	1	1	0	1	0	0
Call Center Support	1	1	1	0	0	0	1	0	1	0
Knowledge Base	0	0	0	0	1	0	0	0	0	0
Forum	1	1	1	1	1	1	1	1	1	1
Social Media Support Contacts										
Instagram	1	1	1	1	1	1	1	1	1	1
Facebook Page	1	1	1	1	1	1	1	1	1	1
Twitter	1	1	1	1	1	1	1	1	1	1
SLAs & Agreements										
Email SLA	1	1	1	1	1	1	1	1	1	1

Live Chat SLA	1	1	0	1	1	0	1	0	1	0
Call Center SLA	1	1	0	1	1	0	1	0	1	0
Forum SLA	1	1	1	1	1	1	1	1	1	1
Legal Contacts										
Terms & Conditions	1	1	1	1	1	1	1	1	1	1
Privacy Policy	1	1	0	1	0	0	1	1	0	1
Security Policy	1	1	1	1	1	0	1	0	1	0
GDPR	1	1	1	0	0	1	0	1	1	0
Total Tools	26	26	26	26	26	26	26	26	26	26
Total available	24	23	17	20	22	16	20	17	21	15
Total Missing	2	3	9	6	4	10	6	9	5	11

From Table 3, we can see that the two platforms with the fewest tools are Blackboard Learn and Moodle, each with only 2 of 26 tools. We see the Google Classroom with 4 tools and the Absorb LMS with 5 tools. The platforms with the most tools are Thinkific LMS and Docebo, with 10 and 11 tools, respectively. Blackboard Learn and Moodle seem to be very important tools for communication between educators and learners.

Support & Technical Tools

This section reviews four types of support and tech tools: Tools & Products; Prices & Licensing; Help; and Bundles. Hardware/Software refers to devices or digital tools designed to make people or groups more productive, and it includes tools or apps that accomplish one or both functions. Tools, Products & Software; Prices & Licensing is about plans or pricing/licensing structures for financial clarity, and it includes tools to determine pricing structures.

Tools, Products & Software: Help refers to Software that supports a system and its functions, and includes tools to simplify problem diagnosis and user instructions. And Products, Service & Utility Tools refers to Bundles or Software that groups multiple together for greater efficiency. Table 5 gives more details on these, their respective Tools, and functions.

Table no 5. The Comparison between LMS based on Support & Technical Tools

No	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Product Name / Tools	**Blackboard Learn**	**Moodle LMS**	**Acorn LMS**	**Canvas LMS**	**Google Classroom**	**Thinkific LMS**	**360Learning**	**Adobe Captivate**	**Absorb LMS**	**Docebo**
Support & Technical Tools										
Hardware/Software										
Client Required	1	1	1	1	1	1	1	1	1	1
Database Requirements	1	1	1	1	1	1	1	1	1	1
Unix Server	1	1	1	0	0	0	0	0	1	1
Windows	1	1	1	1	1	1	1	1	1	1
Pricing/Licensing										
Company Profile	1	1	1	1	1	1	1	1	1	1
Costs	0	1	0	1	1	0	1	0	0	0
Open Source	0	1	0	1	1	0	1	0	0	0
Optional Extras	1	1	0	0	1	0	0	0	1	0
Help										
Learn Help for Instructors	1	1	1	1	1	1	1	1	1	1
Videos Tutorials	1	1	1	1	1	1	1	1	1	1
Contact Support	1	1	1	1	1	1	1	1	1	1
Course Management	1	1	1	1	1	1	1	1	1	1
Automated Management	1	1	0	0	1	0	0	0	1	0
Packages and Utilities										
Import-Package	1	1	1	1	1	1	1	1	1	1
View Logs	1	1	0	0	1	0	0	0	0	1
Copy Course	1	1	1	1	1	1	1	1	1	1
Manage LTI Links	1	0	0	0	0	0	0	0	0	0
Export	1	1	1	1	1	1	1	1	1	1
Archive Course	1	1	1	1	1	1	1	1	1	1
Total Tools	19	19	19	19	19	19	19	19	19	19
Total available	17	18	13	14	17	12	14	12	15	14
Total Missing	2	1	6	5	2	7	5	7	4	5

Table 5 shows that Moodle, Blackboard Learn and Google Classroom are the leading platforms in Support and technical tools, with only 1, 2 and 2 out of 19, respectively. Absorb LMS, Canvas LMS, 360Learning, and Docebo are followed by 4, 5, 5, and 5 tools, respectively. In contrast, Acorn LMS, Thinkific LMS, and Adobe Captivate fall behind with 6, 7, and 7 tools each. This clearly emphasises the effectiveness of Moodle, Blackboard Learn and Google Classroom for Support and technical in educational settings.

Survey

32 Study Design a Survey for Blackboard Learn Users in Universities. A study was designed to conduct a survey assessing perceptions and use of Blackboard Learn among college professors and their students at universities in KSA. The Questionnaire used in the study consists of 13 questions for professors and 13 for students (see appendices 1 and 2). A sample size estimation was performed.

Many studies suggest that around 250 is a good amount; however, over 350, reliability would increase [44,45]. This meant that the target was to collect feedback from more than 400 students and professors. Random Sampling resulted in 456 students and faculty selected to participate. The Sample contains 114 Professors and 342 Students.

1. Faculty Members' Survey

Table 9 in Appendix 3, as well as the visual in Figure 1, show that 64% of respondents preferred Blackboard Learn, 22% had a neutral preference, and 18% had an unfavourable preference. It can be argued that a favourable preference for Blackboard Learn stems from its support for communication between students and instructors and its enabling continuous access to online teaching resources. Also, this platform makes it easier to submit work and take quizzes. Other factors associated with the Blackboard Learn platform, for example, help overcome some communication problems in Saudi universities regarding contact with the female section. Also, Blackboard Learn has been supported for supervisors working on projects with students, where communication and discussion are required.

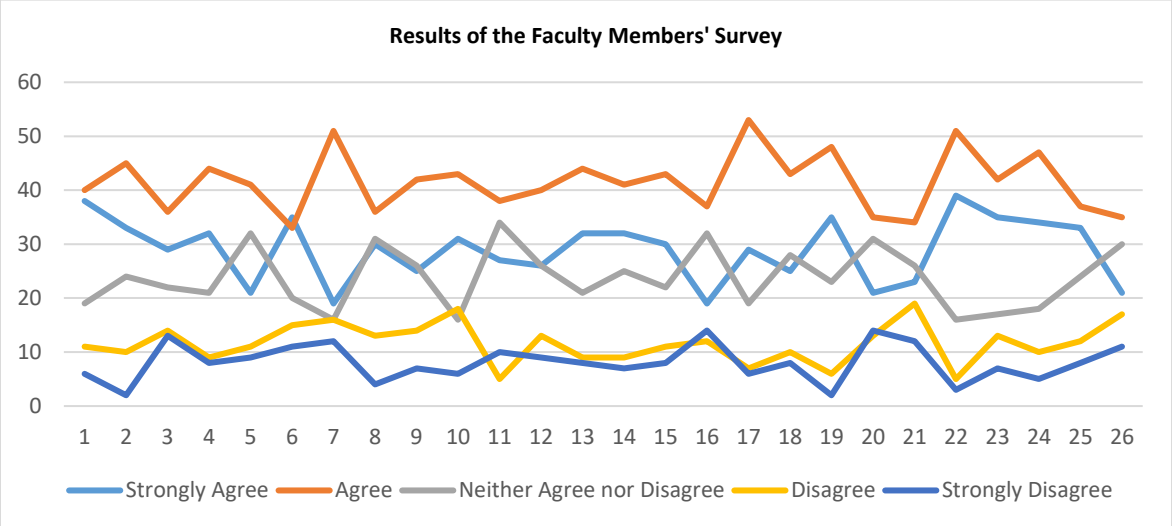

Figure no 1. Results of the Faculty Members' Survey

Figure 1 indicates that 74% of respondents rated the Blackboard Learn system very highly. Q9 (G & I), Q10 (C), and Q11 illustrate this as they highlight the tools such as the (1) Full Grade Center, (2) Import/Export and Copy Package, (3) We can still study and work the same as we do in class face-to-face classroom, and (4) This system really has a high performance to support course containing lots of resources/multimedia to the students. It will also be useful to fix the the problem with Q13, which mentions that only 49% have easy, convenient, and effective communication with administrative and student affairs on Blackboard Learn, as this is another potential to boost users' experiences.

2. Student Survey

The student survey in Appendix 4, Table 10, and Figure 2 shows a discrepancy between student and faculty preferences regarding e-learning. According to Table 10, for example, the results show that 40% of students preferred e-learning, while another 30% stated they felt neutral, and 29% disliked e-learning. Luckily, the number of students who responded to the survey was very high.

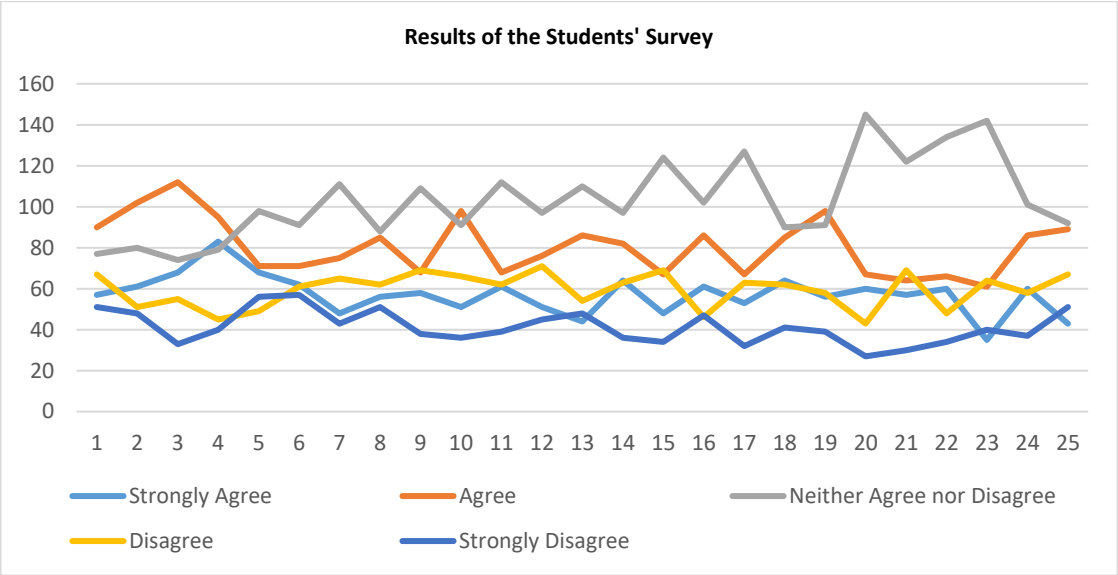

Figure no 2. Result of Student's Survey.

We can infer from this the presence of factors such as close cooperation between students and lecturers and the ample and ongoing availability of numerous scientific resources via online resources on which students work, submit assignments, are subjected to various tests, carry out the ads, follow them through news-flashes and have online the grades, etc. The student survey suggests a high enthusiasm for the grade center (53%), tests (47%), virtual classrooms (43%), attendance (46%), and assignments (48%) as provided by BBP and these would make learning enjoyable and enriching, whereas forums, evaluation tools, and file imports/exports elicit less than a 35% endorsement from users.

As we could predict from the survey, the Blackboard Learn system has a 53% approval, especially the grade centers, the use of virtual classrooms and file imports/exports as mentioned above, while our learners would be helped, mostly by the effectiveness of distance learning in keeping alive the engagement on part of their selves toward knowledge (Q3) [as one student suggested] together with benefits of face-to-face interactions offered by the traditional classroom approach to the peer relationships and to those among teacher and student (Q4-A) and the grade center as one of the favorite functionalities (Q9-G), but, at the same time, the problem relating the need of supporting upload of media-type files, timely and consistent with pedagogical principles of a course, seems to be relevant as only 28% would find their expectations of uploading media to BBP fully meet.

IV. RESULTS AND DISCUSSION

This study evaluated ten different learning management systems based on to which ones best cater to the educational needs of Saudi Arabia, utilizing a two prong methodology - (1) a features evaluation based on specific evaluation of the functionality of each product; and (2) gathering expert feedback through a university professor and student survey, we discuss the relative merits and drawbacks of various online learning systems and the role that the Blackboard Learn platform has played on higher education campuses in Saudi Arabia.

Blackboard is one of ten learning management platforms studied that was reviewed on the number of features they contain, see Figure 3 and Table 6. The number of lost tools included, learning management systems, score: Blackboard Learn, 9; Moodle, 10; Google Classroom, 17; Absorb LMS, 21; 360Learning, 23; Canvas Learning management system, 25; Thinkific Learning management system, 26; Blackboard Classroom, 28; Adobe Captivate, 32; Docebo, 33.

Table no 6. The total Comparison between LMS based on Support & Technical Tools

No	1	2	3	4	5	6	7	8	9	10
Product Name / Tools	Blackboard Learn	Moodle LMS	Acorn LMS	Canvas LMS	Google Classroom	Thinkific LMS	360Learning	Adobe Captivate	Absorb LMS	Docebo
Total Tools	90	90	90	90	90	90	90	90	90	90

Total available	81	80	60	65	73	64	67	58	69	57
Total Missing	9	10	30	25	17	26	23	32	21	33

According to Table 6 and Figure 3, which shows the number of tools discussed in a research that tested ten LMS, Blackboard Learn was scored at the top by offering 81 tools, followed by Moodle, which offered 80 tools in second place, then it was followed by Google Classroom in third place, which provided 60 tools. On the other hand, Adobe Captivate and Docebo offered the fewest tools, with 58 and 57, respectively. Other LMSs have number differences like.

The Absorb LMS has 69 tools, 360Learning has 67 tools, Canvas LMS has 65 tools, whereas Thinkific LMS has 64 tools. The output shows that choosing a sophisticated LMS to reduce tool waste is paramount.

The findings from the first two studies lead to fruitful conclusions drawn from a survey of university professors and students across various Saudi institutions. The second paragraph, subsection two in part three, shows that the faculty opinion poll favoured the Blackboard Learn system: 64% of faculty members supported it. In comparison, the student opinion poll favoured it in 40% of cases. Therefore, the faculty opinion poll clearly showed different perspectives among faculty and students on the preferred online learning system to be implemented; this, in turn, provides a straightforward glimpse of current attitudes toward the online learning system's efficacy and user experience.

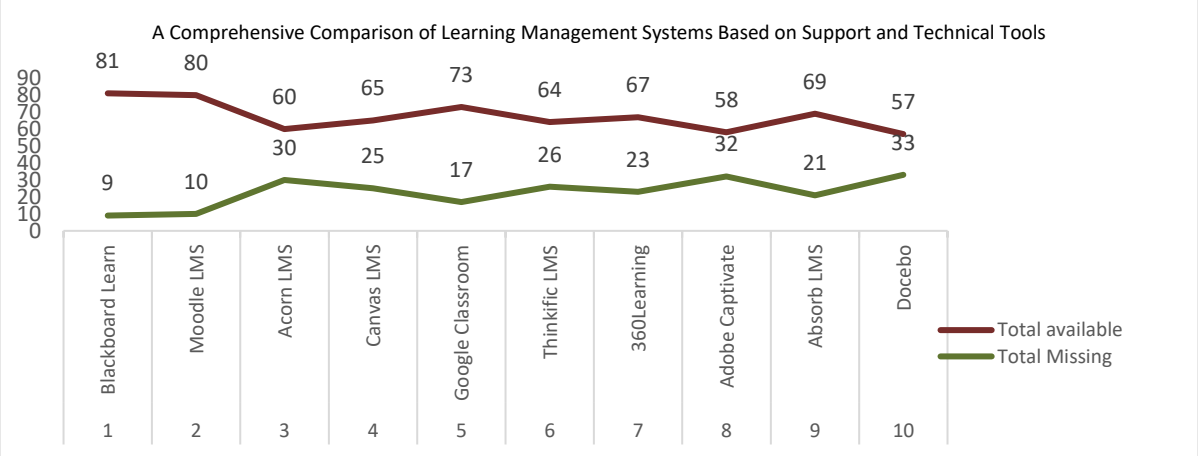

Figure no 3. The Total Comparison Between LMS Based On Support & Technical Tools

The insights from these two studies suggest that Saudi universities' decision to use the Blackboard platform is well-founded and its implementation has been extremely successful; this is attributable to several factors. Firstly, the robustness and efficiency of the Blackboard platform itself; for example, how its outstanding performance, ease of navigation, and all-around utility enable well-administered online learning or working. Secondly, we can see highly competent staff and fully committed students in Saudi institutions; for example, the highly qualified staff at these institutions can maximise the platform's utility, whereas students have extensive awareness of how to use it creatively and effectively for their learning.

Thirdly, the Saudi Ministry of Education's experience during the COVID-19 pandemic also supports the successful implementation of the Blackboard platform. Fourthly, the underlying Saudi education infrastructure provides a vital base of support; finally, the competent management practices used by the Saudi MOE, particularly within Saudi institutions, further foster the successful implementation of the platform.

V. CONCLUSION AND FUTURE WORK

In this fast-changing digital environment we are witnessing, an effective LMS is more needed than ever to meet the diverse needs of educators and institutions. The extensive growth of the Internet has transformed the education system and enabled students through intelligent systems that provide genuine access to modern resources, making it indispensable for contemporary e-learning tools.

We have carried out an extensive empirical study of 10 different LMSs to identify the best LMS for Saudi Arabia, and we have evaluated students' and university professors' feedback collected through questionnaires. By focusing on their advantages and disadvantages, we were able to determine the most suitable technology for the entertaining learning environments. Another objective of our study is to assess the strategic decisions made by the Saudi Arabian university.

The initial stage of our research predicted which LMS would score better in terms of lost functionality. It was found that, among the LMS tested, the future LMS that lost only 9 tools to Moodle lost 10 to Google. On

the other hand, Adobe Captivate and Docebo have lost 32 and 33 tools, respectively. In the second phase, it was shown that 64% of professors and 40% of students preferred Blackboard Learn. These two guides prove that Saudi University's decision to implement an LMS was wise.

The present study recommends that the universities in Saudi Arabia utilize LMS systems more widely, considering the positive (shifting) effects they can have on both the faculty and students. The potential for LMS usage in the universities can help the students to tackle many problems of academic preparation and effort and can lead to the control of all that time the students spend on their study efforts and improve their study skills. Many students had no prior experience of using the computers for e-learning use; that was quite unexpected. This shows the vital need for the training courses to be conducted for the usage of the LMS on the part of the faculty and students. The universities in Saudi Arabia have already initiated such courses running on Blackboard.

Acknowledgement

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Appendix 1

Table no 7. Teacher Survey Questions

No	Teacher Survey Questions
1	Have you ever utilized a course management system?
2	Is training on the Blackboard platform essential?
3	Do you prefer e-learning formats?
4	How do you prefer to interact as a teacher? A. Blackboard platform. B. In-person classroom setting.
5	Does using Blackboard save time for you and your students?
6	Is the Blackboard platform user-friendly?
7	Can the Blackboard platform accommodate students' graduation projects?
8	Which option do you consider superior? A. Blackboard platform. B. Traditional teaching method.
9	Which Blackboard activities do you find most effective for conveying information? A. Tests B. Class Collaborate Ultra C. Announcements D. Surveys E. Assignment F. Attendance G. Full Grade Center H. Calendar I. Import-Export-Copy -Package
10	Please evaluate the Blackboard platform based on the following statements: A. I feel comfortable using it B. It is easy to navigate. C. I learn as effectively as in face-to-face settings D. I would like to use it throughout my educational journey.
11	The Blackboard platform supports courses with various multimedia resources.
12	Is communicating with students on Blackboard easy, convenient, and effective?
13	Is communicating with administration and student affairs on Blackboard easy, convenient, and effective?

Appendix 2

Table no 8. Student Survey Questions

No	Student Survey Questions
1	Have you ever experienced the benefits of a course management system?
2	Is it necessary to receive training on how to use the Blackboard platform?
3	Do you believe that e-learning offers a more effective and engaging way to acquire knowledge?
4	As a student, you may interact best through one of these approaches: A. Face-to-face learning in a traditional classroom allows for direct engagement with peers and instructors. B. The Blackboard platform provides a flexible online environment for accessing materials and submitting assignments.
5	Leveraging the Blackboard platform can significantly streamline your tasks, allowing you to save valuable time.
6	As a student, you'll find that the Blackboard platform is both intuitive and user-friendly, making your learning experience seamless and efficient.
7	Blackboard is an ideal choice for a graduation project. Its robust features and user-friendly interface enhance the learning experience.
8	As a student, I'm curious which option might be more effective: A. Continuing with the VCR method for communication with the girls' department or B. Switching to the Blackboard platform.
9	Which popular activities on the Blackboard platform help you learn most effectively as a student: A. Discussion B. Class Collaborate Ultra C. Course Content D. Enrollment Options E. Assignment F. Attendance G. Grade Center H. Calendar
10	As a student, it's essential to assess the Blackboard platform effectively by considering the following key aspects. Your input can help improve our learning experience and foster a better educational environment.: A. I am comfortable using the Blackboard platform. B. Browsing and navigating the platform is easy. C. I learn as effectively on Blackboard as in face-to-face classes. D. I want to use Blackboard throughout my education.
11	The Blackboard platform allows students to easily upload media files that meet course objectives and support their learning needs.
12	Is interacting with faculty members on Blackboard efficient, user-friendly, and impactful?
13	Is communicating with administration and student affairs on Blackboard easy, convenient, and effective?

Appendix 3

Table no 9. Results of the Faculty Members' Survey

Results of the Faculty Members' Survey- 114						
Survey's Questions		**Strongly Agree**	**Agree**	**Neither Agree nor Disagree**	**Disagree**	**Strongly Disagree**
1		33%	35%	17%	10%	5%
2		29%	39%	21%	9%	2%
3		25%	32%	19%	12%	11%
4	A.	39%	18%	8%	7%	1%
	B.	36%	28%	10%	8%	19%
5		31%	29%	18%	13%	10%
6		17%	45%	14%	14%	11%
7		26%	32%	27%	11%	4%
8	A.	37%	23%	12%	6%	3%
	B.	38%	14%	16%	5%	26%
9	A.	33%	30%	4%	9%	4%
	B.	35%	23%	11%	8%	1%
	C.	39%	18%	8%	7%	20%
	D.	36%	22%	8%	6%	8%
	E.	38%	19%	10%	7%	4%
	F.	32%	28%	11%	12%	6%
	G.	46%	17%	6%	5%	3%
	H.	38%	25%	9%	7%	14%
	I.	42%	20%	5%	2%	5%
10	A.	31%	27%	11%	12%	5%
	B.	30%	23%	17%	11%	13%
	C.	45%	14%	4%	3%	9%
	D.	37%	15%	11%	6%	7%
11		30%	41%	16%	9%	4%
12		29%	32%	21%	11%	7%
13		18%	31%	26%	15%	10%

Appendix 4

Table no 10. Final Result of Student

Student- 342						
Survey's Questions		**Strongly Agree**	**Agree**	**Neither Agree nor Disagree**	**Disagree**	**Strongly Disagree**
1		17%	26%	23%	20%	15%
2		18%	30%	23%	15%	14%
3		20%	33%	22%	16%	10%
4	A.	28%	23%	13%	12%	18%
	B.	21%	29%	14%	16%	10%
5		18%	21%	27%	18%	17%
6		14%	22%	32%	19%	13%
7		16%	25%	26%	18%	15%
8	A.	20%	32%	20%	11%	18%
	B.	29%	27%	19%	11%	3%
9	A.	20%	33%	18%	11%	11%
	B.	22%	28%	21%	13%	4%
	C.	25%	32%	16%	14%	20%
	D.	24%	28%	18%	11%	19%
	E.	20%	36%	20%	10%	8%
	F.	25%	30%	13%	14%	16%
	G.	20%	37%	18%	9%	4%
	H.	25%	26%	18%	12%	21%
10	A.	29%	27%	17%	11%	20%
	B.	20%	42%	13%	8%	15%
	C.	19%	36%	20%	9%	20%
	D.	19%	39%	14%	10%	17%
11		10%	18%	42%	19%	12%
12		18%	25%	30%	17%	11%
13		13%	26%	27%	20%	15%