

## **BIG DATA IN EDUCATION**

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### **Abstract:**

One of the hottest buzzwords these days is big data. It's probably been on everyone's lips for quite some time. The truth is that big data is spreading like wildfire and is about to overtake the entire planet, taking over not only the IT business but other industries as well. With so much information generated every second, data scientists are always on the go with that information. In addition to companies analyzing this data to make better business decisions, big data is also being used in the education sector. Every year, a huge amount of data is produced as thousands of students enroll in a variety of courses at various institutes. The student information includes course information, enrollment year, student ID, exam grades, and marks earned in each topic. For advancing their careers, analysis of this data can be incredibly helpful. Modern educational institutions use student data to understand their educational experience. This allows teachers to better guide their students. Educational Institutes have faced a lot of challenges in the analysis and study of such a huge volume of data with traditional data processing tools. To overcome these challenges, some big data solutions were introduced.

**Keywords:** Data Analytics, Educational Management, Teaching and Learning Systems, Decision Making, Big data, Cloud.

### **Introduction:**

The current IT world is facing a tsunami-like situation due to the rapidly growing numbers of data and information. As the number of end users grows, a secure and dependable model is required to handle the situation. To deal with such situations, big data and the cloud are the best solutions. Virtualization has completely transformed the storage concept. It has a significant impact on industries such as education, healthcare, and finance. Big Data is defined as a massive volume of structured and unstructured data that is too large and difficult to process using traditional methods and current software technologies. Today, data is rapidly increasing, resulting in Big Data. Online transactions, video, audio, email, number of clicks, logs, posts, social network data, scientific data, remote access sensory data, mobile phones, and their applications are common sources of Big Data. Real-time big data applications are used in a variety of industries, including healthcare, network security, market and business, sports, education systems, the gaming industry, and telecommunications. Big data technologies process a wide range of data at high volumes and speeds in order to extract data value and ensure the accuracy of original data. Data is constantly generated by devices and people. Big data is the buzz phrase in the IT industry. Every student is different. A particular learning process may be the best fit for some students while being unsuitable for others. For example, Some students prefer visual learning while others prefer aural learning. The study here aims to implement an automated system for students that can categorize them and provide them with a tailored learning environment. Big Data in education can improve students' overall learning environment, which is essential for quality education. One of the primary goals of any educational system is to provide students with the knowledge and skills they need to become successful human beings. Education assists individuals in developing a variety of skills that will aid in their overall development. Education has taken on a new dimension as the number of schools, colleges, and coaching institutes has increased. The effectiveness with which global educational systems achieve educational goals is a major determinant of both economic and social progress. Every year, a large number of students enroll in universities. With such a large number of students, it has become difficult to provide high-quality instruction and guidance. As a result, many students do not complete their degrees within the time frames

specified. For example, Students may fail advanced subjects because they did not learn the fundamental information in prerequisite subjects. Examining student data using big data methods can help classify possible reasons for student disappointment. Big data offers numerous methods for investigating information. The amount of information currently stored in student records exceeds the human capacity to examine and extract the most useful information without the assistance of automated analysis methods. Big data is a powerful artificial intelligence tool that can discover useful information by exploring data from multiple perspectives or extents, categorizing that information, and reviewing the various relationships acknowledged in the records. This data assists in making or improving decisions.

### **1. Enhancing Student Results**

The grades obtained in exams, projects, and assignments are the most common methods of analyzing a student's performance. However, all of these grades can be added together to form a unique data trail left by the student throughout their lives. Analyzing these data trails will assist educators in better understanding student behavior and performance. It is possible to monitor their actions using Big Data, such as:

- Exam question response time
- Sources from which they choose to educate themselves
- Questions they avoid
- Questions they have successfully answered

The real-time analysis will help in providing students with significantly improved feedback on their performance. Feedback has the potential to significantly improve outcomes. This is because students will be able to see where they excel and where they fall short.

### **2. A better Grading System**

Big Data assists educators in tracking students' performance. The analysis helps in understanding an individual and collective performance. The statistical analysis of individual grades will assist educators in understanding the areas of interest among students. The grading system can be improved to highlight the key areas in which the student excelled. This system will also enable teachers to provide valuable feedback to students and assist them in choosing the best career path.

### **3. Getting People's Attention**

Getting a student's attention is one of the most interesting and useful Big Data applications in education. No matter how interesting the lecture is, there will always be some students who are distracted by their phones or others. On the other hand, a lecture can only be effective if everyone pays attention. Big Data experts intend to use students' biometric data, such as heart rate, facial expressions, and objects touched during the lecture. This data can be collected using a camera mounted on the ceiling or a device resembling a smartwatch. This information can be used to determine how attentive each student is. After returning the data to the teacher, he or she can take the necessary steps to re-engage the students.

### **4. Customized Programs**

Educators can design personalized programmes for students based on their grades and attention span. Students can also be offered blended learning, which includes both offline and online learning opportunities. Students can access study material and lectures online through customized programmes. They are free to study at their own pace. Big data education enables the development of customized programmes for each student, irrespective of the number of students enrolled in universities and colleges. Big data employs "blended learning," which is a combination of offline and online learning. As a result,

students can follow classes that interest them and study at their own pace while still having the option of receiving offline guidance.

### **5. Reducing The Number of Dropouts**

The use of big data in education also includes reducing the number of students who dropout of high schools and colleges. Big Data can be used to perform predictive analysis to predict how students will perform in the future. This analysis will look at students' performance throughout the year and predict if they might drop out. Such an analysis will also assist institute authorities in carrying out a scenario analysis on a specific course before it is introduced. This will greatly assist teachers in directing their students to the best course for them. With improvement in student results, the dropout rates will also decrease.

### **6. Enrolment Management**

To enhance enrollment at a facility, strategies including marketing for the school or college, financial aid, retention programmes, and admissions policies are established. Systematic planning goes into enrollment management in order to achieve institutional objectives.

### **7. Grouping Students**

The students are divided into different groups using classification and clustering techniques so that individualized instruction may be offered. Individual learning preferences, such as visual or aural, are taken into account when grouping people so that appropriate training can be delivered.

### **8. Student Profiling Prediction**

Using the data provided, methods like neural networks can be used to identify the pupils based on various demographic, geographic, and psychographic features.

### **9. Scheduling and planning**

To estimate and illustrate the planning for different future courses, resource allocation, counseling, curriculum creation, etc., various Big Data approaches, such as classification, clustering, etc., can be employed. Planning can improve the standard admissions, recruitment, and course enrollment processes in education.

### **10. Syllabus Structure**

An institute's curriculum is influenced by many factors like affiliation, competitions, partnerships with other organizations, instructor availability etc. These might not be the greatest criteria to use when creating the syllabus for each student. Big Data can provide a better structure of the syllabus than the one that is currently in place by identifying different student characteristics.

### **Advantages of Big Data in Education**

1. Improved Instruction can enhance student performance and learning potential by making sessions more individualized. With the aid of analytics, teachers can modify the curriculum.
2. Student-program matching Parents and children can use open data to pick the best school or educational programme.
3. Job placement for students Alternative and more effective tools might be found by businesses and prospective employees to leverage open data to qualify their talents against the necessary skills. Additionally, students can more effectively than before identify and apply for employment that fits with their skills.

4. Open financing of education. Students now have the opportunity to engage in educational activities that they were previously unable to do. Additionally, they have the freedom to select any aspect of higher education and find the courses that are the most appropriate for them.
5. Effective system management Education systems in schools are able to produce skilled teachers that can assist administrators in allowing more Big Data and Open Data.

### **Conclusion :**

Many researchers around the world are interested in the growing amount of data being produced daily by the rising use of technology in education. Big data in education is a rapidly expanding sector that has the benefit of incorporating cutting-edge machine learning and big data methods and methodologies. The use of big data in education has completely changed the field. Big Data is being used by educational institutions to evaluate candidates and determine which ones will be a good fit and which ones might not. This has made the selecting process quicker for institutions all across the world. Big Data is being utilised in the hiring of instructors. Future research will focus on developing a specific framework and examining numerous factors that have an impact on the teaching and learning process in order to improve students' overall growth.

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