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Quality Monitoring of School Education and Evaluation Platform Based on Big Data

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***Abstract* -The Collection and analysis of quality monitoring data of Schools. I consider this data along with combination of effective and efficiency processing of big data and data interpretation, evaluation, and monitor the status of school education and construct a school education quality monitoring and evaluation platform. The platform is teaching centred with schools including system of collecting data, analysis of data, systematic data storage and other areas [1]. With the application of the school education quality monitoring platform, it is possible to understand the current scenario of the development of school education scientifically, and provide the good decision making to the schools administration department.**
Keywords: **Big Data, Quality Monitoring Platform, Systematic Data Storage, Decision Making**

I. INTRODUCTION

In recent era, the rapid development of information technology leads the reorganization of big data which is used in different fields. In our country, the education field is still in developing stage where the implementation of big data will help the school managements to deal with good decision making in their administration. Big data has the "4V" characteristics of large volume,high speed, high valuation and strong authenticity[1]. Strengthening the integration of big data technology, concept and educational monitoring andevaluation is a major practical problem to solve the current development of education. Introducing the big data into the field of education makes the rapid growth in teaching monitoring activities which deals with big data. With this whole monitoring system, the school management process, teacher education, student growth and mining process of student performance in various tests, personal ability, cognition, emotion and after their school education-what is the next level of higher studies can also be made through scientific analysis with the help of the system. This improves the quality and the method of improvement in education process with proper guidance to parents, students, teachers and society to take the current generation in right path to achieve in their life. This system helps in improving the education system in our country.

Everyone agrees India's public education is in a dire state. The blame for this is typically heaped upon bad infrastructure, teacher absenteeism, poor student attendance, inputs-based monitoring, and inadequate teacher preparation programs. While these issues are valid, all of them taken together do no fully explain the learning crisis apparently in the classrooms [2]. With the integration of big data and the school education quality evaluation, the construction of the school education quality monitoring and evaluation platform based on big data makes the effective and efficiency school monitoring system. With this application, it is possible to integrate fragmentation evaluation into systematic evaluation to ensure the comprehensiveness and sustainability of the evaluation, which solves the problem of asymmetric information collection. At the same time, we can query or browse data in a real time and dynamic manner, and can also perform data aggregation, processing and analysis according to the practical need in order to provide scientific practice andtheoretical basis for the macro-decision of education administration department.

II. FRAME WORK AND EVALUATION

A. Assessment Framework

Every country typically has provisions for student assessment, teacher evaluation, school evaluation and system evaluation, but often these are not explicitly integrated and there is no strategy to ensure that the different components of the framework can mutually reinforce each other. A strategic approach to the development of the evaluation and assessment framework provides an opportunity to reflect on the articulations between the different evaluations components.

Policy development needs to involve a reflection on the different components of the framework such as school assessment, teacher appraisal, or standardized national-level student tests to assess students' progress, and ways in which they can be articulated to achieve the purposes of the framework. The key aspect is to determine how the different components need to be interrelated in order to generate complementarities, avoid duplication, and prevent inconsistency of objectives [3].

B. Developing Competencies for Evaluation

The effectiveness of evaluation and assessment relies to a great extent on ensuring that both those who design and undertake evaluation activities as well as those who use their results possess the proper skills and competencies [3]. This is crucial to provide the necessary legitimacy to those

responsible for evaluation and assessment. Since evaluation has strong stakes for the units assessed and since school outcomes heavily depend on individual relationships and cooperation at the school level, successful feedback mechanisms require particular attention to developing competencies and defining responsibilities in the evaluation process.

Evaluation and assessment frameworks have no value if they do not lead to the improvement of classroom practice and student learning. Securing effective links to classroom practice is a key policy challenge in the design of evaluation and assessment frameworks. A number of strategies can reinforce the linkages between the evaluation and assessment framework and classroom practice. A strong emphasis on teacher evaluation for the continuous improvement of teaching practices within the school is one key link. Another lever is to involve teachers in school evaluation, in particular through conceiving school self-evaluation as a collective process with responsibilities for teachers.

C. Student Assessment

In standard-based systems, which are increasingly common across countries, governments set standards for student attainment, clearly defining the knowledge and skills, students are expected to have attained at different stages of their education. The curriculum covers the objectives identified in standards, and student assessments focus on attainment of standards. The core logic of standard-based systems rests upon the alignment of these key elements. If the assessments do not well match the curriculum and the standards, then results have little value in judging how well students are learning and in diagnosing school or student needs [3].An important policy challenge is the design of student summative assessment which seeks to provide a summary statement of student achievement at a particular point in time. Research shows that while summative assessment is primarily conceived to measure the outcomes of learning, the approach to summative assessment can, in turn, have a strong impact on the learning process itself [3]. Different assessment policies and practices influence students' motivation, effort, learning styles and perceptions of self-efficacy as well as teaching practices and teacher-student relationships.

Teacher-based assessment refers to continuous assessment that is designed and marked by the students' own teachers. It is conducted internally in the classroom and counts towards a final grade or evaluation of the student. Teacher-based summative assessment may include different types of assessment such as teacher-made tests, classroom-embedded assignments, project work and portfolios [3]. Typically, teacher-based assessment is presented in the literature as having higher validity than external assessment. Due to its continuous nature, teacher-based assessment often allows for important achievements to be measured that could not be captured in a final examination, such as extended projects, practical assignments or oral work.

III. BIG DATA PLATFORM FOR MONITORING SYSTEM

In the face of mass data, due to the limitation of traditional architecture that it cannot achieve horizontal expansion, Traditional IT architecture and data processing methods cannot effectively deal with big data environment. The intelligent center of big data analysis platform is regional. The architecture of the platform is the Internet or the dedicated server. The main supporting technology is the key technology of big data preprocessing, storage, processing and visualization analysis of school monitoring system.Classroom-based formative assessment – the frequent, interactive assessment of student progress to identify learning needs and shape teaching – has taken on an increasingly important role in education policy [3]. An important policy challenge is to find suitable strategies that can integrate classroom-based formative assessment within the broader assessment and evaluation framework.

Strategies to achieve such integration include a closer interface between formative assessment and summative assessment. For example, countries may strengthen teachers' assessment roles. Because teachers are able to observe students' progress towards the full range of goals set out in standards and curriculum over time and in a variety of contexts, their assessments help to increase validity and reliability of summative assessments[3].

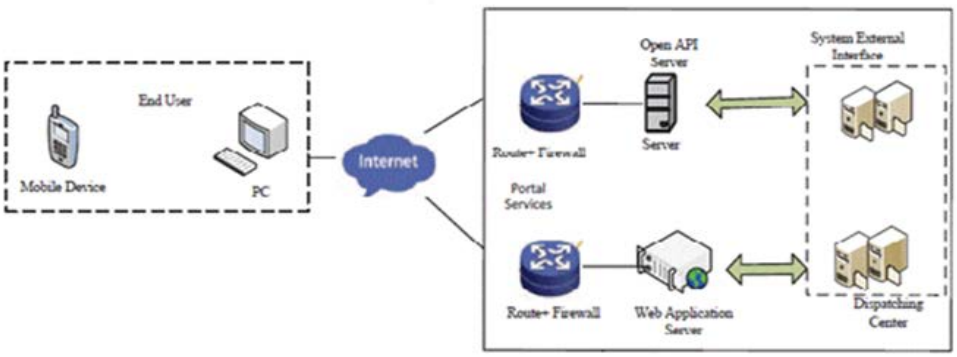

Fig. 1 Big Data Platform Architecture for School Monitoring System

The Fig. 1 indicates the general architecture for collecting and storing the data required for school monitoring system. The end user is the administration people in the school management who can upload the information through the computer devices like Mobile, Personal Computer or Tablet. The basic criterion is that the computer device should be connected with the internet. To avoid the unwanted accessing of web pages by the end user and for protection purpose the fire wall can be implemented in the system. The data which will be stored in the system is cloud system. The cloud system contains the Web Application Server which acts as a central system for the school management. The external interface which dispatches the system for storing and monitoring the school monitoring system by getting information from the end user (school management).

IV. QUALITY MONITORING SYSTEM AND EVALUATION SYSTEM

The combination of the characteristics of higher education monitoring and evaluation with the big data processingplatform to form a multi-functional system with functions of big data acquisition, data processing and results usage [3]. The overall system architecture is demonstrated in Fig. 2.

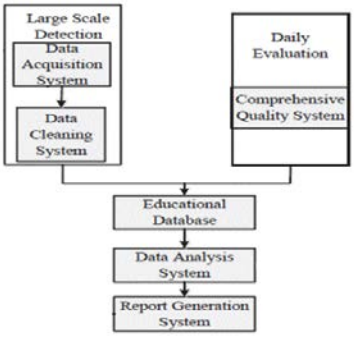

Fig. 2 Architecture of School Quality Monitoring System and Evaluation System

A. Data Acquisition System

Database construction is the basis of educational qualitymonitoring, including school management, teachers, studentinformation and other basic information. In this, it uses imagerecognition technology to realize the automation of paperdata collection, and achieve orderly collection of teachers'data by network questionnaire. During the process of data collection, itneeds to ensure the practicality of the datasource, the normality of the process, and the safety of themonitoring system. In this information collection on the goals of theschool, the resources of teaching, the daily teachinginformation, the academic achievements of students, the onand off campus activities of students, and the communityevaluation information.

B. Data Cleaning System

First perform demand analysis. It is ensured that the need of data cleaning requirement of the system is must, it determines the information environment of monitoring datathrough the data environment analysis. Then it makes clear the goal of data cleaning based on the task, determine the methodof data cleaning, and configure the data interface and so on [5]. Finally, it is determined the implementation plan of datacleaning and then establish files.

C. Comprehensive Quality System

Comprehensive Quality System mainly has the followingmodels: moral quality analysis model, intelligent decision analysis model, and student innovation ability analysis model.The system can generate reports for the comprehensivequality of students, school life information of students and soon. It can also generate quantitative evaluation report basedon daily teaching information of teachers.

D. Education Database

The database adopted in the research is MySQL. Storing the processed education information in the database is done in MySQL.Then we import the data into the DFS (Distributed FileSystem). The data is partitioned according tothe data distribution strategy in DFS, where a block inDFS corresponds to a partition of Spark. It uses a custompartition type and store data to corresponding nodesaccording to the relationship among school, teachers, andstudents.

E. Data Analysis System

The analysis system processes comprehensive informationformed through classification and clustering technology,linear regression model and so on. The monitoring data isentered into the system, to form real-time data stream. Then thesystem divides the associated data stream into data blocks.During the analysis process, the system mainly uses thebuilt-in descriptive algorithm, the variance analysis algorithm,the T test algorithm and so on in order to get usefulknowledge.

F. Report Generation System

Since traditional report has the shortcoming of insufficient information, in this research, it is intend to use heuristic, visualdata mining technology, human-computer interaction andother technologies on the report generation system to achievelarge-scale data mining and human-computer interaction.Under the premise of scientific theory guidance and accurateevaluation results, it forms a specific analysis model bycollecting and analyzing the data, and thencreates the analysissoftware.The system automatically generates qualitymonitoring report with school-teacher-student integration.The higher education quality evaluation system relies onbig data network system, which forms a complete platformwith data acquisition, data storage, data processing and resultfeedback. Only by combining the both together, it can construct a complete system of information exchange, mutualpromotion, common development and effective operation.

V. CASE STUDY

Based on the higher secondary level monitoring and evaluation theory discussed above, the higher secondary education monitoring and evaluation model, design of big data platform for monitoring data, the specific design is implemented for the evaluation of the higher secondary level teaching of Senthil Public School at Salem. Then on this basis, the theory and technology above mentioned is tested and verified.

A. Data Acquisition Process

The data source in the research is mainly concentrated in higher secondary school. The post information of teachers, title information, course selection information etc is dynamic and heterogeneous. The data collection is completed by 5 departments from around 6 sections of class rooms. The departments should complete data collection and submit it on time.

1. Data Acquisition Types

a. Student Information: Student Id, Name, Gender, Class, Section, Subjects, Marks, Grade, Extra-curricular information.
b. Teacher Information: Teacher Id, Name, Gender, Major, Department
c. Information of School relationship with Student : Student Id, School, Academic Year, Term
d. Mark Sheet Preparation: along with ranking and overall performance of assessment wise
e. Attendance System: Student Id, Teacher Id, Attendance.

B. Collecting Information

The information for the above tables are collected through the departments by the Head of the respective departments and stored as tables (relations) in MySQL. All information is gathered, verified and uploaded in the database. Some information are imported in the database from excel.

C. Data Processing

The collected data is processed into tables. The information is segregated into parts of meaningful data, and stored in respective tables. The reports are generated based on the need of the departments by using Structured Query Language.
The unrelated data present in the collected data is omitted and the required information alone is updated in the database.

D. Report Generation Process

Generating report is a feedback to teaching evaluation. The feedback is also reflected in the process of monitoring. The whole process of teaching monitoring providesinformation for the report, and also provides a reference for the teaching quality evaluation in schools. The data provided by school and administrators is the most basic, which requires immediate calculation. Scores and rankings are reflected in real time by administrator operations. The evaluation score of school is used as a reference to adjustteaching strategies. The system reads real-time data so that when a user views information, he or she can get the latest evaluation report.

VI. CONCLUSION

This study constructs the quality monitoring system of higher secondary education (School Monitoring System) based on big data, which involves front-end platform development and back-end system development including the system development of data acquisition, data analysis, machine learning, data storage, and data analysis. The content of the monitoring involves: the evaluation ofeducation and teaching quality of school and teachers, and teaching process; the evaluation oflearning effect and learning development in the process ofstudents learning [3]. The system can provide direct, reliable andvisual data support. At the same time, it can also provide theparticipants in the education (educational management,administrators, teachers andparents) with a more comprehensive and objectiveunderstanding of the current situation of educationdevelopment and the improvement direction from feedbacks.Through the combination of big data technology and higher secondary education (School Monitoring System) quality monitoring and evaluation builds amulti-functional system for data acquisition, data processing,and results usage in order to achieve the early warning andquantitative analysis of teaching status and dynamicmonitoring of the development of school education andteaching activities. With the system it gets a lot ofinformation and data from higher secondary education monitoring and evaluation. Then it provides this information as feedback to schools, teachers and students. Based on the feedbacks, schools can improve specialty provision, personneltraining, curriculum, school management, and make their work effectively and efficiently.

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