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A PATH FOR HORIZING YOUR INNOVATIVE WORK

AN OVERVIEW OF DATA WAREHOUSING AND OLAP TECHNOLOGY FOR AN EDUCATIONAL INSTITUTION

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Abstract: Data warehousing and on-line analytical processing (OLAP) are essential elements of decision support in Educational Institution. This paper provides an overview of data warehousing and OLAP technologies for an educational institution. There are various tools to handle educational institution data in which OLAP tool is one of the way for users to visualize information at different levels according to requirements.

Keywords: On-Line Analytical Processing, Data Cube, ELT (Extraction, Transformation And Loading), Data Warehouse.



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INTRODUCTION

During recent years, universities have become more and more dependent on the collection, storage and processing of educational data. The huge amount of data stored in educational databases is increasing rapidly. The educational databases contain hidden useful information with many important factors related to the student's learning and performance. Since data obtained by any business processes commonly provide predictable clues about the future performances of systems that guide long-term investment plans for the assessment and restoration of process, this data should be safely stored while still being easily accessible for further analysis. To provide top level management in the institution with information about and going insight into the existing data is the key function of the data warehouse systems, in order to make more informative decisions without interrupting the daily work of an On-Line Transaction Processing (OLTP) system.

The idea of OLAP to resolve problems that arise from the application of operational systems for decision support. OLAP is treated differently from online transaction processing (OLTP) with regard to the size, complexity, applicability, and time horizon of relevant data. Typically, OLTP focuses on day-to-day activities such as order entries and bank transactions which store specific values for individual fields [1]. On the other hand, OLAP handles values which represent a historical view of the entity over an extended time horizon.

1.1 Need and Importance

A need of data warehouse and OLAP Technology for an Educational institute that aims at supporting top level management by providing them different views for the same old piece of data. Data warehousing and on-line analytical processing (OLAP) are essential elements of decision support, which has increasingly become a focus of the database educational Institution. OLAP is a useful tool since it reinforces the process of performance and analysis evaluation that is required within all levels of educational environment. Decision support places some rather different requirements on database technology compared to traditional on-line transaction processing applications. Various steps for developing and building the data warehouse system are shown; with special focus on how to customize it to the Educational institute [2].

2. Related Work:

An Overview of Data Warehousing and OLAP for an Educational Institution. The paper introduced by Shaweta(IJCSIT) International Journal of Computer Science and Information Technologies, (2014), the proposed approach covers a need of data warehouse for an Educational institute that aims at supporting top level management by providing them different views for the same old piece of data. Different steps for developing and building the data warehouse system are shown, with special focus on how to customize it to the Educational institute. The main concepts of the data warehouse are reviewed first, and then its importance for the Educational institutes. Also this paper addresses issues related to building and maintenance of a data warehouse for the Institutions.

Boon KeongSeah, MIMOS Technology Park Malaysia, Malaysia (2014) IEEE this paper describes government bodies are enhancing their decision making capabilities using data warehouse. For government bodies, data warehouse provides a means by enabling policy making to be formulated much easier based on available data such as survey-based services data. In this paper we present a survey-based service data with the design and implementation of a Data Warehouse framework for data mining and business intelligence reporting. In the design of the data warehouse, developed a multidimensional Data Model for the creation of multiple data marts and design of an ETL process for populating the data marts from the data source. The paper introduced by Payame Noor University(2014), the many advantages that this system provides for training centers, there are still many problems in the use of these systems and many questions remain unanswered feasibility study of factors influencing students' success and success in attracting students and decision making in order to increase the efficiency of resource allocation issues that are causing challenges for managers and other professionals in the areas of teaching and learning. Business intelligence strategies and analysis of online tools can be used in order to overcome these problems. In this paper, research on business intelligence, analytical databases, and how to investigate online processing system (OLAP) data analysis will be educational environments. The paper introduced by ManjunathT.N, Ravindra S Hegadi. The proposed model evaluates the data quality of decision databases and evaluates the model at different dimensions like accuracy derivation integrity, consistency, timeliness, completeness, validity, precision and interpretability, on various data sets after migration. The proposed data quality assessment model evaluates the data at different dimensions to give confidence for the end users to rely on their businesses [3].

3. Proposed work:

3.1 Building the educational institution

- A) Data Sources which covers different sectors in Institution.
- b) Record of student's intake in various courses in registrar office of institute. Record of industrial visit in TPO office. Information about each faculty qualification and skill record, Information of various accreditations and affiliation record at different time interval.
- 1) Guest faculty visit records.
 - 2) Data about cultural and technical or Faculty Development Program (FDP) events. The data about hostels and catastrophic events is found in hardcopies format, so it needs for data entry step before going on its design as a DW cube. The next step in our approach to build Institution DW is initiated by helping users to put their requirements. A set of discussion sessions were held to extract the requirements from the anticipated users.

3.2 Extraction Loading (ETL)-Transformation-

ETL comprises a process of how the data are loaded from different source systems to the data warehouse. Currently, the ETL encompasses a cleaning step as a separate step. Extraction-Transformation-Loading (ETL) tools are a category of specialized tools with the task of dealing with data warehouse homogeneity, cleaning and loading problems. ETL processes take place on the incoming data from data sources that have to be adapted and formatted before being inserted into the target data warehouse [4]. Data Cleaning aims at finding and removing duplicate records, detecting inconsistent, wrong data, and manipulate sources of errors found in data.

3.3 Data Warehouse Using Multidimensional Cube Structure

Data warehouse using multidimensional cube structure designs to create different data structure. The information that is stored in a data warehouse databases are kept of what is far more important and more valuable. All information contained in data warehouses organized the first ever to be kept united and organized. This repository of information from all sources and are collected in a long period and therefore the amount of data is enormous. In a data warehouse, the information must vary in a specific structure to store transaction processing environments , as well as the need to access information using suitable methods .For this purpose, data warehouse using multidimensional cube structure designs different data

structure is created .For example, data stored in the warehouse for registration of the education system as shown in Figure 1, registered students , semester , course registration and tuition rates of the different aspects considered most cases , this have a hierarchical include semester Date and term of the school year.

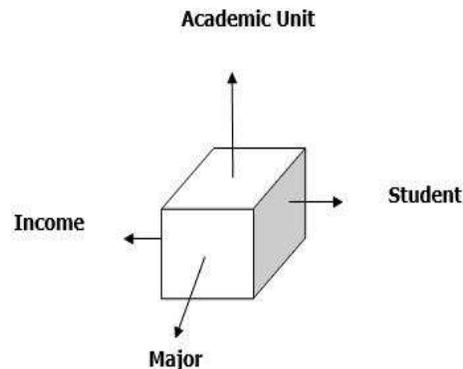


Figure 1. Cube of income enrollees' university education system

Star schema:

Common schema, star schema where the warehouse with a central table called the fact table contains a large amount of data without repetition and smaller tables called dimension tables are defined.

Snow flake schema:

The snow flake scheme, a type of star schema where some dimension tables are normalized and therefore further divide the extra tables are separated from the next table.

Galaxy schema:

In complex applications to share a dimension, it is necessary to require multiple fact tables. These guys set your star schema or a system is therefore called galaxy schema. This allows you to us the dimension tables are shared between different facts tables. After creating a data warehouse logical design data mentioned three methods to turn the physical design of a database management system is implemented. Data warehousing technology, a set of concepts and new tools that provide information to members of the Knowledge Workers in executive decisions, will help managers and analysts [5].

3.4 On-line analytical processing (OLAP)

Various tools can be used for data storage, information processing. This is one of OLAP data analysis tools that are currently three different types of OLAP are defined as follows:

Multidimensional OLAP systems (MOLAP)

Because of the special structure of these systems store information faster than other models, and instead of being stored in the data record to the Keys, have designed specific databases as the data into a sorted array of store data. This system is a multi-dimensional tables with indexes and tables of actual data-intensive storage and complex analytical queries are executed in minimum time. This tool will speed up the database size is relatively small [6]. These data establish a framework to store and retrieve relational databases are based on the optimization of a relational database is based on the ground that ROLAP systems in the framework of the traditional model Relational OLAP operations are organized and therefore slower than MOLAP systems, need more space.

Hybrid OLAP systems (HOLAP)

The hybrid combination of ROLAP and MOLAP in order to have a large database and has higher efficiency than ROLAP. HOLAP systems are implemented in the form of interstitial portion of the data in the tables are maintenance intensive and take part in a relational space so have the benefits of both models. Online processing systems evolved from the online transaction processing systems (OLTP) are in line with the rapid processing of multidimensional data is used to analyze the data. Using the reporting system of education, student enrollment, finances and the like using a multidimensional data much faster than the system acts OLTP [7]. For example, multi-dimensional database systems as shown in Figure 2 can be annual tuition university education with courses Number of Courses and 'income and education in University of to the cross.

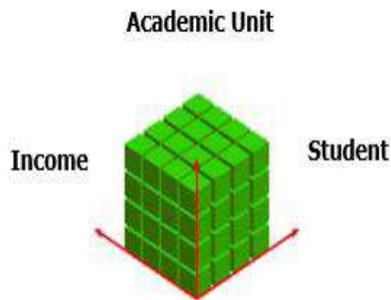


Figure 2. Part of the education system to calculate earnings per academic unit OLAP cubes using comprehensive data models, queries, efficient and fast data presentation and summary tables are the perfect alternative. Complex calculations in cubes are easily and improve the quality of training data analysis.

4. CONCLUSION

Now a day, education system is changing. In every transaction of educational institute online processing is used for convenience and time saving. Using OLAP cube, efficient and fast data representation is possible. The academic data which was spread all across different sources has been loaded into single platform. OLAP technique helps to make precise decision in data analysis over the data store in the data warehouse.

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