INTERACTIVE DASHBOARD FOR STUDENT ANALYSIS

A major project report submitted in partial fulfilment of the requirement

for the award of degree of

Bachelor of Technology

in

Computer Science & Engineering / Information Technology

Submitted by

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Candidate's Declaration

I hereby declare that the work presented in this report entitled 'Interactive Dashboard For Student Analysis' in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology in Computer Science & Engineering / Information Technology submitted in the Department of Computer Science & Engineering and Information Technology, Jaypee University of Information Technology, Waknaghat is an authentic record of my work carried out over a period from August 2023 to May 2024 under the supervision of Prof. (Dr.) Rajendra Kumar Sharma (Vice Chancellor), Dr. Shruti Jain (Associate Dean (Innovation), Department of Electronics and Communication Engineering).

The matter embodied in the report has not been submitted for the award of any other degree or diploma.

(Student Signature with Date)
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This is to certify that the above statement made by the candidate is true to the best of my knowledge.

(Supervisor Signature with Date)   (Supervisor Signature with Date)
Supervisor Name: Prof. (Dr.) Rajendra Sharma   Name: Prof. (Dr.) Shruti Jain
Designation: Vice chancellor   Designation: Associate Dean

Certificate

This is to certify that the work being presented in the project report titled Interactive Dashboard for Student Analysis‖ in partial fulfillment of the requirements for the award of the degree of B. Tech in Computer Science And Engineering and submitted to the Department of Computer Science And Engineering, Jaypee University of Information Technology, Waknaghat is an authentic record of work carried out by Mayank Aryaman, 201381 during the period from August 2023 to May 2024 under the supervision of Prof. (Dr.) Rajendra Kumar Sharma(Vice Chancellor), Dr. Shruti Jain (Associate Dean (Innovation), Department of Electronics and Communication Engineering) , Jaypee University of Information Technology, Waknaghat.

The above statement is correct to the best of my knowledge.

Prof. (Dr.) Rajendra Kumar Sharma (Vice Chancellor)
Jaypee University of Information Technology, Waknaghat, Solan

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Mayank Aryaman (201381)

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Abstract

For the multivariate evolution of the education system globally and nationally, it becomes very critical to analyze a student's performance on the go. After analyzing the student portal that our university holds, I found a lot more room for improvement and redesigning. From the UI of the dashboard, to what the student portal provides to a student, a guardian and a teacher. Hence I sought to build an application that shows end to end student data from the moment they enter into our university till the moment they wish to see their performance and data. As the website is used by students, teachers and parents, the new application provides a very comfortable and easy user experience to the user. The application shall hold student performance data, in the form of marks, CGPA grades, official teacher assessment of the student as well as the entire performance of the batches of students. Whether the student adds some CGPA pointers to his/her grades or drops in CGPA grading, the application shall immediately notify the concerned people. Apart from the markings of a student, the application shall also provide attendance, campus information for the newly joined students, and a common one end solution to all the requirements of a student during their tenure. Such an application not only provides an end-to-end updating of data, but also provides a far larger prospect of in-depth student performance analyzation. Along with this it provides a greater chance of parent and faculty interaction and trust building, which for a university as an organization means an ocean.

Chapter 1: Introduction

1.1 Introduction

The quest for the utilization of learned powerful exploits that guide students to learning and progress is inevitable in today's rapidly changing learning environment. This reality propels us to create a high-tech Student Analysis Dashboard implemented with very latest React and built and designed precisely with Figma. It is primarily molded to cater for versatile needs of educational institutions.

Education in Transition: The educational sector is experiencing a major shift towards a data-driven model of instruction which harnesses data-driven insights to shape academic programs and improve performance. Nowadays, almost every action concern data-accuracy and timeliness to inform deliberations, making advanced analytical tools that provide educators and administrators with actionable knowledge a primary requisite. With the change in education models from individualized learning to scientific learning, the demand for effective data tools for analysis has been hugely increased.

Unveiling the Student Analysis Dashboard: Our initiative is built on the basis of potent and High-Tech Students Dashboard, which is aimed to be as effective and customizable as it is demanded nowadays at the educational institutions. What makes this tool stand out from the others is in its ability to combine and come up analyses of huge numbers of student data in contrast to other tools that may give a general understanding of the performance of students in the classroom. Utilizing cutting-edge technology, the dashboard becomes the source of knowledge and education professionals can take advantage of it to make the best decisions that positively affect the students and the academic process.

Flutter Flow-Powered Page: To generate dynamic and responsive user experience, our dashboard makes use of the Flutter Flow platform as a tool for all of the flexibility and agile standards that it demands. Through this method the transit is taking place without

any bumps not only for the user but also for the system, as it's an easy one that captures the audience. Flutter Flow's well-known functionalities make it possible to quickly come up with a design that is highly responsive and will be able to change in order to fit the device or screen size that we are using, so that with this the consistency in performance and accessibility is ensured over a variety of platforms.

Designed Using Figma: It is the dashboard's interface which combines usability, attractiveness, and ease of use, offering convenience and goodwill to everyone through interactivity. Figma's design precision empowers the developers to create an attractive interface, which blends form and function, and provides a delightful navigational experience for users. The user-centered design-based approach is the key hereby ensuring that any kind of educationalist/administrator can manage easily the dashboard and they can focus on utilizing the data insights rather struggling with tool itself.

Holistic Student Insights: The dashboard is designed to give a complete analytic view of such crucial factors as changes in students' performance, development, and engagement from multiple aspects. Such an integrated perspective provides teachers and administrators with an opportunity to exert data-driven management and improve the implementation of interventions separately at the individual level. Through an in-depth analysis of key metrics, the dashboard helps in noting trends, showing skill areas, and pointing to the weaker areas. Therefore, incorporating this individualized approach is a good strategy, given that students from different backgrounds are placed in one class, and different student needs are met, where learning environment is important to academic success and personal development.

At last, our Student Analysis Dashboard is an outstanding advancement of educational institutions toward the selection of tools, available for them Through adopting the dynamic features of React, the responsive design of Figma, and the precise professionalism of Flutter Flow, we have developed an instrument that apart from being strong and innovative it is user-friendly and very effective in providing Faculty with all required resources. This dashboard occupies an important place among the tools used in evidence-based teaching, the address of which is aimed at educational improvement.

1.2 Problem Statement

Traditional methods of monitoring and analysis of the educational development with the pupils lead to many drawbacks. Therefore, it is extremely important to find a solution that can compete with the mentioned methodology. Those methods usually seem to be missing that necessary detail and only display students' academic activity in retrospect. Without a well-coordinated and unified interactive system, teachers have restricted authority to conduct a holistic analysis of student performance, delineate patterns, and take expediency measures. Not only does it obstruct the introduction of specially designed aids rather than traditional measures, but also it renders the achievement of optimal education outcomes impossible. These outdated methods being heavily depended upon lead to the existence of a chasm between the possible realization of personalized learning and the continued application of one-size-fits-all modules that do not allow individual students to succeed.

Moreover, the integrated approach to overall performance of any level of educational achievement based on both individual student outcomes and the whole system performance is absent in the existent systems and procedures. The deficiency of this comprehensive data shows the fact that educators it is unfeasible to carry out any reliable evaluation of the programs, as well as insert into professional practice only what has been proven workable. A holistic perspective is the key to the effective weighing of strategies and their influence on education practices. The chances of improving educational practices are low if proper evaluation, as well as modification, take too long. The separate and discordant nature of data analysis and tools make it possible for only basic comprehension of students' performance, and with that, there cannot be improvement initiatives that are effective.

The lack of advanced student analytic tools has resulted in a critical challenge: challenges like irrelevant, muddled, and lack of appropriate information. This intruder frames teachers

for building "one size fits all" strategies which do not scale to choosing different educational road for each learner. The capabilities to meet the needs of learners and gives a higher probability of better outcomes are lost due to the impossibility to individualize education. As the need for eugenic and sincere measuring of students' cognitive capabilities in all the contents of their education grows, the inadequacies of the traditional methods become deeply rooted. Educators should be why they must discount down on accurate and well-timed data; therefore, they can plan their approaches and instruct their students uniformly.

This urgent demand has given rise to an innovative solution: we will provide robust yet highly intuitive summarized and interactive dashboards. This is an advanced instrument what is made to adapt a range of indicators, and it gave a whole perspective to each student performance. Its functionalities cover bulk production approach and individual learning impact measurement. The main aim of this Student Information System (SIS) is to provide the educator and administrator with data that can be used to make justifiable decisions regarding strategy reform, consequently improving education results. By using the dashboard, we would like to overcome the gap between the isolated data sources to provide a unique representation that is used for analyzing the complete set of information and making the right decisions.

The dashboard is a communicative tool as it interacts with several records and later comes up with data conversion into facts, its relational feature to it. The collection of data points through which is shown in dashboards is meant to give a stressless overview of things, e.g. students' performance, growth, and their engagement. Such a holistic approach simultaneously answers the question of which major achievements the learner already has, and what fields need improvement. Consequently, the required time of implementation is shortened, and teachers might make more specific interventions, which suit learners' specific needs as well as development goals. The screen is designed for ease of use; this is because it distinguishes between the various group results and individual results.

Therefore, it becomes easy to understand the different teaching strategies, instructional approaches for teaching and students' growth independently. Being the best way to generate empirical knowledge that informs the theoretical knowledge about the education field, research, and practice work together through further development of prior hypotheses. First, to sum up, the intelligence metric will inherit all disadvantages of the conventional measurement of students' development, and it will be characterized by the traditional methods that have limitations. This tool bridges gaps between tutors, school management, and parents, all of which are beneficial in assessing each pupil's progress and a continuous overview of students' performance.

Finally, this ability allows teachers to make strategic decisions, individual or class assistant structure and improve overall educational outcomes. The provision of student-specific comprehensive and practical data variation ensures that educators have access of information that give them the chance to be precise in addressing different students' needs hence they can create an environment that will gives a student chance to be successful. This will be the next big phenomenon for Education gadgets, which will connect with the new environment which modern education is facing.

1.3 Objectives

The primary purpose of creating students dashboard is to effectively correct and bypass the intrinsic restrictions of traditional approaches that may be used to monitor and assess students' growth processes in the educational institutions. The conventional methods typically suffer from presenting a summary, lack of reflection of real-time student progress, and hence, the teachers are usually forced to make the judgment based on limited information. Ensuring that the void is filled and making our platform simpler in design and

especially responsive is our goal. Our platform features different elements that are meant to provide a clear representation of students' learning paths. With the help of the latest

technology, the dashboard targets to change the manner that education supervisors and administration officers use the students' data for decision making process. A perfect design of dashboard gives educators and administrators a strong tool with which they are able to get results on students' performance regularly within such a period of time. Immediately acquisition of information developed the capacity that is timely for various interventions or support. Instructors have the capability of analyzing progress and grasping tendencies among students' educational groups, as well as drawing on relevant statistics. The modern interface that is built using the React Framework and Figma provides an easy-to-use design and besides it being functional, it is also easy to use. Intuitive design enables simple browsing through the entire platform, putting emphasis on user-friendliness for technically competent as well as non-technical participants.

Besides, this project will indeed act in increasing the depth of the study from individualized students' achievements to checking the whole group coverage and grouping the data by disciples and subjects. This showed that it is possible to evaluate separately different projects that got launched, not only the common numbers. Education authorities can, therefore, evaluate both the individual and group level data to tune support and relatability of specifically planned programs to a cadre of the students. One factor is this detail is not just crucial in determining what strategies is best and what should be taught to the highest degree or makes extra resources needed. To start with, the goal of the dashboard is to imply to all the educational leaders the findings from the research on a larger scale. As an example, the team comprises teachers, administrators and so on, but government ministers or parents can also participate. The got dashboard provides definite images of students' performance that will in turn lead to appropriate actions on struggles such as single student support, finding tailor- made intervention strategies and engagement in curriculum modification. The structure of the model is based on an evidence-based approach, which assists the leaders in combination of data from all resources to provide desired student

success and academic excellence. Through the implementation of the dashboard, different audiences can make a discovery and take the initiative to develop secure actions which can

in turn lead to improved learning outcomes for each student.

So, to conclude, the development of the student analysis dashboard counts as one of the most effective surgical instruments for the entirety of the educational facilities. This dashboard's creation is designed to address the shortcomings of the old systems, one of the interesting things that gives the robust understanding of the student performance. It allows the teachers to make decisions based on their individual pupils' or the whole class data, take into consideration group differences, and anticipate proactive courses of action. The advanced technological functions integrated into the steering wheel that do not require complicated button operations motivate the largest number of people to use it from different social environments. Concisely, this relies on the identification student needs of stakeholders including administration that are aligned with such goals as helping the students to succeed and promote academic excellence.

1.4 Significance and Motivation of the Project Work

The Dashboard in student analysis is multi-platform, which means it supports any device. It includes the following: availability of information and communication technologies, analysis of academic databases, and individual learning courses, which is unlike traditional one-size-fits-all learning methods. The topic of this project is concerned with designing an environment where the educators, in addition to learning, can administer the actual process. Therefore, this area focuses on bringing up data of different levels and making it easy for the user to understand and benefit from it. The endeavors revolve live statistics and enable the student metrics to be monitored accurately, evaluated immediately, forecast, and implement timely interventions. It functions as a great thinking model for both

providing instruction and ensuring that the students get the job done by considering the whole process involved from individuals and groups roles. To this end, conversion should

comprise of the redefinition of how the forms of achievement and learning will now be managed which will further foster the design of curricula that are aligned to this. In addition to this, there is equal importance imparted to aspects of security and privacy by provision of robust security offers and giving users transparency and trust as well. In essence, the aim of this campaign is to create a three-tiered data structure that allows schools to fully understand all the options available for the provision of goods and services and ultimately, student success.

Improved Decision-Making: The purpose of this work is that it will facilitate the discovery process of revelation of every step of a student's performance in the educational institution. The provision of them with powerful tools is implementing this process. Having this way of tabulating specific grades for learners, managerial officials will manage to tailor the interventions to the needs at various stages and measure of the supportive tools in place to ensure children get help in stage before collapse. Basically, these formative programs achieve their purpose of realizing life in the learning environment so that it will be fun and worth escape. The ability to inform data driven decisions allows for accurate and timeous identification of support areas where students often struggle, prompt interventions to effectively respond to these challenges leads to a dramatically improved outcome for our students.

Holistic Student Evaluation: The collective intelligence calculated by more than one factor being considered. Each student's performance, the overall statistics from the classes and the specific inputs from each course. Owing to a holistic conception teachers can assess from the web and in person tasks and as a result unveil trends, strong points and weaknesses among different parameters of their overall performance. Through the centralized approach the teachers and administration will have the ability to make practical and informative decisions on the way they teach at any critical time in the process.

Data-Driven Education: As all our other things, now in the sphere of evaluating our portfolio's performance a data-driven analysis is crucial; so that this project, which is the modern technology and traditional evaluation method, was an integration of the two. It is the data analysis that drives the education revolution and helps to rise the successes of the learners. Teachers can graduate from personal intuition-based decision making to the one that is science-based and co-supervised by valid evidence by means of enhanced data analytics. Therefore, the transition to educational approach based on information dropouts gains more importance in striving to deal with new problems of learning sphere and in providing the possibility for all students to get good marks.

Improving Educational Efficiency: As the rationale for this project stands out is to cater the learning phase by means of automation and optimization. With the help of standardization process, the dashboard helps eliminate the administrative workload and instead allows the educator to spend more time on student development. The user-friendly interface and the instant reporting of education data makes the way that the institution manages education more convenient. Educators can see meaningful information to make sound decisions, tailoring the approaches that directly improve the student learning ever more. This efficiency in turn not only creates better dimensions to the educational experiences, but also helps in getting the better educational outputs through utilizing smaller resources.

Educator Empowerment: The project is a call for the teachers to be equipped with instruments to sustain their career through informed decisions. The dashboard creates effective learning outcomes by offering professionals the necessary inputs which they can better use to identify specific needs of the learners and personalized instruction. The dashboard works like that: it presents a complex but up-to-date set of data, through which

educators can design targeted intervention and attend to the different needs of the students. Such empowerment nurtures a more reactive and adaptive educational theater, where educators can he all the time improve their teaching approaches to get more student-centric effects.

Future-Ready Education: Another unique driving force is to ensure that the educational agencies are ready to face the future unexpectedly. With the technology-driven innovations and data-based methodology, the project guarantees that institutions will continue to be dynamic and agile to keep pace with other educational demand scenarios. Hence, the principles of lifelong learning and constant self-upskilling are based within the educational system. Such institutions have infrastructure enabling them to meet the challenges of the future. Moreover, the quality of education offered to students in an advancement keeps pace with fast and continuous everyday changes. The dashboard is more than introducing immediate solution, it would also pave the way for further breakthroughs in education practices for the betterment of the future.

In a nutshell, the magnified impact of this project, transforming decisions in education, comprehensive student evaluation, and data-driven education are mainly designed for closely to overall significance, and the students will be examined more extensively by teachers who are not limited by boundaries of the national curriculum solely but found in the independent research. Through the process of standardizing the education system and giving educators control, and ready institutions to operate under what the future holds permission will be given to achieve the creation of a learning environment where improvement and change is a priority. Video dashboard plays a vital role in reaching the objectives which, in turn, allows instructors to have visibility screened and therefore to have information and tools that are needed for student success and academic excellence.

1.5 Organization Of The Project Report

Background Context

Usually components such as objective, methods, data and findings are presented in the project report of building an interactive student analysis dashboard. An Introduction begins with the purpose of the project and explains why the project was founded and to what ends–it defines its objectives, significance, and goals that the project is aimed at achieving. This segment will explain why the dashboard is created, and what consequences we are expecting it to have.

Problem Statement

The problems of appropriate assessment and presentation of student performance data trigger requirements for an analysis dashboard for student interaction. Present avenues as well as methods may seem too complicated, sluggish, or too manual for holistic student analysis and tracking. Having this gap in mind, our key project goal is enabled by the development of the interactive classroom dashboard that provides students and other stakeholders with data-driven plans to follow.

System Development

Research Review
"Individual analysis and Educational Dashboard" were set forth as an outline in the researcher's review; tools and approaches can be found that will enable students to carry out the personal analysis and build an educational dashboard. Research itself, mindsets, and technologies are overall structure for the flow of the dashboard. This will enable the dashboard to be embraced by different projects.

Methodology

Whereas the Methodology section indicated that a strategy for dashboard development is used, which it is the tools, frameworks, and techs applied (they are Flutter Flow, Figma, and many data analytics utilities). It aptly shows each method employed in collected data,

databases, as well as in the design of some dashboards, which will guide through the process.

System Architecture

The System's Architecture is broken down into introducing system architecture and the components dashboard—these are listed in the System Architecture section. Movements, for example, diagrams or block diagrams can add a dimension as a visual perspective in a way that shows us the technological setup and the relations between the modules for you to get a better understanding.

Dashboard Features and Functionality

This section covers Dashboard Applications and Features and Capabilities where the dashboard applications, options and all the features are elaborated. This part of our webpage is the most interesting one for us since we do not just describe the parts of its design and the issues it causes but respectively, we talk about solutions developed. Step by step going through the product development process we include iterations, testing, and here we make corrections that could be different from one to another so there might be detailed discussions.

Testing

Data Examination & Insights

Data screening & Inference encompasses the operations concerning data inspection of the dashboards' data in order to grab attention on the key figures and searching for the

important patterns that are most nothing but unimportant and irrelevant to the evaluation

of students' performance. Results and Evaluation and Results Evaluating the Result will be the bullet point those states how well the dashboard has achieved its results. User interactions, such as comment field, usability testing, and several metrics for the performance evaluation are all there.

Conclusion and Future Scope

Discussion

The section Discussion presents the findings of the research and the instructions that can be deduced from it. It lets to check on the existing systems and proposes more enhancements in future or possible fallouts.

Conclusion

Here, the Summation section will briefly discuss the key points, results, and major takeaways of the research project. It classifies and formulates conclusions in the form of future betterment or usage recommendations.

References

This section would list all the references and sources that have been utilized to develop the project report, consequently providing proper attribution in the process. Readers would then also be equipped to explore related sources that were used to come up with the dashboard.

Chapter 2: Literature Survey

2.1 Overview of Relevant Literature

[1] Park, Y. J., & Jo, M. H. (2023). Development and Evaluation of an Interactive Dashboard for Student Self-Monitoring and Learning Progress Analysis.

In the study done by Park and Jo in the year 2023, it has been published in Educational Technology Research and Development to design an interactive dashboard that can help learners see their actual improvement and focus on weak areas to achieve more. The study applied a mixed methods approach that was based on surveys, interviews, and data analysis to evaluate an audit effectiveness. The report of the study illustrated the fact that the interactive dashboard really helped the students have self-tracking their progress in the field of educational assessment. Students mentioned the fact that the visual and interactive features of the dashboard is very important in helping them see their learning pathways as well as act to attention subjects or skills that need more work. Using the student's performance and the feedback obtained as the quantitative basis, the report highlights the workability of the data dashboard model in the present educational scenario. Similarly, the study found a link between the dashboard and student self-awareness concerning their learning methods on one hand and the students' engagement in proactive studies on the other side. It was interesting to note that the visual presentation of the degree of progress was very important in creating a sense of accomplishment and resulted in engagement in the learning materials that are continuous. The study showed that the interactive dashboard assisted students to have real-time monitoring and give more incisive and individualized process than the conventional method.

[2] J. L. Almendros and M. T. García, "To design and implement an interactive dashboard to provide instructors with real-time feedback on student performance," *Computers & Education*, 2022.

In the 2022 report published by Amendros and Gama called Computers & Education, the latter proposed the construction and implementing of an interactive dashboard which was aimed to provide the instructors with actual timely information on how the students were performing. A review did not use the design-based methodology which is characterized by the iterative cycles of design and involves user testing extensively in a way of ensuring that the tool meets the requirements of its users perfectly. This interactive dashboard allowed instructors to monitor or support student attainment in real time, and therefore it was obvious that the dashboard proved to be extremely beneficial to the instructors. This direct acquaintance with teaching data gave teachers the opportunity to make decisions about the approaches and interventions that they went to use when they taught the students. Through iterative design process which focused on the users' feedback multiple times, we could continue changing and improving the product until we ended up with the final version of the dashboard which satisfied every user. With the aid of user testing, teachers opined that the active performance of feedback through real-time feedback function enabled them the ability to rapidly identify the students who are having problems thereby adjusting their ideas of teaching. Thus, through the implementation of an interactive, flexible approach to teaching, blending the core beliefs of arithmetic and algebra with the teaching of new concepts and remedial practices, this gave way to a more customized environment for student learning, where outcomes greatly improved. The research proved that the self-driven dashboard is an meaningful component of bringing down the instructional quality by turning out in a timely and applicable information about student performance, hence, it could help in a more data-driven approach to education.

[3] J. M. Guerra-Hernández and E. M. Sancho-Sánchez, "To develop an interactive dashboard to visualize student engagement data and identify students at risk of failing," IEEE Transactions on Learning Technologies, 2021.

In the papers Guerra-Hernández and Sancho-Sánchez's wrote alongside of "An Interactive Dashboard to Visualize Student Engagement Data and Identify Students at Risk for Failure" which were concluded in the IEEE Transactions on Learning Technologies in 2021, they were willing to build an interactive dashboard, present the student engagement data and find a group of students potentially to be failed. Investigation work through systematic LR (literature review) and case studies were conducted to prevent using assumptions only while finalizing the Dashboard. Following the analysis, it turned out that the dashboard was the most efficient instrument in spotting the issues with students who lagged too much, and therefore, the teachers could intervene earlier when the issue was still in the early stages, so it would help improve students' competence in the future. It does its job with graphics and portrays the recent web performance and subject attendance in a simple and clear way for the participating members based on the dashboard. The practical aspect of the study is highlighted as we go through the case study component of the study. Besides it, we see how the school dashboard can be of great significance especially in the educational setting, where the teachers can gain data from the dashboard and subsequently use the information to improve their teaching methods and a system of support. By pointing out the students who was struggling in learning, it was believed that the teachers were able to step in immediately through providing extra resources, personalized feedback, or one-to-one guidance, which tremendously improved the learning process of their students and the success rate was expected to be high. Our proof of effectiveness mostly will rely on a literature review systematically conducted on education data tools which are visualization in nature. Managing, mathematical model anticipated the interactive dashboard to be a reliable tool for improving student accomplishment and effectiveness by making timely and data-driven interventions possible.

[4] M. Almarzouki, "To design and implement an interactive dashboard," Journal of Computers in Education, 2023.

This study claims the applicability of the interactive dashboard for learner's education having the use of user-centered design course. This is an innovative concept, and it considers the audience as well as the profiles of the audience and their expectations. The process of feedback from the students as well as the teachers plus the iterative loops were employed for evaluation of the dashboard to ensure that only the facts, and that they were actually not estimated were used for projections. Our research ended with conclusions that the applied dashboard could help in the achievement of the academic goals through enhancement of the performance indexes. A dashboard in which graphs were present which gave an indication of the improvement in the student's progress was the excellent medium for student and teacher communication. Thus, they could evaluate their achievements and put a finger on the weaker links in this process. The tutorial of how to learn was helped by the fact that the students had to study well and work hard, as they were aware of the explicit report on their capability and efforts. Therefore, the credit amount was rightly spent, and the best learning habits enhanced too. In addition to teachers, the real-time dashboard made it quicker to comprehend situations where the student lacked competency and accordingly the teachers could go back to the textbook to reassess their instructional approach. Through the mind-hands coordination, instructors now could gauge participants performance in class hence make them eligible to give individually focused or timely assistance so that effective teaching can be achieved. The interactive tool has been established to be the gateway to an atmosphere of excitement and unity in learning. Being based on real time data and feedback from the users, the school portal is thus being widely used to implement this concept whereby the teachers are able to analyze and respond to each child's needs leading to improved retention and performance.

[5] H. R. Tenenbaum, "Interactive dashboard to help students understand their strengths and weaknesses in different subjects," Education, 2020.

H.R. N attached research in Education in 2020 that would assist students to do rational

thinking and be able to know the areas that they are strong and those that need more effort across all the subjects. The research being a full of cycle of interviewing, and brainstorming, and prototyping, assures the availability of the service that it suits both the clients and a service provider. Moreover, the methodology was put forward on the grounds of the students' description of their experiences via the interviews and the stimulating exercise. As such, this activity narrows down the scope to solve actual problems anticipated or experienced by the users and improve the product to fit the needs of the users. Through testing, we're able to gradually restructure the prototype which has the quality to support an infinite loop of response on the interface, ending up with a user-friendly and user-friendly interface. Research emerges that this feature identifying interface of the interactive dashboard was very efficient in looking at their own capabilities and incapabilities. The dashboard made visual the data related to students' performance but also the means of acquisition of such data and thus the students understood themselves better academically. Disproving the notion of the cookie-cutter learner led to a situation whereby students decided on better study schedules, in return focusing on the areas they had not done well in. Through analysis, it found that the pupils by using this console gained the use of quality study skills, as well, they improved school performance. Our students became part of a unique educational model, as they got to learn that they can be the best at steering their own routes towards knowledge. Firstly, I would like to mention that the survey results revealed that the investment is very profitable since the dashboard works quite well as a self-evaluation improvement and as a habit-forming tool.

[6] M. J. Rodríguez-Triana and A. Vozniuk, "To investigate the impact of interactive dashboards on student motivation and learning outcomes," Educational Psychology Review, 2019.

In, the research conducted by Rodríguez-Triana and Vozniuk in 2019 in Educational Psychology Review, focused on interactive dashboards and their positive effects on students' motivation and learning. The study employed a meta-analytic method of 20 studies, comprehensive research that investigates the gaps in existing literature. The

research process entailed (i) a rigorous screening of articles and related literature for the purpose of explicating (ii) the predominant outcome of (iii) interactive dashboards in educational environments. Through this approach, researchers were able analyze how the use of these tools affected the student populations and different contexts and then come up with broader generalizations with regards the possible impact of these tools. As per the result of the meta-analysis, the interactive dashboards have presented positive impacts both in the student motivational level and learning outcomes. The dashboards provide evidence-based, on-going feedback and data visualization about performance data, and as a result, it is easier for students to keep track of their progress. This instrument helped them to track their advancement and the improvement overtime and as a result made the students more self-motivated to take up the learning with the focus of attaining the best. Alongside that the dashboards helped personalized learning as they highlighted individuals' strengths and gave an insight into what their weak fields were, resulting in better focused studies. This personalized feedback system relaxed the academic pressure and breathing space which was helpful in achieving better grades and understanding the subject well. An interactive dashboard, as the study pointed out, is a meaning thing in motivating students and helping their success. Through the creation by these dashboards of actionable and timely indicators they are forming the basis for a more dynamic and interactive educational climate that contributes to a higher level of students' engagement with the content and better learning achievements.

[7] B. A. Schwendimann and M. J. Rodríguez-Triana, "To design and implement an interactive dashboard to support collaborative learning activities," International Journal of Learning Technology, 2018.

Schwendimann and Rodríguez-Triana (2018) sought to improve collaborative learning activities through the design and implementation of an interactive dashboard, which was published in the International Journal of Learning Technology. This study used a design-based methodology to improve the dashboard's functionality and usability through intensive user testing and iterative design cycles. According to the study, students'

collaborative learning activities were effectively supported by the interactive dashboard. The dashboard made it easier for groups to coordinate and communicate by giving real-time access to shared resources, progress tracking, and communication tools. Students' engagement and participation in group projects improved as a result of their greater collaboration. Through feedback and user testing, the researchers determined the essential elements that supported productive collaboration and information exchange. The dashboard's tools and visualisations, according to the students, helped them track their group's progress towards learning objectives and gain a better understanding of their individual responsibilities within the group. Teachers also profited from insights on performance patterns and group dynamics, which helped them to offer appropriate interventions and assistance when needed. Overall, the study found that by promoting a more engaging and coherent learning environment, the interactive dashboard greatly improved collaborative learning results. It emphasised how crucial technology is to be enhancing and facilitating collaborative learning, which in turn improves student learning results.

[8] L. Hernández-Cumplido and C. Romero, "To develop an interactive dashboard to help instructors personalize learning experiences for each student," Journal of Educational Technology & Society, 2017.

Hernández-Cumplido and Romero's 2017 project, which was published in the Journal of Educational Technology & Society, sought to create an interactive dashboard that would let teachers tailor lessons to each student. To evaluate the impact and efficacy of the dashboard, the research combined a thorough case study with a review of the literature. According to the study, teachers were able to successfully customise learning experiences to meet the requirements and learning preferences of individual students thanks to the interactive dashboard. Through the dashboard's insights about student progress, learning styles, and areas of difficulty, more individualised teaching tactics were made possible. Because learning activities were more closely matched to the interests and skills of the students, this personalised approach increased student engagement. Teachers shared

through the case study that they were able to intervene with focused assistance and early identification of difficult kids thanks to the dashboard's data-driven insights. The capacity to track student progress in real time and modify instruction accordingly led to better learning outcomes and academic success. All things considered, the study found that the interactive dashboard was a useful tool for raising student engagement and teaching efficacy in classrooms. Instructors were better able to meet each student's unique learning needs and create a positive learning environment by using data to personalise learning experiences.

[9] R. P. Ferguson and J. L. Bracy, "To investigate the impact of interactive dashboards on student perceptions of learning," Journal of Educational Psychology, 2016.

Ferguson and Bracy (2016) investigated the effect of interactive dashboards on students'

perceptions of learning using a randomised controlled trial, which was published in the Journal of Educational Psychology. The purpose of the study was to evaluate the ways in which students' attitudes and perceptions of their educational experience were affected by the usage of these dashboards. Students were randomly assigned to utilise an interactive dashboard or not as part of the study's methodology, and surveys and interviews were used to gauge how they felt about their education. The findings showed that, in comparison to students who did not utilise the interactive dashboards, those who had access to them had far more favourable opinions about their education. It has been discovered that interactive dashboards improve students' involvement with their own learning by giving them access to real-time feedback and visualisations that help them comprehend their academic achievement on a deeper level. Students felt more empowered and motivated because of having more control and transparency over their learning process, which improved their opinions of their entire educational experience. Overall, the study found that by encouraging self-awareness and active engagement in the learning process, interactive dashboards significantly influence students' attitudes towards learning. Teachers can improve student engagement and happiness with their educational experience by using technology to give personalised feedback and insights.

[10] C. Redecker and M. Redecker, "To design and implement an interactive dashboard to provide students with feedback on their writing," Educational Technology Research and Development, 2015.

In Redecker and Redecker's 2015 study, which was published in Educational Technology Research and Development, they concentrated on creating and executing an interactive dashboard that would provide students with writing tutoring. To fully assess the dashboard's impact, the research used a mixed methods technique that included surveys, interviews, and data analysis. The study showed how the interactive dashboard's timely and focused feedback improved students' writing abilities. Students were given valuable insights into their writing talents and areas for growth through the use of specific

performance data and visualisations. Students were able to evaluate their writing techniques, pinpoint certain areas that needed improvement, and make well-informed edits thanks to this practical feedback. Furthermore, the dashboard's capacity to provide customised feedback based on each writer's unique writing issues and style promoted a more encouraging learning atmosphere. The dashboard promoted self-directed learning and iterative adjustments, which led to increased student engagement with the writing process. Teachers gained valuable data from the dashboard as well, which helped them provide more focused instructional interventions to help students improve as writers. Overall, the study found that students' writing skills increased dramatically because of using the interactive dashboard. By utilising technology to offer continuous feedback and assistance, the dashboard encouraged a more efficient and thoughtful method of teaching writing.

[11] G. Siemens and R. S. J. D. Baker, "To introduce the concept of learning analytics dashboards and discuss their potential benefits for education," Educational Technology Research and Development, 2014.

Siemens and Baker presented the idea of learning analytics dashboards and examined its possible educational advantages in a conceptual article that was published in Educational Technology Research and Development in 2014. The article covered the ways in which these dashboards may improve teaching methods by utilising data analytics. Learning analytics dashboards are designed to help instructors make educated decisions and implement individualised interventions by giving them visual representations of student data, such as engagement indicators and performance patterns. The goal of this strategy is to enhance student learning outcomes by facilitating prompt modifications to instructional tactics in response to real-time data insights. Additionally, the study highlighted how dashboards may create a data-driven learning environment and increase student engagement by providing clear feedback mechanisms. In summary, Siemens and Baker contended that learning analytics dashboards has the capability to revolutionise the field

of education by endowing teachers with practical insights and augmenting the educational experiences of students by means of tailored, empirically supported interventions. Their conceptual investigation prepared the way for further empirical research and real-world use of learning analytics dashboards in classrooms.

[12] C. Romero and S. Ventura, "To develop a framework for designing and implementing learning analytics dashboards," British Journal of Educational Technology, 2013.

Romero and Ventura (2013) presented an article in the British Journal of Educational Technology that centred on creating a framework for creating and utilising learning analytics dashboards. This framework was developed because of an extensive

examination of the literature with the goal of offering recommendations that would improve the efficiency and use of these teaching resources. The study emphasised how crucial it is to create dashboards that help instructors and students gain actionable insights in addition to clearly visualising data. Romero and Ventura's framework placed emphasis on a number of important elements, including: the use of simple and intuitive data visualisation techniques; the incorporation of pertinent educational theories into dashboard design; the iterative design process that takes user needs and preferences into account; and the alignment of dashboard design with institutional goals and educational objectives. The study sought to assist educators and developers in developing dashboards that support informed decision-making and improve educational results by synthesising data from current literature and educational practices. All things considered, Romero and Ventura's architecture offered a methodical way to deal with the difficulties involved in creating and executing learning analytics dashboards. For educational institutions looking to use data-

driven insights to boost student engagement, optimise learning experiences in a variety of learning environments, and increase teaching effectiveness, it proved to be an invaluable resource.

2.2 Key Gaps in the Literature

Absence of Longitudinal Studies: According to Ferguson and Bracy (2016), most research concentrates on the short-term effects of interactive dashboards on student results rather than their long-term usefulness. Longitudinal studies might shed light on the long-term effects of dashboard use on student motivation and learning, which would address the requirement for flexible and ongoing development in educational resources.

Limited Attention to User Experience: Although iterative design approaches are mentioned in certain articles, user experience is frequently not thoroughly explored (Redecker & Redecker, 2015). To ensure that educational technologies fit the requirements and expectations of both students and instructors, it might be helpful to understand how users interact with and interpret dashboards.

Generalisation Across Diverse Student Populations: Several studies fall short in discussing the effectiveness of interactive dashboards across a variety of educational environments and student demographics (Rodríguez-Triana & Vozniuk, 2019). Research frequently concentrates on certain contexts, such higher education or particular topic areas, which restricts its applicability to student groups and larger educational environments.

Inadequate Learning Analytics Integration: Although dashboards offer data visualisation, sophisticated learning analytics approaches are frequently not integrated to offer deeper insights into the learning behaviours and patterns of students (Guerra-Hernández & Sancho-Sánchez, 2021). Dashboards that use machine learning or predictive analytics models may be better able to anticipate student performance and provide tailored solutions.

Limited Examination of Pedagogical Impacts: Research frequently focuses on technology features rather than investigating how interactive dashboards affect instructional strategies and pedagogical practices (Almendros & García, 2022). Gaining insight into how dashboards influence teaching methods and student-teacher relationships may help improve the calibre of education and create more productive learning environments.

These gaps point to areas where future research in educational technology can make significant progress, guaranteeing that interactive dashboards serve as essential components in fostering fair and significant learning experiences in a variety of educational contexts, in addition to being efficient tools for monitoring and providing feedback.

Chapter 3: System Development

3.1 Requirements and Analysis

. When developing an interactive student analysis dashboard, there are a number of important requirements that must be carefully considered in order to ensure that the tool effectively meets the needs of administrators, staff, and students while also improving overall usability and user experience across educational institutions.

Setting user demands first to design an intuitive and user-friendly interface is essential to this project. This strategy guarantees that the dashboard meets the various needs of various stakeholders in the educational ecosystem. To promote effective usage and engagement, the interface must be user-friendly and accessible to administrators, instructors, and students.

Data integration is essential to these dashboards' functionality. It is necessary to aggregate and consolidate several facts, including test scores, academic records, attendance logs, and engagement metrics. Teachers and administrators may get a comprehensive picture of students' performance and make wise decisions by merging data from these numerous sources.

Customisation and real-time functionality are critical components of a successful dashboard. Users should be able to choose their favourite metrics, personalise their views, and get real-time or almost real-time updates on the development of their students. Stakeholders are empowered by this immediacy to recognise and resolve any problems quickly, which improves responsiveness and proactive management.

Visual aids including as charts, graphs, and prediction algorithms can enhance data comprehension and facilitate the predictive analysis of student performance. By translating complex data into actionable insights, these technologies assist educators in identifying trends and patterns that impact student performance. The dashboard's straightforward data visualisation assists educators in making data-driven decisions that optimise teaching strategies and student assistance systems.

A strong security framework and accessibility are essential for the dashboard to function well. While adherence to accessibility rules provides usability for all users, including those with impairments, device interoperability ensures smooth access across all platforms. Robust data protection protocols preserve confidential student data, upholding confidence and adhering to privacy laws.

To sum up, an interactive dashboard for student analysis is a valuable instrument that may be used to improve student accomplishment and educational administration. With its integration of several data sources, real-time updates, customisation possibilities, and use of visual aids for data interpretation, the dashboard gives administrators and educators the ability to make well-informed decisions that have a beneficial influence on the learning outcomes of their students. Maintaining security and accessibility requirements also reaffirms how well the dashboard helps academic institutions fulfil their goal of creating a positive and productive learning environment.

By implementing a complete strategy that enhances institutional efficiency and fosters student success through tailored assistance and focused interventions, it fully utilises educational technology in contemporary learning settings.

3.2 Project Design and Architecture

The fundamental plan that directs a project's design, development, and testing stages is known as the project architecture. It includes the first stage in which important choices are taken to guarantee coherence, clarity, and alignment with the goals of the project. The impact of project architecture on each succeeding phase is broken down as follows:

Project Design: The structure, objectives, and requirements are outlined in the project architecture. The architecture defines the project's general interfaces, functionality, and organisation throughout this phase. It pinpoints the technology and user demands necessary to create a solution that lives up to stakeholder expectations.

Project Development: Building on the design foundation, the development phase begins with a strong architecture in place. It entails carrying out the comprehensive blueprints and guidelines established during the architectural stage. The architecture serves as a reference for developers as they code, integrate components, and create functionality in accordance with design standards.

Testing: By offering a distinct structure and functional plan, the architecture is essential to testing. The architecture is used by testers to confirm that the created system satisfies specifications, operates as intended, and matches user expectations. Testing makes that the system is safe, dependable, and operates at its best under different circumstances.

A clearly specified project architecture guarantees certain advantages at these stages:

Clarity and Alignment: It creates a vision that is both clear and in line with the project goals, guaranteeing that every development effort goes towards reaching the intended results.
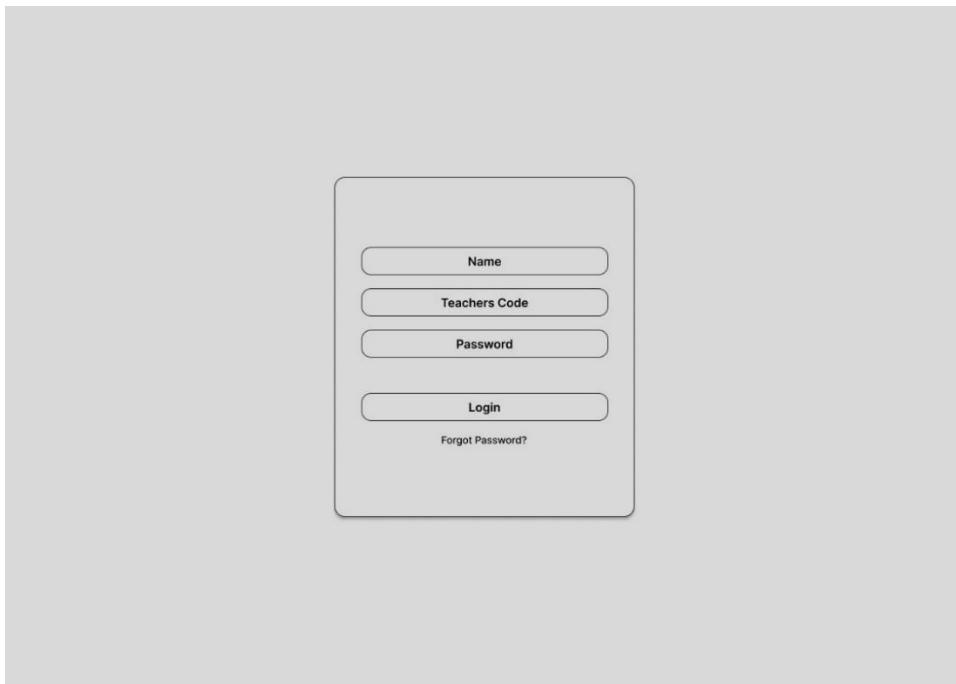
Efficiency: The design simplifies development efforts by laying out the needs and structure up front. By working more productively, developers may cut down on duplication and rework.

Risk Reduction: Early in the project lifecycle, a strong architecture reduces risks and foresees possible difficulties. By being proactive, the risk of expensive mistakes or delays in development and testing is reduced.

Innovation and Scalability: It fosters innovation and scalability by offering a framework that is adaptable to future expansion and advances in technology. A well-designed architecture also encourages innovation as it makes it possible to add new features or improvements as needed.
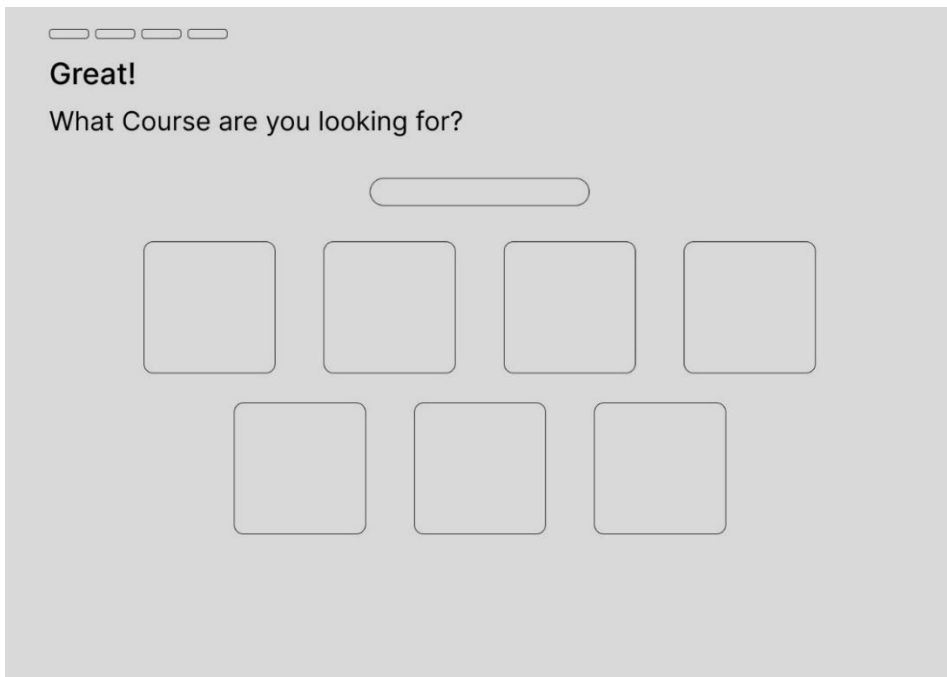
Project architecture is essentially the cornerstone that serves as a guide for the whole project lifecycle, from original concept to development and testing. It guarantees that the project progresses in an organised way, satisfying the requirements of all parties involved and producing a solid, effective, and scalable solution.

Architecture Diagram Layout

Fig 3.1: Login Page

Fig 3.2: Course Selection Page

Fig 3.3: Year Selection Page
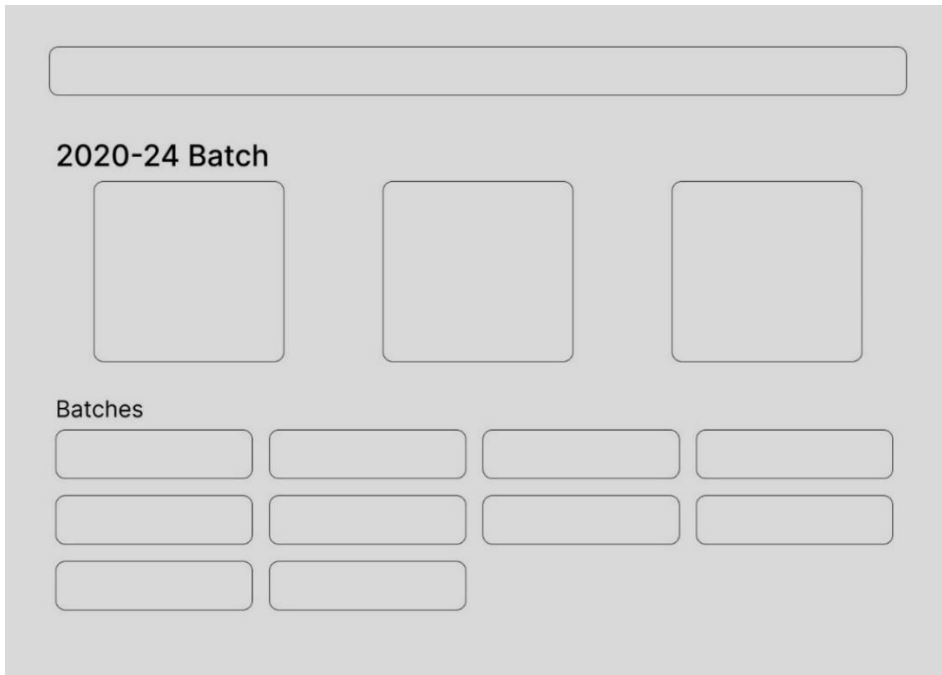
Fig 3.4 Year Dashboard
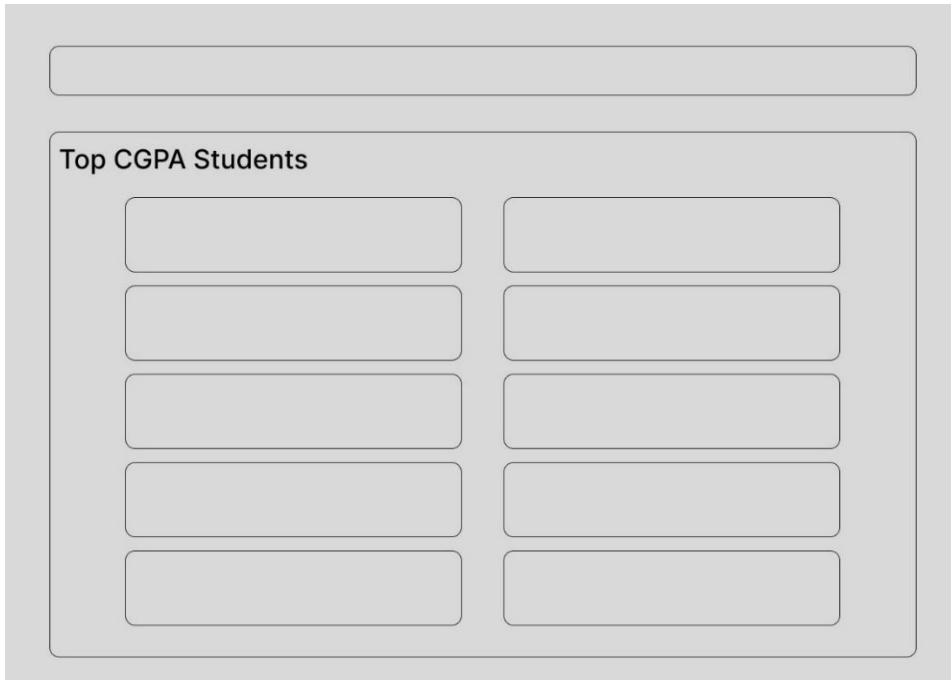
Fig 3.5: Scholar Student Data
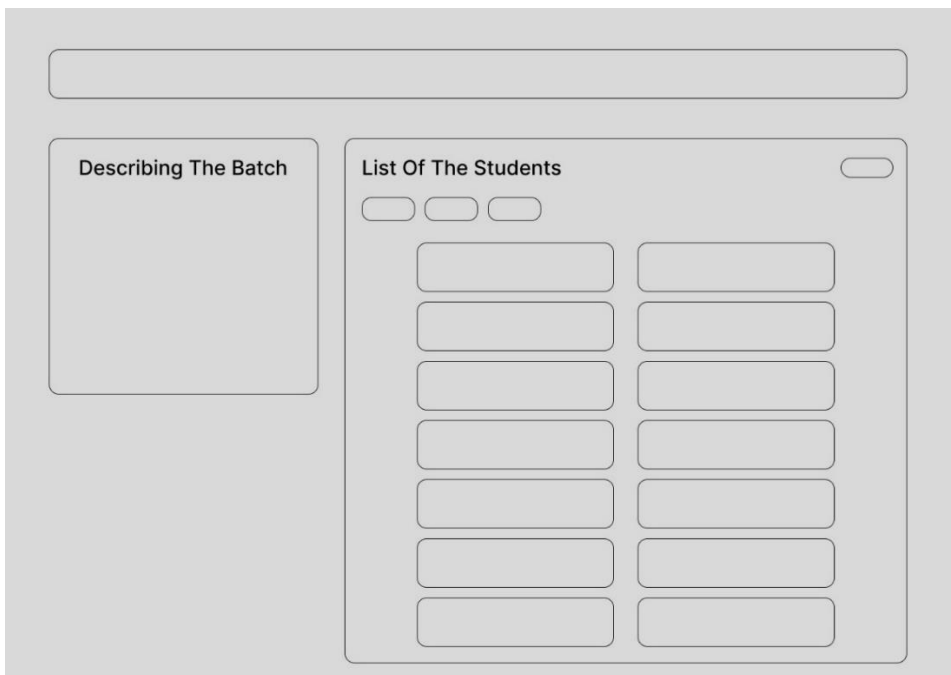
Fig 3.6 Batch Dashboard List
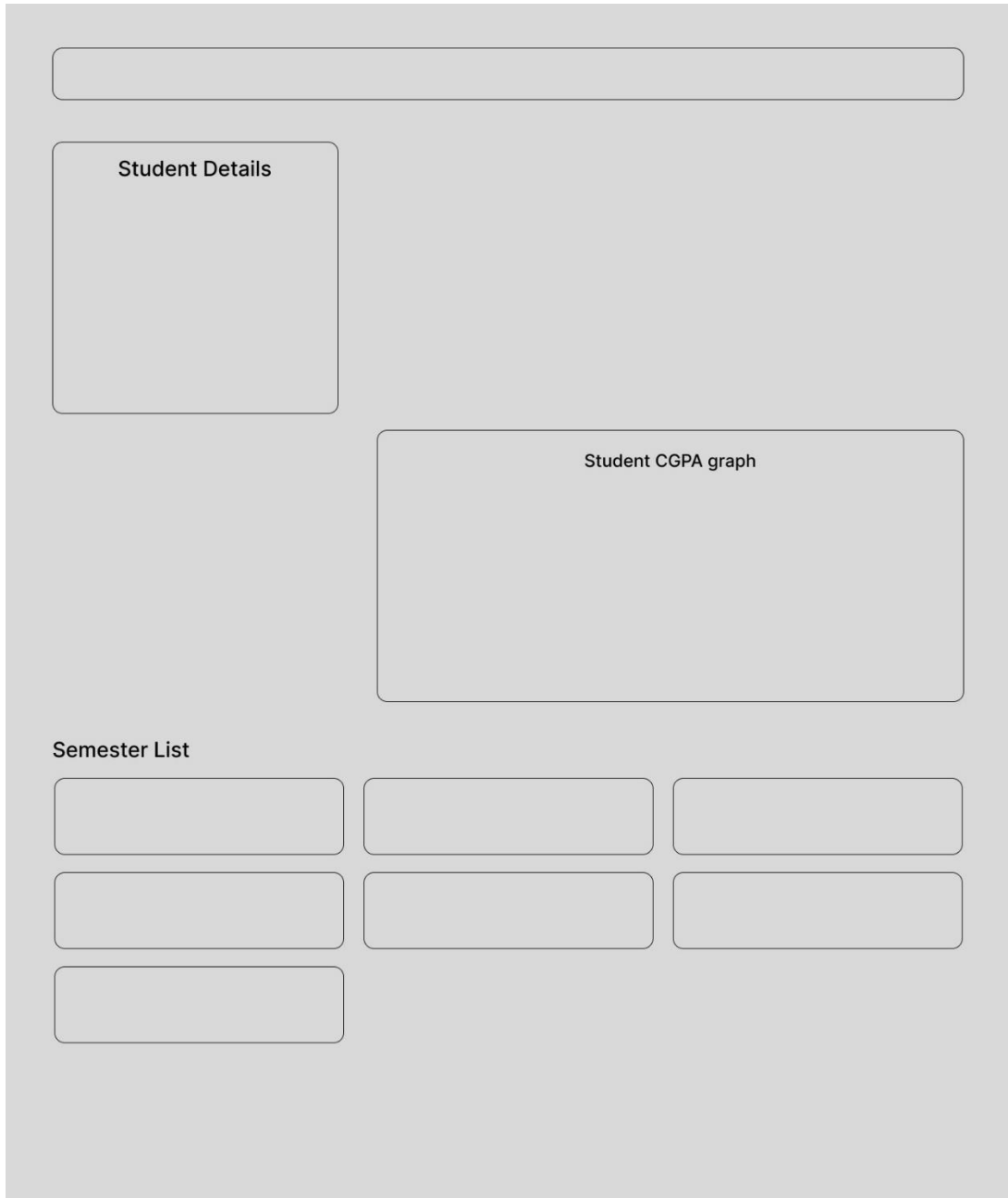
Fig 3.7: Single Student Academic Detail

Figma Designs

Hello Again

Student Analysis Portal

Welcome to your educational student portal! Unlock a
world of knowledge and resources with your secure login

Your E-number

Password

Login

OTP login

Fig 3.8: Login Page

Great!

What Course are you looking for?

Search Student

B.Tech

PhD

B.Sc

M.Sc

Next Page

Fig 3.9: Course Selection Page
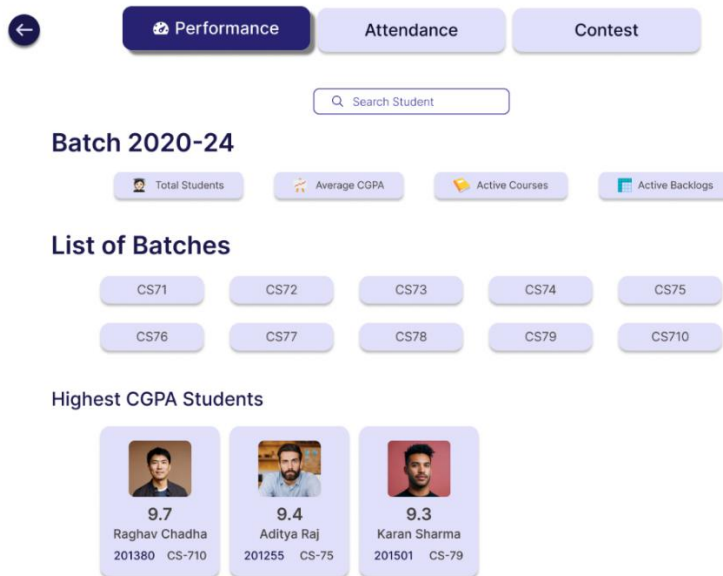
Fig 3.10: Year Dashboard Design
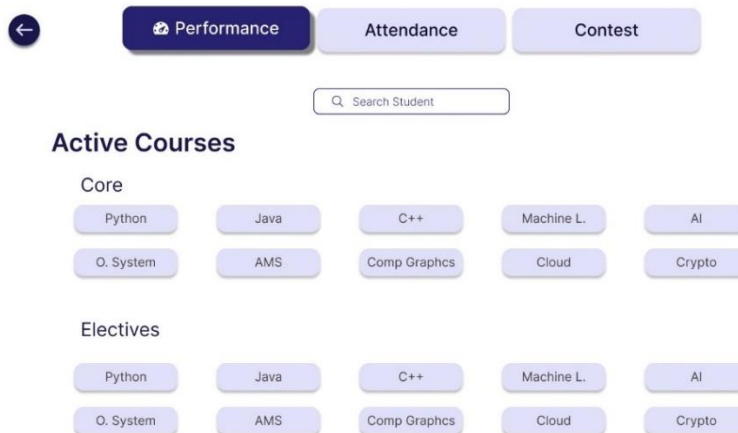
Fig 3.11: Active Course Design

Performance   Attendance   Contest

Academic   Personal Info

Current Semester 07

Mayank Aryman
201380
CS-710   **CGPA-8.1**

Semester 1   Semester 2   Semester 3   Semester 4

Semester 5   Semester 6   Semester 7

CGPA	9.1
SGPA	9.1
Overall Grade	A+
Disciplinary Grade	A+

Subject	Credit	T1(15)	T2(25)	T3(35)	TA(25)	Total(100)	Grade
Subject	01	10	15	20	20	65	B
Subject	02	09	14	22	22	67	B
Subject	03	11	18	25	22	76	A
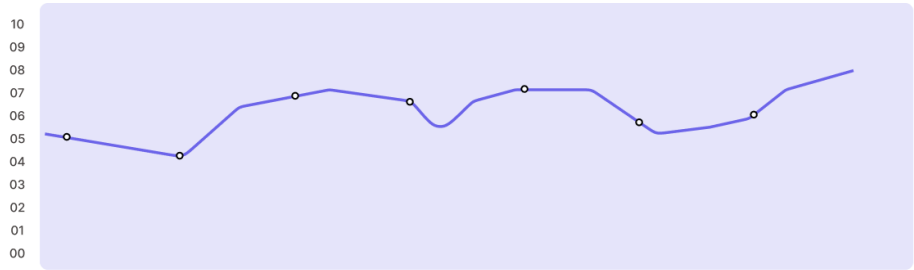
Fig 3.12: Single Student Academic Detail

Fig 3.13: Single Student Personal Detail
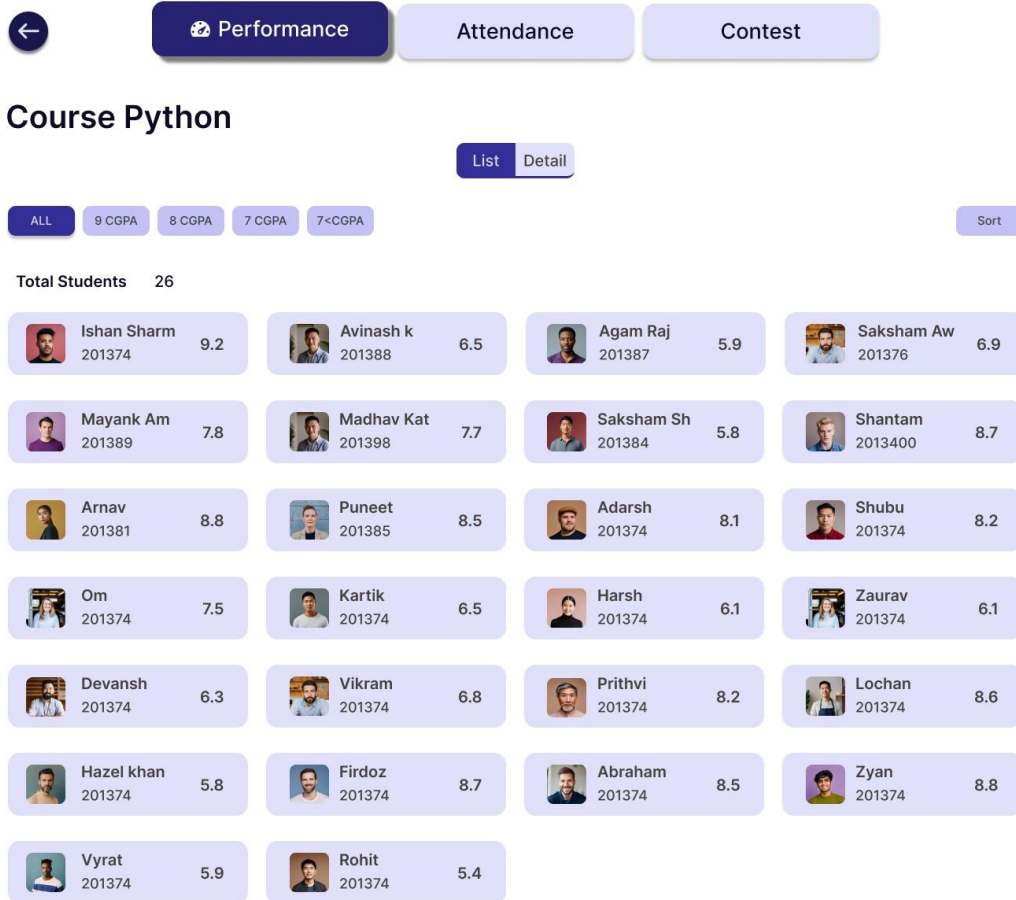
Fig 3.14: Student Sorted According to Course

3.3 Key Challenges

1. **Data Integration Complexity:** Integrating diverse data sources like engagement metrics and academic records poses challenges due to varied formats and patterns. Ensuring accuracy, relevance, and data quality throughout integration is crucial yet challenging.

2. **User-Centric Balancing Act:** Finding the right mix between complexity and simplicity is crucial when designing the dashboard to meet the demands of educators, administrators, and students. It's still difficult to design an interface that is both adaptable and user-friendly while satisfying the needs of many user personas.

3. **Technical Performance and Complexity**: Technical challenges include ensuring real-time updates while preserving system performance and scalability. Development problems are increased when predictive analytics is implemented safely and in compliance with data protection requirements.

4. **Technical Performance and Complexity:** Technical challenges include ensuring real-time updates while preserving system performance and scalability. Development problems are increased when predictive analytics is implemented safely and in compliance with data protection requirements.

5. **Flexibility in the Face of Educational and Technological Changes:** There are constant hurdles in updating the dashboard to reflect changing educational needs and technology improvements. It takes a forward-thinking strategy to maintain compatibility with new technologies and to accommodate future expansions and user demands.

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6. **Compatibility with Emerging Technologies:** It takes a forward-thinking strategy to maintain compatibility with new technology and allow for future growth.

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7. Ability to Adjust to Shifts in Education: There are constant hurdles in updating the dashboard to reflect changing educational needs and technology improvements.

These difficulties draw attention to the complex process involved in creating an interactive student analysis dashboard and underscore the necessity of all-encompassing plans and pre-emptive measures to guarantee efficacy, security, and usability in learning environments.

Chapter 4: Testing

4.1 Testing Strategy

The interactive student analysis dashboard's testing approach includes a wide range of tests meant to confirm various facets of its dependability and performance. Academic records, engagement indicators, and evaluations are some of the data sources that functional tests analyse for accuracy and smooth integration. Evaluations of usability also pay attention to the user interface, making sure that users of all stripes—including academics, administrators, and students—can navigate easily and have a positive experience.

To make that the dashboard keeps responsiveness and real-time updates even with more user interactions, performance tests mimic heavy data loads. In order to strengthen data protection measures and guarantee strong security against possible breaches, security assessments entail thorough vulnerability scans and penetration testing. Compatibility checks ensure that various devices and browsers have consistent functionality and appearance. Data coherence and the continuation of current functionality after upgrades are guaranteed via integration and regression testing. By ensuring the dashboard's efficacy, usability, and security through a diverse testing methodology, educational institutions may build a foundation of trust and dependability around their student data analysis procedures.

4.2 Test Cases and Outcomes

There are some noteworthy results from the use of an interactive dashboard for student analysis. First and foremost, it provides administrators and teachers with thorough insights on student performance, facilitating data-driven decision-making for programme improvements and academic interventions.

Furthermore, the predictive analytics on the dashboard help quickly identify kids who are at risk, which makes immediate interventions and support services possible. By assessing programme efficacy, this data-driven strategy not only improves institutional effectiveness but also cultivates a more knowledgeable and involved academic community, which eventually leads to increased student achievement and institutional growth.

The utilisation of an interactive dashboard for student analysis produces noteworthy results by providing educators with extensive information to support data-driven decision-making, which in turn supports programme improvements and academic interventions. It promotes self-directed learning by improving student engagement and proactive progress tracking. By identifying at-risk students for prompt interventions, predictive analytics enhances institutional efficacy and promotes knowledge throughout the academic community. In the end, these cooperative initiatives benefit both students and institutions by increasing student achievement, advancing the institution, and creating a more dynamic, responsive learning environment.

Chapter 5: Results and Evaluation

5.1 Results

There are some noteworthy results from the use of an interactive dashboard for student analysis. First and foremost, it provides administrators and teachers with thorough insights on student performance, facilitating data-driven decision making for programme improvements and academic interventions. In addition, students gain from proactive progress tracking and higher levels of engagement, which encourage a more self-directed approach to learning.

Furthermore, the predictive analytics on the dashboard help quickly identify kids who are at-risk, which makes immediate interventions and support services possible. By assessing programme efficacy, this data-driven strategy not only improves institutional effectiveness but also cultivates a more knowledgeable and involved academic community, which eventually leads to increased student achievement and institutional growth.
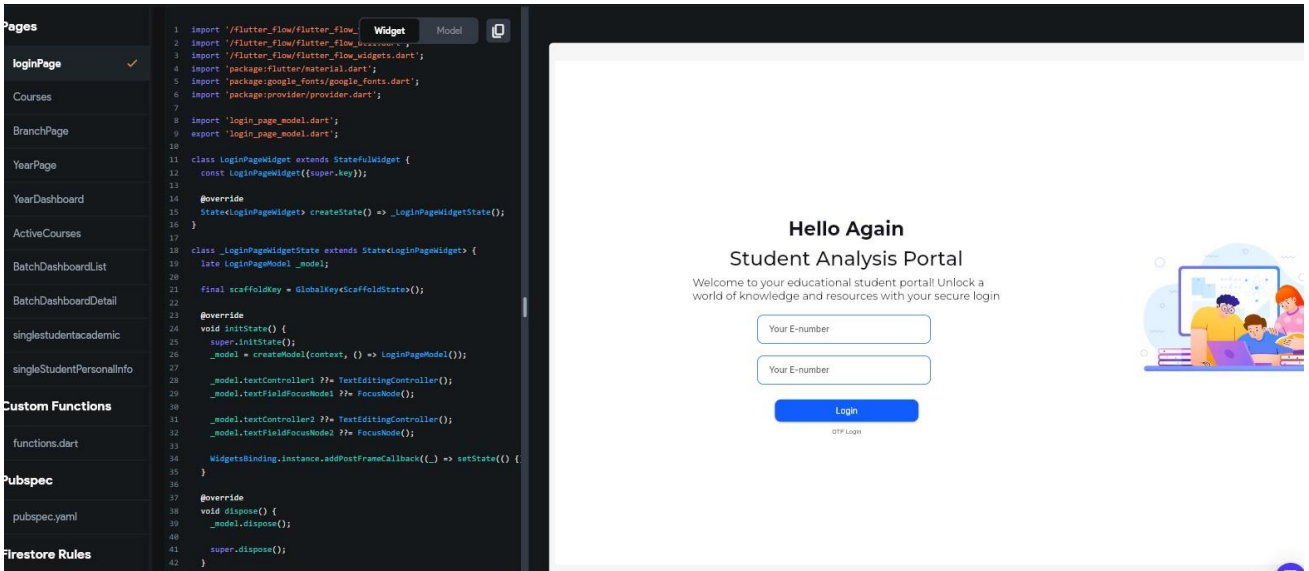
Fig. 5.1 Login Page Code
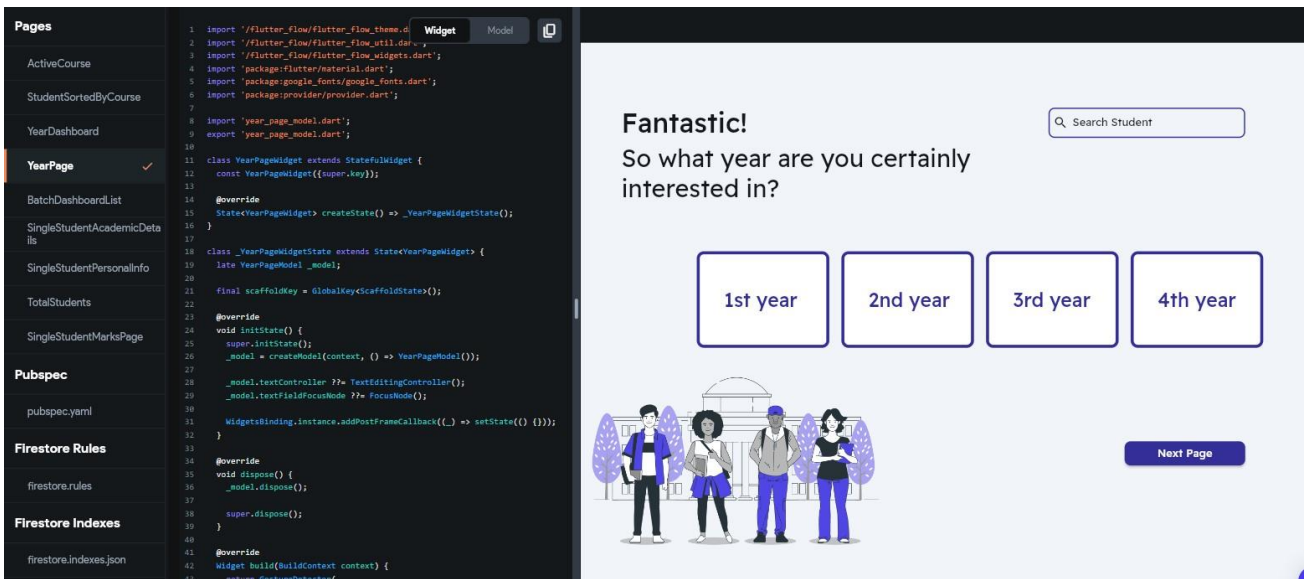
Fig. 5.2 Year Selection Page Code
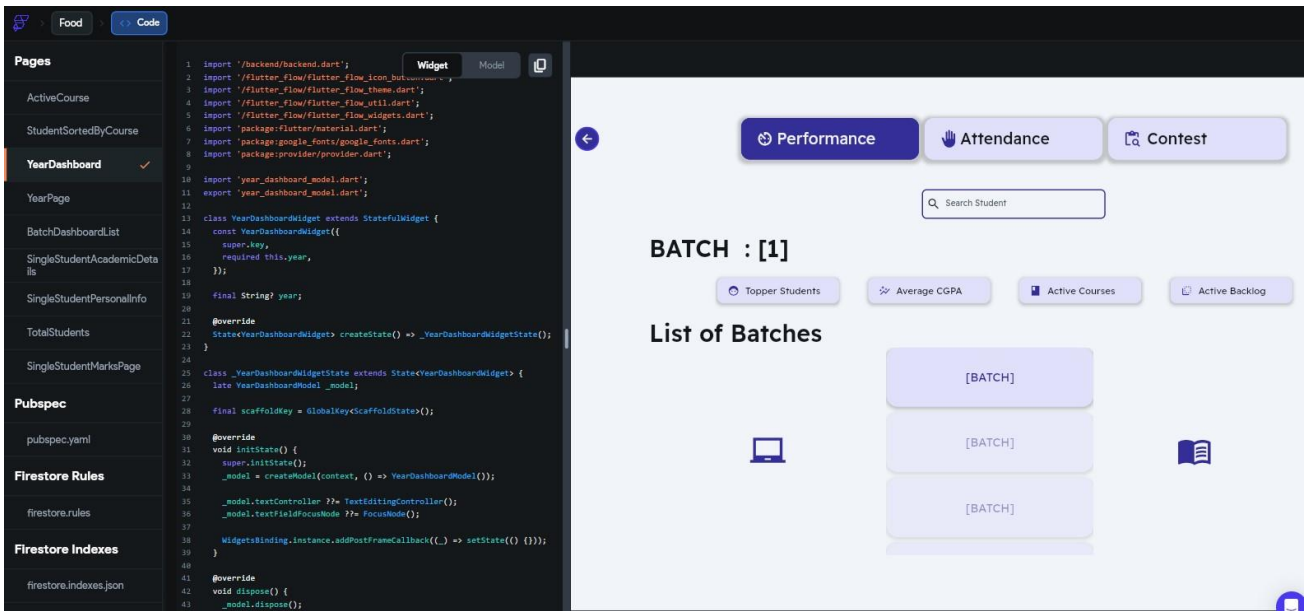
Fig. 5.3: Year Dashboard Code
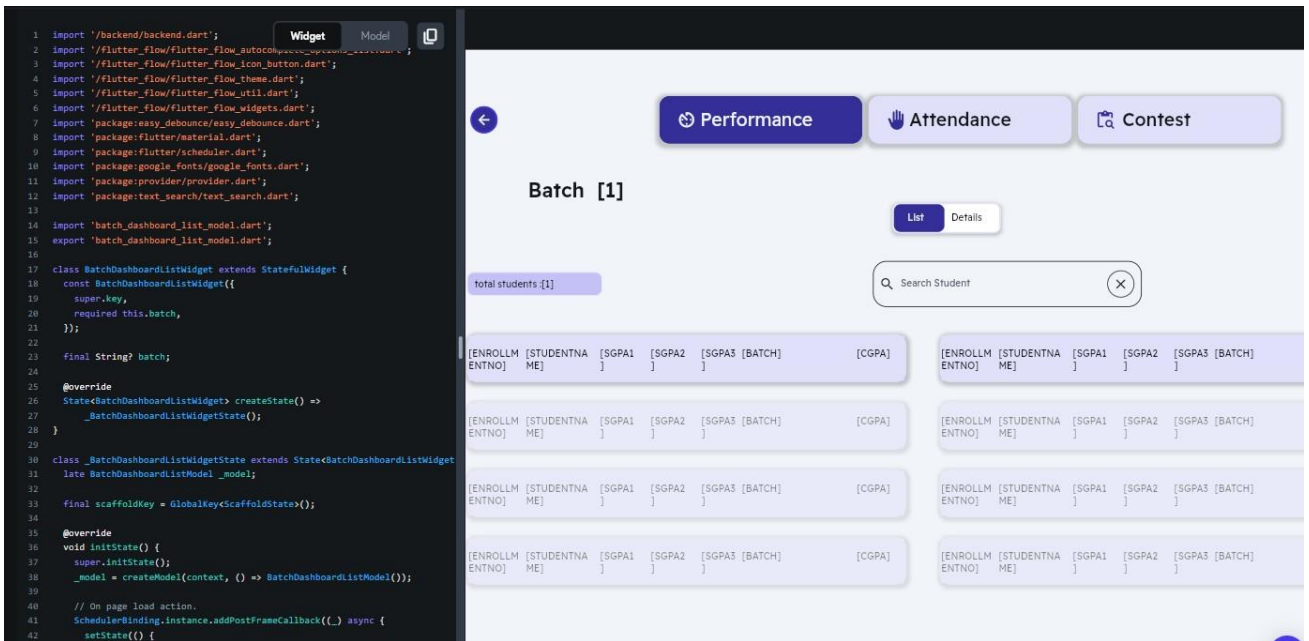
Fig. 5.4: Batch Dashboard List Code
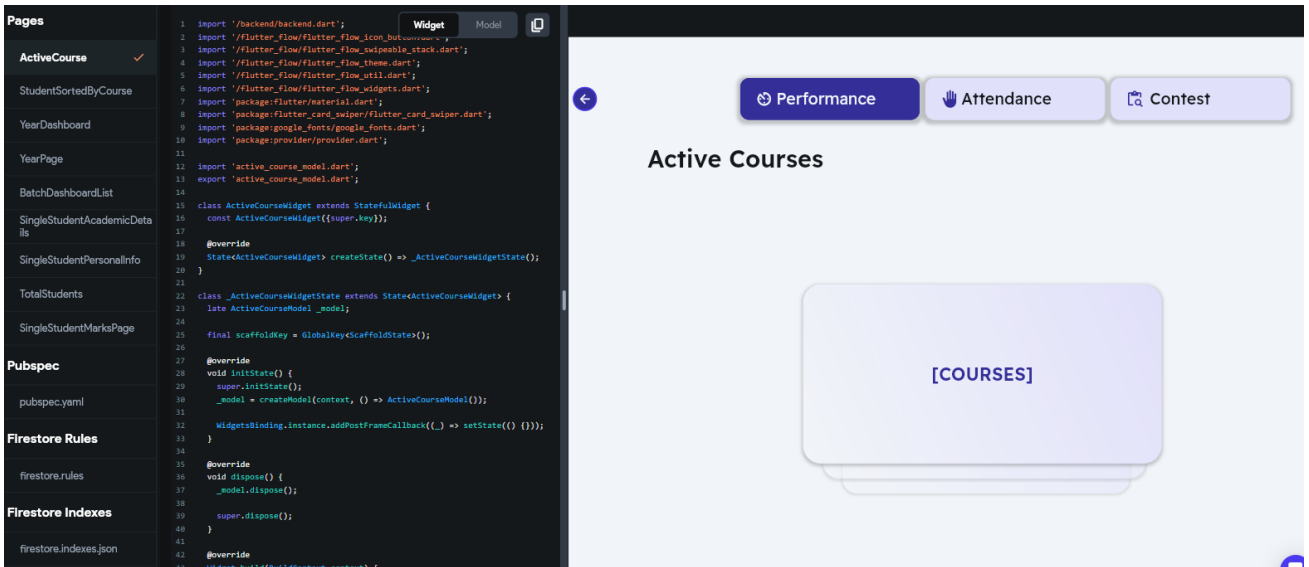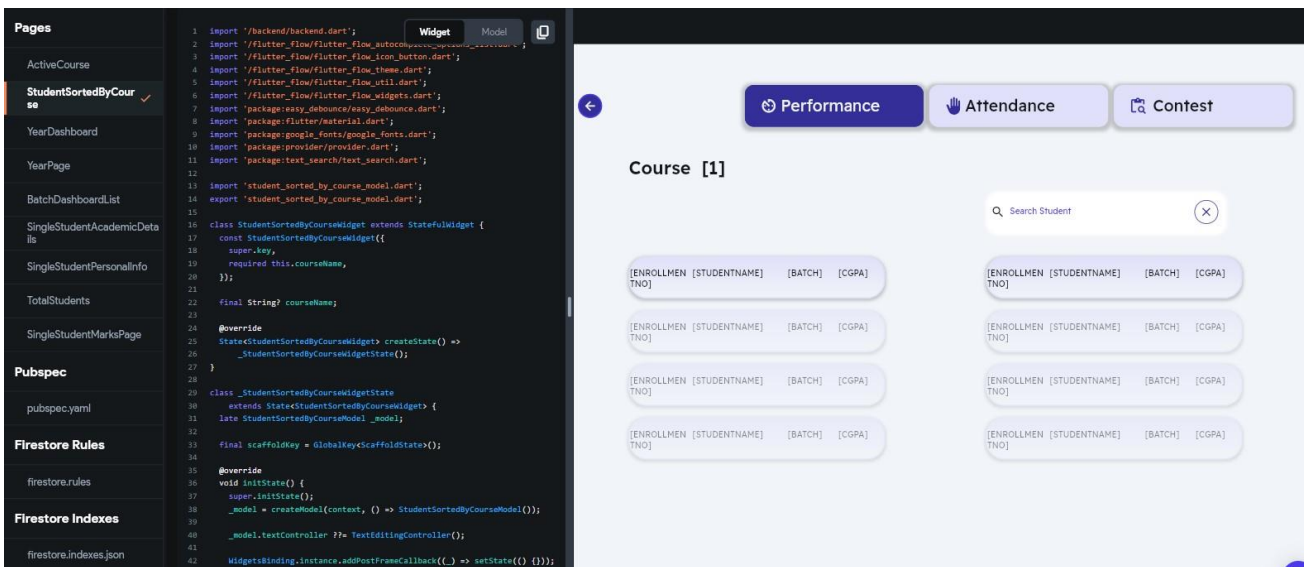
Fig 5.5: Active Courses Code

Fig 5.6: Student Sorted According to Course Code

Fig 5.7: Single Student Academic Detail Code

Chapter 6: Conclusions and Future Scope

6.1 Conclusion (summarize key findings, limitations and contributions to the field)

The implementation of an interactive dashboard for student analysis marks a revolutionary turning point in educational establishments, with the potential to completely reimagine how decisions are made and how students are involved. This state-of-the-art dashboard fosters a deeper knowledge of individual progress and needs by providing educators and administrators with a comprehensive view of student performance through the integration of different data sources. By utilising predictive analytics, the platform effectively detects kids who are considered to be at-risk, facilitating prompt interventions and strengthening existing support systems to guarantee that no student is left behind.

Moreover, by providing real-time progress reports, this cutting-edge solution fosters a proactive learning environment and increases student engagement. Increased openness in the educational process helps students take charge of their development and make wise choices about their learning trajectories. In addition to increasing student involvement, the dashboard's instantaneous insights foster a culture of data-driven decision-making among educational stakeholders.

This dashboard is a key component in creating a future where evidence-based practises drive advancements as educational institutions continue to seize the opportunities presented by data analytics. Its function is not limited to helping students succeed academically; it also serves as a driving force behind institutional progress by creating an

atmosphere in which well-informed choices based on thorough data insights result in comprehensive enhancements to teaching strategies, student outcomes, and overall institutional efficacy.

6.1.1 Key Findings

View of Complete Student Performance: The interactive dashboard combines many data sources to offer a comprehensive picture of student performance, improving comprehension of each student's needs and development.

Early Intervention: By identifying pupils who are at risk, predictive analytics is used to build support networks and enable prompt interventions.

Real-Time Progress Reporting: Provides students with access to real-time progress reports, which promotes a proactive learning environment and raises engagement levels.

Increased Student Engagement: When the educational process is transparent, students are given the tools they need to take charge of their education and make well-informed decisions about their futures.

Fostering a culture of data-driven decision-making among educational stakeholders can enhance the overall educational approach and results. This is known as data-driven decision-making.

6.1.2 Limitations

Complexity of Data Integration: It might be difficult to integrate different data sources while preserving relevance and accuracy.

User-Centric Design Challenges: It's still challenging to strike a balance between complexity and simplicity to satisfy the requirements of many user personas, such as administrators, students, and instructors.

Technical Restrictions: Maintaining real-time updates without sacrificing system speed or scalability.

Security and Privacy Issues: Strict adherence to privacy laws and strong security procedures are necessary to protect sensitive student data from breaches.

Adaptability Issues: It's a constant struggle to keep the dashboard up to date with changing technology and educational requirements.

6.1.3 Contributions to the field

An important development in educational technology, the interactive student analysis dashboard changes how students interact with their education and how decisions are made in the classroom. The dashboard improves individualised support by giving teachers and administrators a thorough understanding of students' performance, enabling more customised interventions. Its early identification of at-risk children using predictive

analytics allows for prompt interventions that enhance student outcomes. Furthermore, by providing real-time progress monitoring, the dashboard promotes a proactive learning environment that raises student accountability and engagement. Additionally, it encourages the use of evidence-based practices, which enhances instructional methods, student performance, and institutional efficacy as a whole. The dashboard's ability to foster a culture of data-driven decision-making among educational stakeholders solidifies its position as an indispensable and creative tool for holistic improvements in education.

6.1.4 Future Scope

The interactive student analysis dashboard's future trajectory offers a promising avenue for complete enhancement by incorporating state-of-the-art technology and advanced data-driven functionalities. A key component of this forward development is the smooth integration of sophisticated capabilities through dashboard integration with the WebKisk database in its backend architecture. The goal of this integration is to improve data accessibility, correctness, and dependability to strengthen the foundation of the system. By doing this, it hopes to promote more effective administrative procedures and well-informed decision-making by streamlining the storage, retrieval, and analysis of a wide range of student-related data.

A significant development that is imminent is the integration of Artificial Intelligence (AI) functionalities into the dashboard. The dashboard has the potential to completely transform the field of student mentoring by utilising artificial intelligence technologies.

With this cutting-edge feature, the system will be able to anticipate and suggest customised courses based on information about each student's academic standing, aptitude for learning, and personal interests. Powerful machine-learning algorithms in the dashboard will sift through vast data sets to offer customized courses specific to the unique interests, strengths, and projected track of each student. The forthcoming dashboard feature update holds much promise for enhancing both student benefit, administration efficiency. Suggestions powered by AI can empower students to consider informed choices concerning their educational courses. By so doing, students will be able to make registration in courses that are aligned with their academic interests and capabilities thus creating personalised learning environment. This programme is designed to enhance student satisfaction while increasing the academic success rates that are aligned institutional quality goals. The individualized, data driven decision making strategy is prioritized to support student's academic planning and achievement.

References

[1] Y. J. Park and M. H. Jo, "Development and Evaluation of an Interactive Dashboard for Student Self-Monitoring and Learning Progress Analysis," Educational Technology Research and Development, 2023.

[2] J. L. Almendros and M. T. García, "To design and implement an interactive dashboard to provide instructors with real-time feedback on student performance," Computers & Education, 2022.

[3] J. M. Guerra-Hernández and E. M. Sancho-Sánchez, "To develop an interactive dashboard to visualize student engagement data and identify students at risk of failing," IEEE Transactions on Learning Technologies, 2021.

[4] M. Almarzouki, "To design and implement an interactive dashboard," Journal of Computers in Education, 2023.

[5] H. R. Tenenbaum, "Interactive dashboard to help students understand their strengths and weaknesses in different subjects," Education, 2020.

[6] M. J. Rodríguez-Triana and A. Vozniuk, "To investigate the impact of interactive dashboards on student motivation and learning outcomes," Educational Psychology Review, 2019.

[7] B. A. Schwendimann and M. J. Rodríguez-Triana, "To design and implement an interactive dashboard to support collaborative learning activities," International Journal of Learning Technology, 2018.

[8] L. Hernández-Cumplido and C. Romero, "To develop an interactive dashboard to help instructors personalize learning experiences for each student," Journal of Educational Technology & Society, 2017.

[9] R. P. Ferguson and J. L. Bracy, "To investigate the impact of interactive dashboards on student perceptions of learning," Journal of Educational Psychology, 2016.

[10] C. Redecker and M. Redecker, "To design and implement an interactive dashboard to provide students with feedback on their writing," Educational Technology Research and Development, 2015.

[11] G. Siemens and R. S. J. D. Baker, "Learning analytics and educational data mining: Towards communication and collaboration," Educational Technology Research and Development, 2014.

[12] C. Romero and S. Ventura, "To develop a framework for designing and implementing learning analytics dashboards," British Journal of Educational Technology, 2013.