

Utilization of Educational Data Mining for Classifying and Predicting Students' Performance, Dropouts as Well as Teachers' Performance

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Abstract

This research study has aimed to analyze the importance of educational data mining on the performance and efficiency level of teachers and students. Presently, in the competitive world, several organizations are utilizing educational data mining to enhance the performance of the educational institute to stay competitive among the competitiveness in the universities. The implication of data mining has supported the students to enhance their efficiency level through enhancing their knowledge base. On the other hand, the implication of educational data mining has also supported the teachers to track the performance of the students.

As a result, they support the teachers to provide effective training and development classes to the students who are facing difficulties in the understanding of a subject. However, in this research study, the researcher has utilized a secondary qualitative method of data collection to collect the data regarding the research topic. In addition, the secondary sources of data have been collected from verified articles, websites, journals, and Google scholar to justify the aim of this research study. In the data analyst part, the research study has provided a holistic view about the way universities are utilizing the data-mining program to enhance the efficiency level of the students.

Keywords

Data mining, educational data mining, students, teachers, technology, and universities.

INTRODUCTION

Presently, in the recent world, the utilization of education; data mining in educational institutes have enhanced up to an extreme level. Due to the potential impact of educational data mining, several organizations are utilizing this. However, the inclusion of data mining in an educational institute can enhance the efficiency level of students as well as of the teachers. As a result, that creates a positive impact on the operational efficiency of the educational institute. The implication of educational data mining can support an educational institute to analyze the capability and potential of a student [1]. As a result, that has created a potential impact on the performance of the students, through enhancing their development process up to **93.51%**. On the other hand, the inclusion of educational data mining in the educational sector has also created a positive impact on the efficiency level of an educational institute by reducing the failure rate of the students. Educational institutes with an effective educational data mining system can reduce the rate of failing students up to **46.21%** [2].

As a result, the educational infrastructure of a country got enhanced, which reflects a potential impact on the development process of a country. In addition, the implication of education has also a positive impact on the efficiency level of the students. As the implication of educational data mining can support the teachers to identify the potential of each student that supports the teachers to give effective classes to the students who are lacking in the

learning process. Moreover, the inclusion of educational data mining can also support the students to identify the percentage of dropouts of an institute. In addition, in the technological world, the inclusion of data mining in the educational system has supported the educational institutes to maintain the essential data of each student that helps the educational organization to track the performance of any student at any time. In this research study, a brief overview will be provided on the impact of educational data mining on the efficiency level of the students and the performance of the students.

The Educational Data Mining Process

Educational data mining is a process that supports an educational institute to enhance the efficiency level of each student through enhancing the performance of the teachers and education system. An appropriate choice of the educational data mining system can create a positive impact on the performance as well as the development process of an educational institute. There are a total of four types of data mining systems available in the process of educational data mining such as *demographic data, perception data, achievement data, and program data* [3]. In order to enhance the operational efficiency of an educational institute, the institute must adopt an effective educational data mining program as per the educational infrastructure of the institute. On the other hand, several organizations such as businesses, healthcare, educational systems, and insurance companies are utilizing the data mining process to enhance the efficiency

level of the education mining process. However, in the context of educational institutes the utilization of data mining is creating an impressive impact on the efficiency level of the institutes.

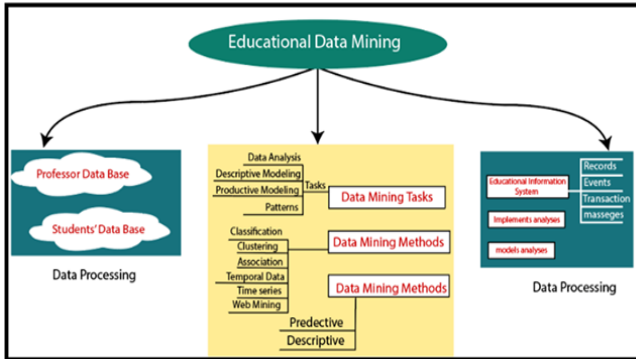


Figure 1. Process of educational data mining (Source: [3])

Several educational institutes are utilizing the data-mining program to enhance the efficiency level of the students through supporting the students to explore new things regarding the subject they are reading. In addition, the process of educational data mining also supports the teachers to forecast the efficiency level of students. That supports the teachers to guide the students in a positive way to enhance their learning outcomes. The inclusion of educational data mining in the educational system can support the students to enhance *their efficiency level up to 93.51%*, which has reduced the percentage of backlog students [1]. However, while considering the positive impact on the process of educational data mining there are also numerous gloomy effects on the process of educational data mining that may create a negative impact on the performance of educational institutes.

As the inclusion of data mining significantly charges a massive amount of resources and money that may create several difficulties in the development process of the educational institutes. On the other hand, the process of data mining is not having a robust security system that might leak the essential information of the students. However, the selection of an appropriate EDM can also be a massive challenge in the development process of the educational system. As there are several data mining tools available with different algorithms and designs that require a potential knowledge base to choose an appropriate data mining tool as per the infrastructure of an organization or educational system. Therefore, through the findings it can be easily stated that the selection of an appropriate process of educational data mining system can create a useful outcome on the efficiency level of an educational institute.

Impact of Educational Data Mining in Institutes

In order to enhance the learning and development process of the students, the inclusion of educational data mining is creating a massive impact on the performance of educational institutes. The implication of educational data mining can

support an educational institute to enhance the efficiency level of each student which indicates a potential outcome on the learning process of the students [4]. In addition, the inclusion of data mining can also support an educational institute to enhance the performance of the students through enlarging their knowledge base.

Presently, in the technological world maintaining the data of each student is being a massive challenge to the educational institutes. Therefore, in order to maintain the data set of the students several educational institutes are utilizing the cloud base data mining system in the educational institutes. On the other hand, the inclusion of data mining in the educational system can also support the students to enhance their learning capability through enhancing the learning process of the students. Through the implication of data mining in educational institute’s students can enhance the learning capability of the students which indicates a positive outcome on the efficiency level of the students [5].

Universities such as *Harvard, Oxford* are enhancing their operational efficiency through the implication of data mining in their educational system. In addition, the usage of data mining in an educational system can support the teachers to enhance their operational efficiency through providing essential knowledge to the students. As a result, it has supported several educational institutes to reduce the percentage of backlog students, which indicated a positive impact on the performance of the educational institutes. The implication of educational data mining in an institute can support the teachers in classifying and forecasting the efficiency level of each student [6]. In addition, it also supports the teachers to track the operational efficiency of the institutes, which creates a positive impact on the efficiency level of the educational institutes. Therefore, through the finding it can be easily stated that the inclusion of educational data mining in an organization can impose a positive outcome on the operational efficiency of an educational institute.

METHODS AND MATERIALS

The selection of an appropriate methodology for a research study plays an important role to conduct a reliable and credible research study. Through analyzing the nature of this research study, the research study has adopted a *positivism research philosophy, deductive approach and descriptive research design* to justify the research objectives. On the other hand, this research study implicated a *Secondary qualitative method* to collect the valuable data regarding the impact of educational data mining on the performance of an educational institute from secondary sources of data collection method. Conclusion of a secondary quantitative method in a research study can support a researcher to collect the valuable data regarding the research topic from generating graphs and charts from the data of verified websites and articles [7]. In addition, the secondary sources of data have been collected from Google scholar, Pro Questa, verified articles and peer reviewed journals from 2017 to 2021.

RESULT AND FINDINGS

The result of the data mining process is generally used to enhance the development process of an educational institute. However, as shown in the previous part the inclusion of educational data mining is creating a potential impact on the efficiency level of the learners through enhancing the learning process of the students. Sometimes students need alternative learning skills to enhance their efficiency level, in that context the utilization of educational data mining creates an impressive impact on the efficiency level of the learners [8]. In addition, the inclusion of educational data mining has enhanced the efficiency level of the learners up to 93.51% that indicates that the students are getting beneficial impact on their performance through the usage of EDM.

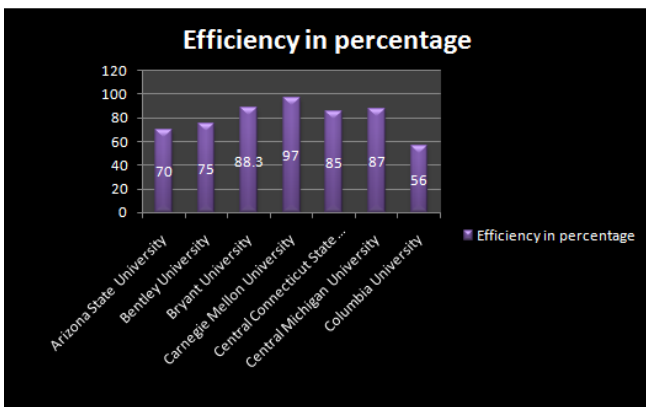


Figure 2: Efficiency level of the universities with data mining
(Source: 8)

As shown in figure number 2, universities with effective educational data mining are performing in a significant manner. As a result, the universities are ranked as one of the most efficient universities across the globe. In addition, the students who are graduating from these universities are scoring better marks than the universities without an effective educational data mining program. On the other hand, the inclusion of data mining is also creating a negative influence on the development process of the universities. The utilization of EDM charges a massive amount of expenses and maintenance cost of the EDM is also comparably higher than the normal educational system. However, these organizations have managed to resolve the challenges of the educational data mining; as a result, that has created a potential outcome on the efficiency level of the students of those universities. Through identifying the weakness of each student these universities are providing the needed resources thus the student can gain a better overview about the subject they are lacking.

On the other hand, presently in the competitive world every educational institute is prone to enhance their operational efficiency to increase the percentage of successful students of the organization [9]. In addition, in the context of the admission process the utilization of data mining has created a revolutionary impact, as the inclusion of

data mining gives several potential impacts on the efficiency level of the universities. The implication of data mining in the educational institutes has supported the administration to identify the students that need more attention [10]. As a result, that creates a positive impact on the reputation of the universities as well as on the performance of the students. Moreover, the implication of data mining can also support the administration of a university to identify the students who need scholarships to continue their education. Through providing the scholarship to students those are in need the universities have reduced the dropout percentage of the students up to 6.33% [11]. Therefore, through the finding it can be easily stated that the inclusion of educational data mining has created significant outcomes on the performance as well as on the development of educational institutes.

CONCLUSION

Presently, in the competitive world every educational institute wants to enhance their operational efficiency thus they can stay competitive in the competitive world. However, the inclusion of data mining created a positive influence on the efficiency level of the educational system through enhancing the performance of the teachers. As shown in this research study, the inclusion of data mining has supported the universities to enhance the success rate of the students that has created a positive impact on the admission process of the universities. However, the implication of educational data mining has also supported the teachers to identify the weakness of each student that helps the teachers to give essential classes to the students facing difficulties to understand a subject.

On the other hand, as mentioned in this research study, the inclusion of educational data mining is creating a positive impact on the performance of the learners through enhancing the efficiency level of the learners up to 93.51%. Conversely, the utilization of educational data mining has also reduced the percentage of dropout students through providing scholarship and essential classes to the students. Therefore, through the findings it can be easily concluded that the inclusion of educational data mining has the potential to enhance the performance of teachers as well as the efficiency level of the learners.

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