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Information system to measure healthy home

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Abstract. Healthy home is very important for human life. Benefit for healthy home will protect householder from man diseases based on environment, to find out the percentage of healthy home conducted by survey by puskesmas officer. Assessment is done by filling the questionnaire by using 3 categories namely the components of the house, sanitation facilities and householder's behavior. These parameters have not been able to assess a house maximally, because it has not involved the habit of householder in involving household waste yet. This study adds three parameters the behavior in processing household waste; drainage; and physical path. These additional parameters have been approved by the head of the health office in Kabupaten Ngawi. Subjects in this study is information system to measure of healthy homes. This research method is conducted by identifying problems, data collection through interview. The process model used in this research is waterfall model while decision making method use analytical hierarchy process (AHP). The research created resulted in a design to measure healthy home determination that can be used as prototype for the construction of decision support system of healthy home determination.

1. Introduction

The home is an important place for the people. It not only affects the overall quality of life but is also a place where many people (especially older) spend a large part of their time. It is self-evident that constantly improving and developing this area of life takes an important role. A step in this direction are the so-called smart home environments [1]. Proper adequate housing is still a big issue in the world today, especially in developing countries including Indonesia. The 2010 National Socioeconomic Survey mentioned that Indonesia was one of the countries with the highest relative minimum wage in the world with the percentage reaching around 65% of the average wage of salaried workers [2]. On the other hand, the dense population of Jakarta, partly due to urbanization, leads to high housing prices. These factors lead to the condition in which middle-to-low income earners have difficulty in buying houses [3].

In 2000 about 25% of all households in Indonesia lived in houses below the ideal size of 10 m2 per person as stipulated by the World Health Organization (Ministry of Environment, 2002). In 2003, the highest percentages for urban and rural areas were in the provinces Papua (52,3%), West Nusa Tenggara (46,2%) and East Nusa Tenggara (50,5%) [4]. In the most densely populated provinces such

as DKI Jakarta and Bali, the percentage reached more than 30% (in urban areas only). During times of economic crisis, less people can afford to buy a house and in fact a substantial part of the community cannot afford to pay housing credit; others have even been forced to sell their houses in order to obtain cash money. The lack of affordable housing has partly led to the development of slum settlements, which in Indonesia amounted to 4 million ha in 1996. These facts show that Indonesian regional governments face difficulties in predicting the increasing or decreasing population numbers and providing an adequate amount of housing facilities, especially in dense urban areas. This condition is worsened by the reluctance of the regional governments to recognize indigenous kampungs, which have been inhabited for many generations, as a formal administrative part of the city. Kampungs inhabitants are commonly people whose income sources is in the informal sector: they possess no certifications for land ownership. It is difficult for these people to obtain such certificates since they lack of proper identification, formal documents and financial capital, which has forced them to build illegitimate settlements.

Studies indicate that housing conditions have a significant influence on the health of the occupants [5, 6, 7, 8, 9]. Furthermore, the effect of high levels of household air pollution on health is much higher among those who spend more time indoors than outdoors. Thus, mothers and young children who are confined indoors after childbirth in dwellings with high levels of household air pollution are a particularly vulnerable group [10]. The importance of view for engendering a sense of wellbeing and satisfaction with the housing environment, as well as for being a therapeutic tool in aiding recovery from sickness, cannot be over-emphasized. By contrast, a gloomy outside environment tends to make people feel shut in or oppressed. Aesthetic satisfaction in the home also will benefit mental health and wellbeing although placing a "health" value on aesthetic considerations that are indeterminate and dependent upon social, cultural, economic and individual factors would be difficult [11].

To know the percentage of healthy home, the usual survey is done organized by a sanitarian puskesmas or an environmental health worker regencies / municipality under the supervision of District Health Office Kabupaten Ngawi. Sampling in conducting data collection takes a long time because the surveyor conducts a large number of surveys. A healthy home assessment should use an appropriate calculation system guideline from the Ministry of Health, but so far, the assessment of healthy homes conducted by sanitarian sanitation officers only based on PHBS (Life Behavior Clean and healthy). The assessment aspect based on the Ministry of Health consists of 3 the main categories are categories of house components, sanitation facilities and householder behavior with some criteria.

Based on the above problems, it is proposed research with the title "Information System to measure Healthy Home". Which method used is a mathematical method that conforms to the technical guidance of the assessment healthy homes, by utilizing the weight of each category obtained based on the number of categories used, the categories are poured in questions in accordance with the addition of criteria.

2. Method and material

The development of computer-based information systems means a revolution to information handling in the construction process. Among the prerequisites of a computer integrated construction process is that:

- information must be structured into computer-based models in order to enable computer-based analyses of the products and processes that are developed,
- the computer must be able to handle information of other objects than buildings, e.g. the user organization, the site, the construction process, and the facility management process,
- information must be standardized in order to be consistent throughout the processes,
- information must be computer based already in the initial processes,
- it must be possible to use the computer as a design tool [12].

Everyone has the right to live a prosperous and spiritual life, to live and to gain an environment living a good and healthy life, as referred to in Article 28 paragraph (1) of the Constitution State of the Republic of Indonesia Year 1945 [13]. Therefore, the state ensures the fulfillment of the needs of

citizens the country of decent and affordable shelter in order to build Indonesian people wholly, self-reliant, independent, and productive. The right to residence is a mandate contained in the Constitution of the State Republic of Indonesia Year 1945 and clearly stated as a human right in the Law Number 39 Year 1999 on Human Rights [14].

Healthy home already described in Regulation of the minister of health of the republic of Indonesia number 39 year 2016 about guidelines for the program of healthy Indonesian programs with family approach. In this regulation mention that family Health Profile (hereinafter referred to as Prokesga), in the form of family folder, which is a means to record (save) family data and individual data of family members [15].

Healthy homes are residential buildings that meet health requirements, that is, houses that have:
- healthy latrines,
- clean water facilities,
- garbage dump,
- waste water disposal facilities,
- good home ventilation,
- appropriate dwelling density
- floor of a house not made of soil [16]

3. Result

This information system method used in the determination calculation Healthy homes are a mathematical method based on home assessment technical guidelines health issued by the Ministry of Health of the Republic of Indonesia in 2002. Use of methods this by utilizing the weight of each criterion that is poured into the form question and grouped into several categories. From the weight obtained each criterion will then be multiplied by the category weight. Multiplication result is summed if the total amount is more than 80% then the house otherwise eligible. From each weight of the criteria, a value has been determined minimum limit. This minimum value limit will affect whether the house is otherwise eligible or not. As for the steps done in assessment in Puskesmas Kendal Kabupaten Ngawi is as follows:
- Determining the data needed. Such as officer data, location data, and data house / KK.
- Determine the categories and aspects used for the assessment. In this case there are 3 categories, namely house components, sanitation facilities and householder behavior.
- Define multiplier weights for each category. Weighting of categories components of houses, sanitation facilities, and occupational behavior categories are interpreted against:

Component of The House	- 12%
Sanitation Facilities	- 14%
Behaviors of The Residents in Healthy Living	- 23%
Behaviors in Processing Household Waste	- 23%
Drainage	- 18%
Physical Path	- 10%

- In the assessment of a healthy house the percentage of health care and heredity ignored.
- Compare to the threshold, when the total score of the data collection obtained greater or equal to (≥) from the threshold, and a house said to not qualify if the total score of data collection obtained smaller (<) threshold.

3.1. Definition phase and needs analysis

The analysis done before building this system is with collection of data on healthy homes. The data obtained is the data in the form criteria determination to be used in the process of calculating the feasibility of the house healthy. The analysis includes input, process and output analysis.

3.2. System and software design phase

At this design stage is carried out the design process which can then be used for system construction. In Figure 1 describes the prototype of a healthy home simulation, there are two users that can interact with the system, i.e. admin and citizens. Admin in question is the health service officer of Ngawi District, where admin can insert weight of healthy house assessment, entering citizen data and entering data of house component, then system give result of healthy house assessment. Furthermore, other types of users are residents of Ngawi District where residents can see the house inhabited whether already included in the criteria assessment of healthy homes or not.
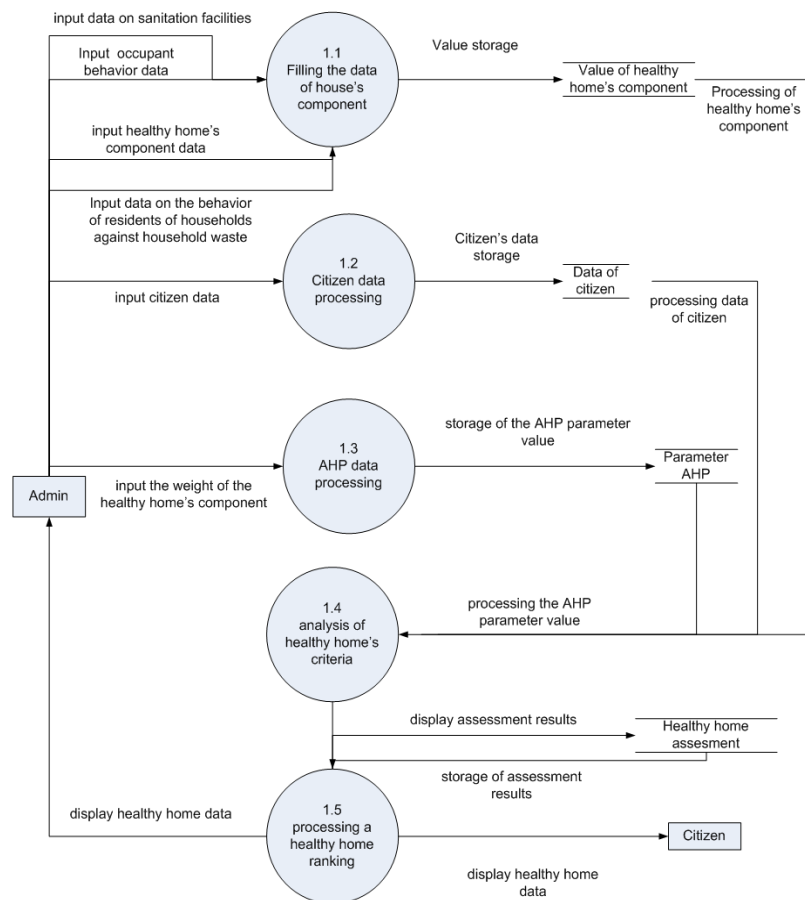

Figure 1. DFD level 1 design healthy home.

3.3. Implementation and review phase

Figure 2 illustrates the view of newly added data in the system, which has Jarsongo data as the village name, then Jarsongo street number 2 as the village address, then the number of houses is still zero (0) since no householder data has been stored, and the can be edited to write down the distinctive features of the village.

Figure 2. Component healthy home.

In Figure 3 the report shows the number of healthy houses in all villages so that the admin can see the healthy number and unhealthy house of rural people in Ngawi District
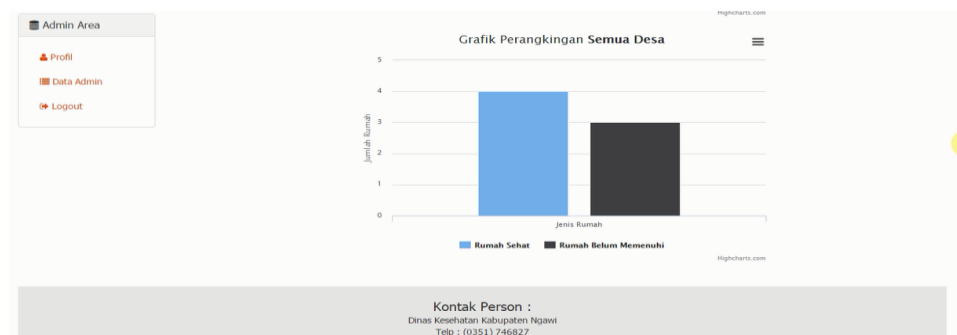

Figure 3. Healthy home ranking view.

4. Conclusions

Based on the results of research and discussion that have been described previously then the following conclusions can be drawn:

- This research has designed a system that can help provide advice, input or consideration in decision making to determine eligibility healthy home.
- Parameter measurement of healthy home in this research developed parameter which have been done by Ministry of health department, which use three parameters namely the components of the house; sanitation facilities; the behavior of the residents in healthy living. This study adds three parameters the behavior in processing household waste; drainage; and physical path. These additional parameters have been approved by the head of the health office in Kabupaten Ngawi.

References

[1]　Koskela T and Vnnen-Vainio-Mattila K 2004 Evolution towards smart home environments: empirical evaluation of three user interfaces *Personal and Ubiquitous Computing* **8** p 234–240

[2]　OECD 2010 *Overview of OECD economic surveys: Indonesia* [Online] Available from: http://www.oecd.org/eco/46266398.pdf [Accessed 3 Apr 2018]

[3]　Baker J L 2012 *Climate change, disaster risk, and the urban poor: Cities building resilience for a changing world* (Washington D.C.: The World Bank)

[4]　Belcher B 1995 Bamboo and rattan production to consumption systems: A framework for assessing development options *INBAR working paper/International Network for Bamboo*

and Rattan 4

[5]   Armstrong J R and Campbell H 1991 Indoor air pollution exposure and lower respiratory infections in young Gambian children *International Journal of Epidemiology* **20** p 424–429

[6]   Bruce N, Pope D, Rehfuess E, Balakrishnan K, Adair-Rohani H and Dora C 2014 WHO indoor air quality guidelines on household fuel combustion: Strategy implications of new evidence on interventions and exposure risk functions *Atmospheric Environment*

[7]   Bruce N, Perez-Padilla R and Albalak R 2000 Indoor air pollution in developing countries: a major environmental and public health challenge *Bulletin of the World Health Organization* **78** p 1078–1092

[8]   Krieger J and Higgins D 2002 Housing and health: Time again for public health *American Journal of Public Health* **92** p 758–768

[9]   Lim S S, Vos T, Flaxman A D, Danaei G, Shibuya K, Adair-Rohani H and Aryee M 2012 A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010 *The lancet* **380** 9859 p 2224-2260

[10]   Smith K R, McCracken J P, Weber M W, Hubbard A, Jenny A, Thompson L M and Bruce N 2011 Effect of reduction in household air pollution on childhood pneumonia in Guatemala (RESPIRE): A randomised controlled trial *The Lancet* **378** p 1717–1726

[11]   Larasati D 2003 *Sustainable Housing in Indonesia, Journal of Global Community Based Housing* [Online] available at http://www.cbhjournal.com

[12]   Eastman C M and Fereshetian N 1994 Information models for use in product design: a comparison *Computer-Aided Design* **26** 7 p 551-572

[13]   Republic of Indonesia 1945 *Undang-undang Dasar of the Republic of Indonesia* (Jakarta, Indonesia)

[14]   Republic of Indonesia 1999 *Undang-undang for human right* (Jakarta, Indonesia)

[15]   Republic of Indonesia 2016 *Regulation of the minister of health of the republic of Indonesia number 39 year 2016 Guidelines for the program of healthy Indonesian programs with family approach* (Jakarta, Indonesia)

[16]   The Ministry of Environment, Republic of Indonesia 2002 *From Crisis to Sustainability: Paving the Way for Sustainable Development in Indonesia. Overview of the Implementation of Agenda 21* (Jakarta: Ministry of Environment, Republic of Indonesia) p 10