



# International Journal of Innovative Research in Science Engineering and Technology (IJIRSET)

*(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)*



**Impact Factor: 8.699**

**Volume 14, Issue 12, December 2025**

# LearnXchange: Smart Skill Exchange for Digital Learning

Kavya Sthavaramath<sup>1</sup>, Ms. Kavya H V<sup>2</sup>

Student, Dept. of MCA, PES Institute of Technology and Management, Shivamogga, Karnataka, India<sup>1</sup>

Assistant Professor, Dept. of MCA, PES Institute of Technology and Management, Shivamogga, Karnataka, India<sup>2</sup>

**ABSTRACT:** LearnXchange is a skill-sharing platform that allows users to share knowledge without exchanging money. It is primarily targeted at low-income students. Artificial intelligence facilitates engaging and productive interactions by matching users for learning in the most effective manner based on their learning objectives interests and skill sets. Its exceptional user experience safe data handling and high scalability are all due to the MERN stack on which it was built. AI-based matching accurate skill classification real-time communication and a loyalty or reputation system that encourages openness collaboration and trust are some of the most significant features. LearnXchange has developed a skill development solution that is simple to use user-friendly and environmentally friendly for both personal and professional users by fusing clever suggestions with community-based learning.

**KEYWORDS:** LearnXchange, Skill Exchange Platform, MERN Stack Application, AI-Based Skill Matching, Peer-to-Peer Learning System, User Skill Profiles, Complementary Skill Recommendation, Real-Time Chat Communication, Non-Monetary Learning Exchange, Community-Based Learning, Secure Authentication, Admin Monitoring System, User Rating and Feedback, Scalable Web Platform, Knowledge Sharing.

## I. INTRODUCTION

Learning and skill development are now considered to be the most important requirements for both professional and personal development in today's digital world. One of the main causes is the lack of access to high-quality education since most of the platforms in use today mainly rely on service-based transactions or paid course subscriptions. On the other hand LearnXchange is a community-based model that makes it possible for users to share their skills and learn from each other without having to make any financial transactions. The platform gives its users the option to create comprehensive profiles that include a list of the skills they wish to acquire in addition to highlighting their competencies. The platform uses a potent AI-based algorithm that takes into account users' interests, learning objectives and supporting skills in order to match the right partners. The platform, which is based on the MERN stack, includes structured skill listings, real-time chat and an admin panel for authenticity monitoring. These features guarantee the platform's quick scalability, safe data management and smooth user experience.

## II. LITERATURE SURVEY

Fernandez Li and Brown [1], In addition to other topics the study looks into peer-to-peer knowledge-sharing platforms. It shows how skill-complementary matching of users improves learning outcomes and user engagement.

Peñalvo Berlanga and Tan [2], examines cooperative learning situations where each user's distinct profile promotes knowledge sharing. The results demonstrate that matching students according to their interests in the absence of a teacher enhances their recall and comprehension of the subject matter.

Ahmad and Patel [3] describe AI-based recommendation methods that enhance peer matching by taking into account user skills, goals and interaction patterns. Their hybrid filtering model produces more accurate partner recommendations and raises user satisfaction. They emphasize that in order for the AI-generated recommendations to be reliable and consistent appropriate data collection is necessary.

Sofiya Pallavi Sufyaan and Hemanth [4] It is suggested to implement a skill-barter system that allows users to exchange skills without using money. According to their research interaction and trust are fostered by rigorous

communication and reaching consensus. They attest to the fact that non-financial education methods can successfully enhance users skills and maintain their engagement over time..

Longani Tawse Jagtap and Anekar [5] The main requirements for skill-exchange platforms are secure backends and scalable architectures. The authors also demonstrate how the primary features of MERN-based systems are their efficient data management and strong performance in real-time. Their findings also demonstrate that a solid infrastructure serves as the cornerstone of the numerous interactive learning communities. .

Jadhav and Ahire [6] To preserve the authenticity of the interactions incorporate user verification rating systems and structured interaction. According to the study open and honest feedback and monitoring foster trust and reduce abuse. The researchers claim that the credibility-focused design greatly improves the learning communitys stability and engagement. .

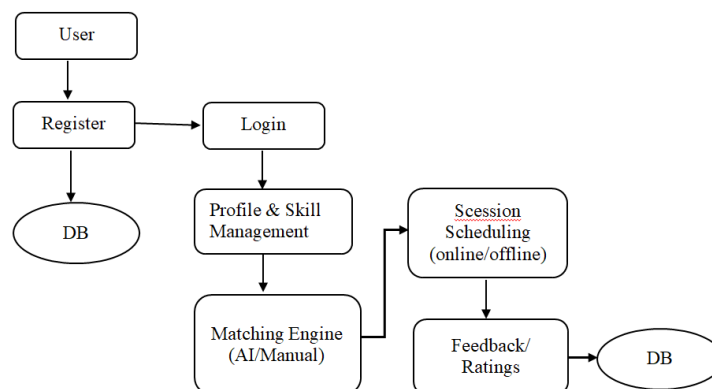
Huang Zhao and Lee [7] investigate how AI-assisted skill classification affects peer learning by classifying users based on their interests and skill levels. In their research they have shown that automatic tagging and categorization processes improve matching speed and accuracy.

Pawar Nikumbh Patade and Rokade [8] propose a methodical skill-swap model that allows users to exchange services based on their availability and learning needs. According to their research open communication feedback mechanisms and clear session scheduling are essential. Additionally they affirm that building platforms based on mutual benefit and accountability improves teamwork lessens conflict and increases the number of students who stick with the program.

### III. PROPOSED METHODOLOGY

LearnXchange is a highly structured process that uses clever peer-to-peer interaction and skill matching to link users. Each user must first register on the platform and provide a thorough profile that includes personal details about their present areas of expertise and future business objectives. The profiles stored in the MongoDB database serve as the foundation for the matchmaking algorithm. Both collaborative and content-based filtering are used in the hybrid recommendation system. The users interests skill tags availability and learning objectives are also taken into account to determine compatibility between the partners. Despite their disparate skill sets the AI engine gives preference to users who can collaborate for mutual gain.

Following the creation of a match the system allows the two parties to communicate in real time through chat and notifications allowing them to plan meetings share resources and monitor developments. To ensure platform security an admin dashboard monitors activity confirms user identity and addresses issues that are reported. The platforms MERN architecture guarantees safe JWT authentication quick data retrieval and scalability. To increase confidence and offer better recommendations moving forward the rating and feedback modules are integrated after the session. This approach ensures that education is always effective transparent and cooperative without requiring financial investment.



**Fig. 1: Data Flow Diagram**



The flowchart for the LearnXchange platform shows how it works. Users go to profile management after registering and logging in to add their skills and those they would like to learn. The system then enters the matching engine where users can be matched by artificial intelligence or by hand. The process then proceeds to session management offering choices for both online and offline sessions after a match is confirmed. Users rate and comment after the session is over. All data profiles match sessions and feedback is securely stored in the database to enable dependable and smooth operation.

#### Algorithms Used:

LearnXchange is an AI powered community platform that connects users based on their skills goals and interests using clever matching algorithms. These algorithms not only guarantee accurate partner choice session designs and learning suggestions but they also customize them to each users unique requirements.

1. Content-Based Filtering: Content-Based Filtering in LearnXchange makes a match based on each users learning objectives and teaching skills. The skill lists and associated tags are stored by the system when a profile is created. The algorithm determines similarity by comparing these tags during matching. The match score rises if a user offers to teach guitar and another user wants to learn it. Because the system only uses profile information and not past sessions it can recommend partners even if the user is brand-new and has no history. Users can read the profiles and select a partner when these matches show up on the dashboard. This approach provides insightful and pertinent recommendations right away because it emphasizes interests and skills.

2. Collaborative Filtering: Matches are improved through collaborative filtering based on feedback and behavior. Following a. Users rate and comment on the learning session. The system tracks trends over time such as regular attendance clear instruction and positive feedback. The system recognizes that two users may have similar preferences if they like the same learning partner or rate things similarly. Because behavior and dependability are equally important this information is used to recommend partners even if their skills are not exactly a match. The recommendation quality improves with the number of sessions. By doing this inactive or unreliable users are not recommended and new users are assisted in finding reliable partners faster.

3. Hybrid Recommendation: LearnXchange combines the two methods to recommend the best option. Content-Based Filtering first looks at how similar skills are in order to identify the best matches. In order to identify the most trustworthy matches Collaborative Filtering then examines user ratings and historical behavior. The dashboard shows the process with the highest overall score first after the results of these two processes are combined and ranked. As a result in addition to teaching the required skill users are paired with partners who have a good reputation. The hybrid approach eliminates the drawbacks of a single method. While returning users receive help with better output based on feedback new users continue to receive recommendations based on their abilities. The platforms accuracy fairness and helpfulness all improve as the community grows.

#### Software Testing:

All LearnXchange components user authentication, profile management, skill matching, session scheduling, real-time communication and feedback modules can only be guaranteed to function properly through system testing. Verifying the systems accuracy functionality performance and usability was the primary goal of the testing. The areas that received the greatest attention were data security AI-based matching and seamless front-end and back-end communication. System user acceptability integration and unit testing were carried out sequentially. Each function could be validated independently thanks to the testing series which also ensured that the entire process would run smoothly.

1. Unit Testing: Unit testing is done on the smallest parts of the system to make sure that every component is operating properly before they are all combined. Individual tests were conducted on various LearnXchange components including skill selection matching logic profile updates login validation and session scheduling. For instance the login module was examined for incorrect user credentials and token generation. In a similar manner the skill matching function was tested by providing different skills and verifying whether the correct matches were found.

2. Integration Testing: Integration testing guarantees that linked modules work together seamlessly. The interaction between the modules was confirmed after each test was finished. One such integration test confirmed that the system correctly loaded user data from the database onto the dashboard after a successful login. After two users were matched the session scheduling module was able to schedule a time and date according to the results of the subsequent

integration test. Checks were made for database updates API responses and UI updates to ensure that there was a consistent flow between the modules.

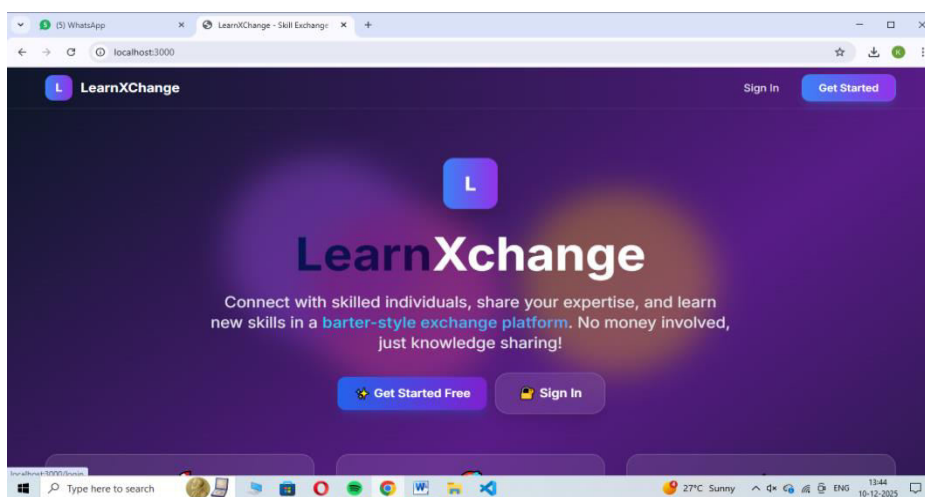
3. System Testing: The platform as a whole was tested which involved testing the entire system. The tester followed the real user journey which included registering logging in setting skills viewing matches scheduling sessions making a video call rate and logging out. Every single step was tested in a very realistic environment. System testing made sure the database was storing data correctly pages were loading properly video sessions werent ending and the features werent interfering with one another. LearnXchanges overall stability efficacy and mode of operation were validated.

4. Validation TestingValidation testing: ensured that LearnXchange performed as intended in real-world scenarios. Every step of the process including skill matching session scheduling video calling dashboard access and login was tested. The systems responsiveness ease of use and proper data storage were assessed. Each feature was examined to make sure it fulfilled the project requirements and provided real users with a reliable experience.

5. Acceptance Testing: Acceptance testing was done by actual end users to assess the softwares usability and comprehensibility. Every feature including the ability to log in share skills view matches schedule sessions hold video conferences and rate partners was experienced by the chosen users. They verified the simplicity of the procedure and the benefits of the outcomes. The response demonstrated how user-friendly the platform was how easy it was to schedule appointments and how the application had successfully matched users with similar skill sets. This bolstered the assertion that the system was ready for practical application.

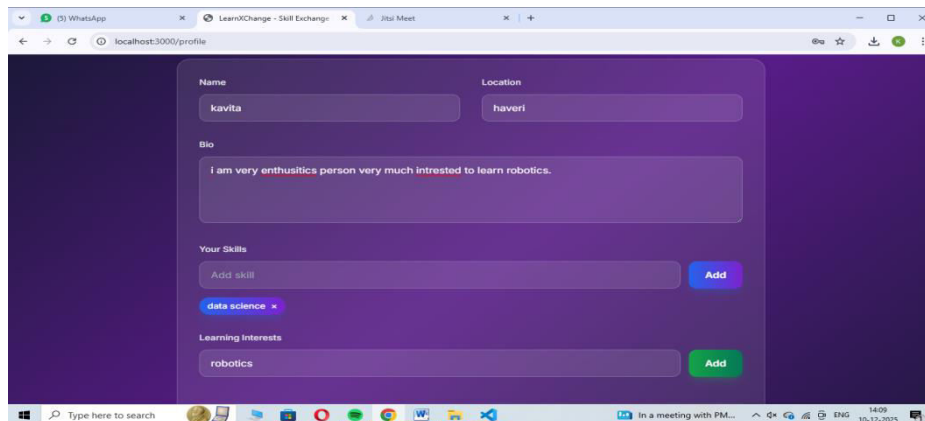
#### IV. EXPERIMENTAL RESULTS

The experiments findings show that every major LearnXchange system module functions perfectly allowing users to register create profiles and manage their skills without any issues. The matching engine consistently linked users and provided accurate and relevant partner recommendations based on the skills and learning interests that users had listed. Users were able to plan meeting times video calls and locations without interruption thanks to the reliable online and offline session scheduling. Feedback and rating submissions were accurately documented in order to improve future recommendations. All user data including profiles skill matches schedules and feedback was securely stored throughout the testing process. All things considered the results validate LearnXchanges stability usability and effectiveness for real-world skill-exchange transactions.



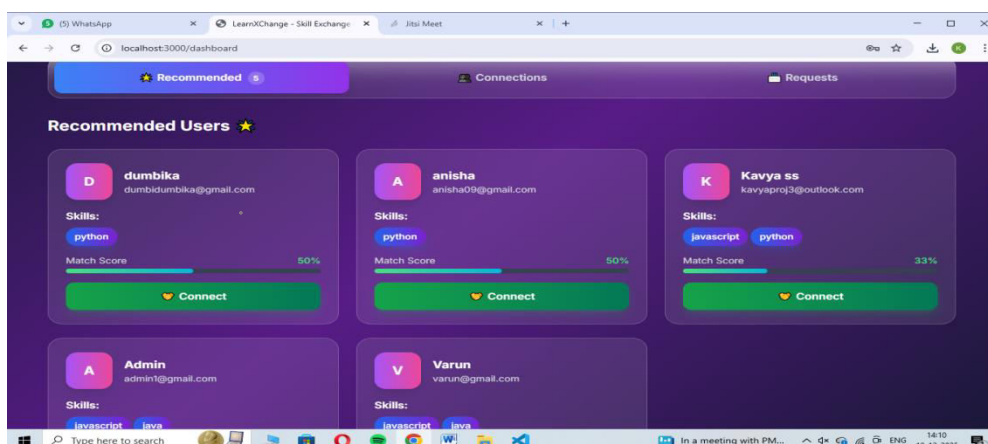
Home Page

Through a free barter-style exchange system users are invited to share their skills and learn new ones on the LearnXchange home page which highlights the platforms goal. Its straightforward title succinct description and simple Sign In and Get Started navigation buttons enable users to register log in and explore the platforms features with ease.



## Profile creation Page

Users can enter their basic information on the Profile Creation page such as their name location and a brief bio that highlights their interests. Users can indicate the skills they wish to learn and add the skills they currently possess. This data enables the LearnXChange platform to match them with appropriate partners for skill exchange.



## AI matching page

AI Matching carries out the process of automatically recommending skill partners based on their availability skills and interests as well as the suggested partners relevance. It ensures quicker more intelligent and highly customized match recommendations that promote efficient knowledge sharing.

## V. CONCLUSION

LearnXchange offers a modern and effective way for individuals to learn and share skills by combining skill matching, session scheduling, video interaction and feedback on a single platform. The system helps users identify what they want to learn and what they can offer, and then connects them with suitable partners through an AI-supported matching process. Users can schedule sessions, choose online or offline options, communicate through video calls, and later share feedback and ratings, which improves the quality of future matches. The modular structure ensures that every feature, from authentication to matching and scheduling, can grow and adapt as more users join the platform. The project supports personal and professional improvement by enabling continuous peer-to-peer learning rather than depending on traditional single-source trainers. With the possibility of extending features such as automated recommendations, advanced chat, and secure video collaboration, LearnXchange is well-positioned to become a complete learning and skill-sharing environment.

**REFERENCES**

- [1] “ AI-Driven Skill Matching in Online Learning Platforms: A Deep Learning Approach ” --C HuangY Zhao.
- [2] “Learning Design for Peer-to-Peer Knowledge Sharing” -- A J BerlangaF J García- Peñalvo.
- [3] “Deep Learning for Personalized Learning Path Recommendations in Skill Exchange Networks” -- Z TanK Chua Berlanga, A. J., & García-Peñalvo, F. J.
- [4] “Skill Barter System” -- Aniket Eknath Pawar , Kasturi Nikumbh , Reshma Vishwas Gade , Sakshi Vijay Patade , Priyanka Arun Rokade
- [5] “Skill Swap Website for Sharing Skills using Match Making Algorithm” -- Shaik Sofiya,P. Pallavi,, Mohammad Sufyaan,, N. Hemanth.
- [6] "The Effectiveness of Peerto-Peer Skill Exchange Platforms in Lifelong Learning” – M. Li and T. Brown.
- [7] "Building Sustainable Learning Ecosystems” -- A. Fernandez.
- [8] “A Peer-to-Peer Skill Exchange Platform for Academic and Professional De” --Nachiket Jadhav, Prof. Pritam Ahire.
- [9] “BARTER TRADING SYSTEM USING VECTOR DATABASES” -- Ohm Chiluka, Rounak Longani, Harshad Jagtap, Aditya Tawse, Dr. D.R. Anekar.
- [10] “Buyer-supplier matching in online B2B marketplace” -- Z TanK Chua Berlanga.





INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  [ijirset@gmail.com](mailto:ijirset@gmail.com)



[www.ijirset.com](http://www.ijirset.com)

Scan to save the contact details