

Team 1: Blogging, a Strategy for Knowledge Diffusion Within Teams

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Abstract. In recent years, the use of blogs in academic environments has risen in popularity. There have been several pieces of research on the viability of blogs in this context. Also, there has been a major focus on the influence of blogging on students' learning styles and behaviour. In addition to this, the relationship between blog structure, students' engagement in blogs, and its effects on their ability to absorb knowledge has been a major research focus. While it is observed that the blogging behaviour of students is not significantly affected by the way they perceive learning, the motivation and degree of difficulty faced by students has a significant effect on their engagement with the blog and acquiring information. In this research, we investigated the effectiveness of academic blogs with respect to students, whether it is a credible source to acquire knowledge. Evaluation is carried out through a carefully structured questionnaire based on our pre-defined hypothesis. The result shows a generally positive consensus on the integration of blogs, since it provides distinctive features to interact and collaborate on a topic, argue and critique the work, and prove and justify their findings.

Keywords: Academic blog · Blogging behaviour · Evaluation · Students' engagement.

1 Introduction

The internet has enabled humankind to connect with each other irrespective of an individual's designation and effectively communicate in a way that has never been explored before. Blogs, a tool facilitated by the internet serve as a pivotal source of information, and communication in these rapidly evolving times. To add some more perspective to it, research indicates that 39 percent of the internet users from the USA read blogs, and 8 percent of their internet users have a blog of their own, among which more than half of the users are under 30 years of age [10]. Ergo the importance of academic blogs, tools that can potentially facilitate skill acquisition, or for maintaining group discussion during a project. Blogs can typically be updated on a daily basis, in a reverse chronological order, while the writing pieces can be done by a single author or a team. It mainly eliminates the geographical limitations between two users and provides a plat-

form for them to plan, learn, and share pieces of information with each other in an easily readable format. Its effectiveness for the students to adapt skills from a literary blog piece has been a focal point of several research pieces [1]. Also the ability to engage users, a vital feature achievable with blogs, directly impacts how far the information presented in the blog has reached, and how wide it can possibly be further communicated. Thus reader-oriented aspect is essential to good writing and helps involve readers as possible participants and guides them through to see what the author intends to convey to the readers. To aid engagement, hyperlinks are a great way to direct readers to the source of some specific information used in the blog [32]. A blog topic URL can be bookmarked to be referenced later during the course and the share button can publicize the knowledge learned to be diffused among other students[31]. What is more, the anonymous internet usage habit has facilitated the users to express themselves in a manner that is upfront and instructive.

This specific psychology can be molded into effective knowledge sharing through the use of blogs [30]. A further use of blogs in pre-service teacher education has also become paramount due to the introduction of online teaching and the technological convention of the curricula. Although the use of such tools in the education system is not unprecedented, the advancements of technology have instantiated the prominence of research in this field. This study aims to quantify the factors affecting the students' continual usage of such tools for learning purposes. The drive behind this endeavour is crucial as previous work has proven that the students' constant participation in blogging is difficult to uphold, due to the short attention span of people. Ergo, the outcomes of this study will help teachers and supervisors to understand the factors that impact students to use blogs for continuous learning [14]. The remainder of this paper is organized as follows: Section 2 describes the related work while Section 3 describes the implementation of our blog. We describe the architecture and respective use-cases. We access user feedback in section four and in section five, we discuss the results of the assessment and some observations. Section six presents the summary and scope for future work.

2 Related work

Blog originated from the word "web log" [18]. The role of blogs, as discussed in academics, has gained a significant boost since the start of this century and this, in turn, drew the attention of investigators towards the significance and effectiveness of it. In the last decade alone, many types of research have been carried out with varying focuses on different aspects of educational web logs. The article from Miceli, Murray, and Kennedy [19] incorporated a blog in the Italian language lecture. They drew out the outcome by carefully examining the involvement of students in the blog as well as the questionnaires, and deduced that the blog encourages cooperation among learners. But two factors are important for this to be successful: firstly, the merger of blogs into the course structure should be methodical and precise, and secondly, the instructor

must play their role to promote this sense of community among students.

Similarly, Manfra and Lee [17] engaged their students in blogging to facilitate the understanding of authentic United States history. They analyzed the blog by considering the comments by students in the blog, observed them in the class, and did interviews with the students at the end. Using this method, they were able to determine the efficacy of that educational blog. Lester and Paulus [16] in their paper focused on 152 web logs by individual students and interpreted their results based on them, by carefully mapping out their judging criteria. These mentioned research papers were carried out to measure the influence of a blog when introduced to informal educational courses.

Blogs can be used as a means for sharing and discussing course content and learning among fellow students to promote further analyzing and understanding [14]. Blogs may also be used as a tool by teachers to help students dignify their work as their own, with their own unique writing and visualization styles.

Moreover, blogs also act as a storage facility to implement the archival capabilities of information and written text [?]. Further research states that blogs perform a pivotal role to bring forth connectivity and interactions in the class [2,4,7,11,15,23]. Hall and Davidson (2007) [12,26] made a remark on blogs as a means for endorsing students to engage with the course materials, hence, promoting communication in the classroom.

The study that was done by Oravec (2002) [20,28] states that blogs are a digital version of Journals that can be edited and contextualized based on the blogger's own choices and can be made to communicate their views with others through social media via the usage of the share button. Blogs may allow students to fully contemplate their own ideas in a clear analytical way before making the conscious decision to post online.

Blogs are accessible, comprehensible, and user-friendly, which encourage learning among readers. Several academic establishments across the globe further solidify the significance of blogs

by relying on them to deal with shortcomings, such as a more sophisticated way to archive the old but important information and give an individual full ownership over their contribution [10]. The blog authors have the privilege to initiate and move the blog's focal point of discussion, which helps assess the learning goals of a specific theme in an educational environment [13].

While such concepts have been thoroughly researched [24], it has been proven to be a great struggle to implement them in academic scenarios, where there is a lack of accessibility to the required tools [3]. To assist students in processing new information, to critically analyze and reflect upon it, it is necessary to provide them useful opportunities and an efficient learning environment [8]. Its consequences are nothing but good, as it enhances their capability to perform well and gain knowledge actively [22].

The literary work focusing on the blogs' usage in the field of pre-service teacher education concluded with the results of four different kinds: [33]

1. Increased teamwork and conversations among students to students.
2. Blogs contributed to critical analysis and reflective thinking.
3. Active participation from students noticeably increased.
4. Students showed more motivation and were more confident to use technology.

Most of the research on blogging and teacher education indicated positive dependence between the blog usage in academia and enhanced collaboration capabilities of pre-service teachers and that is the main goal for using blogging in education [5]. It requires giving critical feedback or reflections about a specific subject matter, and a few studies concluded that it contributes to students developing their critical thinking skills and improving the ability to reflect, which are crucial to solve a problem effectively [9].

This study aims to explore the efficacy and the validity of using blogs for academic and teaching purposes. We aim to answer the following research questions in this paper:

- To investigate the effect of academic blogging on students' subject perception.

- To what extent can blogs be used to evaluate students' blogging behaviour.
- What blog features or structures affect student learning engagement and skill acquisition.

3 Materials and methods

3.1 Materials

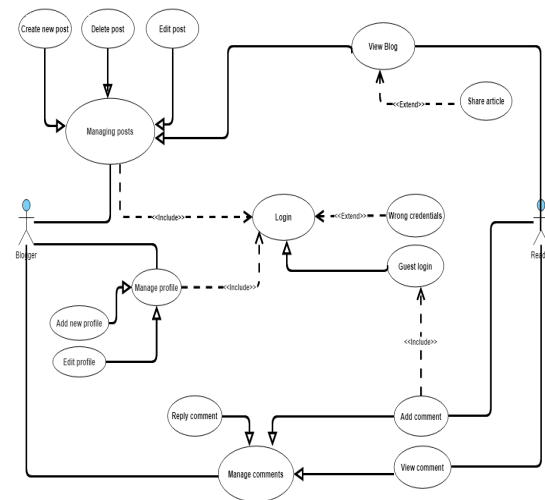


Fig. 1: Use Case Diagram

The use case diagram focuses on two actors: the blogger and the reader. The blogger serves as one of the admins, who is equipped with handling managing posts, comments, and user data. In managing posts, the blogger is responsible for creating, deleting, and editing the posts. In managing comments, they can view, add, delete, and reply to the comments made on the blogs. Lastly, they have access to managing the user rights, which means they can grant users admin powers or assign a user as a reader.

The reader engages with two main aspects of the blog: viewing publications and commenting. When viewing an editorial, the readers can see the visit counter and share the blog. They can also add their own comments, view others' thoughts, and read all the blogs. Only for commenting, the reader has to log in.

Authors	Methodology	Merits	Assessment Strategy	Limitations	Environment
Stoyle et al. [25]	Learning fractions using blog	Gain in conceptual Knowledge	pre-test, post-test, and delayed post-test of fractions	Randomly selected groups, learning needs of students	Classroom
Halic et al. [11]	Blog integration in an undergraduate course	Stimulated thinking about course-related concepts	Analysis of data collected through survey/Principal axis factoring extraction with varimax rotation	Moderate survey response rate was 43%	Online learning
Zou et al. [32]	Blog engagement across disciplines	Blog posts from both soft and hard fields	Measurement of Engagement	Focus on limited disciplines, avoiding variations in them	Online learning
Hasan Çakır [33]	Surveying pre-service teachers about the merits of blog implementation in the classroom	Expand in-class discussions among students	Survey to measure student engagement with blog use	Student motivation, reasons to use blog in the course, level of challenge perceived	Web 2.0
Princely Ifinedo [14]	Students' intention to use blogging	Playfulness positively affects blog usage for learning	Relevant hypotheses were formulated and tested using the partial least squares technique	Non-response, common method and selection bias cannot be eliminated	Classroom
Alsubaie et al. [1]	Focus on students' vocabulary	Improvement in students' English writing, enhanced vocabulary	blogging intervention, a paired-sample test utilized for statistical analysis	Lack of engagement, not everyone passed post- and pre-tests	Online learning
VanEpps [27]	Blog engagement between peers	Increase in student motivation, authentic learning experience	Students' traits: date of entry, genre of book, title and author of book	Time allotted for research in practice was minimal	Elementary school
Parnin et al. [21]	Inspecting blog posts, surveying the respective authors	Maintaining a personal knowledge repository motivate	IDE plugin, mobile as well as web development	Need better tool support for preparing posts	Online learning
Yan et al. [29]	Maintaining a single class blog	Higher sense of authorship and community, more collaborative learning	Submitting homework on the private space of the blog	Low internet speed, online distractions, lack of typing skills	Classroom
Derntl et al. [6]	Felder-Silverman learning style model	Bloggng in education support all learners independent of their learning styles	Students filled out an ILS questionnaire	Quality of student participation varied	Classroom
Miceli et al. [19]	Introducing a blog for an advanced Italian Cuisine and language course in the class	Information sharing in the blog also increased the sense of community and independent voice among students	Students filled out questionnaires during and at the end of the study to express their opinions	Including disagreements among students in the list was not a good idea	Out-of-class online forum

Table 1: Summary of literature review

3.2 Materials

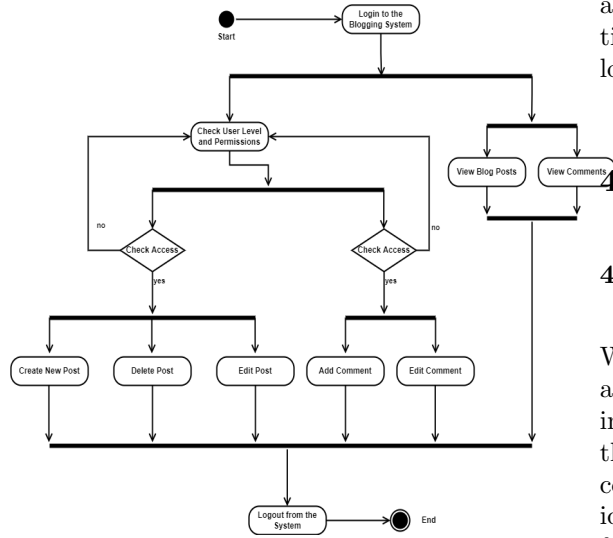


Fig. 2: Activity Diagram

Moreover, the activity diagram visualizes the various activities that the different users can perform while using the blog. It is essentially a behavioural diagram which is portrayed similarly to a flowchart that represents workflows for step-wise activities and the actions performed in response to a condition or choice.

Here, a user does not need any login credentials to surf around and take a look at the blog posts and view the respective comments section. But when a blogger or admin wants to add, delete, or edit a blog post from the website, they need to provide their login credentials to validate their user access. The same is also required for when a certain user wants to add a comment to a post or edit a previous comment written in the comments section.

3.3 Participants

The data used in this study was collected during the period between 15th and 24th of February 2022. It includes information from forty on-line learners out of which thirty were enrolled in Otto-von-Guericke University Magdeburg in a post-graduate study. The rest were recent graduates working in professional fields. All of the voluntary participants have an academic background in engineering, mainly computer science.

The participants were provided with the admin access such that they can experience the functionalities of the blog as a guest user, a normal login user, as well as an admin user.

4 Implementation

4.1 Database

We have created five tables for our blog database as shown in figure 3. The users table holds the information of users and connects with others through its id attribute, through which posts, comments, and replies are able to determine the identity of the respective user submitting the information in those tables. The comments and replies tables are connected by "comments.id" to make sure that each reply corresponds to the correct comment. Similarly, the comments table has "post.id" such that it can be displayed under the corresponding post. "topic.id" foreign key in posts table is used so as to list the post under the mentioned topic.

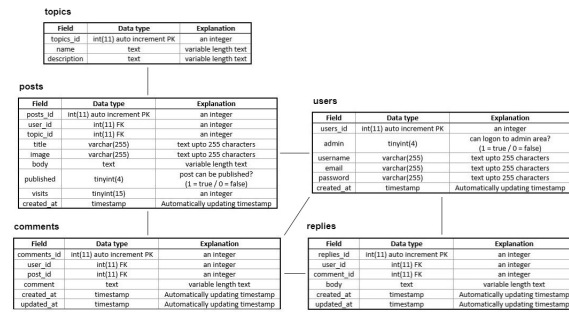


Fig. 3: SQL Database tables

4.2 Layout

Providing a user-friendly experience to the blog's readers is a key aspect of the research questions that this paper addresses. Its layout is based on two key aspects, readability and accessibility.

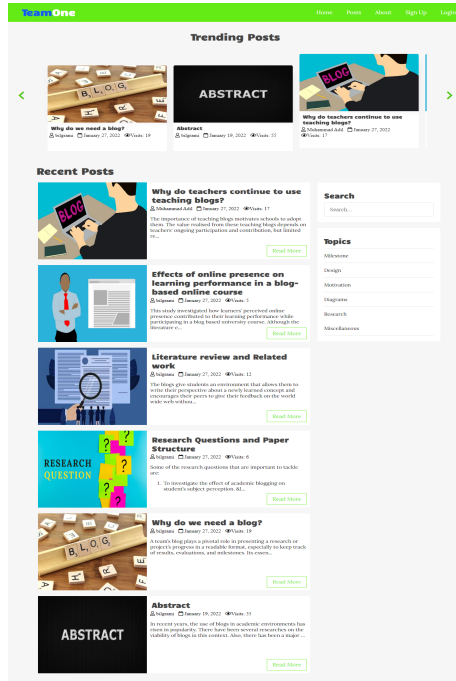


Fig. 4: Home page screenshot

The blog's home page is a good reflection of what we as blog contributors can share with our readers. It begins with a dynamic "trending posts" section on top, which consists of blog posts that are popular among the readers, which is set based on the number of views that the articles receive. The section below it features a brief version of a list of articles, with the most recent publication on top. The readers also have an option to "search" the blog post with the specific words that are used in the respective blogs. Further, each blog post is assigned a particular topic and the list of topics is also displayed below the search bar. When a single topic is selected, all the posts under that topic will be displayed thus making it easier for the user to search the posts with a similar topic.

The blog post page contains the author's name, the date of publication, and the visit counter. In the main body of the blog, hyperlinks can be present either to provide a source for the literature, or to provide references for a detailed explanation. The blog can be shared across various social media platforms by using the share buttons available immediately below the blog's main

body. The readers can give their feedback or can engage in the discussion by using the comment section provided below the article.

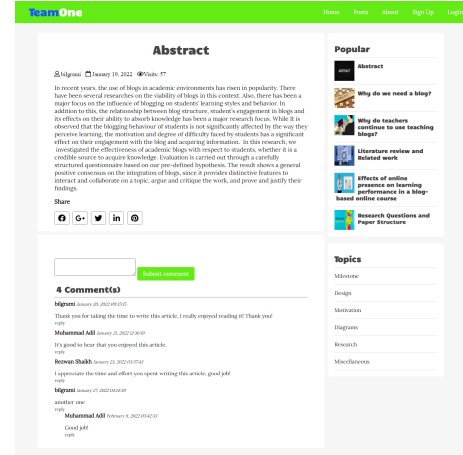


Fig. 5: A single post screenshot

The complete directory of blogs is listed in a separate section. Arranged in ascending order with a time of publication as a reference, the page includes blogs with their complete titles, a thumbnail image that also serves as the main header of the post, and a blurb that addresses the first set of lines from the blog.

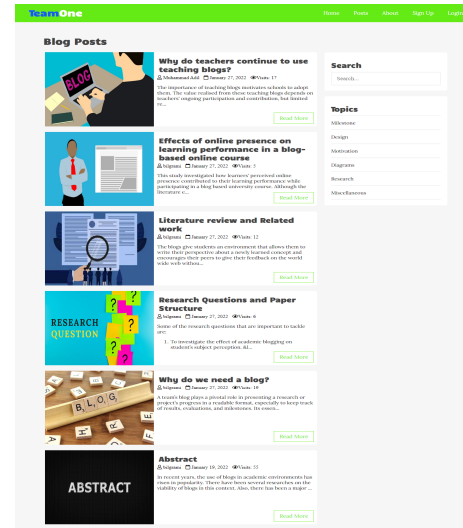


Fig. 6: Posts page screenshot

The user rights are divided into two distinct categories: administrators and readers. The readers have an option to sign up on the website, with

which they can submit their comments to address potential feedback. The administrators are tasked with managing the blog posts, managing the topics, and managing the readers in general. A new account can be made by using the ‘Sign Up’ button, or the users can simply log in if they are already registered users.

Fig. 7: Sign-up page screenshot

Fig. 8: Login page screenshot

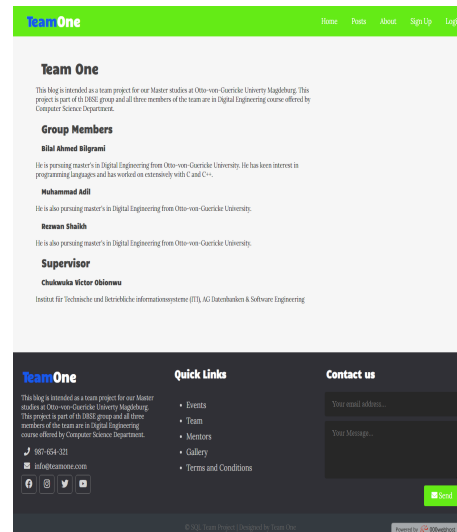


Fig. 9: About page screenshot

The administrator section of the blog contains Manage Posts, Manage Users and Manage Topics sections which can only be accessed by admin users.

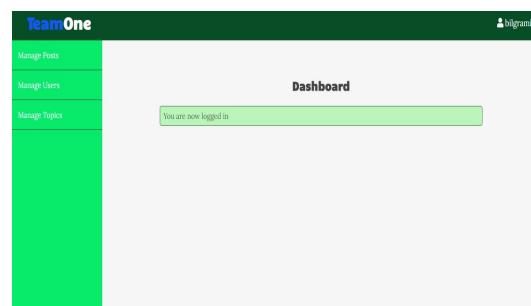
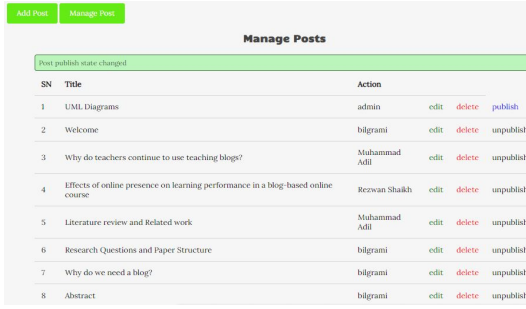


Fig. 10: Dashboard screenshot

A brief introduction about the blog creators is listed in the "About" section. The readers can reach out to the administrators by using the "contact us" form at the bottom right of every page, along with links to our social media channels, telephone number, and E-Mail address.

All the blog posts are listed in a table here on the manage posts page with the options to edit or delete the post. Published/Unpublished state is also displayed for each post; the admin can choose to make the post available for visitors to read or not.

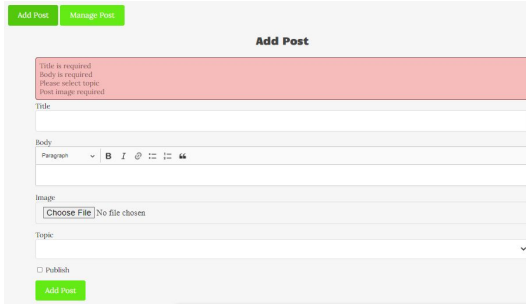


The screenshot shows the 'Manage Posts' interface. At the top, there are two buttons: 'Add Post' and 'Manage Post'. Below them is a table with columns: SN, Title, and Action. The table lists 8 posts with their serial numbers, titles, authors, and actions (edit, delete, unpublish). A green notification bar at the top says 'Post publish state changed'.

SN	Title	Action
1	UML Diagrams	admin edit delete publish
2	Welcome	bilgrami edit delete unpublish
3	Why do teachers continue to use teaching blogs?	Muhammad Adil edit delete unpublish
4	Effects of online presence on learning performance in a blog-based online course	Rezwan Shaikh edit delete unpublish
5	Literature review and Related work	Muhammad Adil edit delete unpublish
6	Research Questions and Paper Structure	bilgrami edit delete unpublish
7	Why do we need a blog?	bilgrami edit delete unpublish
8	Abstract	bilgrami edit delete unpublish

Fig. 11: Manage Posts page screenshot

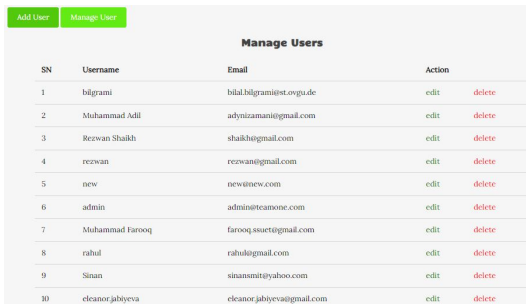
Add post and edit post are similar, each field in the form has to be filled to save the post, otherwise, error messages will be displayed asking the writer to satisfy the requirements.



The screenshot shows the 'Add Post' form. It has a title field, a body field with a rich text editor, an image field with a 'Choose File' button, and a topic dropdown menu. There is a 'Publish' checkbox and an 'Add Post' button. A red error message at the top says 'Title is required. Body is required. Please select topic. Post image required'.

Fig. 12: Add Post page screenshot

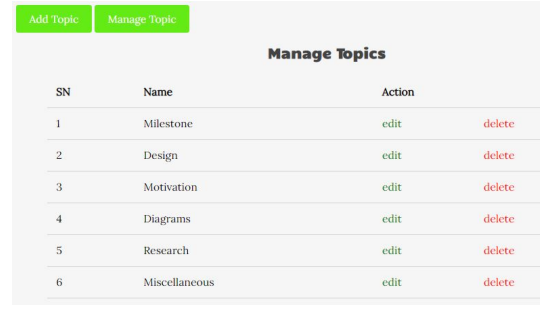
Similar to the manage posts section, manage users and topics contain the table listing all registered users and created topics respectively. They can be edited or deleted from here and new users.



The screenshot shows the 'Manage Users' interface. At the top, there are two buttons: 'Add User' and 'Manage User'. Below them is a table with columns: SN, Username, Email, and Action. The table lists 10 users with their serial numbers, usernames, emails, and actions (edit, delete).

SN	Username	Email	Action
1	bilgrami	bilal.bilgrami@st.ovgu.de	edit delete
2	Muhammad Adil	adynicamani@gmail.com	edit delete
3	Rezwan Shaikh	shaikh@gmail.com	edit delete
4	rezwan	rezwan@gmail.com	edit delete
5	new	new@new.com	edit delete
6	admin	admin@teamone.com	edit delete
7	Muhammad Farooq	farooq.su@rt@gmail.com	edit delete
8	rahal	rahal@gmail.com	edit delete
9	Sinan	sinanm@yaho.com	edit delete
10	eleanorjabyeva	eleanorjabyeva@gmail.com	edit delete

Fig. 13: Manage Users page screenshot

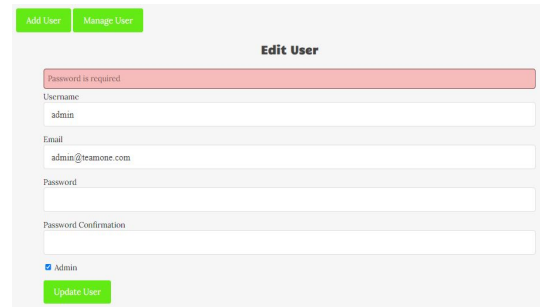


The screenshot shows the 'Manage Topics' interface. At the top, there are two buttons: 'Add Topic' and 'Manage Topic'. Below them is a table with columns: SN, Name, and Action. The table lists 6 topics with their serial numbers, names, and actions (edit, delete).

SN	Name	Action
1	Milestone	edit delete
2	Design	edit delete
3	Motivation	edit delete
4	Diagrams	edit delete
5	Research	edit delete
6	Miscellaneous	edit delete

Fig. 14: Manage Topics page screenshot

Add users form is identical to the registration form with the added option here to make the user admin. This option also appears while editing or updating the registered user information which allows them to be converted to an admin user. While add topics contain two fields namely topic name and its description.



The screenshot shows the 'Edit User' form. It has fields for Username, Email, Password, and Password Confirmation. There is a checkbox for 'Admin' and an 'Update User' button. A red error message at the top says 'Password is required'.

Fig. 15: Edit User page screenshot

5 Results

After conducting the survey from over 40 users, the results indicated that when it comes to the influence of the blog on a subject's perception, 87.5% of them understood the topic better after reading the blog, 75% claimed that it increased the knowledge of the subject, and 72.5% found it captivating to read. Nearly one-fourth of the users experienced some complications upon using the blog while 62.5% implied that the blog was not unnecessarily complex. 67.5% of the users agreed how very effective the blog is as a tool for interactive learning, other than the traditional learning methods in the university. While 32.5% found it just somewhat effective. Most of the

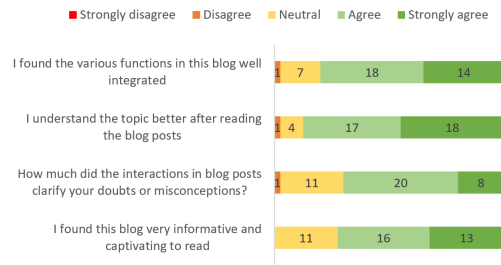


Fig. 16: Responses for Influence on subject perception and blogging behavior

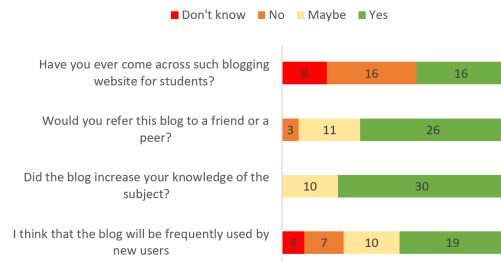


Fig. 18: Responses for Influence on subject perception and blogging behavior

users found the language used to be easily comprehensible, while only 3.1% had difficulty understanding the vocabulary used in the publications. The blogging behaviour of the readers showed 90% of the users can learn to use our blog quickly and 80% of them felt confident using it. The time spent on reading the blog varied: 12.5% used it for 5 minutes, 42.5% spent 6 to 10 minutes reading it, 32.5% gave it 11 to 20 minutes of their time, and 12.5% read through it for more than 20 minutes. Three-fourths of the users found the comments section very helpful and engaging to discuss the topic further and 72.5% showed interest in reading more posts on the blog. 62.5% of the users were in an agreement that the blog will be frequently used by the new users and 12.5% were in disagreement. Out of 40 users surveyed, only 17.5% expressed that they needed to learn a lot of things before using the blog effectively, but 75% did not think so.

Among blog features, 85% of the 40 users surveyed were in agreement on how helpful the view counter is in determining the engaging publications. 90% of them thought that it was easy to share the blog with their peers using the share button available on posts. Four-fifths of the users

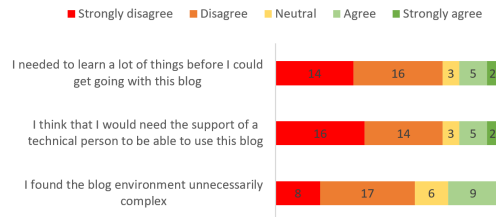


Fig. 17: Responses for Influence on subject perception and blogging behavior

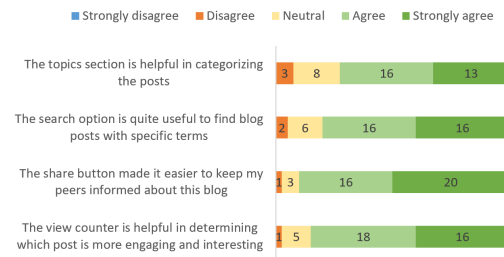


Fig. 19: Thoughts on blog features

found the search box very helpful to look up blogs with specific terms and 72.5% supported the use of topics to categorize the blogs. Overall, 90% of the users were satisfied with their experience using the blog and 65% were confident in recommending the blog to a friend. Around three-fourths of the users came to a consensus that they will not need the support of a technical person to be able to use the blog, while 17.5% expressed the need for some assistance. Overall, 80% of the users agreed that the various functions of the blog were very well integrated.

6 Discussion and Future Works

For future insight, the usability and performance of the website were deemed as very good to excellent by more than three-fourths of users. The impacts that the blogging platform will have on learning and interaction in our university was noted by most of the users, with one of them being how it can provide a space for students to understand and discuss related topics in much detail, which is often not possible in classrooms due to time constraints, as this is more specific

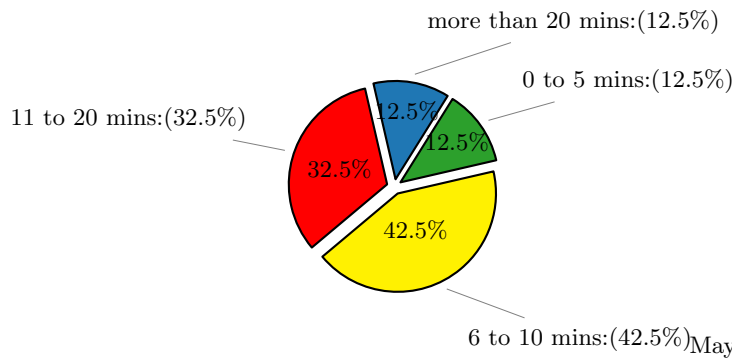


Fig. 20: Responses to question "I spent this much time on this blog"

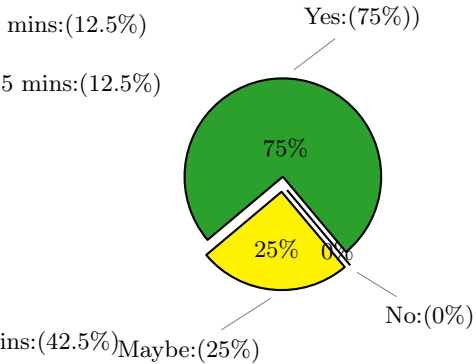


Fig. 21: Responses to question "Did the blog increase your knowledge of the subject?"

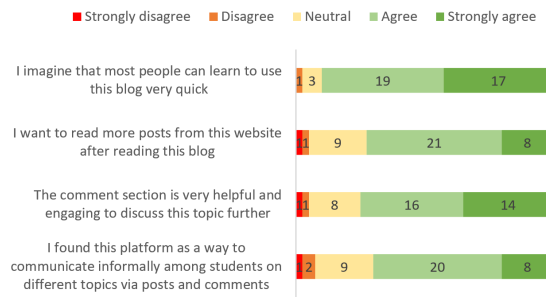


Fig. 22: Thoughts on blog features

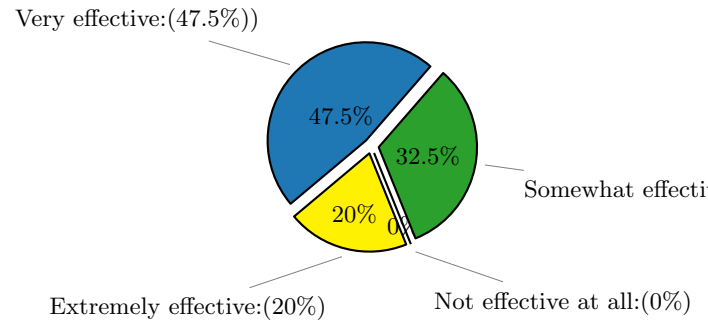


Fig. 23: Responses to question "How effective is this blog as a tool for interactive learning, other than the traditional learning methods in university?"

and users have more time to read the content at their own pace.

The initial perception about the most suitable aspect for students concerning this blog environment was that it allows students to express their opinions and increase knowledge sharing, as it is convenient and user-friendly, and supported that the more students find our website gratifying, the more time they will spend in blogging to enhance creative writing. About the type of blogging content readers would prefer to consume, 59% selected science, 17.9% use them for cultural and entertainment content, 12.8% wanted their daily news from blogging, and 10.3% would like to have sports content.

Furthermore, the concluding part of the questionnaire included an open-ended question regarding what improvements the users would like implemented on the blog. There was a series of valuable feedback from more than half of the respondents, like the inclusion of animations and videos to make the blog more attractive, adding a dedicated discord server or live chat option dedicated to the blog, and adding more topics for varied users. One user suggested for it to be focused more on scientific researchers and topics, which we can further improve by including categories concerning each research area and those will have their own set of posts and creator from the respective fields. One user suggested that we can give any registered user the ability to create

a post but not publish it, it will only be published by the admins. This response gave us the idea for the very first upgrade we can make to our system by introducing another category of user- "the Contributor". These users will be able to create posts and topics, but their posts will be scrutinized by the admins before getting published. These are all very valuable and insightful responses from the users and in the future, most of these improvements will be introduced in the blog.

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