ISSN 2347 - 3983
Volume 8. No. 4, April 2020
International Journal of Emerging Trends in Engineering Research
Available Online at http://www.warse.org/IJETER/static/pdf/file/ijeter53842020.pdf
https://doi.org/10.30534/ijeter/2020/53842020

Student Absence Attendance Fine using Data warehouse System

Haryo Pramanto[1], Candra Setiawan[2], Abba Suganda Girsang[3], Roni Jhonson Simamora[4], Melva Hermayanty Saragih[5]
[1]Computer Science Department, BINUS Graduate Program – Master of Computer Science, Bina Nusantara University, Jakarta, Indonesia 11480,haryo.pramanto@binus.ac.id
[2]Computer Science Department, BINUS Graduate Program – Master of Computer Science, Bina Nusantara University, Jakarta, Indonesia 11480, candra.setiawan@binus.ac.id
[3]Computer Science Department, BINUS Graduate Program – Master of Computer Science, Bina Nusantara University, Jakarta, Indonesia 11480, agirsang@binus.edu
[4]Universitas Methodist Indonesia, Medan, Sumatera Utara, Indonesia, ronimor4@gmail.com
[5]Management Department, BINUS Business School Undergraduate Program, Bina Nusantara University, Jakarta, Indonesia 11480,:melva.saragih@binus.ac.id

ABSTRACT
University ABC is a college that produce fresh graduate student who ready to give contribution in industries. They are expected to be having a character, skilful, expert and competent in their study. To accomplish that, the student attendance system are quite strict. Students will get fine for their late or absence at the end of the semester. The problem is the system is still manually managed. It is hard for the student to know their absence status, how much fine that they must pay in real time. The head of study program and head of study majors are also hard to track the problematic student which has a lot of absence attendance. To answer their problem, we proposed the solution using data warehouse development which was first proposed by Kimball for student absence attendance fine at University ABC. This data is analysed using OLAPto provide data visual such as dashboard or report. With this solution, University ABC can process and present the report of Student Absence and Attendance Fine relatively faster.

Key words : Business intelligence, fine, student absence, OLAP.

1. INTRODUCTION
University ABC is a higher education institution established to meet the needs of professional human resources in the industry, both service industries and manufacturing industries. Learning in University ABC applies the National Curriculum(Kurnas) professional education responsibly supported by professional lecturers. The system consists 55% theoretical and 45% practice which is applied harmoniously to produce graduates who are professional and meet industry qualifications.

To accomplish the needs of professional human resources in the industry, the student attendance system is quite strict. Student will get fine for their late or absence at the end of the semester that they attend. This student attendance systems are made to make the students more disciples and train them to meet the schedule on time like the need of professional human resources in the industry. The problem in the school is still manually managed. It is hard for the student to know their absence status, how many fine that they must pay in real time. The head of study program and head of study majors are also hard to track the problematic student which has a lot of absence attendance.

To answer their problem, the solution is proposed using data warehouse development for student absence attendance fine at University ABC. Data warehouse is developed using Kimball and Ross method which consists nine steps [1]. Business intelligent is then developed by using OLAP and display in report or dashboard. This system makes University ABC can provide the important data regarding the Student Absence and Attendance Fine relatively faster. The complexity of OLTP ERD also will be reduced when the system uses data warehouse and OLAP analysis. Students, head of study programs, and study majors are also get the benefit of getting the information of student attendance using the dashboard and the report. They also could get the insight of problematic student that need to discipline. Kimball lifecycle method is one of famous method to build data warehouse[2]. It was used in many applications and many cases.

2. PROBLEM STATEMENT
Each universities want to improve their system to improve the efficiency [3] Data warehouse is very useful to analyze the organization system by providing the reporting to get the useful decision. This system is built to see the detail of Student Absence Attendance Fine at University ABC. By building this data warehouse, the school can get the insight for taking decision [4]. The strategy of building this data warehouse by define the field count value and modelling dimension [5][6]. This system uses the online transactional

process (OLTP) to capture the transaction which is transferred into data warehouse system. The OLAP can be performed by using some queries and aggregate data [7] [8] [9].

3. METHODOLOGY

3.1 Data Source Transaction

Student absence compensation system is a system which captures the data transaction. It can be used a raw data for develop the data warehouse. A subsystem of the student attendance system that are previously managed to mainly count only the attendance to determine whether a student may continue the study, eligible to attend exam or not, and so forth. The student absence compensation system also could count the student absence attendance fine but still uses the OLTP not the OLAP analysis. So it should be complex using a query. The ERD of the student absence compensation System could be seen in Fig 1 .

3.2 Star Schema Model

Determining the star schema model helps building the data warehouse further[10]. The snowflake scheme is implemented because there are some specific in lecturer's role. This lecturing roles and the lecturers data can't be stored in one dimension table because one professor may have several role such as Class Supervisor, Head of Study Programs, and Head of Majors.

3.3 Extract Transform Load

The input comes from student absence system which represents as an OLTP database as seen in Fig. 1. Data warehouse database is designed by generating the star schema as shown Figure 2. The process changes from OLTP database into data warehouse database is called extract transform load (ETL). It will rename, extract OLTP data into information needed on data warehouse system. It will be store in dimension tables or fact table [11] [12] [13]. This process uses Pentaho Data Integration tool.

Fig 3shows ETL of student dimension, Fig 4shows ETL of semesters dimension, Fig 5shows ETL of lectures dimension, and Fig6shows ETL of study programs dimension.

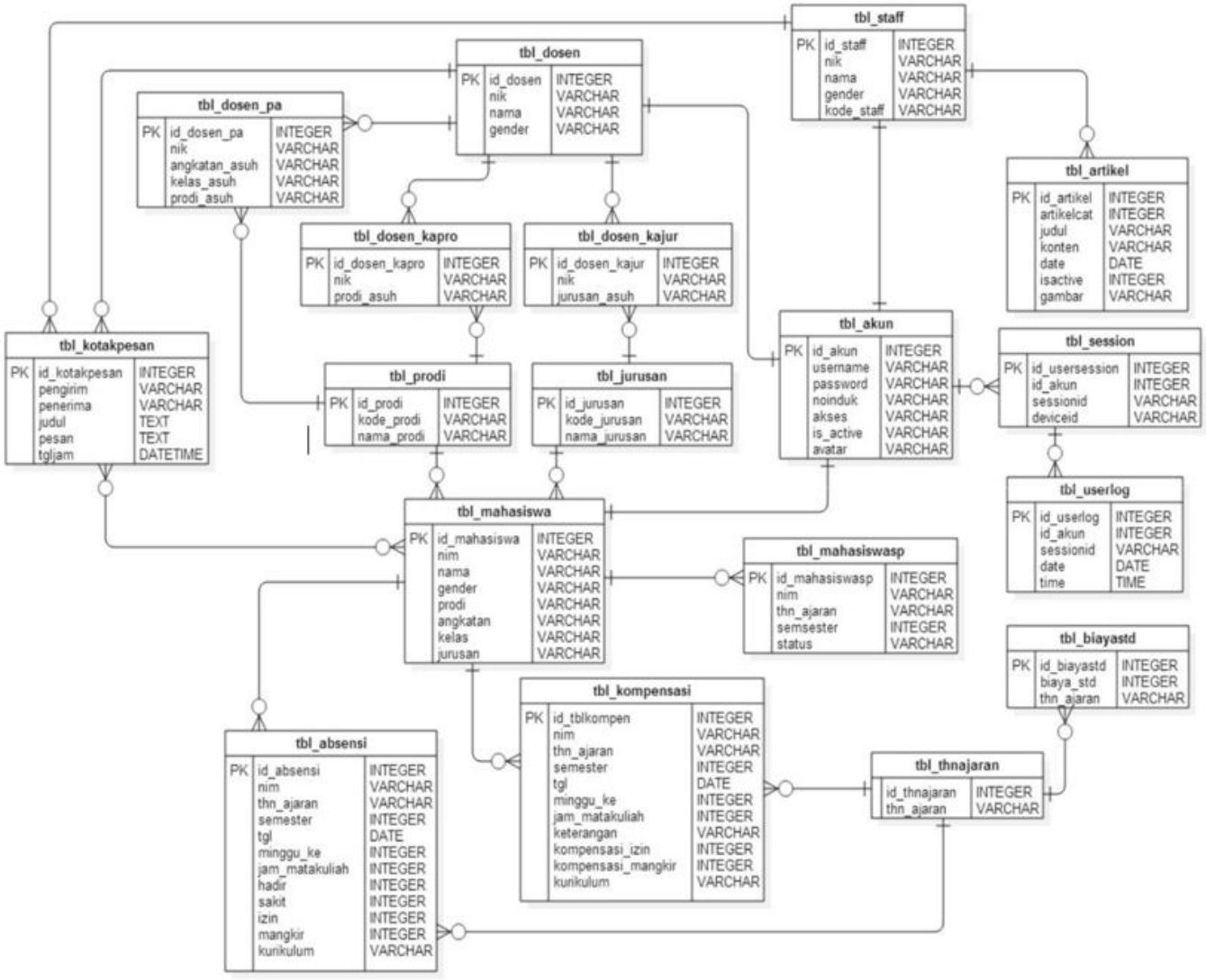

Figure 1: Entity relationship diagram (ERD) of student absence compensation system

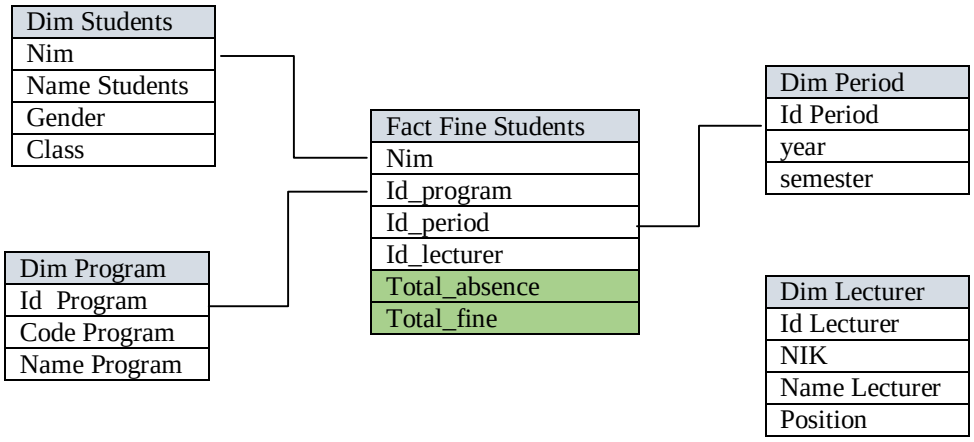

Figure 2 Star Schema for fine system

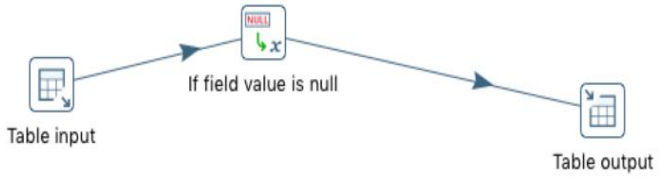

Figure 3: ETL of student dimension

Figure 4:ETL of period dimension

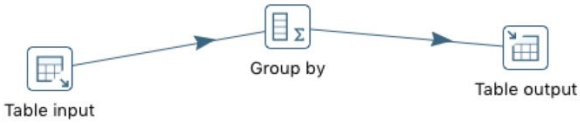

Figure5:ETL of lecturers dimension

Figure 6: ETLof programs dimension

Rank of Students Absences

Total (menit)	Name	Study Programs	Class	Year
34335				
2340	LATIP MULYADIN	TI	B	2013
2205	RUSYDA NABILA	TI	B	2013
1890	DANANG SEPTIADI	TI	B	2013
1710	APRELA LAREFA	TMJ	A	2013
1665	AULIYA HANIF	TKJ	B	2013
1575	ANNISA GUSVIANY MAUDY SALIM	TI	A	2013
1440	ATIKAH HAZARAH	TKJ	A	2013
1080	BAGUS TRIHANDOKO	TKJ	A	2013
1080	MOHAMMAD RAMADHAN MONOARFA	TKJ	A	2013
1035	RAHMAT IBRAHIM	TKJ	A	2013
990	DELLA ARNINDA PUSPITA	TKJ	B	2013
990	HABIBULLAH SHALIHUDDIN	TKJ	B	2013
990	RUMAISHA MAKKIYAH	TMJ	A	2013
765	NICOLAUS ERNEST MAMONTO	TM J	A	2013

Figure 7 : Rank of students absence based on duration

Rank of Supervising Professors

Total (Minutes)	Professor Name	Study Program	Class	Year
34335				
9135	Nur Fauzi Soelaiman, S.T., M.Kom	TI	B	2013
8730	Yoyo Sabar Waluyono, S.S., M.Hum	TKJ	A	2013
7020	Drs. Abdul Aziz, M.MSI	TKJ	B	2013
4860	Dewi Yanti Liliana, S.Kom, M.Kom	TMJ	A	2013
3240	Iwan Sonjaya, S.T., M.T.	TI	A	2013
720	Prihatin Oktivasari, S.Si., M.Si	TI	A	2014
630	Dewi Yanti Liliana, S.Kom, M.Kom	TMJ	A	2012
0	Anita Hidayati, S.Kom, M.Kom	-	-	-
0	Defiana Arnaldy, M.T.I.			

Figure 8: Rank Of Supervising lecturers

August 30, 2018 @ 12:23

Laporan Denda Mahasiswa

Semester Ganjil Tahun Ajaran 2014/2015

Jurusan Teknik Informatika dan Komputer Politeknik Negeri Jakarta

angkatan 2,014

semester 1

nim	nama	prodi	kelas	total_denda	total_ketidakhadiran
4314010003	DZAKIYYAH HANIFATULQOLBI	TI	A	0	0
4314010005	FARHAN FADHLI DZIL IKRAM	TI	A	0	0
4314010007	INTAN DYAH KOMARAWATI	TI	A	0	0
4314010010	JIHADA AMALIA	TI	A	0	0
4314010012	MUHAMMAD AZMI K	TI	A	0	0
4314010014	NABILA KHALDA LILIPALY	TI	A	0	0
4314010016	PATRICK MARSHALL	TI	A	0	0
4314010017	RETNO WIDIANTI	TI	A	0	0
4314010019	TIMBO HIDAYAT SIREGAR	TI	A	2,000	45
4314010020	YESNIDA APRILIANTARI	TI	A	0	0
4314010024	ELSA OKTARIZA	TI	A	0	0

Figure 9: Students Absences and Fine Report

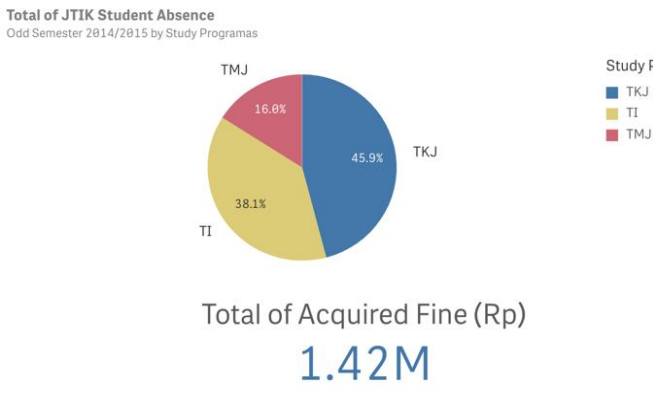

Figure 10 : Pie chart percentage of students absences

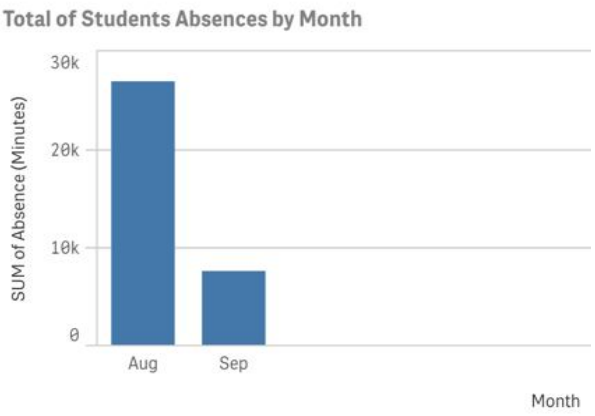

Figure 11: Bar chart number in minutes of students absence by month

.

4. ANALYSIS RESULTS

By using this system, reporting some information can be generated faster. This reports also can be adjusted by controlling some parameters. The reports are generated as shown on Fig 7, Fig 8, Fig 9, Fig 10 and Fig 11. Fig 7 shows the rankof students absence in duration (minutes). The report shows the most absent displayed in the first row Each lecturers supervises some students. The Fig. 8 shows the rank of lectures which have the most absence. This report is expected to help the lectures understand for theirs student absence. Fig 9 shows the detail of student which can be breakdown form their program study. Fig 10 shows the student absence based on their program study. Fig 11 shows the bar chart of student absence in minutes by month. However it can be controlled each year a.

By using data warehouse, a dashboard can be generated to show the insight of the dimension. This dashboard was generated using qliksense cloud by importing csv files of dimension tables and fact table from the OLAP databases. This tool offers some style graph such as pies, lines, and bars pies.

5. CONCLUSION

This data warehouse is developed to offer some important information which is faster than usual to ease taking decision in some important strategy. The Dashboard also could beshown and give some insight for the students, head of study programs and head of major programs know better about the student absences problems. Data warehouse is built by generates some dimensions which are considered as part important information such as students dimension, semester dimension, lecturers dimension, and study programs dimension. This data warehouse can be a fundamental based to generate a business intelligence system

REFERENCES

1. R. Kimball and M. Ross, The data warehouse toolkit: the complete guide to dimensional modeling. John Wiley & Sons, 2011.
2. S. George, “Inmon vs. Kimball: Which approach is suitable for your data warehouse?,” Data Warehous., pp. 1–12, 2012.
3. O.V. Ovchinkin, A.I. Pykhtin, and L.V. Shirokova, “Monitoring system of graduate employment as a factor of improving the efficiency of university educational activities International Journal of Emerging Trends in Engineering Research., vol. 7, issue 12, 2019. https://doi.org/10.30534/ijeter/2019/207122019
4. A. S. Girsang and C. W. Prakoso, “Data warehouse development for customer WIFI access service at a telecommunication company,” Int. J. Commun. Antenna Propag., vol. 7, no. 2, 2017.
5. K. . Chau, Y. Cao, M. Anson, and J. Zhang, “Application of data warehouse and Decision Support System in construction management,” Autom. Constr., vol. 12, no. 2, pp. 213–224, 2003.
6. Q. Sun and Q. Xu, “Research on Collaborative Mechanism of data Warehouse in Sharing Platform,” Indones. J. Electr. Eng. Comput. Sci., vol. 12, no. 2, pp. 1100–1108, 2014.
7. X. M. Luan and H. Jiang, “Design of Books Analysis System in University Library Based on Data Warehouse,” Appl. Mech. Mater., vol. 513–517, pp. 2121–2124, 2014.
8. A. S. Girsang et al., “Decision support system using data warehouse for hotel reservation system,” in Proceedings - 2017 International Conference on Sustainable Information Engineering and Technology, SIET 2017, 2018.
9. R. Jindal and S. Taneja, “Comparative Study Of Data Warehouse Design Approaches: A Survey,” Int. J. Database Manag. Syst., vol. 4, no. 1, pp. 33–45, 2012.
10. X.-N. Shang, L.-Y. Sun, T. Pemg, and C. Liu, “Campus Card Application System Based on Data Warehouse [J],” Comput. Syst. Appl., vol. 21, no. 3, pp. 20–23, 2012.
11. X. Zhou et al., “Development of traditional Chinese medicine clinical data warehouse for medical knowledge discovery and decision support,” Artif. Intell. Med., vol. 48, no. 2–3, pp. 139–152, 2010.
12. K. G. Karimi Namusonge, “Role of Information Technology on Warehouse Management in Kenya: A Case Study of Jomo Kenyatta University of Agriculture and Technology,” Int. J. Acad. Res. Bus. Soc. Sci., vol. 4, no. 11, pp. 2222–6990, 2014.
13. PP. V Nguyen, “Using Data Warehouse to Support Building Strategy or Forecast Business Tend,” arXivPrepr. arXiv1205.0724, 2011.