IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 2, April 2026
Impact Factor: 8.2

Design and Development of VidyaSetu: An Online Donation System for NGO Educational Welfare Program

Dr. Mrunal Pathak[1], Dr. Pritesh Patil[2], Yash Raut[3], Vinayak Patil[4], Ayush Shetake[5]
Associate Professor, Department of Information Technology[1]
Assistant Professor, Department of Information Technology[2]
Undergraduate Student, Department of Information Technology[3,4,5]
AISSMS's Institute of Information Technology, Pune, India

Abstract: *Non-governmental organizations (NGOs) play an important role in supporting students from economically weaker sections by offering scholarships, books, and other learning resources. However, many NGOs continue to depend on manual or partially digital systems to manage donations and monitor how funds are utilized. These traditional methods often result in limited transparency, inefficient record handling, and a decrease in donor confidence. This research introduces VidyaSetu, a web-based donation management platform developed to enhance transparency, accountability, and operational efficiency in NGO activities. The system enables NGOs to record donations, maintain donor details, monitor expenses, and present the impact of donations through a centralized dashboard. The platform is developed using HTML, CSS, and JavaScript for the frontend, Node.js with Express.js for backend functionality, and MySQL for database management. Additional features such as OTP-based authentication, chatbot assistance, and real-time donation analytics further improve the overall functionality of the system. By promoting transparency and efficient fund utilization, VidyaSetu contributes to the United Nations Sustainable Development Goals of SDG-1: No Poverty and SDG-4: Quality Education, supporting equitable access to educational resources for underprivileged students*

Keywords: NGO Donation System, Management Information System, Educational Welfare, Transparency, Web Application.

I. INTRODUCTION

A. Background of the Study

The continuous growth of digital technologies has greatly influenced how organizations manage information, financial transactions, and day-to-day operations [1], [2]. In recent years, web-based systems have become an important solution for improving efficiency, transparency, and accessibility across different sectors such as healthcare, education, and social welfare organizations. Among these sectors, donation-based systems play a vital role in supporting charitable initiatives, community welfare activities, and institutional development. Many organizations rely on donations from individuals and communities to support activities such as medical assistance, educational programs, disaster relief efforts, and social development initiatives [3]. However, traditional donation management methods often depend on manual record keeping or simple digital tools that lack automation, real-time tracking, and transparent reporting features. These limitations can result in data inconsistencies, administrative inefficiencies, and reduced trust among donors.

With the growing adoption of digital platforms, there is an increasing demand for intelligent systems capable of managing donations efficiently while maintaining transparency and accountability. A web-based donation management system offers a centralized platform where donors can easily contribute funds while organizations maintain well-

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 2, April 2026
Impact Factor: 8.2

structured records and derive meaningful insights from donation data. Such systems not only simplify operational processes but also improve donor confidence by ensuring greater transparency in fund management [4], [5].

B. Problem Statement

Despite the availability of several digital tools, many organizations continue to face major challenges in maintaining accurate and transparent donation records. In many situations, donation information is recorded using manual registers or stored in separate digital files, making it difficult to monitor donations efficiently or generate dependable reports. Such practices often lead to delayed updates, duplication of data, and possible errors in financial documentation. In addition, the absence of transparency in donation tracking can lower donor confidence and discourage people from contributing to charitable causes. Donors usually expect clear information about how their contributions are recorded and utilized, yet many existing systems are unable to provide this level of visibility.

To overcome these challenges, this research proposes the development of a web-based donation tracking system that allows organizations to monitor and manage donation data more effectively. The system is designed to ensure transparency, accuracy, and reliability in donation management while offering an accessible platform for both donors and administrators.

C. Motivation of the Study

The main motivation behind this research is to improve trust and accountability in donation management systems by utilizing modern web technologies. As charitable activities increasingly depend on public participation, maintaining transparency in the handling of donations has become highly important. A well-developed digital donation platform can make the donation process easier, reduce the manual workload for administrators, and provide donors with clear confirmation of their contributions. In addition, such systems can enhance data organization, support effective reporting, and assist decision-making processes for organizations that manage large volumes of donation records.

By implementing a transparent donation tracking mechanism, the proposed system seeks to encourage higher donor participation and build a stronger relationship between organizations and their supporters.

D. Objectives of the Study

The key objectives of this research are outlined as follows:

- To design and implement a web-based donation tracking platform that enables efficient management of donation data.
- To ensure transparency and accuracy in recording and monitoring donation-related transactions.
- To establish a secure database system for storing donor information and donation records safely.
- To create a user-friendly interface that allows donors to submit their donation details conveniently.
- To assist administrators in analyzing and managing donation data in an effective manner.

E. Scope of the Study

The scope of this research centers on the design and development of a web-based system that allows donors to contribute and track donations through an online platform. The system stores donor information such as name, contact details, and donation amount in a centralized database to support efficient management and easy retrieval of records. The proposed platform enables administrators to access donation records, review transaction history, and maintain well-organized documentation of all donations. While the current system primarily focuses on donation tracking and transparency, it can be expanded in the future to include advanced features such as payment gateway integration, data analytics capabilities, and automated reporting mechanisms.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 2, April 2026 Impact Factor: 8.2

F. Contribution of the Study

This research contributes to the development of transparent and efficient digital donation management systems by demonstrating how modern web technologies can be applied to donation tracking. The proposed system shows that a well-structured web-based platform can improve the accuracy of donation records while also increasing the trust of donors. By combining transparency, organized data management, and easy accessibility within a single platform, the study offers a practical solution for managing donations. Such systems can be useful for charitable organizations, educational institutions, and healthcare initiatives that depend on public contributions.

II. LITERATURE REVIEW

The rapid growth of digital technologies has significantly changed the way non-governmental organizations (NGOs) and charitable institutions manage their operations. Many studies highlight the importance of using digital platforms to improve donation management, increase operational efficiency, and ensure transparency in the use of funds. Kumar et al. (2023) point out that many NGOs in developing countries still depend on traditional manual systems for managing donor information and financial transactions [6]. These manual processes often result in inefficiencies, inconsistencies in data, and difficulties in maintaining accurate financial records. The researchers suggest that adopting web-based donation management platforms can help organizations organize data more effectively, access donor information quickly, and reduce administrative workload.

Transparency in donation management has also been widely recognized as an important factor that influences donor trust and participation. Patel and Singh (2022) studied donor behavior in charitable organizations and found that a lack of transparency in the use of funds is one of the main reasons for declining donor confidence [7]. Their research indicates that donors are more willing to contribute repeatedly when they can clearly see how their donations are recorded and used. As a result, modern donation platforms increasingly include features such as donation tracking, transaction histories, and financial reporting dashboards to improve accountability and strengthen trust between donors and organizations.

Several well-known online donation platforms, including GiveIndia, Milaap, and Ketto, demonstrate the potential of digital systems in supporting large-scale fundraising and improving accessibility for donors. These platforms allow users to donate through online payment systems and support a wide range of social causes. However, previous studies suggest that many existing platforms focus mainly on collecting donations rather than providing detailed transparency in tracking how donations are recorded and utilized. This creates a need for systems that prioritize transparent record management and allow stakeholders to monitor donation activities more effectively.

Security and reliability are also critical factors in the development of web-based donation platforms. Sharma (2024) highlights the importance of implementing secure authentication mechanisms, encrypted data storage, and structured database systems to protect sensitive donor information and maintain the integrity of financial transactions [8]. Modern web technologies such as Node.js, relational databases, and secure authentication frameworks provide developers with powerful tools to build scalable and secure applications. Despite these technological advancements, many small-scale organizations still lack access to efficient and transparent digital systems for managing donations. Therefore, developing a dedicated web-based donation tracking platform can help improve transparency, accuracy, and accountability in donation management systems.

III. METHODOLOGY

A. System Architecture

The proposed system is designed using a three-tier architecture, which divides the application into three main layers: the presentation layer, the application logic layer, and the data storage layer. This separation helps improve the scalability, maintainability, and overall performance of the web platform. By organizing the system into different layers, each component can function independently while still working together to deliver the required functionality. The architecture of the system includes the following components:

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 2, April 2026
Impact Factor: 8.2

1) Presentation Layer (Frontend): The presentation layer represents the user interface of the system and serves as the point of interaction between the users and the platform. It allows users such as donors and administrators to access the system and perform various actions. The front-end of the platform is developed using HTML, CSS, and JavaScript, which helps create a responsive and easy-to-use interface. Through this layer, users can perform activities such as registering on the platform, logging into their accounts, making donations, and viewing or tracking their donation details. The design focuses on simplicity and usability so that users can navigate the system comfortably and complete tasks without difficulty.

2) Application Layer (Backend): The application layer contains the business logic of the system and manages the core operations of the platform. It is implemented using Node.js with Express.js, which handles HTTP requests, authentication procedures, and donation management operations [9], [10]. This layer processes requests received from users, performs necessary data validation, and executes the required operations within the system. It also establishes communication between the user interface and the database by storing new donation records, retrieving existing information, and ensuring that all transactions are processed accurately and efficiently.

3) Data Layer (Database): The data layer is responsible for managing the persistent storage of all application data within the system. In the proposed platform, a MySQL relational database is utilized to store essential information such as user details, donation records, and other related data [11]. The use of structured queries enables efficient data storage, retrieval, and management while maintaining the integrity and consistency of the stored information. This layer ensures that all donation transactions and user records are securely maintained and can be accessed reliably whenever required by the application.

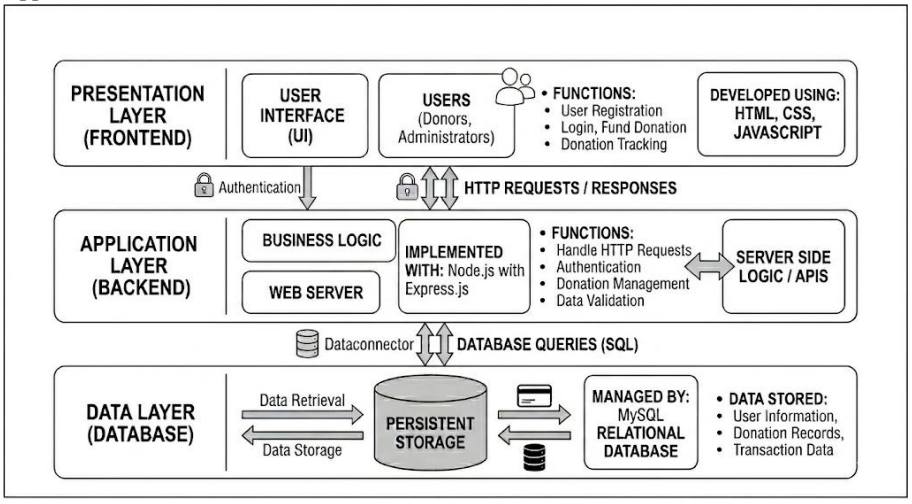

Fig. 1. Three-tier system architecture for donation platform

This layered architecture ensures the system stays modular, allowing each layer to work independently while maintaining smooth communication between components.

B. Database Design

The system database is built using a relational database model to provide organized storage and effective management of donation data. It includes multiple tables that handle user accounts and donation transactions.

TABLE I DATABASE STRUCTURE OF THE DONATION TRACKING SYSTEM

Table Name	Key Attributes	Description
Users	user_id, name, email, password, role	Stores user registration information
Donations	donation_id, user_id, amount, category, date	Records all donation transactions

DOI: 10.48175/IJARSCT-32483

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 2, April 2026 Impact Factor: 8.2

Table Name	Key Attributes	Description
Receipts	receipt_id, donation_id, generated_date	Stores donation receipt information
Admin	admin_id, username, password	Stores administrator login credentials

The relationship between tables guarantees that each donation is associated with a specific user via a foreign key, allowing precise tracking of donations.

C. Pseudocode of Donation Processing Algorithm

The donation recording and tracking process follows a well-defined algorithm to ensure precise handling of data.

Pseudocode 1: User Authentication with OTP Verification

```
BEGIN
 PROCEDURE LOGIN(email, password)
  user ← DATABASE.GET_USER(email)
  IF user = NULL OR VERIFY_HASH(password, user.password_hash) = FALSE THEN
   RETURN "Invalid Credentials"
  ENDIF
  otp ← GENERATE_RANDOM(6 digits)
  DATABASE.STORE_OTP(email, otp, expiry = 3 minutes)
  SEND_EMAIL(email, otp)
  RETURN "OTP Sent for Verification"
 END PROCEDURE

 PROCEDURE VERIFY_OTP(email, entered_otp)
  record ← DATABASE.GET_OTP(email)
  IF record = NULL OR record.expired OR record.used THEN
   RETURN "OTP Invalid or Expired"
  ENDIF
  IF entered_otp = record.otp THEN
   session_id ← CREATE_SESSION(email)
   MARK_OTP_USED(record)
   RETURN session_id
  ELSE
   RETURN "Verification Failed"
  ENDIF
 END PROCEDURE
END
```

Pseudocode 2: Donation Processing and Recording

```
BEGIN
 PROCEDURE PROCESS_DONATION(donor_id, student_id, amount)
  IF amount ≤ 0 THEN
   RETURN "Invalid Donation Amount"
  ENDIF
  donation_id ← GENERATE_UNIQUE_ID()
  DATABASE.INSERT_DONATION(donor_id, student_id, amount, donation_id)
  UPDATE_TOTAL_FUNDS(student_id, amount)
  GENERATE_RECEIPT(donation_id)
  RETURN "Donation Successful"
```

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 2, April 2026 Impact Factor: 8.2

```
  END PROCEDURE
END
```

Pseudocode 3: Role-Based System Access (Donor, Admin, Student)

```
BEGIN
  PROCEDURE SYSTEM_ACCESS(user_role)
    IF user_role = "DONOR" THEN
      DISPLAY_AVAILABLE_STUDENTS()
      SELECT student
      ENTER donation_amount
      CALL PROCESS_DONATION()
    ELSE IF user_role = "ADMIN" THEN
      MANAGE_STUDENT_DATABASE()
      VIEW_DONATION_REPORTS()
      UPDATE_SYSTEM_RECORDS()
    ELSE IF user_role = "STUDENT" THEN
      VIEW_RECEIVED_DONATIONS()
      VIEW_SUPPORT_HISTORY()
    ELSE
      DISPLAY "Unauthorized Access"
    ENDIF
  END PROCEDURE
END
```

This algorithm ensures that every donation is securely processed, stored in the database, and linked to the appropriate user account.

D. Experimentation

To assess the functionality of the proposed platform, several experiments were carried out during system development. These experiments aimed to validate the performance of the donation tracking system under various operational scenarios.

The experimentation process included the following steps:

Deployment of the web application on a local development server.

Creation of multiple user accounts to simulate donor activity.

Recording several donation transactions to confirm database storage.

Monitoring system response times during donation processing.

Checking receipt generation and the accuracy of donation tracking.

TABLE II EXPERIMENTAL SETUP FOR SYSTEM EVALUATION

Component	Specification	Purpose
Development Environment	Visual Studio Code	Used for coding and system development
Backend Runtime	Node.js (v18+)	Handles server-side logic and API processing
Framework	Express.js	Manages routing and backend services
Database	MySQL	Stores user data, donation records, and receipts
Email Service	Gmail SMTP with Nodemailer	Sends OTP authentication and donation receipts

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 2, April 2026 Impact Factor: 8.2

Component	Specification	Purpose
Testing Platform	Localhost Web Server	Used to simulate user interactions and system testing
Client Interface	Web Browser (Chrome/Edge)	Access platform and perform donation transactions

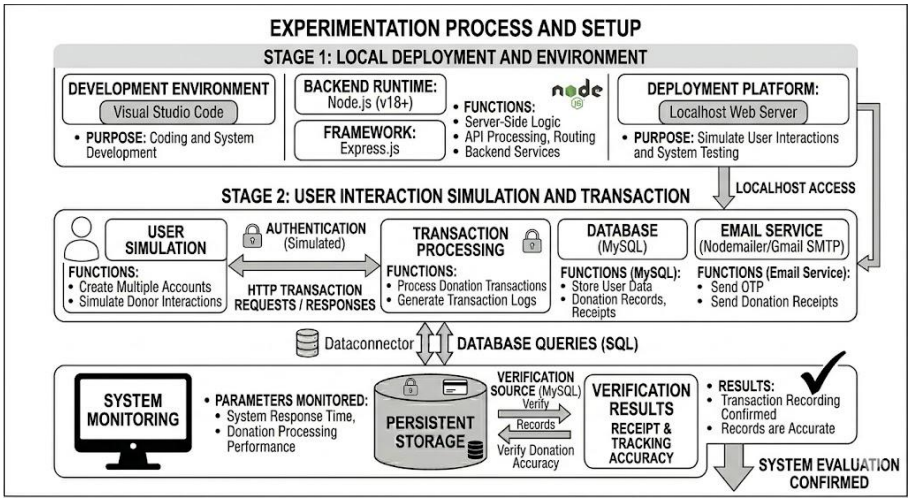

Fig. 2. Workflow of the Experimental Setup and System Evaluation Process

The results confirmed that the system effectively recorded donation transactions and kept accurate records in the database.

E. System Testing

Testing was performed to verify the reliability and accuracy of the system's functionality. Multiple testing methods were employed to validate the different components of the platform.

TABLE III TESTING RESULTS OF THE PROPOSED SYSTEM

Test Type	Description	Result
Unit Testing	Individual modules such as login and donation processing were tested	Passed
Integration Testing	Interaction between frontend, backend, and database verified	Passed
Functional Testing	System functions like donation tracking and receipt generation validated	Passed
User Testing	Real users interacted with the platform to test usability	Passed

The testing phase verified that the system functions correctly, accurately records donation information, and ensures transparency and accessibility.

IV. RESULTS AND PERFORMANCE EVALUATION

A. Successful System Implementation

The complete VidyaSetu web platform was successfully deployed using a full-stack architecture with HTML, CSS, and JavaScript for the frontend, Node.js and Express.js for backend services, and MySQL for database management. The

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 2, April 2026 Impact Factor: 8.2

integration of the frontend interface with REST APIs enabled smooth interaction between users and the server-side logic. All major system modules, including authentication, donation recording, expense tracking, and dashboard analytics, operated as intended [4], [2].

B. OTP-Based Authentication Validation

The two-step authentication system with email-based OTP verification was tested across multiple login scenarios. Users provided their email and password credentials, after which a 6-digit OTP was generated and sent via Gmail SMTP using the Nodemailer library. Experimental results confirmed that the OTP system correctly enforced the 3-minute expiration period, prevented OTP reuse, and ensured secure session creation upon successful verification [12].

C. Donation Recording and Data Integrity

The donation module was assessed by simulating multiple donor transactions across various donation categories, including educational materials, meals, and scholarships. Each donation entry was successfully recorded in the database with a unique receipt ID and donor reference. The system reliably preserved historical donation records, ensuring data persistence and integrity within the MySQL database.

D. Email Receipt Generation

After every successful donation submission, the platform automatically generated an HTML-based donation receipt and sent it to the donor via email. Testing verified that the receipt contained essential transaction details, including donation amount, category, receipt ID, and estimated educational impact. The email delivery system consistently performed well using Gmail SMTP integration.

E. Trust Index Transparency Metric

The Trust Index metric was validated through controlled experiments with simulated donations and NGO expense records. The system dynamically calculated the Trust Index by taking the ratio of total expenses to total donations and displayed the result on the NGO dashboard. This metric offered donors and administrators a clear view of how efficiently funds were being utilized.

F. Real-Time Dashboard Analytics

The platform dashboards effectively displayed real-time donation analytics and summary statistics. Donor dashboards showed individual donation history, impact estimates, and contribution metrics, while NGO dashboards offered administrative insights such as total funds received, expense summaries, and category-wise donation distributions. The dashboards refreshed automatically to reflect the latest database records.

G. System Reliability and Performance

Performance testing confirmed that the system managed multiple simulated user requests without any data inconsistencies or failures. Backend APIs efficiently handled authentication requests, donation submissions, and analytics queries, demonstrating stable response times and consistent data synchronization across all modules.

H. Overall System Outcome

The experimental results confirm that the VidyaSetu platform effectively integrates secure authentication, transparent donation tracking, automated email communication, and real-time data visualization into a single web-based system. The platform successfully demonstrates the feasibility of implementing a scalable and transparent digital donation solution for education-focused NGOs.

I. System Description

The VidyaSetu platform functions as a web-based full-stack system designed to enable transparent, education-focused donations for NGOs. It combines a structured frontend interface, a RESTful backend service layer, and a relational database for persistent data storage. Donors register and authenticate using an OTP-based verification system before accessing donation features. Once logged in, users can make donations, view their contribution history, and track the estimated educational impact of their support. On the administrative side, NGO administrators have access to a dedicated dashboard for recording expenses, monitoring donations, and analyzing fund utilization. The system dynamically processes donation and expense data to calculate transparency metrics such as the Trust Index, offering a

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 2, April 2026
Impact Factor: 8.2

visual representation of how effectively collected funds are used. The architecture ensures secure data communication, reliable transaction recording, and smooth interaction between donors and the NGO management system.

J. System Output

The implemented system generates multiple outputs that help both donors and NGO administrators understand the impact and utilization of donations. Following successful authentication and donation submission, the system creates a transaction record with a unique receipt ID, which is stored in the database and sent to the donor via email. The donor dashboard shows outputs such as individual donation history, total contributions, and estimated impact in terms of supported students. Meanwhile, the NGO dashboard provides aggregated outputs, including total donations received, recorded expenses, category-wise donation statistics, and Trust Index visualization. These outputs are displayed through organized tables, summary panels, and graphical representations to enhance data interpretation and support informed decision-making.

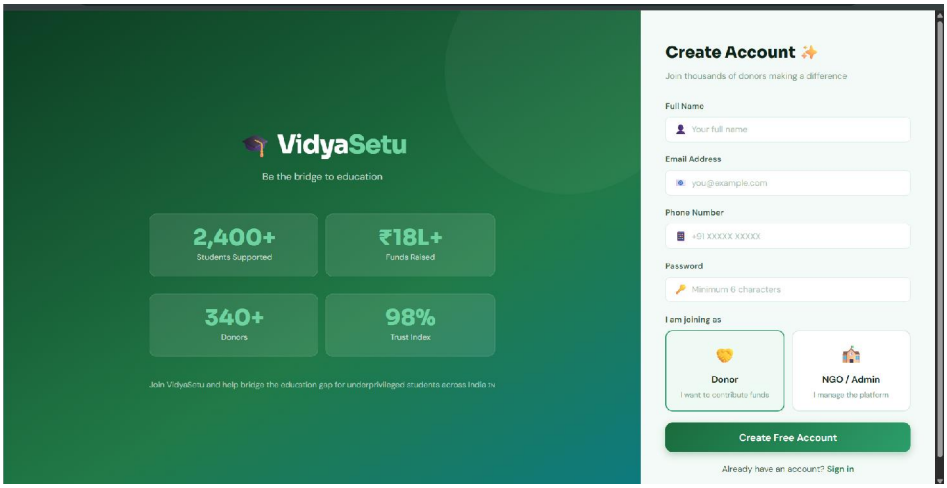

Fig. 3: User Registration Page — Role-based signup with Donor and NGO Administrator options

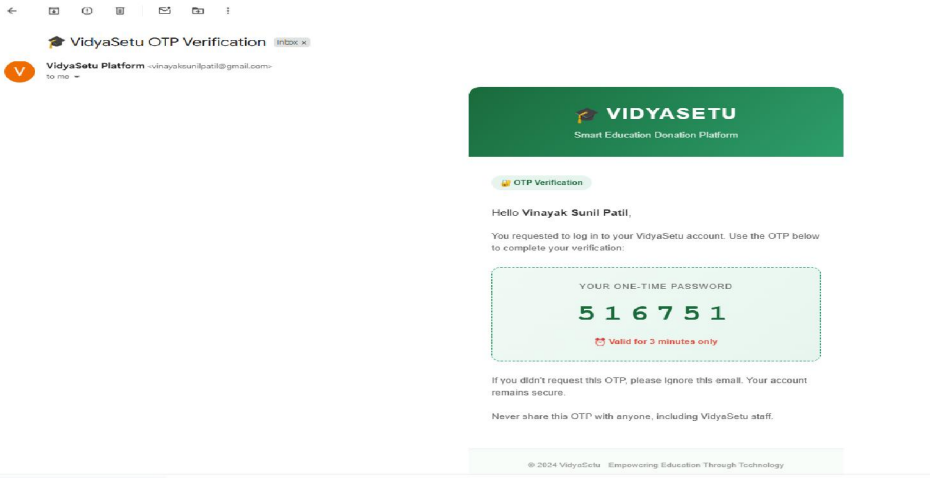

Fig. 4: OTP Email Delivery — Branded HTML verification email containing 6-digit OTP delivered via Gmail SMTP using Nodemailer, valid for 3 minutes.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 2, April 2026
Impact Factor: 8.2

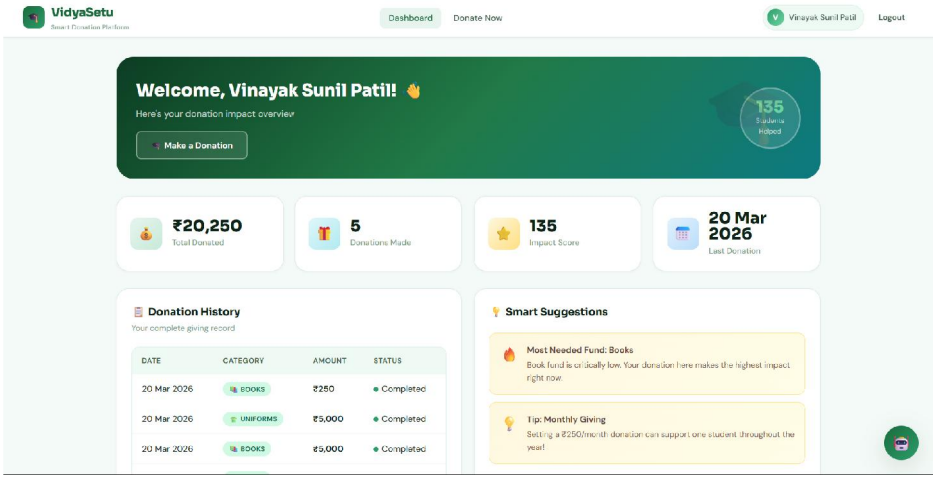

Fig. 5: Donor Dashboard — Real-time statistics showing total donated amount, impact score, donation history, category-wise breakdown, and personalized impact messages after successful OTP login.

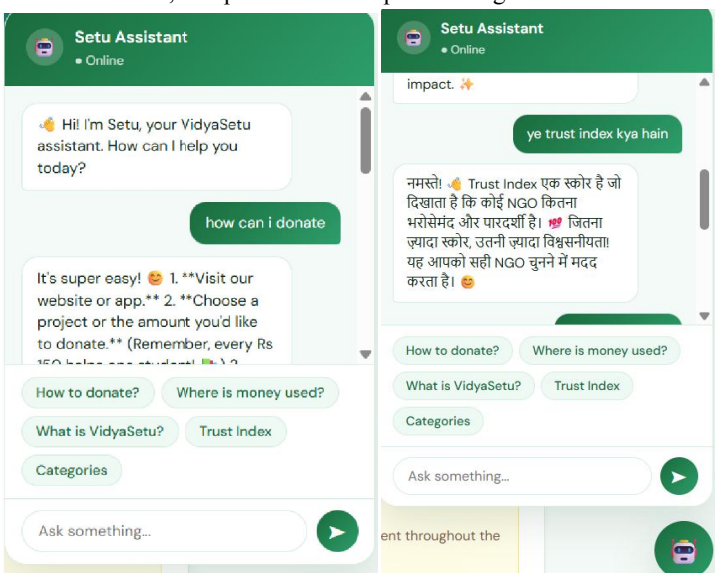

Fig. 6: Setu AI Assistant — Google Gemini-powered chatbot providing intelligent natural language responses in English and Hindi.

V. SDG ALIGNMENT / SOCIAL IMPACT

The VidyaSetu platform aligns with multiple United Nations Sustainable Development Goals (SDGs), particularly SDG-1: No Poverty and SDG-4: Quality Education. The social impact of the system is described as follows:

A. Alignment with SDG-1: No Poverty

Support for Economically Weaker Students: VidyaSetu enables NGOs to allocate financial aid, scholarships, and learning resources to students from low-income backgrounds, helping reduce educational barriers caused by poverty.

Transparent Fund Management: Real-time tracking of donations ensures that resources reach intended beneficiaries, reducing mismanagement and increasing donor confidence.

Encouragement of Social Responsibility: By providing an accessible platform for donors, the system fosters a culture of community support and collective action toward poverty alleviation.

DOI: 10.48175/IJARSCT-32483

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 2, April 2026
Impact Factor: 8.2

B. Alignment with SDG-4: Quality Education

Increased Access to Educational Resources: Donations can be utilized to provide books, study materials, and scholarships, improving access to quality education for underserved students.

Tracking Educational Impact: Donor dashboards display how contributions support individual students, making the outcomes of educational support visible and measurable.

Support for Holistic Student Development: By funding learning resources and scholarships, VidyaSetu helps students complete their education and improve future career opportunities.

VI. CONCLUSION

This research presented the design and implementation of VidyaSetu, a web-based donation management platform aimed at enhancing transparency, efficiency, and accessibility in education-focused NGO funding. The system incorporates secure OTP-based authentication, structured donation tracking, and real-time analytics to ensure accurate monitoring of financial contributions and their utilization. With a well-defined system architecture and database design, the platform allows donors to contribute conveniently while enabling administrators to manage expenses and maintain transparent records of fund usage. The use of modern technologies provides scalability and adaptability, making the system suitable for large-scale deployment. Future enhancements, such as AI integration, mobile applications, and collaboration with government bodies, can further strengthen the system. Overall, VidyaSetu represents a meaningful step toward advancing educational welfare through technology [20].

ACKNOWLEDGMENT

The authors sincerely express their gratitude to their guide and mentor, Dr. Mrunal Pathak, for her invaluable guidance, encouragement, and continuous support throughout the development of this research work.

We would also like to thank the faculty members of the Department of Information Technology at AISSMS's Institute of Information Technology for providing the academic environment and support necessary to carry out this study. Their motivation and assistance were instrumental in the successful completion of this research work.

REFERENCES

[1] A. Tanenbaum and H. Bos, Modern Operating Systems, 4th ed. Upper Saddle River, NJ, USA: Pearson, 2015.

[2] I. Sommerville, Software Engineering, 10th ed. Boston, MA, USA: Pearson Education, 2016.

[3] World Bank, "Digital technologies in social impact and nonprofit sectors," World Bank Report, 2022.

[4] M. Fowler, Patterns of Enterprise Application Architecture. Boston, MA, USA: Addison-Wesley, 2003.

[5] S. Pressman and B. Maxim, Software Engineering: A Practitioner's Approach, 9th ed. New York, NY, USA: McGraw-Hill Education, 2020.

[6] A. Kumar, R. Singh, and P. Sharma, "Donor trust and digital transparency in Indian NGOs," Journal of Social Technology, vol. 12, no. 3, pp. 45–62, 2023.

[7] N. Patel and M. Singh, "AI-powered chatbot systems for online service platforms," International Journal of Artificial Intelligence Research, vol. 15, no. 2, pp. 88–97, 2023.

[8] V. Sharma, "UPI adoption patterns and digital payment behavior in India," Indian Journal of Digital Finance, vol. 8, no. 1, pp. 23–38, 2024.

[9] D. Tilkov and S. Vinoski, "Node.js: Using JavaScript to build high-performance network programs," IEEE Internet Computing, vol. 14, no. 6, pp. 80–83, 2010.

[10] Express.js Foundation, "Express – Fast, unopinionated, minimalist web framework for Node.js," [Online]. Available: https://expressjs.com

[11] Oracle Corporation, "MySQL 8.0 Reference Manual," [Online]. Available: https://dev.mysql.com/doc/

[12] N. Provos and D. Mazieres, "A future-adaptable password scheme," in Proc. USENIX Annual Technical Conf., 1999, pp. 81–91.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 2, April 2026 Impact Factor: 8.2

[13] D. Flanagan, JavaScript: The Definitive Guide, 7th ed. Sebastopol, CA, USA: O'Reilly Media, 2020.
[14] E. Freeman and E. Robson, Head First HTML and CSS, 2nd ed. Sebastopol, CA, USA: O'Reilly Media, 2012.
[15] R. Nixon, Learning PHP, MySQL & JavaScript, 6th ed. Sebastopol, CA, USA: O'Reilly Media, 2021.
[16] G. Coulouris, J. Dollimore, T. Kindberg, and G. Blair, Distributed Systems: Concepts and Design, 5th ed. Boston, MA, USA: Addison-Wesley, 2012.
[17] OpenJS Foundation, "Node.js documentation," [Online]. Available: https://nodejs.org
[18] M. Fowler and J. Lewis, "Microservices: A definition of this new architectural term," ThoughtWorks Technology Radar, 2014.
[19] Google Developers, "Google Gemini API documentation," [Online]. Available: https://ai.google.dev
[20] P. Mell and T. Grance, "The NIST definition of cloud computing," National Institute of Standards and Technology, NIST Special Publication 800-145, 2011.

BIOGRAPHY

Dr. Mrunal Pathak and Dr. Pritesh Patil are currently working as an Associate Professor and Assistant Professor respectively in the Department of Information Technology at AISSMS's Institute of Information Technology, Pune, Maharashtra, India. Her areas of specialization include Machine Learning, Deep Learning and Soft Computing and his areas of specialization include Database Management System, ADBMS, Ubiquitous Computing, Cloud Computing, Computer Network. They both have guided several undergraduate research projects. Yash Raut, Vinayak Patil and Ayush Shetake are undergraduate students pursuing a Bachelor of Technology in Information Technology at AISSMS's Institute of Information Technology, Pune, India. Their areas of interest include web development, artificial intelligence, information systems, software development, database management systems, and emerging software technologies