



E-Upakara, Bebantenan Learning Information System with Tree Diagram Model

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Abstract

Yadnya ceremony is a religious ceremony when Hindus expressed gratitude to God, to fellow humans, to the *rest*, (priest/teacher), to the ancestors, and to *Bhuta Kala*. The implementation of *Yadnya* is usually accompanied by *bebantenan* (offerings) or *upakara*. Nowadays there are many Hindus especially the younger generation who do not understand about *bebantenan* and *Yadnya* ceremony, because information about *bebantenan* and *Yadnya* ceremony is relatively difficult to obtain. *E-Upakara* system or *Bebantenan* Information System as a part of *E-UpacaraYadnya* System is made to help people learning about *bebantenan*. The tree diagram model is used to illustrate the relations between *bebantenan* and *Yadnya*. *E-Upakara* provides information related to *Yadnya* ceremonies such as the time the ceremony is held, the ceremony procedures, the *bebantenan* used during the ceremony, procedures of making *bebantenan*, videos, and pictures of *banten*. From test results, *E-Upakara* can be accessed with multiple platforms and easily provides information about related *upakara* used in specific *Yadnya* ceremony.

Keywords: *E-UpacaraYadnya*, *E-Upakara*, *Bebantenan* System, web and mobile programming, *tree diagram model*.

1. INTRODUCTION

Researches on the implementation of information technology in Balinese culture and Hindu religion are still relatively rare, especially the ones related to *Yadnya* ceremonies, *bebantenan*, *kekidungan yadnya*, *mantram*, and dances related to *yadnya*. In contrast with the assumption that information technology is something that is very modern, local culture such as Balinese culture and Hindu religion whose followers are relatively few is often perceived as “old fashioned”, causing the lack of interest from Balinese people to combine these two [1].

Yadnya ceremony in Hinduism holds a very important position. The ceremony is a form of religious activity, which is in the form of human activities to strengthen their inner feelings in getting closer to God, to express gratitude, ask for guidance, forgiveness and salvation. The ceremony is accompanied by *bebantenan* (offerings) or *upakara*. Nowadays the form of *upakara* or *bebantenan* is very diverse, apart from many functions and usage, the variety of *upakara* or *bebantenan* is also influenced by the culture and art of local area [2,3].

Hindus in Bali should be able to understand which *bebantenan* is needed in a religious ceremony, because of the widespread use of *bebantenan* or *upakara* in Bali. The understanding of *bebantenan* is not only intended to increase knowledge alone, but can also influence efforts to preserve the culture of Bali. *Bebantenan* needs to be preserved because today there are so many Hindus, especially the younger generation who lack understanding about *upakara* or *bebantenan* due to their complexity. One of the reasons why Hindus are reluctant to make *banten* by themselves is because they don't know which *banten* is used for each ceremony. This is because information about *bebantenan* is still very limited and hard to obtain [4].

One way to help overcoming the problems of understanding religious ceremonies and *bebantenan* is by the development of an information system that gives information related to *Yadnya* ceremony, which is multimedia-based and can be implemented in either web or Android platform. The existing information systems of *bebantenan* related to *Yadnya* ceremony [5,6] and according to types of *banten* [7] already provided information about the making of *bebantenan* for Hindu ceremonies. However, the videos and photos in both systems were ordinary photos and videos that are less appealing to young people to learn. A web-based *Pitra Yadnya* information system [3] has the same problem with existing *Yadnya* information systems, where it's still not integrated between one information system with another. Web-based *Bebayuhan Oton* information system gave the information about the process of *Bayuh Oton* ceremony with the necessary *banten* used, however it still uses only photos and text captions [8]. Tree data structure has been used for modelling on making Android based information systems about *Yadnya* ceremony [9], as well as *Ulam Bebantenan* [10]. The learning media for making *upakara* for the *Nyiramin Layon* procession is designed based on Android by displaying 3-dimensional objects, photos and videos [11]. An Android application using 3-dimensional objects has been developed as a learning medium for *Mendem Ari-ari* ceremony process [12]. Augmented Reality-based application aimed at learning to make *Banten Otonan* has been developed with detailed animations for the making of *banten (Sampian)* items [13].

This paper proposes an *E-Upakara* information system, which is an information system that provides information about *bebantenan* in *Yadnya* ceremony. *E-Upakara* is a part of *E-Upacara Yadnya* application, which is equipped with multimedia such as photos, videos and animations. This paper is arranged as follows. Section 2 describes the methods used. Section 3 discusses the testing result of *E-Upakara* information system. Lastly, Section 4 discusses the conclusion taken from the testing result.

2. METHODS

2.1. *Yadnya*

The word *yadnya* is a Sanskrit language word rooted in the word *yaj*, which means "praying". The word *yaj* eventually developed into *yadnya* meaning offerings. *Yadnya* is all actions that are based on *dharma* (good deeds) and are done sincerely [2]. *Yadnya* consists of five categories (*Panca Yadnya*) which are described as follows.

- 1) *Dewa Yadnya* is a sincere offering to *Hyang Widhi* as an expression of gratitude for his gift of giving life and life to humans.

- 2) *Pitra Yadnya* is an offering to the ancestors as an expression of gratitude for their services in giving birth, raising and maintaining life in the world so that we can become an independent person.
- 3) *Rsi Yadnya* is a *Yadnya* to the *Rsi* or *Sulinggih* (priest) for their services in guiding the people in religious life and as a person who has the duties in completing religious ceremonies.
- 4) *Manusa Yadnya* serves both as ceremonies of celebrating life cycle of a human and as the *Yadnya* intended to help fellow humans.
- 5) *Bhuta Yadnya* is a sacred sacrifice to *Bhuta Kala* to keep the balance between *bhuwana agung* (macrocosms/the universe) and *bhuwana alit* (microcosmos/our world).

2.2. Upakara and Bebantenan

Upakara is a means or equipment used in a ceremony [2]. *Upakara* in general is made of leaves, flowers, fruits, and water in various ways of processing. *Upakara* in Bali is known as *banten* that has similar meaning with *upakara*. The word *banten* implies to awake the presence of memories towards *Hyang Widhi* because he is the creator of this world [10].

2.3. System Architecture Design

The *E-Upakara* system architecture design involves the user (who manages both user data and *bebantenan* data within the web site) and the guest (who can retrieve the *bebantenan* information) as shown in Figure 2.

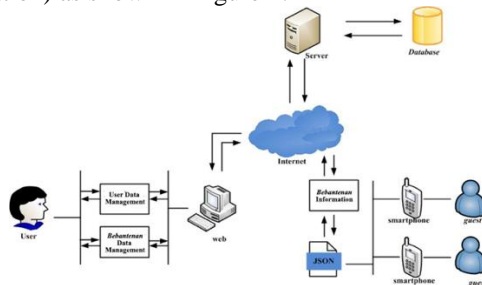


Figure 1. *E-Upakara* information system architecture design

2.4. Tree Diagram Modelling

The Tree diagram is used to describe the general framework of *banten/upacara* information system. Tree diagram usually describes the hierarchy of relations from each element [1]. This modelling is done to understand the relations between one ceremony with another and the *bebantenan* used. *Yadnya* ceremony consists of ceremony group, description, time of execution, level of ceremony, place of execution, *pemuput* (the leader of ceremony process), the ceremony procedures, means of ceremony, video, and pictures of ceremony as described in Figure 3.

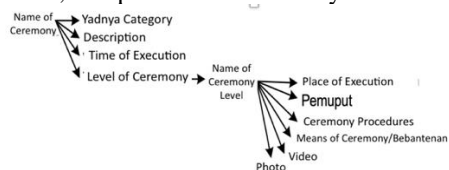


Figure 2. General modelling of *yadnya* ceremony related to *bebantenan*

The *Yadnya* ceremony group describes which group from *Panca Yadnya* the ceremony belongs to. The E-Upakara Information System Tree Diagram is presented in three categories, which are the relations of banten/upakara with Panca Yadnya, the tree diagram of the banten/upakara and their equipment, and the tree diagram of one of the banten/upakara namely Banten Ajuman/Soda.

2.3.1. Tree Diagram of Banten/Upakara Based on Its Properties

The tree diagram of *upakara/banten* has two properties which are the detail of *upakara* and the usage of *upakara*. The detail of *upakara* is then divided into *upakara* description and function, *upakara* equipments, photos of *upakara*, steps of making *upakara*, and video tutorial on how to make *upakara*. The usage of *upakara* consists of ceremony name and name of *upakara*. Based on the research conducted, the tree diagram of *banten/upakara* based on its properties can be illustrated as shown in Figure 4.

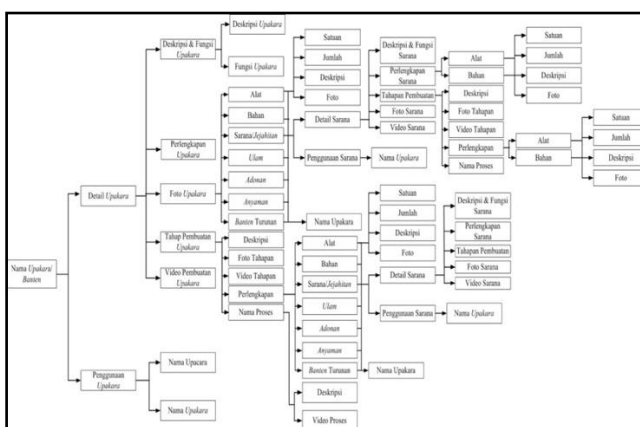


Figure 3. Tree diagram of *banten* and its properties

2.3.2. Tree Diagram of Banten/Upakara Related to Yadnya Ceremony

The relationship between *upakara/banten* and *Yadnya* ceremony is shown by tendencies of *upakara/banten* from each *Yadnya* ceremony to be different. Sometimes the procession of *Yadnya* ceremony isn't held in only one place, but can be held in multiple places. Figure 5 shows the tree diagram of *upakara/banten* related to *Yadnya* ceremony.

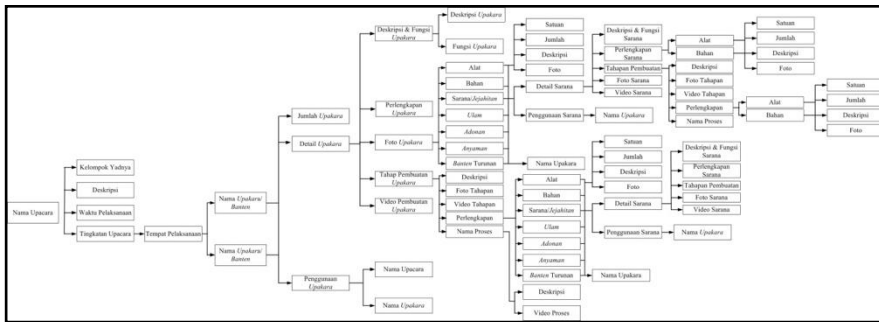


Figure 4. Tree diagram of yadnya ceremony related to bebantenan

2.3.3. Tree Diagram of Banten Ajuman/Sodan

Banten Ajuman/Sodan is one of the upakara used when tangkil (coming) to Pura or become part of other bebantenan. Figure 6 shows tree diagram of Banten Ajuman/Sodan

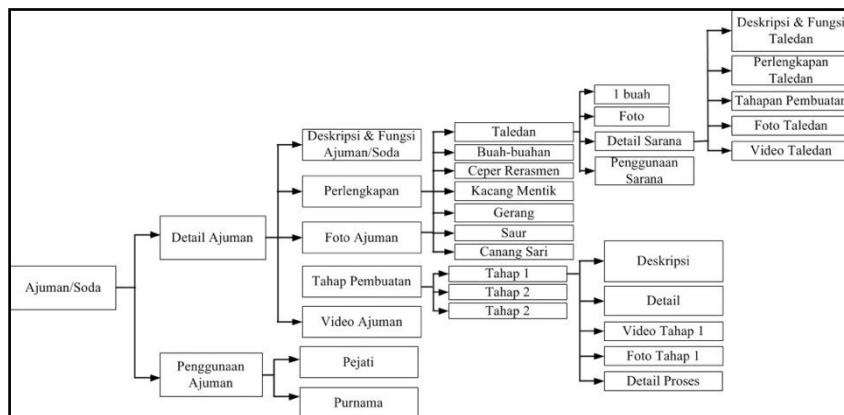


Figure 5. General modelling of yadnya ceremony related to bebantenan

Figure 5 displays the tree diagram of Banten Ajuman/Soda. Banten Ajuman/Soda will be divided into two properties which are Banten Detail and Banten Usage. Banten Detail consists of description, function, equipments, photos, the stages of making, and videos of making banten. The Banten equipments show the ingredients that make up the banten, which are tools, ingredients, ulam, dough, anyaman (matting), jejaritan, and banten turunan. Each equipment will contain the number of equipment needed, the display photo of the equipment and unit. Details about equipment can also be explained. The stages of making bebantenan is explained in the form of a description accompanied by detailed equipment used at that stage, photos, videos and an explanation of the process. The Banten Usage part explains where Banten Ajuman/Soda is used in banten or ceremony, which is in Banten Pejati during the the Purnama ceremony.

2.5. Context Diagram

Context diagram illustrates all the relations of the main entities involved inside the information system [8]. Figure 6 shows the context diagram of *bebantenan* information system.

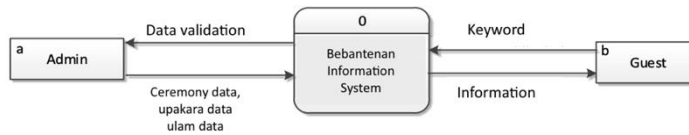


Figure 6. Context diagram of *E-Upakara* System

The context diagram as shown in Figure 6 has two entities, namely guest and admin. The admin entity is able to input data (such as ceremony data, *upakara* data, and *ulam* data) and validate data from the system. The guest entity can find the *bebantenan* information by inputting the *keyword* to the information system, and accesses *bebantenan* information.

3. RESULT AND DISCUSSION

A web-based *E-Upakara* information system was built with CodeIgniter 3. The ceremony, *upakara*, and *ulam* data used for creating the information system were obtained from *Ida Sulinggih* (Hindu religious leaders), traditional elders who understand about religious ceremony, *Banten* makers, and places where *Yadnya* ceremony is held. The data is then stored inside the database, where the CRUD process is able to change the existed data. *E-Upakara* system testing includes data input that is only done by the administrator and feature testing.

In order to access the dashboard page, the administrator must be logged in first. The user interface of dashboard page is shown in Figure 7.

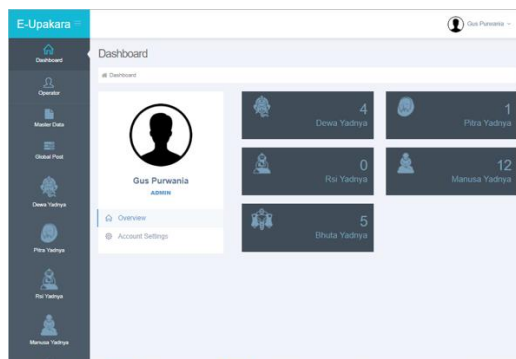


Figure 7. User interface of *E-Upakara* dashboard page

Master data management is a feature available for administrator in *E-Upakara* information system. Administrators have full access rights in master data management. The usage of master data is to add *Yadnya* category and post type. The Master Data functions to add categories from the *Panca Yadnya* such as *Dewa Yadnya*, *Pitra Yadnya*, *Rsi Yadnya*, *Manusa Yadnya*, and *Bhuta Yadnya*. Post type is a

submenu that will appear in each of its *yadnya* categories, such as *Upakara*, *Banten*, *Ulam*, *Uparengga*, *Dance*, *Tabuh* and *Mantra*.

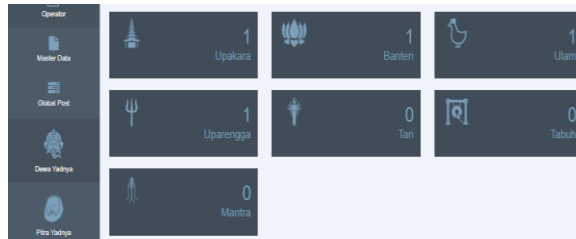


Figure 8. Example of *Yadnya* category in data management
Data Management feature as shown in Figure 8 is available at the main page of the E-Upakara system, where the administrator can input the *Upakara*, *Banten*, *Ulam*, *Uparengga*, *Tari* (dance), *Tabuh*, and *Mantra* from each *Yadnya* category.

No	Nama Upakara	Deskripsi Upakara	Action
1	Segehan	Upacara Bhuta Yadnya dalam tingkatan kecil	Edit Show Preview Delete
2	Caru	Upacara Bhuta Yadnya dalam tingkatan sedang (madya)	Edit Show Preview Delete
3	Tawur Kesanga	Upacara Bhuta Yadnya yang jatuhnya setahun sekali	Edit Show Preview Delete
4	Panca Wali Krama	Upacara Bhuta Yadnya yang jatuhnya setiap sepuluh tahun sekali	Edit Show Preview Delete
5	Eka Dasa Rudra	Upacara Bhuta Yadnya yang jatuhnya setiap seratus tahun sekali	Edit Show Preview Delete

Figure 9. Data example in *Bhuta Yadnya* category
Figure 9 shows the example of *upakara* data that has been inserted into *Bhuta Yadnya* category, which is one of the *Yadnya* categories. This page shows the name of *upakara*, the description of *upakara*, and the actions that can be taken.

Figure 10. Add data form

Figure 10 shows Add Data form in E-Upakara information system. This form is used to add new *Upakara* data. Administrator can input the name of *upakara*, the description, the image of *upakara*, and content that explains the *upakara*. Inside the data content can be filled with additional links to refer to other information, photos, sound recordings, and videos that complete the contents of the information entered.

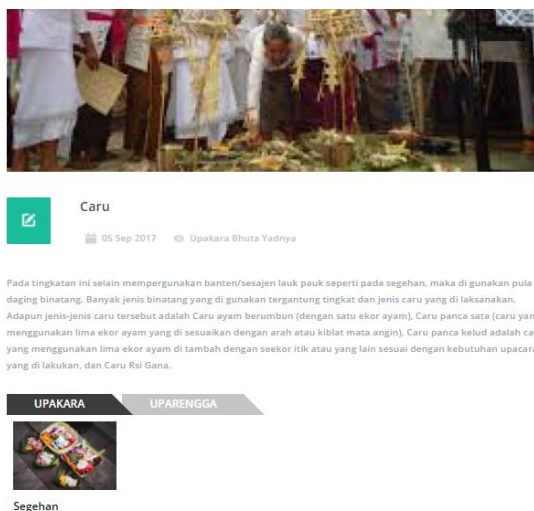


Figure 11. *Upakara* post detail

Figure 11 is the post detail on E-Upakara information system of an *upakara* as seen from the user, with *Caru* as *upakara* used in *Bhuta Yadnya* as an example. User is able to read more information regarding the post by clicking Read More from the main page. The user is able to read and find out if there's another *upakara* related to *Upakara Caru* after clicking the Read More button. Users can also find out about the *uparengga* needed in the *upakara*. If the user wants to read related post to *Upakara Caru*, the user can immediately select the desired post. The user can also share the

post via social media such as Facebook, Twitter, and Google Plus by using the Share feature.

The *E-Upakara* information system can be accessed from both desktop and smartphone. Users are able to easily find out a specific *upakara* from a *Yadnya* ceremony based on the *Yadnya* category, and also understand other *upakara* used in the same *Yadnya* ceremony by looking at the related posts in the *Upakara* Post Detail page. The photos and videos of *upakara* in each post provide a look of how the *upakara* looks like and is made, which makes learning about *upakara* more interesting.

4. CONCLUSION

According to the testing results, it can be concluded that the *E-Upakara* information system can manage the information of *bebantenan* related to *Yadnya* ceremony by using tree modelling as the main model. *E-Upakara* provides information about the description, tools, ingredients, and how to make *bebantenan* in the form of text, photos, and videos. *Bebantenan* is modeled with tree diagram, because each *bebantenan* may have properties that can be symbolized until a certain level of depth. The properties of *upakara/bebantenan* are its group, description, and its relation to *Yadnya* ceremony, where these properties can be applied to all kinds of *Yadnya* ceremony. The user interface of *E-Upakara* information system can be improved to make it more appealing to users, since the current user interface is still quite simple. Future researches on *bebantenan* information system can combine the multimedia files used in *E-Upakara* with three-dimensional augmented reality applications related to *bebantenan* to make learning about *bebantenan* more interactive.

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