A Critical need for Application of DWM in Educational Domain

Nida Parkar
Computer Department,
ACE, Mumbai

Bhavna Arora
Computer Department,
ACE, Mumbai

Tejal Rachh
Computer Department,
ACE, Mumbai

Archita Dad
Computer Department,
ACE, Mumbai

Abstract— Data warehouses can serve the purpose of extraction of information for data-driven decision support systems. Single view of information is provided using warehouse and data across the organization is standardized . Decision makers can use the data stored in data warehouses. Application of a data warehouse for educational institute is the less focused area since educational institutes are non-profit and service oriented organizations. In current day scenario where education has been privatized and become competitive, institutes needs to be more organized and need to take better decisions. The overall enrollments of students in Institutes are increasing to a count of thousands as a result of increase in the number of branches and intake. The management of these institutes face challenges of meeting the diverse needs of students and complex academic process. Therefore frequent improvements in operational strategies based on accurate, timely and steady information are required to overcome the difficulty of these challenges. For any educational institution the expense of building a data warehouse is costly as it requires data warehouse tools for building data warehouse and data mining tools for extracting data from data warehouse. The current day study provides open source tools to build data warehouse and extract useful information using data warehousing and data mining. In this paper we have explored the need of data warehouse for an educational institute to manage data in organized manner. The study may help better decision making regarding managing large scale of data for educational institutes worldwide.

Index Terms—Data warehouse, data mining, analysis, ETL, BI.

I.INTRODUCTION

In the current day scenario, generating funds for educational institutes for their research and other operational activities is difficult as the funding by the government has been limited to aided institutes only. Data warehouse and mining is a practical way to use data to manage, work, and assess educational institute in a improved way. This system could address a extensive range of problems by selecting data from any combination of education records maintenance system depending on the accessibility and availability of the underlying data. Extracting data from data warehouse can be an effective way for making the institutional system work in a better and organized manner. A data warehouse is a subject specific, incorporated, non-volatile, and time variant collection of data which will be useful to support management decisions [1].Data warehouse acquires the data from a number of operational database systems which can be based on DBMS/RDBMS/ERP package, etc. The data from these sources are converted into a form suitable for data warehouse. This process is called Extraction, Transformation and Loading (ETL). Apart from the target database, there will be another database called the metadata repository which stores the metadata. This database should include data about data-description of source data, target data and how the source data has been modified into target data.

II. MOTIVATION

The neccessity for building and implementing data warehouse for the educational institute was considered because of several factors like incapability of present day operational systems to provide information required for various analysis and other factors like competitiveness in the market. A survey has been carried out by visiting several educational institutes to gather information about the current practices the institutes have implemented as decision support systems. The findings are summarized below.

1) The data is stored in diverse sources in scattered locations.
2) Users find trouble in locating the reports required by them.
3) The user interface for the current operational system is not adequate and is baffling and difficult to use for decision makers.
4) When the combined report from two or more different subject area is required, it is almost impossible to make.
5) Getting assistance is a difficult task.

Implementing a decision support system to use data to manage, operate, and evaluate educational institute is a proactive way for better running of the institution. Depending on the accessibility of the underlying data, such a system could address a wide range of problems by selecting data from any combination of education records maintenance system. The entire purpose of this paper is to examine existing system of information delivery and propose a better system for timely, accurate, consistent information delivery to the decision makers of the educational institutes.

III. LITERATURE REVIEW

Following section briefly describes the different application areas for which data warehouses are built.

A. Retail Sales

Data is gathered at several places in a grocery Stores. Customers products data is collected at the cash counters for further references. Now-a-days barcode scanning is most popular technique in grocery stores which directly stores data into the point_of_sale system. The POS system is used to keep track of the grocery store items sold to the consumers. Another entrypoint is where vendors make deliveries to the grocery stores[8]. At the grocery store, logistics of ordering, stocking, and selling products are taken into consideration while maximizing profit. Offers provided on pricing and promotions play a very important role in marketing and management strategies. Teams handling store marketing and management spend a great deal of time tinkering with pricing and promotions. In such scenarios, data warehouses come to rescue.

C. Transportation

In this case, the frequent travel activity details of the travellers is analyzed througha customer travel programme detail. For eg. The department keeps check on seeing which trains the company's frequent passengers take, which trains they travel in what basic fare they pay, how often they upgrade, how they earn points. These requirements details can be fulfilled by data warehouse.

D. Education

There are various efforts to be taken in the area of data warehouse for building data warehouse focussing education domain. Current facilities and databases affect the chosen data warehouse that brings them together to shore up decisional activities leading the whole university environment, including administrators, faculties and students. The choice to develop a devoted system is mainly forced by the unusual information type that defines the basic information in data warehouse widely different from institution to institution .In the article titled 'What academia can gain from building a data warehouse' by David Wierschem, et.al [11].The authors have recognized the opportunities linked with developing a data warehouse for an academic environment. They begin by focussing what a data warehouse is and what its detail contents may include, related to the academic environment. Next thing focussed is the present environment drivers that provide the opportunities for utilization of a data warehouse and some of the obstacles restricting the development of an academic data warehouse. At the end, the article provides strategies to develop a data warehouse useful for an academic institution.

IV. DATAWAREHOUSE ENVIRONMENT

Implementing a decision support system to use data to manage, operate, and evaluate educational institute is a proactive way for better running of the institution.

Depending on the accessibility of the underlying data, such a system could address a wide range of problems by selecting data from any combination of education records maintenance system. The data mining carried out on the data warehouse can be a proactive and useful system for the decision makers.. Fig. 1 shows the data warehouse architecture of a College taken into consideration where source systems are smart campus, asset management server and csv files, the information is scattered over various platforms, data from distinct sources is gathered and then used to produce required report. ETL activities are performed to take out the data from various sources and load into staging and then load the data into dimension and fact tables as per the schedules. Further we make the BI report from data warehouse based on requirement from the management. In any educational institute, the data required will be regarding key constituents of the education institute like student information, employee details and infrastructure. The purpose of this paper was to study current system of information delivery and proposing a better system for well-timed and exact information delivery to the decision makers of the educational institute.
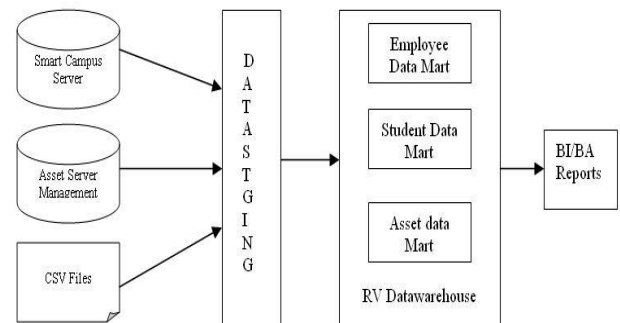

Fig. 1. Engg_Data warehouse architecture

Data warehouse allows the decision takers with the following benefits listed below.

1) Exceptional improvements in turnaround time for data access and reporting.

2) Data across the organization is standardized to get a better view of information.
3) Integrating data from different sources of information to create a complete information source.
4) Costs are summary to produce and give out information and reports.
5) Encouraging & improving truth-based verdict making.

V. BI-REPORTING

This refers to the variety of capabilities that can be provided to the users to leverage the presentation area for analytic decision making. All data access tools query the data in the data warehouse presentation area. A data access tool can be as simple as an ad hoc query tool or as complex as sophisticated data mining application. The majority of the users use pre-built parameter driven analytic applications to access the information. Enabling them to recover the required data and study unseen pattern in the

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retrieved information [11]. Data mining techniques, are useful so that the information can be retrieved from the data warehouse. Data mining form three key components of the institute, namely Employees, Students and Infrastructure. Employee information mart can give the users with the data such as career uplift and attrition rate. Student mart can provide the data related to the student like best outgoing student considering his academic and non academic activities. Information regarding assets such as the venture in a particular working year can also be accessed.

VI. RESULTS

Once the data warehouse is deployed, it always becomes a mission-critical submission. Users depend on the information data warehouse to offer them with the information they need to use properly. To make sure that the ETL procedure runs and completes, it must be vigorously verified and supported. Some of the solutions seen after questioning the data marts are listed below. The final outputs are verified with the solution specified by the dissimilar types of users. The supplies with regard to asset data were to retrieve the data regarding the no. of assets of different type of the Institute. The various data marts are queried by using SQL query. The final output returned by the queries are established correct and meeting users demands. The model screen shots of queries and the outcome are shown.
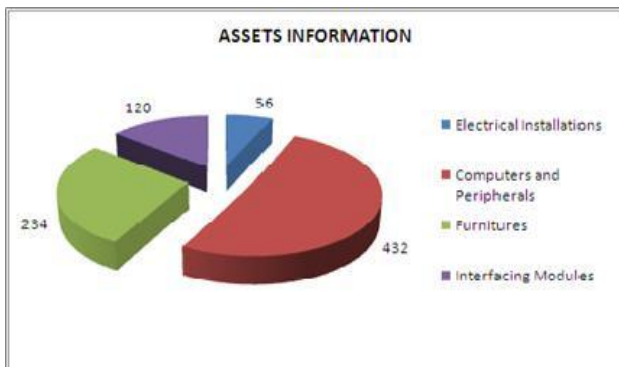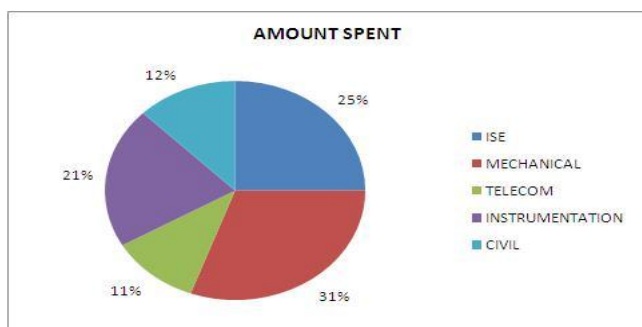

Fig. 2. Assets Information

Fig. 3. Amount spent

Fig. 2 gives the asset data of the institute which are electrical installations, computers and peripherals, furniture's and interfacing modules.

Fig. 3 gives amount used on different department viz EE, MECHANICAL, TELECOM, INSTRUMENTATION and CIVIL. Fig. 2 and Fig. 3 are results from asset mart
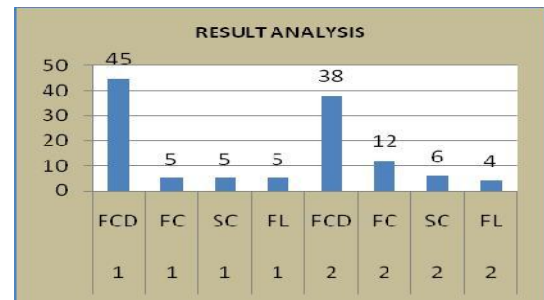

Fig. 4. Result Analysis

Fig. 4 shows the detailed result analysis which shows number of students who have obtained different classes; this is the output from student mart

VII. CONCLUSION

A data warehouse project can be extremely difficult. The analysis of the achievement of the data warehouse scheme is completed considering the monetary profit against the deposit. The academic information which was spread all across various sources has been uploaded into one platform. In any educational institute, the data required will be regarding key constituents of the education institute like student information, employee details and infrastructure. Employee information mart can offer the users with the data such as career growth and erosion rate. Student mart can provide the information connected to the student like best outgoing student considering his academic and non-academic activities .Data related to assets such as the asset in a particular financial year can also be accessed. In educational institute, conclusion makers ask "What are the predictable outcome and payback?" when making a data warehouse project rather than "What is the expected revisit on asset?". We can perform widespread study of stored data to offer solution to the extensive queries to the administration. Which helps them to formulate Various strategies and policies for employees and students. Making decisions becomes easy. The ultimate profits of the new policies made by the decision makers and policy planner's wide way study on student and employee linked data.

Over all 80 to 85% of decisions are made based on the information regenerated by the above proposed system. The productivity is about 85% in real.

VIII. FUTURE SCOPE

The improvement that can be carried out on the current system is the execution of the real time ETL system. It refers to the software which moves information one after the other into a data warehouse with few important things-within minutes of the implementation of the business transaction. Execution of data warehouse refers to a new generation of h/w, s/w and techniques. confine, change, and Flow (CTF) is a comparatively new group of information incorporation tools designed to simplify the movement of real-time data diagonally mixed database

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technologies. The alteration functionality of CTF tools is naturally basic in assessment with today's advanced ETL tools, so real time data warehouse CTF answers include transferring information from the working environment, slightly changing it with the CTF tool and then staging it.

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