Learnsphere- A Digital Learning And Sociohub

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Abstract

Most public school students, especially low-income families, have enormous difficulties getting quality learning materials, and thus encounter disparities in learning opportunities. They neither get enough support nor do they access any coaching to consolidate their views. Our website alleviates this situation by offering free AI-driven academic support for all learning materials. Besides AI, which works on doubt clearing, test, and assignments help, we provide according to the school syllabus an array of subjects. The AI system uses natural language processing(NLP) and deep learning to provide instant and accurate answers to student questions- reason given and step by step guidance, if wrong. The React.js, Node.js, Express.js, and MongoDB development have provided a handy interface to ask questions in real-time and track academic performance-attractive and engaging experiences for teachers and learners alike. The complete solution helps the students develop confidence and become successful academicians.

Keywords

Digital Learning, AI-based Support, Real-time Query Answering, Natural Language Processing (NLP), Deep Learning.

Introduction

The platform addresses education inequities for public school students with a particular focus on those who are at the lowest end of low-income. It emphasizes using artificial intelligence-driven academic support that is either free or low-cost. It enables the students to clear up their various doubts in the quickest possible time, undertake personalized learning and assessment tests, and receive step-by-step guidance on certain concepts towards enhancement of understanding and performance.

Through state-of-the-art technologies-powered with natural language processing and deep learning-this engagement

becomes interactive and intuitive. It in turn boosts student confidence and performance.

This addresses the inequities in education by providing affordable, quality tutoring across all income brackets. This provides quick learning support for those traditionally disadvantaged, increases academic performance through confidence building, and in stills a cooperative teaching-learning atmosphere that enhances achievement for such students.

Key features include instant resolution of doubt, personalized assessment per student, personalized study paths for students, including monitoring progress and areas of need. Scalable tutoring provides universal access to guidance, while a streamlined user interface encourages students. The teacher has tools to continue caring for and monitoring the ongoing progress of students.

It tries to fuse the AI-powered solutions with personalized learning to surpass the bounds of traditional education and provide them with real-time assistance, flexible tutoring, and consistent logging of progress, thus granting every child optimal equitable learning.

II. LITERATURE SURVEY

Numerous studies have examined the most effective strategies to improve access to quality education and support learning for students, especially those from underserved backgrounds. Some of the most widely used approaches include

the following:

A study has looked at the adoption of Google Classroom in writing courses using a 5-point Likert scale survey and interview with 130 Vietnamese university students. This study found that students had a positive perception of Google Classroom as they appreciated it as a helpful tool in their writing process[1]. Another study examined the extent to which online learning influenced motivation during the COVID-19 pandemic among Grade 9 students in an Indonesian junior high school. It concluded that online learning could promote independent learning but would demotivate students because of the absence of interaction and novelty[2]. Using qualitative research methods, a study in AI examined what were considered ethical considerations of AI systems and chatbots in learning and research. It concluded that while there is much potential with AI and chatbots to revolutionize learning, there is the elephant in the room of serious ethical issues they could face, including possibilities of exploitation and manipulation[3]. Another research critically reviewed 67 studies on the advantages and disadvantages of AI chatbots in education. It concluded that AI chatbots have many advantages, including personalized learning for students and enhanced time management for teachers[4]. A conceptual framework for e-learning instructional design was introduced to cover the shortage of systematic research on online pedagogy. The framework grouped variables into outcome, in situ, and independent types, recommending a need for further systematic research in order to

enhance e-learning pedagogy[5].The study proposes an internet-enabled blended learning platform as an education enhancer for underprivileged students in India. The findings show that the combination of digital content, expert teachers, and on-site support improves the learning outcomes[6]. The study evaluates the efficiency and acceptability of e-learning methods used in India during the COVID-19 pandemic, specifically Google Classroom, Zoom, and Microsoft Teams. While e-learning encourages accessibility and comparatively lowers carbon footprints, it raises concerns regarding mental wellbeing, seclusion, and physical stressors[7]. The study analyses the impact of COVID-19-induced school closure in West Bengal, highlighting a huge digital divide. Private school students had more access to online classes, whereas government school students, particularly in rural areas, faced severe learning gaps[8]. A study was carried out at Adamas University to investigate teachers' readiness, difficulties, and practices in assessing students during an online competent approach to learning during COVID-19. The findings show projection among the respondents, from low to intermediate and up to advanced levels, mainly being challenged by technology and teachers' mental well-being[9]. Abductive reasoning is considered in this chapter to be a major instigator of creativity in learning, triggered by authentic uncertainty when traditional reasoning falters. It shows that stimulation of abduction can foster creativity in the classroom while guiding many future educational research endeavors[10].

III. METHODOLOGY

The system guarantees fair access to quality learning by implementing AI technologies along with an easy-to-use interface. This AI-driven learning support platform is meant to correct the educational disparities experienced by students in public schools, more specifically the low-income families' students.

A. User Authentication

Authentication should enable blocking unauthorized access into personalized features, providing usage strictly by registered students and teachers and secure logins. Upon input of the credentials, these are first checked against a database, and incorrect attempts instantly trigger a retry routine.

B. Query Resolution

Students can pose any academic question in natural language, which will go through Natural Language Processing (NLP) models. AI translates the question, attributions are assigned to the relevant concepts, and precise answers are created. The teacher also needs to provide proper and interactive explanation while handling such query resolution.

C. Adaptive Assessments and Personalized Learning

• Tests & Quizzes: Adaptive dynamic tests are created by the platform based on LSTM and transformer models according to student performance.

• Performance Tracking: Tracks the individual students and suggests the

personalized learning according to progress.

D. AI-Powered Chatbot (EduBot)

An AI chatbot using Bert model provides immediate support to students in raising questions when teachers are not available physically. It provides ongoing support to students by explaining challenging concepts interactively.

E. User Dashboard and Profile Management

Every student has a dashboard to monitor their progress, view past questions asked, and get personalized recommendations. Teachers also view student activity and provide additional assistance.

A reactive website for educational technology using React.js, Node.js, Express.js, and MongoDB has been conceptualized to provide an easy, scalable, and resilient system for the facilitation of learning by students to provide confidence and close educational gaps.
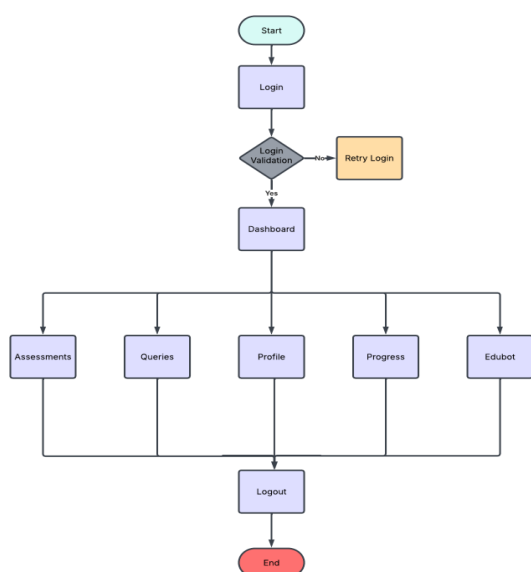

Fig.1.   FLOWCHART OF STUDENT PAGE

After successful login, teachers are led to the dashboard, which is the core location for managing students, answering queries, and administering assessments.

F.   Student Management

The "Get Student Details" module allows teachers to:

•   Access student profiles and academic performance.

• See previous assessments and learning history.

• Determine weaker areas to give targeted support.

This aspect provides customized student counseling.

G. Query Resolution Support

Educators can deal with student queries directly. The system offers:

• A log of query history to monitor prior interactions.

• Providing extra clarifications and explanations.

This helps in effective doubt clearance and increased student-teacher interaction.

H. Assessment Management

The Post Assessments tool enables teachers to:

• Design and distribute tests according to student requirements.

• Test student submissions and return feedback.

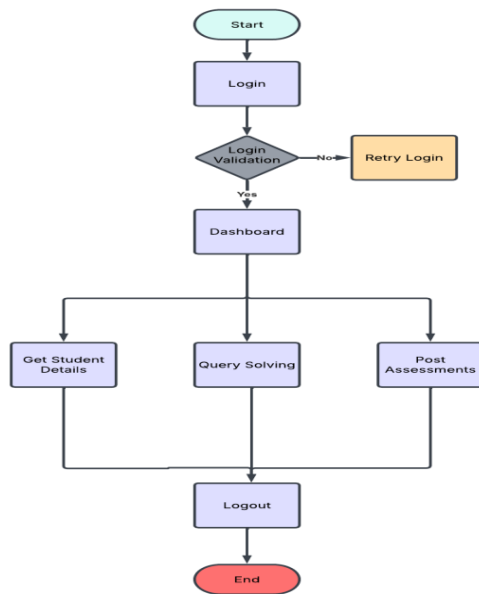This aids in disciplined learning and monitoring of academic progress.

Fig.2.   FLOWCHART OF TEACHER PAGE

Mentors start with registering and filling in the required information to create a profile. Upon registration, mentors provide their application for vetting. This process is to ensure only eligible people acquire mentoring privileges. The system processes each application and determines whether to issue mentor rights.

• If successful, mentors are allowed access to the query-solving interface.

• If unsuccessful, the applicant is informed, and their profile is disallowed from acquiring mentor privileges.

I.   Query Resolution

Certified mentors are able to begin resolving student questions. The platform allows mentors to:

• Offer in-depth explanation and instruction.

• Keep track of solved questions for reference in the future.

J.   Secure Logout

Once done with their work, mentors securely log out to guarantee data security and uphold privacy.
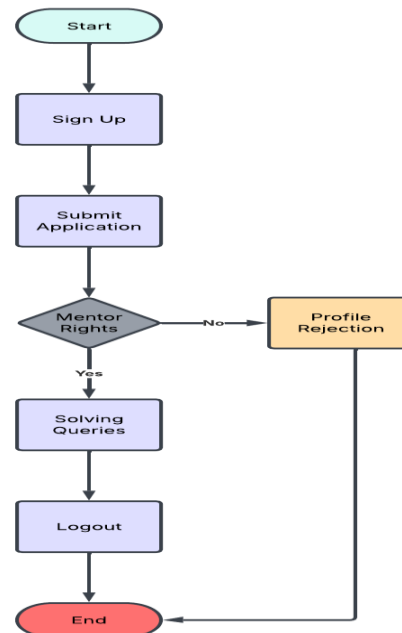

Fig.3.   FLOWCHART OF MENTOR PAGE

RESULTS AND DISCUSSION

Figure 4 and Figure 5 represent the web interface of Learn Sphere, prepared for student-teacher-mentor collaboration. The structured authentication system accommodates multiple user roles to provide secure access.
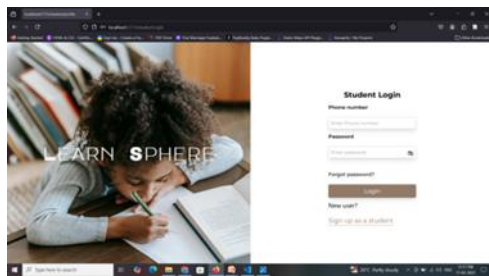

Fig.4. LEARNSPHERE PLATFORM

Fig.5.STUDENT LOGIN

Its features combine a Q&A system with

short educational content and access to resources like is shown by the following, Figure 6. Figure 7, represents online assessments are designed simply, with clear instructions and data privacy measures as background to recommendations. On completion of any assessment, learners enjoy some good feedback display with the score achieved from the assessment, an encouraging message, and rewarding animation on Figure 8.
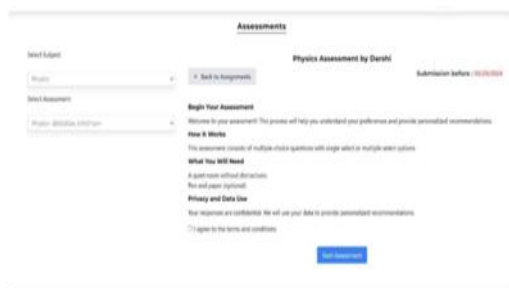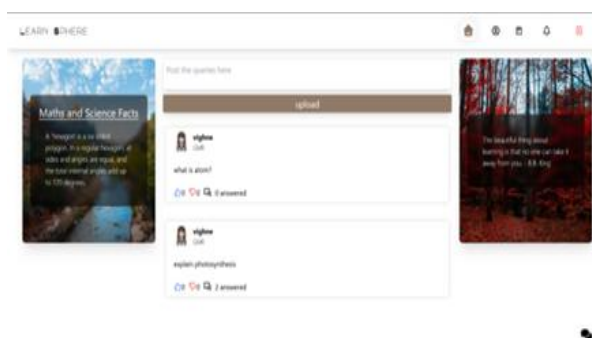

Fig.6. STUDENT HOME PAGE

Fig.7.   ASSESSMENT PAGE

Fig.8.ASSESSMENT SCORE

Figure 9, integrates the student profile presentation with the assessment progress feature to provide users with an easy way to manage their personal information and to monitor their performance. Figure 10, enables checking of an individual assessment in more detail: the answer of the user and recognition of the weak points by the teacher.

Fig.9.   STUDENT PROFILE

Fig.10. TEACHER PROFILE

Figure 11, In the "Post Assessments" interface, teachers can create and schedule assessments by selecting the subject, class, and deadlines. Figure 12 shows an "Assignments Status" view to monitor active assessments for deletion. Figure 13 illustrates the "Mentors" management

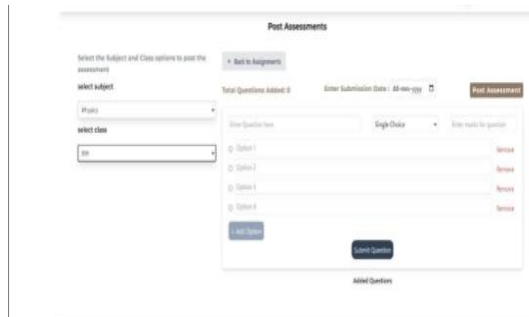page where the admin can manage the teachers, their subject areas, their verification status, and profiles.
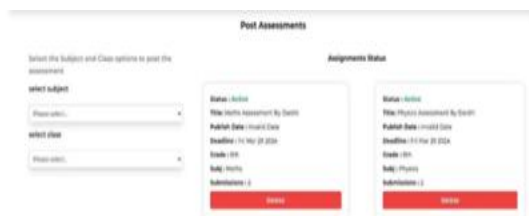

Fig.11. POST ASSESSMENTS PAGE
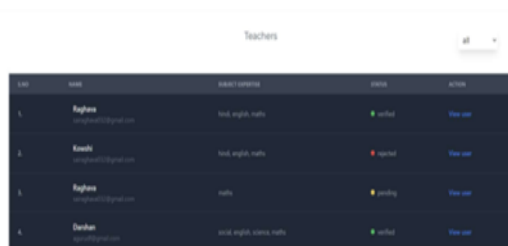

Fig.12. ASSESSMENT STATUS

Fig.13. MENTOR SELECTION

Figure 14 represents EduBot, question's will gets answered instantly by AI. It also explains the answer so you can learn on your own without a teacher.
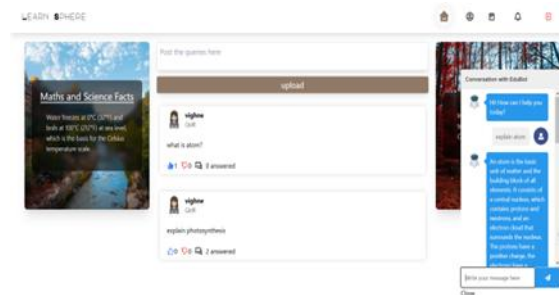

Fig.14. EDUBOT ASSISTANCE

V. CONCLUSION

In conclusion, our platform, offer free AI-driven academic assistance to public school students from low-income households, including doubt clearing, assessments, and homework support, for any subject. Our platform is built with a technology stack including React.js, Node.js, Express.js, and MongoDB to enable real-time doubt resolution and progress tracking so all students can thrive academically.

VI. FUTURE SCOPE

The platform's future rests in the future, the platform will enable more people to access it through partnerships with schools and institutions, making it a key part of the learning environment. AI grading of subjective answers and automatic analysis of performance will provide students with better insights. Also, handwriting recognition will boost the AI doubt clearing mechanism to offer personalized instant support.

REFERENCES

[1] Pham, A. T., & Nguyen, T. B. (2024). English as a foreign language students' acceptance of Google

Classroom in writing classes: A case study in Vietnam. Heliyon, 10(8).

[2] Zaitun, Z., Hadi, M. S., & Harjudanti, P. (2021). The impact of online learning on the learning motivation of junior high school students. Bisma The Journal of Counseling, 5(1), 56-63.

[3] Kooli, C. (2023). Chatbots in education and research: A critical examination of ethical implications and solutions. Sustainability, 15(7), 5614.

[4] Labadze, L., Grigolia, M., & Machaidze, L. (2023). Role of AI chatbots in education: systematic literature review. International Journal of Educational Technology in Higher Education, 20(1), 56.

[5] Meyen, E. L., Aust, R., Gauch, J. M., Hinton, H. S., Isaacson, R. E., Smith, S. J., & Tee, M. Y. (2002). e-Learning: A programmatic research construct for the future. Journal of Special Education Technology, 17(3), 37-46.

[6] Dey, P., & Bandyopadhyay, S. (2019). Blended learning to improve quality of primary education among underprivileged school children in India. Education and Information Technologies, 24(3), 1995-2016.

[7] Agarwal, A., Sharma, S., Kumar, V., & Kaur, M. (2021). Effect of E-learning on public health and environment during COVID-19 lockdown. Big Data Mining and Analytics, 4(2), 104-115.

[8] Sarkar, B., Islam, N., Das, P., Miraj, A., Dakua, M., Debnath, M., & Roy, R. (2023). Digital learning and the lopsidedness of the education in government and private primary schools during the COVID-19 pandemic in West Bengal, India. E-Learning and Digital Media, 20(5), 473-497.

[9] Gupta, T., Shree, A., Chanda, P., & Banerjee, A. (2023). Online assessment techniques adopted by the university teachers amidst COVID-19 pandemic: A case study. Social Sciences & Humanities Open, 8(1), 100579.

[10] Beghetto, R. A., & Schreiber, J. B. (2017). Creativity in doubt: Toward understanding what drives creativity in learning. Creativity and giftedness: Interdisciplinary perspectives from mathematics and beyond, 147-162.