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Introduction to Big-Data on New Teaching Mechanism

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Abstract

In current date, we all face the problems of Covid-19 case around the world. Especially its case impact on the higher education. So, all teachers or educators will have to apply digital platform or technology. Moreover, we all use online application on cloud. The recent technologies offer a new research platform for the collaborative research. High-performance computing, client-cloud design, broadband setups, personal devices and sensors, multimedia data penetrate our association. The complex process of observing huge and varied data sets is often described as "Big Data". The Big Data applications are significant to meet the social needs and to generate new information for smart decision-making. Social networks, digital manners, data analytics on education are the typical research areas. This paper introduces the big data trends on new teaching/learning mechanism in higher education. Moreover, this paper used Microsoft Team application as a software tool for teaching, learning and sharing.
Keywords: Higher Education, Digital Platform, Online Application, Cloud, Big Data.

1. Introduction

The usage of big data is now widely used. The traditional data analytics is not be able to handle such huge amount of data. This paper begins with a brief introduction to big data analytics. Big Data is the expression used to describe large volumes of structured and unstructured data that are so large that is very difficult to process this data using traditional databases and software technologies. The meaning of big data is a well-known definition of 3V's to explain the meaning of big data: volume, velocity and variety.

During pandemic period, the purpose of teaching/learning style in higher education has been changed. The technological platform is slowing transforming into digital route way. Technology makes us the capability of institutions to face a new challenge. To develop decision making, higher education has accessed to data that can be used. The big data and analytics trend in higher education is quite innovative new zone.

The importance of analytics is deeply seen in many areas whereas it has not been changed in Higher Education yet. This paper examines the role of Big Data and teaching style in Higher Education.

2. Related Works

Fisher et al. [1] pointed out that most traditional data mining methods or data analytics developed for a centralized data analysis process may not be able to handle big data. This can help produce teams discovering large, real-world usability issues while supplementing laboratory techniques that tend to focus on smaller, more isolated problems. So, this research supports the way for teaching/learning role.

Athanasios et al. [2] study how is the value potential of Big Data of recent years and what will be the development in the near future. Finally, they are analyzing the learning benefits from Big Data and Open Data giving a brief description of how these technologies can

contribute to a renowned education system. It helps teachers and students make more targeted choices in the sector of education.

Laney [3] presented a well-known definition of 3V's to explain the meaning of big data: volume, velocity, and variety. This paper aims to analyze the volume which refers large amount of data set, and to access the velocity refers the fast speed to access and variety means the various data format such as text, audio, video, etc. So, the usage of big data is important in the educational sector due to these reasons and benefits. More resources should be directed into big data, because it will completely improve learning outcomes, student performance, and teacher effectiveness.

3. Impact of Big Data in the Education

Universities, Colleges, and other educational center require to keep very huge amounts of data related to students and department or faculty. These data can be analyzed to attain their desired knowledge or pattern of the educational institutions. The educational needs for student assessment or student's exam results or the recording courses based on changing educational requirements. In current conditions, big data covers the teaching or learning mechanism system where students will learn in stimulating ways.

3.1. Big Data Education System

The big data education system is a new trend of learning techniques. It is also called E-Learning System. The aims of the E-Learning are to capture and record students or learners in various learning activities. These activities consist of mobile learning, experimental learning, and collaborative learning. It is not like face-to-face learning or classroom learning.

The E-Learning is about learning to interact with learners and share the contents or files each other. It is all documented through the process of Big Data education system. In some Universities, Microsoft Team application from Internet browser or Microsoft Team App is used to teach the subjects to learners/students. The teachers can share these data from databases. After the big data storage, comes the analytic processing [4]. The system that is called Learning Management System (LMS). Big Data conveyed to education makes customized education possible.

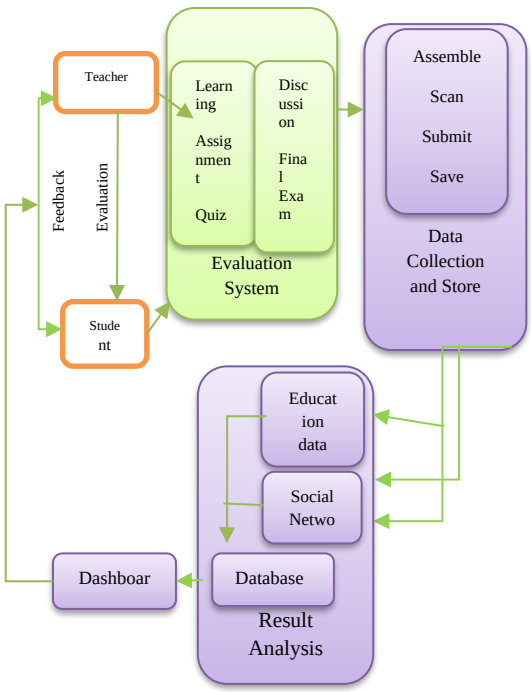

Figure 1. Flow chart of big data education system

3.2. Three Dimensions of Big Data

The three dimensions of Big Data are described as follows:

3.2.1. Volume

Big data is being made in terms of hundreds of terabytes, or zeta byte and etc. The data size is the data generated or available to education. The volume of data in LMS or the records become higher. For example, the volume of data size such as teaching notes, files need to our teaching material for our educational institutions.

3.2.2. Velocity

The rate of making of data is termed as velocity of data. It is seen that data is being generated at exponential rate. The digital being generated is massive and is awesome. It is relating to the characteristic of volume more times needed to process it. The speed is growing when the new data is generated and moves. The velocity or speed is essential to submit our data quickly.

3.2.3. Variety

This is a size of varied data signs like text, audio, video, images. Some of varied data are structured, semi structured and unstructured forms of data. These are dealing with the characteristic of volume, velocity and variety for the accuracy and potential value of Big Data. In teaching, it is created a video clip for lessons with better than audio. Several of type of data are also used as a multimedia format.

4. Teaching/Learning Process Using Big Data

In educational area, the highest impact on student learning depends on the pedagogical methods applied by a teacher or the structure of a course. Big data analytics can give teachers and students the quality of learning experience. Traditionally, education is located within physical boundaries of universities or other educational establishments to get degree level. But in case of current condition, teachers or educators and students won't need to learn in the physical layer and we can learn virtually in a real world.

We can learn all things by using mobile devices on the Internet. In the information age, most of people can get knowledge anywhere, anytime. The life of educator is like a life-long learning process. There are three ways of teaching/learning process by using big data analytics.

4.1. Measure, Monitor, and Respond

All teachers can measure and monitor their students' ability by online learning tool. They can also respond to the students based on the feedbacks by examining assessments. Big data analytics allows a teacher to evaluate, assess, and respond, in real time to a student's understanding of the subject. All educators or teachers change their teaching styles that can adapt the student needs. Adaptation to analytics would lead the institution to be more intentional, intelligent with data and evidence [5]. Before final grade is delivered, they should monitor and respond their pupils' condition. It is important that teachers and students will collaborate with each other for improvement of students' ability.

In most of Universities, it has been currently prepared to teach faculty subjects on online. Microsoft Team Application is applied for the purpose of teaching, learning and sharing.

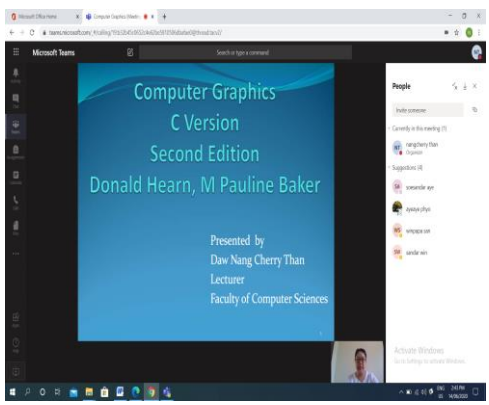

Figure 2. Online teaching using video meeting.

Figure 2 shows the online teaching of computer graphics course with slide share by using Microsoft Team software. The following figures demonstrate that teacher uploads their teaching subject, assignment and makes an appointment for discussion on calendar date/time.

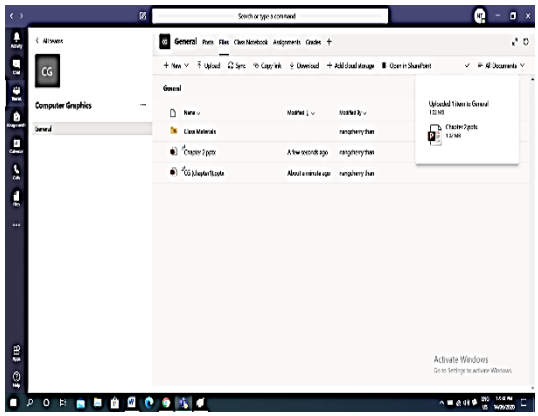

Figure 3. Upload the file preparation for learning.

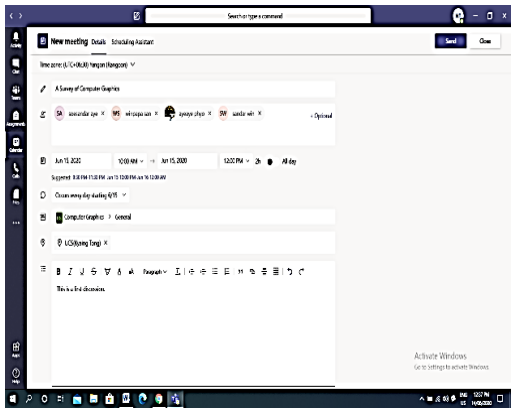

Figure 4. Appointment for assignment with due date.

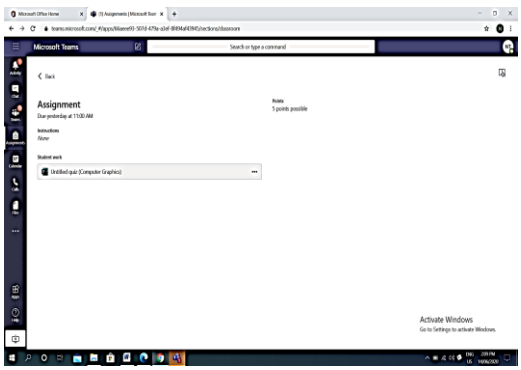

Figure 5. Assignment has been prepared for the group.

4.2. Personalize the Learning Practice

The teachers will create the courses interesting for their students based on different levels of understanding.

Introduction courses can often provide students with different levels of fundamental knowledge. Using data analytics to understand for the student who is struggling can allow to offer different materials for each student within the same course. This will improve student interest in the subject, and indicate to whom and when specific learning content should be delivered. In Figure 6, it shows the students' assignment status to view by teacher. The teacher will respond on their status to what extent students can absorb their lessons.

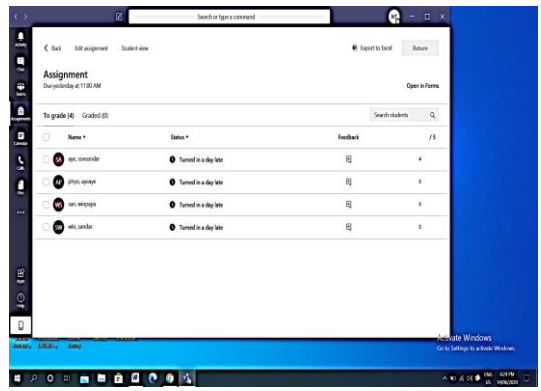

Figure 6. Students result after submit their assignments.

4.3. Design a New Course for Online

A challenge for Universities, is to understand quickly what industry needs and to deliver a curriculum to meet those demands.

Big Data Analytics can be used to understand market and employment trends and to organize introductory courses and fundamental learning principles around emerging ideas in the real world. Figure 7, shows the Computer Graphic subject course aimed to teach and share by online teaching.

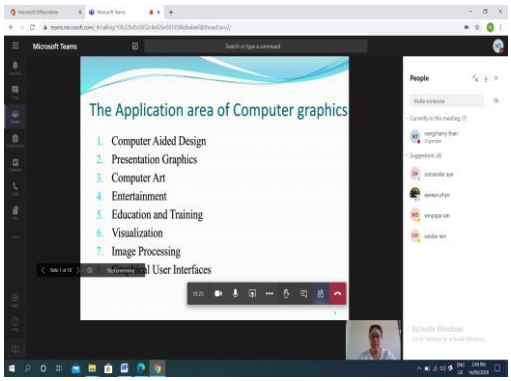

Figure 7. Lectures file (computer graphics course) sharing to the group.

4.4. The Results of Big Data Analytics in Teaching Mechanism

This section presents the outcomes of big data analytics in teaching mechanism.

Big data is the complex process of examining large and varied data sets—or big data—to uncover information including hidden patterns, unknown correlations, market trends, and customer preferences that can help organizations make informed business decisions.

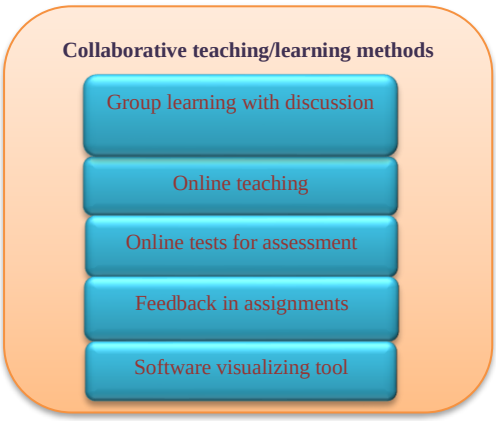

Figure 8. Teaching/learning mechanism

In order to provide new perceptions on this research, this paper is used a qualitative approach to explore this new teaching mechanism. It analyzed this teaching mechanism based in a comprehensive qualitative study using websites, online press articles, social media channels to capture advanced teaching and learning approaches and identify value plans.

Figure 8 shows the collaborative teaching-learning mechanisms that are discussed in this paper. They are: group learning, online teaching, online test for assessments, feedback in assignment, and software visualization tool. In most Universities, Microsoft Team is applied as a software visualization tool with an official account. These mechanisms are used effectively in university with new syllabus.

4.4.1. The Outcomes of Mechanisms

This mechanism helps students to promote themselves with new methods when compared with traditional teaching techniques. This makes student to understand critical topics easily with discussions held in the classroom. According to this mechanism, a troubleshooting question has been given by the teacher to the students. The teacher asks them to resolve the question and find out the solution individually.

After solving the question, the teacher asked each student to compare their results with nearby student (making a pair) and discussed their methods to find the appropriate solution. Finally, one of the pairs in class came-up with a solution and explained it to whole class. It is hope that the outcomes of this mechanism will be a good result for teaching and learning because of the need for online learning or e-learning during the pandemic Covid-19.

5. Conclusion

Big Data creates new trend to improve the education process by helping teachers and learners make smarter decisions earlier in the learning development. Developments, in using data science to drive process improvement, are growing fast. We are seeing almost daily the creation of new tools and apps to help students and teachers make an efficient use of their time. Technology has always been an important part of our practice. This paper tends all educators to know the effective and efficient usage of Big

Data in Higher Education sector. The teaching/learning mechanism will transform to a new normal form of technology on Web with incremental and radical changes.

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