DEVELOPMENT OF TARUMANAGARA UNIVERSITY TRACER STUDY INFORMATION SYSTEM

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Abstract. A tracer study is a graduate or alumni survey that attempts to track the activities of former students of an academic institution. Tracer Study results can be utilized by universities to find out the success of the educational process that has been done towards their students. In the current tracer study at Tarumanagara University, the data collected has not been optimized for the use of detailed data accreditation and reporting purposes. The process in this application program begins with alumni filling out their identity and a questionnaire. The data that has been entered by the alumni will then be processed so the data can be used for data reporting. The purpose of making this application program is to collect alumni data and establish alumni data reports that can be used for university accreditation on QS Stars accreditation and BAN-PT accreditation. The system development method used in developing this system is the System Development Life Cycle with Waterfall model. This program is designed based on the web using the PHP programming language and using the Laravel Framework. Based on testing conducted on the application and evaluation programs that have been carried out, the program can assist users in managing alumni data and tracer studies as well as producing the required reports.

1. Introduction

The use of information technology at universities is a very important thing in the era of globalization. Every year, universities will certainly produce alumni. Career after graduating from college education will be part of the benchmark for university success. A tracer study is a graduate or alumni survey that attempts to track the activities of former students of an academic institution [1]. Tracer Study results can be utilized by universities to find out the success of the educational process that has been done towards their students [2]. The results of tracer studies will help universities in knowing the position of graduates who have been absorbed in the world of work and prepare graduates by the competencies needed in the world of work. The results of the tracer study which are then reported to the Directorate of Higher Education will assist Government programs to map the needs of the world of work with the development of education in Indonesia. [3]

Tracer study of alumni is one in all the strategic things that has got to be done by every academic institution. There is a minimum of three benefits that will be obtained from the implementation of this activity, that is: 1) Knowing stakeholder satisfaction, in this case graduates, related to the learning experiences they experience, to be used as an evaluator tool for university performance. 2) Obtain relevant input as a foundation for institutional development, related to
the competitiveness, quality, and working experiences of graduates that can be used to seize opportunities and overcome future threats. 3) Improve the relationship of graduates and alma mater, because when viewed from the experience of well-known educational institutions, strong ties of graduates and alma mater will bring many benefits to the alma mater along with the recognition of the gait of graduates in the community [4]

Tracer study conducted at Tarumanagara University can be useful as a component of university ranking such as the QS Stars ranking. Tracer studies can also be used by faculty or study programs for components in the BAN-PT accreditation in the study program or faculty. Data reporting for tracer studies is not optimal and is not well categorized. For this reason, the development of Tarumanagara University tracer study information system needs to be made. This development is carried out to further optimize data usage and produce better data reports.

2. Related Work
There are several studies that discuss tracer study information systems that can help universities track alumni activities after graduation. The first research is designing mobile alumni tracer study with android based. This research using SDLC Waterfall. The expected results of this study are in the form of an android application for alumni search and analysis of alumni data obtained. [4]. the second research using a social network approach to gather the data from alumni. This research aimed at providing support for the system in the form of Tracer Study based multi-platform portal and web mining techniques to capture and process data in order to optimize graduates and with due regard to data security. The development of the program is using PHP, MySQL and some libraries in PHP [5]. The third study is approaching the strategy to manage its firstly integrated tracer study system with two methods: localization and multiple touch points (MTS). Localization is to exploit the emotional relationship between the department and alumni to reach more alumni. MTS is to set more channels to seize data from alumni both offline and online. The aim of the study is to establish an integrated tracer study system (ITSS), which applies the two methods to enhance the coverage of the tracer study.. [6].

3. Method
Software development life cycle (SDLC) is a methodology for designing, building, and maintaining information and industrial systems. There exist many of SDLC models, one of them is Waterfall model, which contain five phases to be completed in order sequentially to develop software [7]. The Waterfall SDLC model is a sequential software development process in which progress is considered as flowing increasingly downwards (similar to a waterfall) through a list of phases that has to be performed in order to successfully build a software [8].

In this application program, there is a calculation of the distance of an alumni company from a university that is used for the purposes of the QS Stars accreditation. The distance calculation uses the calculation of both location longitude and latitude points using the haversine formula. The Haversine formula is an equation important in navigation, giving great-circle distances between two points on a sphere from their longitudes and latitudes [9]. These names follow from the actual fact that they’re customarily written in terms of the haversine function, given by haversine \( \theta = \sin^2 \left( \frac{\theta}{2} \right) \). The haversine formula is used to calculate the distance between two points on the Earth’s surface per longitude and latitude [10].

\[
\Delta \text{lat} = \text{lat}_2 - \text{lat}_1 \\
\Delta \text{long} = \text{long}_2 - \text{long}_1 \\
a = \sin^2
\]
(Δlat/2) +
\[ \cos(\text{lat}1).\cos(\text{lat}2).\sin 2 \]
(Δlong/2)
\[ c = 2\tan 2(,) \]
d = R.c

4. Result & Discussion
From this research, the development of Tarumanagara University tracer study information system was produced which helping the university to trace alumni and getting a required report. The relationship between entity of this application program can be seen in figure 2.

![Figure 1. Entity Relationship Diagram](image)

There are 5 forms of reports that can be produced by this application, the first report is the calculation of the distance of the alumni company with the university whose results will be used in the QS Stars accreditation. The second report is the position of alumni and alumni companies. The next 3 reports are the results of completing the alumni questionnaire, namely the suitability of the alumni work, alumni time to get a job and alumni time to graduate. The three reports are used for BAN-PT accreditation.

The first report is using haversine formula to calculate the distance between alumni company and university. It is used for QS Stars accreditation.
The second report collects alumni position and alumni company data which can then be viewed in graphical form.

The third report shows the suitability of alumni positions with majors taken while at university.
Figure 4. The suitability of alumni positions

The fourth report shows the time of the alumni to get their first job. The data is presented in graphical form.

Figure 5. The time of the alumni to get their first job

The fifth report shows data on alumni’s time spent studying at university. The detail button will display a list of alumni who graduated in that time span.

Figure 6. Alumni time to graduate

5. Conclusion

Based on testing conducted on the application and evaluation programs that have been carried out, it can be concluded that the Development of Tarumanagara University Tracer Study Information System has been going well and can already be used by the University and alumni. This application program has been able to display complete report data and sorting alumni data making it easier for Untar Career to find the required alumni data, which can then be used for accreditation and other purposes.
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