Designing Web-based Database Applications in CV Bahagia

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Abstract. The purpose of this paper are to analyze, and design web-based database system for operational activities, that use to assets storage or company document as well as booking online from client to CV Bahagia. This paper consists of data collection methods which include observation, interview and research. The other method that used for this database design is Database System Development Life Cycle (DSDLC). The results achieved are speed up operational activity CV Bahagia and minimize the chance of fraud in operational activities perpetrated by staff who work in CV Bahagia. To improve the company’s service, it is advisable to develop a live chat feature and custom design for stage and tent from client. So can more easily relate to client and can also fill orders in accordance with the wishes of the client.

Keywords: System, Database, Database System Development Life Cycle, Web

1. Introduction
The development of the current service industry is inseparable from the role of technology. This is reinforced by [1] which explains that the dynamics of business development in the service sector are inseparable from various changes in environmental factors which becomes trigger factors, including increasing needs, desires and even expectations of customers that they want services that can provide solutions (problem solving), drivers of the development of the service industry from technology and globalization factors that provide greater opportunities for business people to go international or go globalization.

Technological advancements have caused enormous changes in the lives of people with all their civilizations and cultures. The study by [2] explains that the advancement of information and technology media has been felt by almost all levels of society, both in terms of positivity and negativity from its use, accessing information and technology media is very easy or affordable for various groups, both young and old, the rich or middle class.

According to [3] promoting products or services using a website will be more profitable as well as simplifying the development process and can save costs. Clients are easier to choose products or services without having to come directly to the company. Databases have long been an integral part of the system in running a business, both in its initial form, namely ordinary database files and in their current form, namely an advanced database oriented [4]. The need for information storage and access quickly becomes urgent things for each business or application, as well as the web. Web applications are now paired with databases. Databases are used for a variety of uses ranging from storing usernames
and passwords to official access, to storing user email addresses, and credit card information to facilitate the delivery of products or services and payments. Therefore, a thorough understanding of web security must also include the database layer and most importantly understand how intruders try to enter the application to gain access to parts of the data.

Party equipment rental companies in Jakarta are growing rapidly with competitors as the use of websites such as http://www.berkahtenda.com and https://www.mentarisewatenda.com grows. Clients are given the convenience of viewing, choosing, and renting equipment needed because everything can be done online and not limited to time. The website generally provides a catalog feature that allows the client to see in detail every tool that is leased [5]. Therefore, a system is needed to support the development of the company, namely a website system for company policies that has online booking features, stock items, employee transactions and payroll.

CV Bahagia is a company engaged in services in the form of leasing party tools such as tents, stage, chairs as needed by the client. To deal with global competition, CV Bahagia provides online services to clients. Based on the discussion above, the research aimed to help reduce employee fraud such as replacing invoices from the receipt (the double-bookkeeping system) to increase transparency in the processing of goods and services, processing data, up to the report making process.

2. Research Methodology

2.1 Data Collection

Data collection methods used in this research process include observation, interviews, and questionnaire. Observation is a direct research by observing the business processes of CV Bahagia, and collecting materials related to the problem. Interviews are conducted through two-way communication directly with the parties involved. The last method is through questionnaires which were distributed to all employees of CV Bahagia.

![Figure 1. Stages of Database System Development Lifecycle](image-url)
2.2 Database Design Method
The design methodology used in writing this essay uses 11 stages of the Database System Development Lifecycle [6], as displayed in Figure 1, with descriptions as follows:

1. Database planning is a regulatory activity that allows the stages of the database system development lifecycle to be realized as effectively and efficiently as possible.
2. System definition is to determine the scope and limitations of the database application, and the main point of view. The point of view is very necessary to identify information needed by the user. The point of view illustrates what is needed by database applications from the point of view of certain job roles or from the point of view of the organizational application area.
3. Requirement collection and analysis is the process of collecting and analyzing information about parts of an organization that is supported by a database system, and uses this information to identify needs for a new system.
4. Database design, which consists of three stages, namely:
   a. Conceptual Database Design, which is the process of building a model from the data used in the company and is free from all physical considerations.
   b. Logical Database Design, which is the process of building a model of data used in a company based on a specific data model, but is free from certain Database Management Systems and other physical considerations.
   c. Physical Database Design, which explains how the database will be implemented, basic relationships, document preparation, etc.
5. DBMS(Database Management System) selection involves choosing the right DBMS to support the database system. If there is no appropriate DBMS, the part of the database system development lifecycle will select between the conceptual and logical database design stages.
6. Application design describes how the application design and user interface will be built.
7. Prototyping is to build a working model from a database system. A prototype is a non-normal working model that has all the features needed or that provides all the functions.
8. Implementation is the physical realization of the database and application design.
9. Data conversion and loading is the transferring of all existing data into a new database and conversion of all existing applications to run it on the new database.
10. Testing is analyzing the results of applications and databases created, to find errors or bugs.
11. Operational maintenance refers to observations and maintenance of the database system.

3. Result and Discussion
After conducting observations and interviews with the owners of CV Bahagia, the researchers concluded that there are problems faced by CV Bahagia. Therefore, a web-based database application is designed to help deal with problems in CV Bahagia. The observations and interviews resulted in the conceptual database design consisting the identification of entity types as displayed in Table 1, and relationship types as shown in Table 2.
| Entity Name  | Description                                                                 | Occurrence                                                                 |
|-------------|------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Staff       | Entity that contains data about staff working at CV Bahagia.                 | Each staff has their own roles and responsibilities.                        |
| Client      | Entity that contains data about clients who make transactions with CV Bahagia.| Each client can do a client order.                                          |
| Vendor      | Entity that contains data about vendors that provide tools for CV Bahagia.   | Each vendor has a different item or Purchase Order.                         |
| PurchaseOrder| Entity that contains data about the purchase or rental of stock items to the vendor. | Every Purchase Order owned by CV Bahagia is managed by staff.               |
| Item        | Entity containing data about items leased by CV Bahagia.                    | Each item can be ordered by the client via the client order.                |
| ClientOrder | Entity that contains data about ordering items carried out by the client.   | ClientOrder is created when the client places an order through the CV Bahagia website. |
| DeliveryOrder| Entity that contains data about staff who carry out client order installation and dismantling received by CV Bahagia. | Delivery orders are made by the field after the client orders.              |
| RejectedOrder| Entity containing data about Client Order that was rejected by CV Bahagia. | Rejected Orders are made if there are items that are not fulfilled according to the client’s request. |
| Role        | Entity that contains data about the position held by the CV Bahagia staff.  | Role is used to determine the duties and responsibilities of CV Bahagia staff. |
| CategoryClient| Entity that contains data about the client category registered at CV Bahagia. | The Client category is used to view the client status that is used as promotional purposes. |
| CategoryItem | Entity containing data about the category of items recorded in CV Bahagia.   | Item categories are used to group items according to their categories.      |

Table 2. Relationship Types

| Entity Name     | Multiplicity | Relationship | Multiplicity | Entity Name     |
|-----------------|--------------|--------------|--------------|-----------------|
| Staff           | 1..1         | Handle       | 0..*         | ClientOrder     |
| Staff           | 1..1         | Make         | 0..*         | DeliveryOrder   |
| Staff           | 1..1         | Do           | 0..*         | PurchaseOrder   |
| Staff           | 1..*         | Have         | 1..1         | Role            |
| Client          | 1..*         | Contact      | 1..1         | Staff           |
| Client          | 1..1         | Do           | 0..*         | ClientOrder     |
| Client          | 1..*         | Have         | 1..1         | CategoryClient  |
| ClientOrder     | 1..*         | Involved     | 1..*         | Item            |
| RejectedOrder   | 0..1         | Have         | 1..1         | ClientOrder     |
| DeliveryOrder   | 1..1         | Have         | 1..1         | ClientOrder     |
| Item            | 1..*         | Have         | 1..1         | CategoryItem    |
| PurchaseOrder   | 1..*         | Involved     | 1..*         | Item            |
| Vendor          | 1..1         | Handle       | 1..*         | PurchaseOrder   |

From the conceptual database design stages that have been done, the results obtained are illustrated through the Entity Relationship Diagram shown in Figure 2 below.
After the conceptualization of each entity is designed, the next step is to determine the Candidate Key and Primary Key for each entity, as outlined in the Table 3. The Primary Key is the key attribute of the entity.

**Table 3. Candidate and Primary Key Attributes**

| Entity Name       | Candidate Key                  | Primary Key        |
|-------------------|--------------------------------|--------------------|
| Staff             | IdStaff                        | IdStaff            |
|                   | Username                       |                    |
|                   | NomorTeleponStaff              |                    |
| Client            | IdClient                       | IdClient           |
|                   | EmailClient                    |                    |
|                   | NoTeleponClient                |                    |
| Vendor            | IdVendor                       | IdVendor           |
|                   | NoTeleponVendor                |                    |
|                   | EmailVendor                    |                    |
| PurchaseOrder     | IdPurchaseOrder                | IdPurchaseOrder    |
|                   | TglOrder                       |                    |
| Item              | IdItem                         | IdItem             |
|                   | SatuanItem                     |                    |
| ClientOrder       | IdClientOrder                  | IdClientOrder      |
|                   | NamaClient                     |                    |
| DeliveryOrder     | IdDeliveryOrder                | IdDeliveryOrder    |
|                   | TanggalsPemasangan             |                    |
|                   | TanggalmPembongkaran           |                    |
| RejectedOrder     | IdRejectedOrder                | IdRejectedOrder    |
|                   | TanggalmReject                 |                    |
| Role              | IdRole                         | IdRole             |
| CategoryClient    | IdCategoryClient               | IdCategoryClient   |
| CategoryItem      | IdCategoryItem                 | IdCategoryItem     |

**Figure 2. Entity Relationship Conceptual Diagram**

The diagram illustrates the relationships and attributes for entities such as Staff, Client, Vendor, PurchaseOrder, Item, ClientOrder, DeliveryOrder, RejectedOrder, Role, CategoryClient, and CategoryItem.
Following the assignment of Primary Key for each entity, the process moved to the stages of conceptual database design and logical database design. The result of conceptual database design and logical database design that have been carried out is illustrated in Figure 3.

Figure 3  Entity Relationship Diagram Logical Design

The user interface was then built after the design of the application is completed. To find out how the user interface perform and satisfy the organization’s requirements, a User Interface Testing is carried out and the result is displayed in Table 4 below.
### Table 4. User Interface Testing Result

| Scenario                                      | Test Case                                                                 | Expected Result                                                                 | Actual Result                          | Status             |
|-----------------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------------|--------------------|
| Check login access rights for users who already have a username and password | The username and password entered are not appropriate                      | The system will reject login permissions and display the message "Email or Incorrect Password" | According to expectations           | Success            |
| Client orders                                 | Input order and order amount                                               | The system will display the total price according to the order made by the client. | According to expectations              | Success            |
| Check the stock in the warehouse              | Input items sought                                                         | The system will display the name of the item and the details of the item sought by the user | According to expectations              | Success            |
| Item Input                                    | Fill in the incomplete item input form                                     | The system will reject and display the message "Item Input Form must be filled in completely" | According to expectations              | Success            |
| Available Stock Update                        | Fill in the incomplete item update form                                    | The system will reject and display the message "Item Update Form Must Be Fully Complete" | According to expectations              | Success            |
| Check the Installation Schedule               | Client orders via website                                                  | The system will display the available installation schedule.                    | According to expectations              | Success            |
| Employee Schedule                             | Field staff choose employees                                               | The system will automatically send a report to the owner of the company who does the installation and demolition | According to expectations              | Success            |
| Client Register to get login permissions      | Data is filled in and the format is appropriate                            | The system will receive Client registration and the Client's personal data will be stored in the database and will send a message "register has been Success" | According to expectations              | Success            |
| Client Order Form to get the right to Order   | If all data is not filled                                                 | The system will reject the registration and will send the message "All Data Must be Field" | According to expectations              | Success            |
| Client Order Form to get the right to Order   | Data is filled in and the format is appropriate                            | The system will receive the Order Form and the order form data will be stored in the database and will send a message "data has been Success" | According to expectations              | Success            |
| Client Confirm Payment to complete the Order  | If all data is not filled                                                 | The system will reject the registration and will send the message "All Data Must be Field" | According to expectations              | Success            |
| Client Confirm Payment to complete the Order  | If the email doesn't match the format use of [@] and [.com]                | The system will reject the payment confirmation and will send a message "Please include an @" | According to expectations              | Success            |
| Client Confirm Payment to complete the Order  | If the payment value is not numeric                                       | The system will reject the payment confirmation and will send a message “value of Payment Must be Numeric” | According to expectations              | Success            |
| Client Confirm Payment to complete the Order  | Data is filled in and the format is appropriate                            | The system will receive the Order Form and the order form data will be stored in the database and will send a message "data has been Success" | According to expectations              | Success            |
4. Conclusion
Based on the results of the analysis and design of information systems at CV Bahagia, by creating a web-based database application that will assist in leasing, inventory and purchasing, the conclusions obtained after analyzing and designing the information system made at CV Bahagia are as follows:
1. With the database system already created, the data on CV Bahagia can be organized better and effectively.
2. The new system in CV Bahagia helps booking staff, financial staff, warehouse staff and field staff in conducting company operations.
3. Data is easier to find because it is well organized and the supporting features that are owned by the website such as search and grouping data.
4. The website that has been created makes it easy for the client to place an order and pay online without having to visit CV Bahagia. This finding is evident from

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