International Research Journal of Education and Technology
Peer Reviewed Journal
ISSN 2581-7795

PERSONALISED SKILL DASHBOARD FOR ADMINISTRATOR

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Abstract - The program is an online platform created to improve skill management in learning environments. It allows administrators to monitor and assess staff, instructor, and student ability levels, guaranteeing efficient use of resources and ongoing skill improvement. The solution facilitates data-driven decision-making for institutional growth by streamlining skill monitoring, assessment, and reporting through customised dashboards. Integrating data from many sources, including Learning Management Systems (LMS) and Human Resource Management Systems (HRMS), is one of the main issues in skill management. By compiling skill data, offering insights into skill distribution, spotting gaps, and monitoring advancement over time, our dashboard tackles this difficulty. Furthermore, customised dashboards guarantee that users at all levels—administrators, department heads, instructors, and students—get insights that are appropriate for their roles.

Key Words: Skill management, Data-driven decision-making, Learning Management Systems (LMS), Resource Management Systems (HRMS), Customised dashboards.

1. Introduction

The success of people and organisations is greatly influenced by skill development in the quickly changing educational and professional landscape of today. To ensure ongoing learning and professional development, universities and colleges need effective ways to monitor, evaluate, and manage the abilities of staff, teachers, and students. However, it can be difficult to detect skill shortages, distribute resources efficiently, and align skills with institutional objectives due to the fragmented, manual, and time-consuming nature of traditional talent management methods. In order to overcome these obstacles, the Personalised Skill Dashboard for Administrator offers a web-based platform that lets administrators keep an eye on and control skill development in an organised and data-driven way.

By providing real-time insights into performance indicators, growth patterns, and skill distribution, the dashboard assists organisations in promoting a continuous improvement culture. The solution guarantees thorough and precise skill tracking by combining data from several platforms, including Learning Management Systems (LMS) and Human Resource Management Systems (HRMS). The system's capacity to offer customised dashboards for various user roles is one of its primary characteristics. Faculty, staff, and students may keep an eye on their personal skill growth, department heads can measure skill improvement within their departments, and administrators obtain a high-level institutional perspective. Each user is guaranteed to have access to pertinent information through role-based customisation, which aids in decision-making on professional development projects, curriculum modifications, and training programs.

1.1. Background of the Work

For both students and teachers, skill development and competence tracking have become crucial in the rapidly evolving academic and professional world of today. To make sure that graduates are ready for the expectations of the market, universities and colleges are embracing outcome-based education (OBE) and skill-centric learning more and more. To track staff and student skills, many institutions still use antiquated techniques, disjointed paperwork, and manual record-keeping. Ineffectiveness in detecting skill shortages, coordinating training programs, and evaluating overall institutional development is frequently caused by this absence of a systematic, data-driven strategy.

By offering a centralised digital platform that makes it possible for educational institutions to effectively monitor, control, and evaluate skill development, the Personalised Skill Dashboard for Administrators seeks to address these issues. This dashboard provides real-time data visualisation, automated analytics, and customised reporting for various user roles, such as students, teachers, department heads, and placement officers, in contrast to conventional paper-based or spreadsheet-based monitoring systems. The system guarantees that skill monitoring is not only thorough but also dynamic and responsive to institutional requirements by combining training modules, Human Resource Management Systems (HRMS), and Learning Management Systems (LMS).

Furthermore, schools must move away from a one-size-fits-all paradigm and towards a data-driven, customised approach since modern education places a strong emphasis on individualised learning pathways and ongoing upskilling. This dashboard's implementation makes use of cutting-edge technologies like the MERN stack (MongoDB, Express, React, and Node.js) to give administrators an interactive, scalable, and effective solution. They may create reports for curriculum improvement, track trends in skill acquisition, and offer strategic insights for faculty development and student career advancement thanks to it.

Institutions may improve workforce planning, close skill gaps, increase training effectiveness, and eventually promote a culture of job preparedness and lifelong learning by digitising skill management with our Personalised Skill Dashboard. In addition to modernising skill monitoring, this project gives administrators useful information they may use to create a more competitive and skilled learning environment.

2. Motivation and Scope of the Proposed Work

An organised and effective skill management system is now more important than ever in the changing field of education and professional development. Conventional techniques for monitoring staff and student proficiency through manual record-keeping and paper-based documentation are laborious, error-prone, and inefficient. Ineffective training programs and misaligned curriculum design result from institutions' frequent struggles with fragmented data, a lack of real-time insights, and difficulty detecting skill shortages. Furthermore, there is an increasing need for a data-driven strategy to track skill development and guarantee that students are well equipped for future employment prospects due to the growth of competency-based education (CBE) and industry-driven skill needs.

The need to digitise and automate skill tracking is what spurred the creation of the Personalised Skill Dashboard for Administrators, which offers a centralised, intelligent, and interactive platform for tracking faculty and student improvement. This solution helps administrators make data-driven decisions by combining contemporary technologies like the MERN stack (MongoDB, Express.js, React.js, and Node.js) to provide real-time analytics, customised insights, and automatic reporting. The dashboard facilitates academic, student, and placement officer cooperation, increases accessibility, and expedites the administration of skill records.

Real-Time Skill Tracking: The dashboard makes it possible to keep an eye on students' development in a number of skill areas, allowing teachers and administrators to step in and provide support or extra materials as needed.

Make Customisation and Role-Based Access Available To ensure pertinent and useful findings, many stakeholders—including students, instructors, administrators, and placement officers—will have access to dashboards that are customised for their particular tasks.

Automated Skill Gap Analysis is made possible by the system, which uses data analytics to find gaps in students' skills and suggests suitable training courses, certification tracks, and programs to close these gaps.

Connect with External Learning Platforms: The dashboard guarantees smooth data integration for a comprehensive perspective of skill development by connecting with Learning Management Systems (LMS), Human Resource Management Systems (HRMS), and other institutional databases.

3. Proposed Automated Workflow System

The purpose of the proposed automated workflow system for the administrators' personalised skill dashboard is to expedite the processes of skill tracking, evaluation, and decision-making in educational establishments. Students, instructors, administrators, and placement officers are authenticated using JWT-based security measures throughout the system's initial user registration and role-based access phase. After registering, students may modify their credentials, skill profiles, and course enrolments, and administrators and instructors can verify and track their progress. To get pertinent training and skill data, the system easily connects with Human Resource Management Systems (HRMS) and Learning Management Systems (LMS). AI-driven recommendations build tailored learning pathways, courses, and certifications to assist students improve their abilities through automated skill gap analysis.

4. Full-Stack System Architecture

To guarantee a scalable, effective, and user-friendly experience, the Personalised Skill Dashboard for Administrator is constructed utilising a combination of contemporary web technologies, databases, and security frameworks. The requirement for sophisticated analytics, data security, seamless integration, and high performance is what motivated the choice of these technologies. A thorough explanation of the technology utilised in the various system components may be found below.

The system's frontend is in charge of providing administrators, department heads, instructors, and students with an interface that is dynamic, engaging, and easy to use. The following technologies are used in its development:

React.js: React.js offers a smooth and dynamic user experience and was selected due to its component-based design, reusability, and speed optimisations.
Tailwind and Bootstrap CSS: With little coding labour, these frameworks guarantee a contemporary, responsive, and accessible user interface.
In order to maintain synchronisation of application-wide data, including user sessions, role-based dashboards, and skill tracking changes, Redux is utilised for state management.
Axios: A JavaScript library for managing API requests and front-end-backend communication.

Business logic, user administration, authentication, and data processing are all handled by the backend. It is constructed with:
Node.js & Express.js: This high-performance, event-driven JavaScript framework and runtime is used to create a server-side application that is scalable, light, and effective.
RESTful APIs: To facilitate communication between the frontend and backend and guarantee quick data retrieval and integration with external systems, the system makes use of RESTful API endpoints.
Role-based access to system capabilities is ensured via JWT (JSON Web Token) authentication, which offers secure authentication and session management.

The system stores and retrieves information about users, skills, training progress, and analytics using an extremely effective database structure. MongoDB (NoSQL Alternative): Employed when the system needs a flexible schema to store analytics data, dynamic skill evaluations, and user progress.
Firebase (For Real-time Data Processing): Firebase may be incorporated for cloud-based storage and quick data updates if synchronisation and real-time changes are needed.

5. Implementation Details

In order to provide a scalable, real-time, and data-driven solution, the Personalised Skill Dashboard for Administrators is implemented utilising the MERN stack (MongoDB, Express.js, React.js, and Node.js). Students, instructors, and administrators may easily access skill monitoring tools thanks to the frontend's user-friendly and engaging interface, which was created using React.js. Redux or Context API are used for state management, guaranteeing effective data transfer between components. Constructed using Node.js and Express.js, the backend facilitates seamless communication between the database and the frontend by handling business logic, authentication, and API queries. The main database is MongoDB, which houses structured data including training suggestions, skill logs, user profiles, and course progress.

5.1. Workflow Automation Process

Using an organised, data-driven methodology, the Workflow Automation Process in the Personalised Skill Dashboard for Administrators is intended to expedite skill tracking, evaluation, and decision-making. Role-based access control (RBAC) and user authentication are the first steps in the automation process. Students, instructors, administrators, and placement officers register and safely log in using JWT authentication. As instructors and administrators keep an eye on, confirm, and offer comments, students may update their skill profiles, track their course enrolments, certificates, and project progress after authenticating. In order to provide real-time data synchronisation for precise skill monitoring, the system automatically retrieves learning records from integrated Learning Management Systems (LMS) and Human Resource Management Systems (HRMS).

Skill gap analysis, in which the system dynamically assesses students' abilities against preset standards, is a fundamental step in the automation process. The gathered data is processed by AI-driven algorithms, which then detect gaps and suggest suitable training programs, credentials, and skill-building exercises. Students and teachers may respond right away because these suggestions are updated in real time. Dashboards are dynamically updated by the React.js frontend, which offers visual statistics on trends in institutional and individual skill sets. Users receive automated alerts and reminders about impending due dates, educational opportunities, and placement-related tasks, guaranteeing consistent system usage.

The solution provides placement officers with real-time insights by automatically matching students' talent profiles with industry employment criteria for placement readiness evaluation. While MongoDB effectively handles structured skill-related data, the backend, which was constructed using Node.js and Express.js, handles API calls for skill tracking, analytics, and report production. Cloud platforms are used to install the full system, guaranteeing scalability, security, and smooth upgrades. User data is protected and system dependability is guaranteed by frequent automatic backups, API security protocols, and access monitoring systems. The Personalised Skill Dashboard improves student engagement, job readiness, and institutional efficiency by reducing manual involvement and utilising process automation. This promotes a data-driven culture of ongoing learning and professional development.

6. Benefits of the Personalized skill dashboard

Through the simplification of skill monitoring, evaluation, and decision-making in educational institutions, the Personalised Skill Dashboard for Administrators provides

a host of advantages. Effective skill management is one of the main benefits, as the dashboard gives administrators, instructors, and students a single location to track and assess skill development in real time. Students receive individualised learning routes that guarantee they concentrate on areas that require development through automated skill gap analysis and AI-driven recommendations. By matching skills to industry demands, this improves learning outcomes and increases their employability.

7. Conclusion

A game-changing tool for improving career preparedness, skill monitoring, and evaluation in educational institutions is the Personalised Skill Dashboard for Administrators. The solution guarantees an automated, scalable, and data-driven approach to skill management by utilising the MERN stack (MongoDB, Express.js, React.js, and Node.js) and incorporating AI-driven analytics. Personalised learning pathways help students, and administrators and instructors may effectively track skill trends and enhance training initiatives. Placement officers bridge the gap between academics and business by gaining insights into students' employability preparation.

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