Experimental Study of Content Management Systems Joomla and Drupal

Ms. Trupti Mestry[1], Dr. Vaishali Sindekar[2]
[1,2]*Department of Information Technology, Patkar Varde College*

Abstract- A content management system is a software tool which allows users in the creation, management, and modification of content on a website without writing code from scratch. The content management system handles all the basic tasks of website management so that user can focus on more different and advanced parts of the website. There are several CMS available nowadays varying in functionalities and features. This experimental study explores the various use of Joomla and Drupal. It evaluates their key attributes, including usability, security measures, platform compatibility and so on. This study aims to help individuals or organizations choose an appropriate CMS for their web application.

Keywords: CMS, Joomla, Drupal

I. INTRODUCTION

A content management system is software tool which allows users to create, manage, modify, and publish content on a website without the need of coding, that allows users to focus on content creation and providing an easy and cost-effective solution for content management. The content is stored in a database and presented through a presentation layer based on templates, like a website. The CMS provides the ability to maintain and navigate the site's structure, which makes it easier for developers to build and manage websites. CMSs store data in databases, simplifying website management and maintenance as there are no separate files for each webpage. In the CMS, Different privileges and responsibilities are assigned to an individual based on his role. Various types of CMSs are available online, such as open-source software that is easy to download and install. Because of this, choosing and implementing a particular content management system procedure for any organization or company is becoming increasingly difficult. It is quite difficult to conclude on which CMS is better as there are several advantages and disadvantages to each CMS. This study analyzes two popular CMS Joomla and Drupal and evaluates them based on their usage, scalability, compatibility and security measures.

II. OVERVIEW

1] JOOMLA

Joomla is the most powerful and an open-source Content Management System which helps in building websites and online applications very efficiently. As Joomla is open source you can also change the page layout code according to your needs by hiring a web developer and enjoying the freedom. Joomla is free , extendable CMS with separate front-end and back-end templates and is developed using PHP, OOP and MySQL, which makes it user-friendly and easy to install and use.

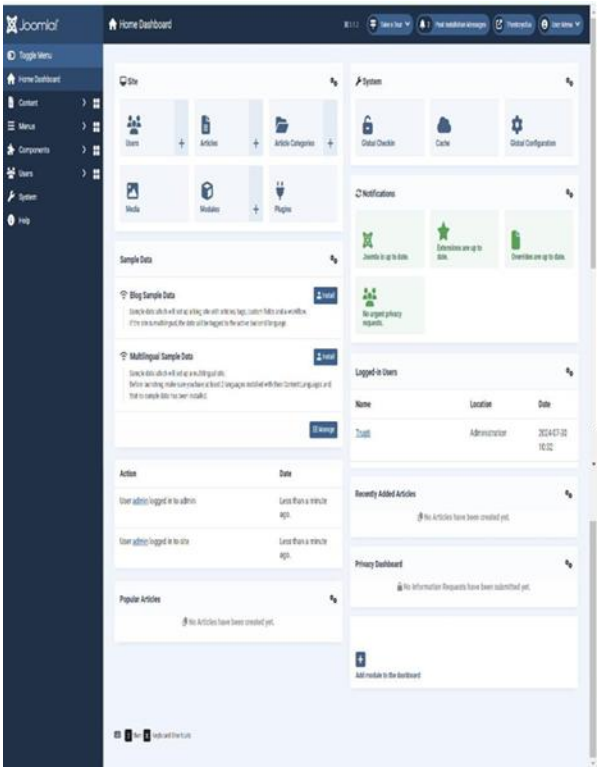
1.1.1 KEY FEATURES OF JOOMLA:

1. User Management: Manages user information including permissions, passwords, editing rights, and many more.
2. Content Management: Provides a WYSIWYG (What You See Is What You Get) for simple creation and editing of the content.
3. Banner Management: Allows adding and editing website banners.
4. Template Management: Allows website design management and allows template changes without altering the content structure.
5. Media Management: Facilitates easy upload, organizing, and management of media files.
6. Contact Management: Allows you to add and manage contact information.
7. Web Link Management: Provides and allows categorizing link resources for site users.
8. Search: Allows users to find site information with smart indexing, advanced options, and auto-suggest features.

9. Menu Management: Allows creating and managing menus and menu items, allowing multiple styles and placements.
10. RSS: Allows automatic updating of site contents and RSS files through Really Simple Syndication.
11. Contact Management: Adds up and efficiently manages the user contact information
12. Integrated Help System: Provides built-in help documentation and resources for users. 13. System Features: Provides robust system functionalities like caching, debugging, and performance monitoring.

Apart from the above key features Joomla gives you the freedom of extensibility in which you can do extensive customization through numerous plugins as well it also supports integration with other web services and external applications which makes it easier to use and more efficient. Joomla offers users built-in documentation and resources so that they can use Joomla efficiently and effectively without any obstacles. Joomla's community is robust and powerful. The developers work hard to make Joomla efficient to use for every user.

1.1.2 JOOMLA CMS DASHBOARD PAGE AND FILE STRUCTURE



Figure–1: Joomla CMS Page

In the dashboard, we need to know several different tools or sections before using Joomla and their uses. They are as follows:

Menu Bar:
Provides access to the administrator management pages. The system menu itself leads to a dashboard. Each section has a collection of pages for managing that particular aspect of Joomla, such as content, menus, and users.

Dashboard Panel
Dashboard provides quick access to frequently used pages via their icons.

Notifications Panel
The notification panel shows when updates are available for Joomla and other extensions. Privacy requests are shown here.
The Top Bar
The top bar shows the page's title so you always know where you are. The other items in the top bar are optional modules.

Help and Information
Many resources to help you can be found here, with additional links to more resources, documentation, and support.

JOOMLA FILE STRUCTURE

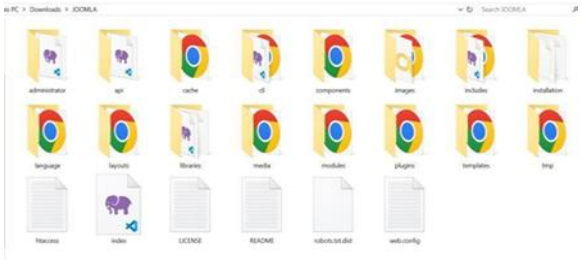


Figure-2: Joomla File Structure

While using Joomla understanding its file structure and its basics is as crucial as using it. After installing Joomla its files and directories are saved by default in the local machine or the server. The representation is given below of the file structure.

1.1.3. ANALYSIS OF JOOMLA

1. Installation and usability:

Joomla installation is straightforward and fast and can

be installed in less than half an hour. Installation users don't need much technical knowledge; they must know how to create and install databases and connections through FTP. It can be hosted on standard Linux, Apache, MySQL, and PHP environments.
The User Interface of Joomla is very user friendly, adding up new images according to your choice updating the websites, and creating banners, Joomla allows straightforward creation and organization of content with a simple interface managing them.

2. Security and permissions:
In the CMS Joomla unlike Drupal, the administrator can set the permission for each user and can handle user updating, and managing the users also, the admin can set multi-actor authentication for the user.
In Joomla unlike Drupal, an administrator of the website cannot set any permissions for site visitors to comment on any website content through core extensions, but it can be done through a plug-in.

3. Updates and Community support:
The updates on security are released on joomla.org and these updates occur frequently. Also, if any updates on the website are available it is shown on the dashboard's notification section so the user doesn't have to search for it. Joomla has an active and supportive community, which provides ample resources, including forums, documentation, and professional services.

4. Performance and Customization
Joomla can handle high traffic efficiently with quick load times and reliable performance, even when numerous extensions were installed. Joomla offers extensive customization options through a wide range of templates and extensions, which allows users to edit and manage their site's appearance and functionality according to their needs.

5. Multilingual Support and SEO Capabilities
Joomla also offers a multilingual site setup, and managing content in multiple languages makes it beneficial for people with different languages. Also, the Built-in SEO features of Joomla are very effective, and additional plugins feature enhance SEO capabilities. This allows users to optimize content and manage metadata easily.

2] DRUPAL
Drupal is an open-source Content Management System used for building websites and online applications. It builds robust and flexible websites. It is used by all over the world. Drupal is released under GPL ("GNU General Public License"), is free to download, and can be set up on Linux, Windows, or Macintosh OS. It is a dynamic platform that will grow as your needs increase.
Drupal operates with three independent yet interconnected layers that are content, application logic and representation. You may allow users to explore your web content differently by adding features like advanced search, auto- tagging, and internationalization.

2.1.1. DRUPAL CMS DASHBOARD PAGE AND FILE STRUCTURE
After installing Drupal its file and directories are saved by default in the local machine or the server. The representation is given below of the file structure:

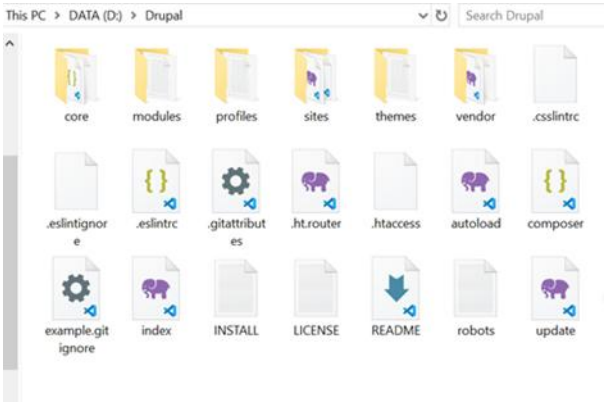


Figure -3: Drupal File Structure

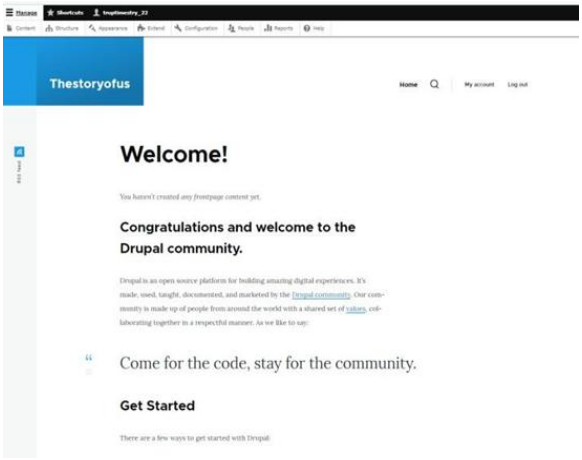


Figure-4: DRUPAL CMS PAGE

Site Title: Represents the website's name, which can be customized within the Drupal settings.

Welcome Message: The main content area is welcoming to new Drupal users. It introduces Drupal as an open-source platform for building digital experiences and highlights the global community that contributes to it.

Navigation Menu: The top-right corner has a navigation bar with links like Home, My Account, and Log Out. This is part of the default theme's structure and can be customized.

Administration Toolbar: The black bar at the top provides access to administrative tools and menus, including:
1] Manage: Offers access to content, structure, appearance, and other settings.
2] Shortcuts: Allows quick access to frequently used admin functions.
3] Your Account: Displays the logged-in user's profile options.
4] Get Started Section: Below the welcome message is a brief "Get Started" section with instructions or links to help new users begin working with Drupal.

2.1.2 KEY FEATURES

1. Security: Drupal allows you to secure & protect the users.
2. Performance & Scaling: Drupal allows users to perform under pressure
3. Multilingual: Drupal allows users to do seamless translation
4. Accessibility: Make your content accessible to the widest possible audience
5. Marketing Automation: Drupal allows users to target their reach with audience customization
6. Content Authoring: Drupal allows users to integrate a diverse yet simplified ecosystem of multichannel messaging
7. Personalization: Drupal Turns customer data into one-to-one custom experiences.

2.1.3. ANALYSIS OF DRUPAL

1. Installation and Usability

Installing Drupal is a little bit more complex and time-consuming than Joomla. Also using Drupal requires advanced technical knowledge. The setup of Drupal involves detailed configuration but is well-documented. Drupal offers and allows users to manage the content efficiently with a steep learning curve. Its interface supports extensive customization but may be less intuitive for new users.

2. Security and Permissions

Drupal offers a highly flexible permissions system, which allows administrators to set detailed permissions for users and visitors. It supports many access control features, including commenting permissions, without requiring additional plugins. This approach offers a high level of security and customization and works efficiently.

3. Updates and Notifications

Drupal releases frequent updates for the site's safety and efficiency, including security patches, which the admin manages. The update management system ensures that users promptly know and implement the necessary updates by providing notifications and tools features.

4. Integration with Third-Party Tools

Drupal supports integration with numerous third-party tools and services, including analytics, marketing, and e-commerce platforms. While the integration process is generally more complex than Joomla’s, it offers a high level of customization and flexibility, allowing users to manage and design their site’s functionality according to their specific needs.

5. Content Management and Organization

Drupal manages complex content types efficiently. It allows users to extensively customize content types, fields, and taxonomies, making it suitable for sites with diverse and structured content needs. This flexibility supports detailed content organization and management. Also, unlike Joomla, you can edit your content on your home screen without going to the specific folder, making it less time-consuming and the process less cumbersome.

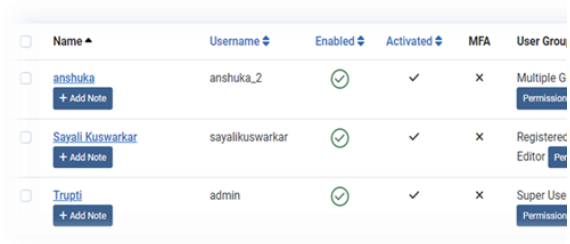
6. Scalability and Performance

Drupal is known for its scalability and performance because it efficiently handles high traffic volumes, many requests simultaneously, and large datasets. While it is well-suited for large and complex websites, optimizing performance may require additional configuration and fine-tuning done by the user.

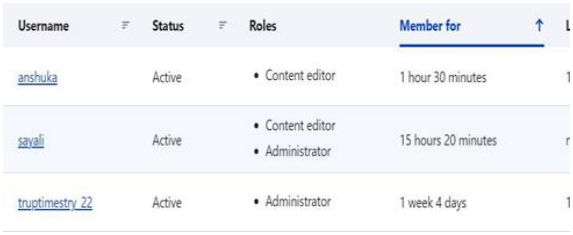
III. RESULTS

Creation and Management of user:

1. Joomla

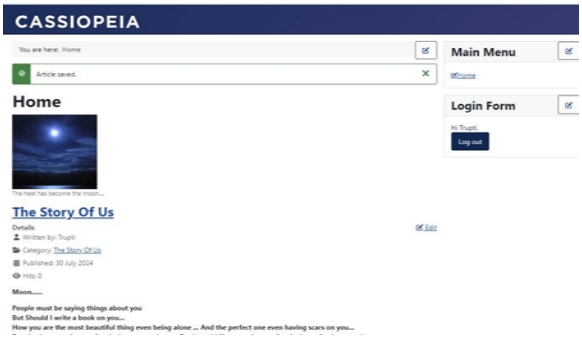


2. Drupal

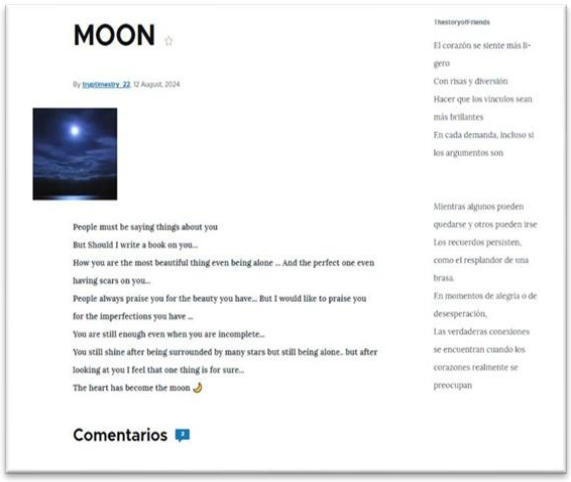


Article Creation:

1. Joomla

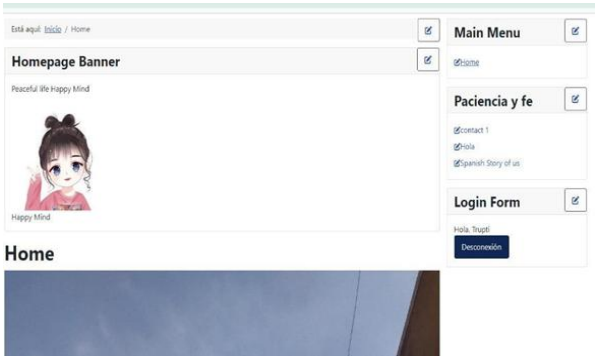


2. Drupal

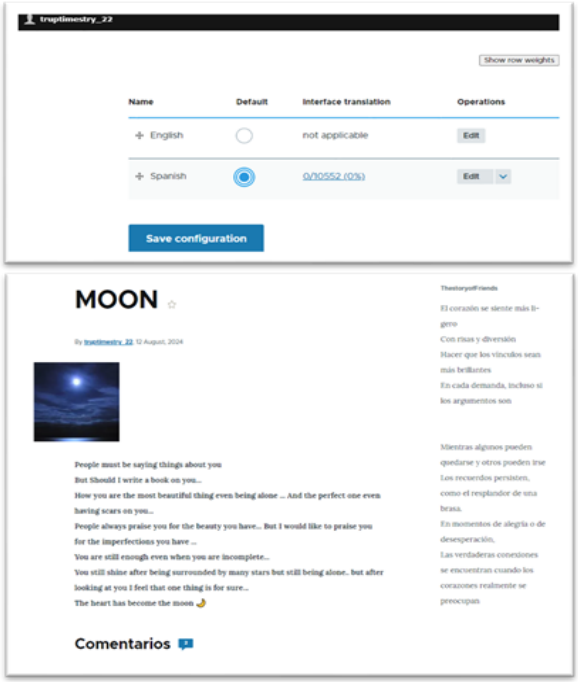


Multilingual Support:

1. Joomla

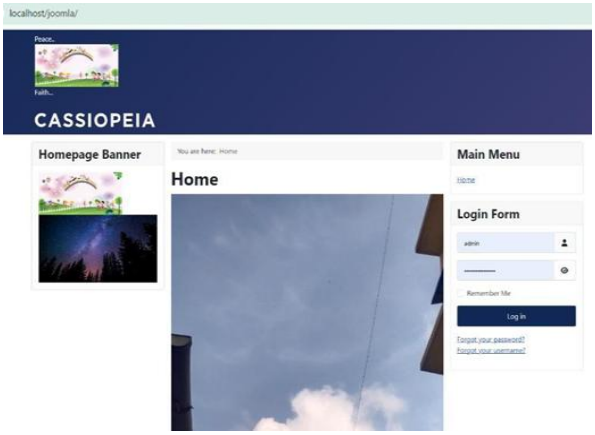


2. Drupal

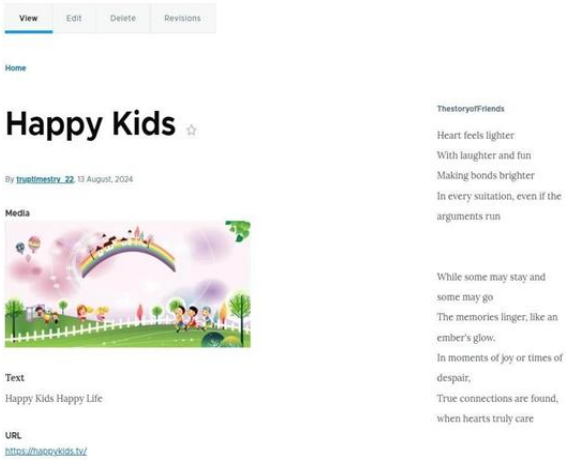


Creation of Banner:

1.Joomla

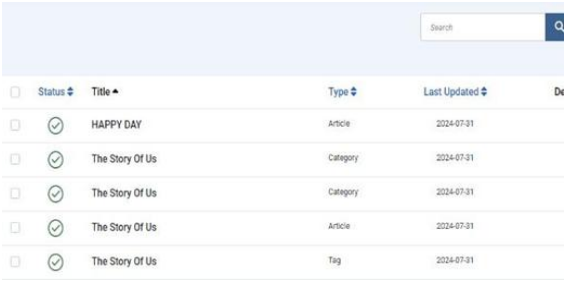


2.Drupal

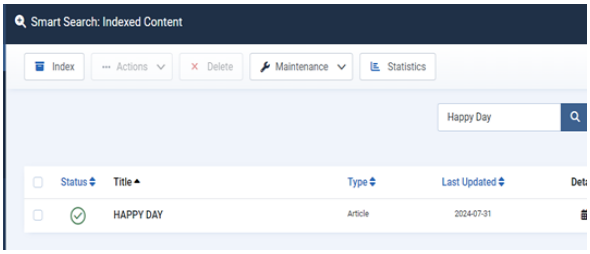


Smart Search in Indexed Content

1. Joomla



2. Drupal



IV. SURVEY AND USER FEEDBACK

A survey was conducted among six users to understand their experience with Joomla and Drupal.

- 50% had used Joomla, 16.7% used Drupal, and 33.3% used both (Figure 1).
- 83.3% found Joomla easier for system maintenance and updates (Figure 2).
- 66.7% preferred Joomla overall based on analytical performance, while 16.7% preferred Drupal, and the rest said it depends on the use case (Figure 3).

These results support Joomla's ease of use and broader accessibility, while Drupal remains favored for specific technical needs.

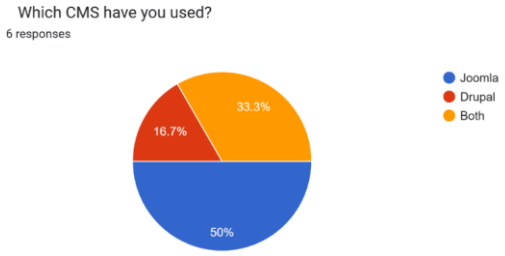


Figure 1: User Experience Distribution

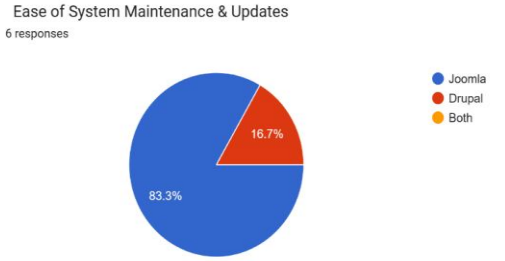


Figure *2:* Ease of System Maintenance and Updates

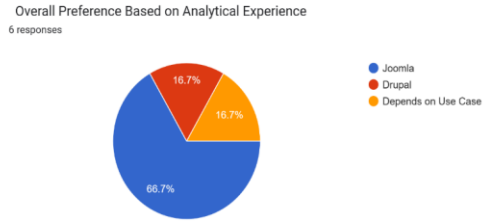


Figure 3*:* Overall CMS Preference Based on Analytical Experience

V. COMPARATIVE ANALYSIS

Analytical Parameter	Joomla	Drupal
Page Load Time	1.8 sec	2.3 sec
Installation Time	20 minutes	35 minutes
Memory Usage (Initial Load)	45 MB	70 MB
CPU Usage (100 req/min)	10%	14%
SEO Score (Google Lighthouse)	82/100	88/100
Accessibility Score (Lighthouse)	78/100	91/100
Security Score (OWASP ZAP test)	85/100	92/100
Admin Interface Click Depth (avg task)	3 levels	5 levels
Default Database Table Count	70 tables	85 tables
Multilingual Setup Time	10 minutes	15 minutes
Number of Built-in Modules	35	50

Number of Available Plugins/Extensions	7,000	46,000
Plugin Dependency for Core Features	40% of key features	20% of key features
User Role Granularity (distinct roles)	3 roles (default)	6+ roles (default)
Content Type Customization (fields/editors)	Limited to 8 types without plugin	Unlimited with taxonomy/fields
Search Indexing Speed (10 articles)	2.5 sec	1.6 sec
Cache Efficiency (repeat load)	65% reduction in load time	72% reduction in load time
Updates per Year (core + security)	15 releases	25 releases
Community Forum Topics (as of 2024)	800k	1.3 million

Note: All metrics are measured using standard benchmarking tools such as Google Lighthouse, Apache Benchmark, and OWASP ZAP on a LAMP environment.

VI.CONCLUSION

Based on the experimental study and results, Joomla offers a simpler and more beginner-friendly CMS experience, with easy site management, article and banner creation, and multilingual support. However, it lacks built-in commenting, requiring extensions for that feature. In contrast, Drupal includes advanced features like integrated commenting and search, and allows users to edit, delete, and revise articles directly from the homepage. Yet, it demands more technical expertise, as tasks like banner creation, multilingual setup, and smart indexing must be configured manually.

Overall, Joomla is ideal for users seeking ease of use, while Drupal suits those needing advanced functionality and customization. Analyzing both platforms based on these parameters helps individuals and organizations choose the most suitable CMS for their specific needs.

As a researcher, my role was to critically analyze both CMS platforms using defined analytical parameters, and to validate those observations through real user feedback collected via surveys. This dual approach ensured a balanced evaluation that reflects both technical aspects and user experiences.

After completing the comparison, my objective was to interpret the results in a way that aids decision-making. Rather than just listing differences, the study translates those findings into practical insights that help individuals or organizations choose the right CMS based on their specific needs, technical skills, and long-term goals. The comparison is not the endpoint, but a foundation for guiding strategic CMS selection in real-world scenarios.

VIII.ACKNOWLEDGMENTS:

I am privileged to express my sincerest regards to my guide Dr. Vaishali Sindekar Madam for their valuable input, guidance, encouragement, and whole-hearted cooperation.

REFERENCE

[1] https://ijret.org/volumes/2013v02/i12/IJRET20130 212096.pdf
[2] https://www.ijcaonline.org/volume21/number4/px c3873373.pdf
[3] https://www.oracle.com/in/content- management /what-is-cms/
[4] https://www.drupal.org/
[5] https://www.joomla.org/
[6] https://www.mendeley.com/catalogue/21083242-fd75-374c-b80c-041826b2ecb2
[7] https://research.ijcaonline.org/volume52/number3/pxc3881502.pdf
[8] https://www.ijcaonline.org/volume21/number4/px c3873373.pdf
[9] https://www.researchgate.net/publication/3535537 35_Comparison_Between_Traditional_Web_Desi gn_and_CMS