

A framework to apply ICT for bequeathing the cultural heritage to next generation

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Abstract. Of course, preservation of cultural heritage is a task given by UNISCO charter, but bequeath the cultural heritage to the next generation is most important. The cultural heritage contains the lost intelligence, displaced by modernization and globalization, but ICT can be a way out although ICT has a negative effect. Based on the component we apply ICT, we derive a framework for applying ICT as core and next generation as consideration scope.

1. Introduction

The cultural heritage is the hidden knowledge in a particular community [1], but modernization and globalization has penetrated into the heart of every culture and change it [2], especially ICT has accelerated the flow of change through the information [3]. The changes prosecute individual by individual in a community be similar between one to another [4, 5].

In the old society or a particular community has existed local wisdom that can deliver a community to next community until their generation today [6]. However, the old culture gradually eroded by a new culture, and old community and their generation are not same [7]. There is the lost intelligence between them. Old community may be heterogeneous, but new communities tend to be homogeneous [8], for example. The other side of ICT is aimed at improving the welfare of the community. It reveal also the hidden knowledge to any people. However, a few of studies have done to implement ICT for bequeathing the cultural heritage of Indonesia to next generation. Therefore, this paper aims to address a framework to develop ICT for bequeathing the cultural heritage to next generation.

2. Basic Concept and Motivation

Cultural heritage is a condition of tangible or intangible knowledge of a community or society that are delivered from past generation, maintained in the present and bestowed for the benefit of future [9]. This condition as an expression of the ways of living that has developed by a community for surviving and existing currently [10]. Arguing that every community has its own challenges, the growing culture with the community itself. In this case, each person has different capabilities, and is able to survive based on that ability [11]. At that time, the competence of each person depends on social activities. However, now everyone pressed to have almost the same competence: They tend to have the same attitude toward both socially and outlook on profits. For example, everyone is not feel perfect life if he/she does not have mobile phone, afterwards get the gadget, and more often alone [12].



All technologies have double-sided blade: negative of positive. Technology as a result of culture will serve to give added value to a community. Meanwhile, technology as a tool tends to ignore the community life but focus on individual life [13]. ICT (Information and Communication Technology) to be a term that includes any communication devices like radio, television, cellular phones, computer and network, hardware and software, satellite systems and others in various services or applications, or it is an extended term for IT (information technology) [14]. ICT is the essence of every life, and provide the main characteristics for layer generations of a community such as z-generation now. Currently, ICT becomes a gateway for the entry of a culture to other cultures. Interacting and build other cultures. ICT however also become the frontline to inform all stakeholders about something [15].

A culture is built from the interaction of environment conditions, the challenges of life, and the approach by human [16]. Therefore, a culture is established by habit, habit comes from the implementation of either by nature or rule force. Approach repeatedly is a way of using force indirectly to change something cultural, such as advertising approach to the consumer via short message service (sms) [17]. So the habit may be generated through the things that are recurring (in frequency of events). An event despite having a single moment, but read many times by a group of peoples (often) cause the community members are forced to change. ICT causing an information about an event can be accessed repeatedly, and then be part of community. Therefore, ICT offers a way to deliver the cultural heritage to the next generation, so that no the loss intelligence from Indonesia.

3. An Approach

To establish a framework for applying ICT to something it is necessary to express the definitions and scope of work. In the scientific culture, the definition is the basis for developing a theory and its application. So the definition of framework is intended to express the basics of the framework and possibilities its application. Therefore, a framework is an abstraction in which something providing generic functionally can be selectively changed by the user based on an approach [18]. In general, a framework for applying ICT has different components as follows [19]:

- a. Stakeholder is social actors related to something.
- b. Content is all records about something.
- c. Processing about converting the raw input into a meaning form.
- d. Management is a group that organize all people for those activities.
- e. Cost of programs is a plan about something for generating budgets.
- f. Facilities and infrastructures are all facilities for succeeding this program.
- g. Test and evaluation are an activity for sustaining this program forever.
- h. Result or product of this program are a system that bridges the relevant stakeholders.

The arrangement of the components based on the relationship between them can be built as Figure 1. A model proposed for preserving cultural heritage, where all the components are denoted in uppercase (A, B, C, D, E, F, G, H), and their relations in symmetric are (A,B), (A,C), (A,H), (B,D), (C,E), (H,G), and (G,F) [20].

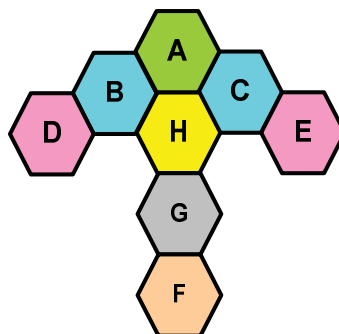


Figure 1. A proposed framework with 8 components

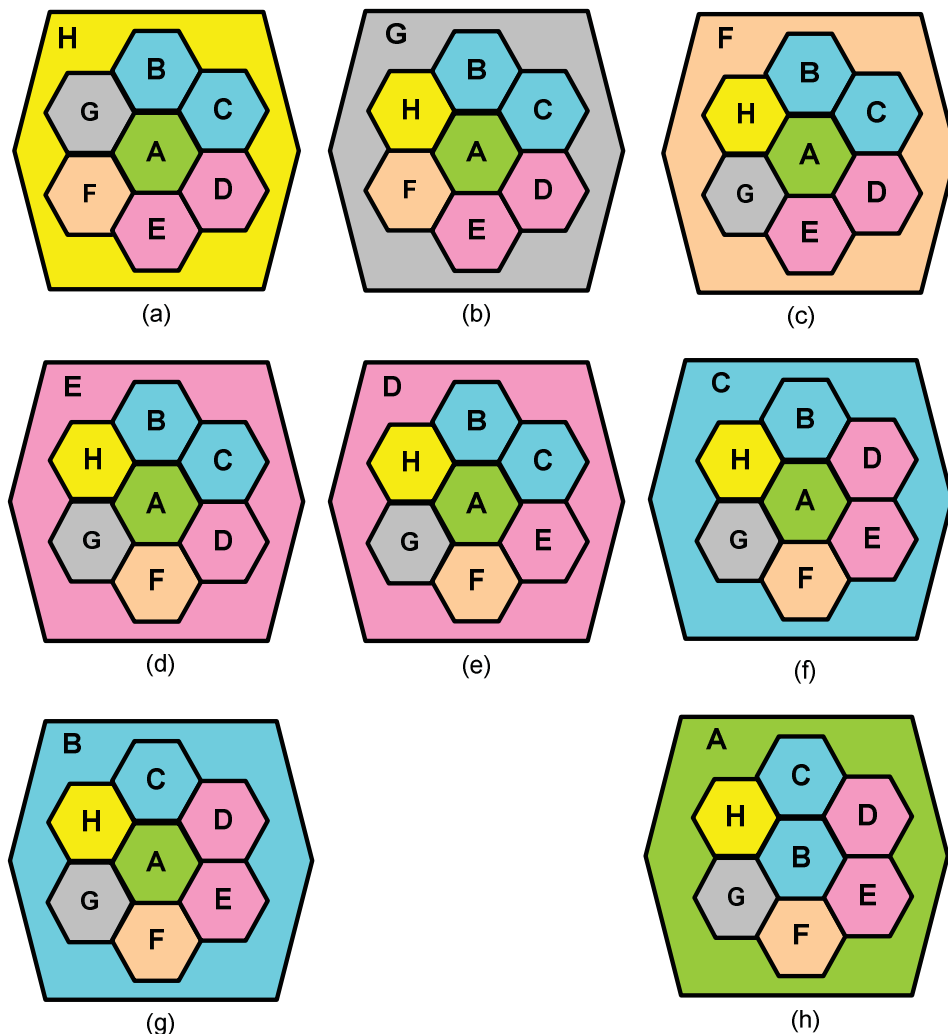


Figure 2(a), 2(b), 2(c), 2(d), 2(e), 2(f), 2(g), 2(h). 8 frameworks with 8 components

4. A Discussion about Relation between Components

We discuss first about the cultural heritage of the area. For example, the cultural heritage in the province of Sumatera Utara. The term Sumatera Utara (North Sumatra) is to refer to an area on Sumatra Island that has its own cultural heritage, where there are 8 communities or indigenous tribes (Melayu, Mandailing, Toba, Karo, Angkola, Simalungun, Pakpak, and Nias) and have the culture that is hardly the same. This can be seen from tangible knowledge: buildings, monuments, landscapes, books, works of art, artifacts; intangible knowledge: folklore, traditions, language and science/technologies; and natural heritage i.e. culturally significant landscapes and biodiversity. Because all exist in Sumatera Utara (*Sumut*) we call the framework as *SumutSiana*: The term is derived from two words. The term *Sumut* is abbreviation of North Sumatera, while the term “*Siana*” means as treasure/treasury or scientific wealth. Therefore, *SumutSiana* is owned as cultural or natural wealth that exists in that provincial, implicates the regional assets consisting of 8 indigenous people [19].

The above definition is the basis for the establishment of a framework to bequeath the *SumutSiana* (as cultural heritage) to the next generation. The framework consists of 8 components [19]:

- a. Stakeholder is either authors or receivers, either individually or a group, or with categories: individual, student, group, functionary, researcher, lecturer, or professor.
- b. Content is all records of: actors or agents of history, local language, art, traditional houses, transportation, lighting and irrigation, customs, religion, environment, flora and fauna.
- c. Processing is a transformation raw input into a meaning form.
- d. Management is about leading for information flow: text, graphics, audio, and video; about historical information: manuscripts, painting, drawings, narrative, investigative reports; about cultural environment, the history of characters or actors, descent and family; about results of mining like scientific papers, imagery, dialogue, and journey.
- e. Budget is cost of this programs.
- f. Facilities and infrastructure are all devices: software and hardware about ICT, or information system: *E-SumutSiana* or *M-SumutSiana*.
- g. Test and evaluation: any software used first tested prior to launch, and then do an evaluation to enhance a system regularly.
- h. Result or product is files about text, video, audio, and database, and then local language dictionary, semantic technology, or media.

In connection with the activities currently undertaken by various levels of society about 8 indigenous tribes, we can see through the frequency of web pages provided by search engines. This information may contain descriptions of components as the cultural heritage of Sumatera Utara [19].

Framework based on the merit of the work focus about 8 components of applying ICT have the combination of components related their relation to be $c(n,k) = n!/(n-k)!k! = 8!/(8-2)!2! = 28$ or for $n = 8$ there are $n(n-1)/2 = 28$ relations between 8 components [21]. If taken one be core and one be the scope of work, then we have 8 arrangements of the components (see Figure 2) where $n = 8$ and $k = 6$. Thus, 8 framework models can be used one of them in accordance with the focus being the development of systems that deliver the information of cultural heritage from stakeholders to system or vice versa. For example, let us focus on ICT like internet and Web, so we consider all components against the facilities and infrastructure: For stakeholder, system should be user friendly to members of stakeholder; About content, the system capable of recording and presenting all information about the content; For processing, the system has ability to process data into information or new meaning; For management, the system can help administrators to manage the entire application about preserving cultural heritage; through the system can be made budget planning for sustaining this application; For test and evaluation, the system is able to tell deficiency, error, and the destruction, and; Statistically the system provide important information on the results or products themselves.

	A	B	C	D	E	F	G	H
A. stakeholder		0.0043	0.0034	0.0008	0.0085	0.0229	0.0095	0.0061
B. content	0.0043		0.2588	0.0192	0.1468	0.4901	0.4183	0.4202
C. process	0.0034	0.2588		0.0061	0.1410	0.4836	0.3676	0.3448
D. management	0.0008	0.0192	0.0061		0.1845	0.4852	0.4966	0.3067
E. budget	0.0085	0.1468	0.1410	0.1845		0.4803	0.3216	0.5994
F. facility	0.0229	0.4901	0.4836	0.4852	0.4803		0.1083	0.0953
G. test	0.0095	0.4183	0.3676	0.4966	0.3216	0.1083		0.2276
H. result	0.0061	0.4202	0.3448	0.3067	0.5994	0.0953	0.2276	

Figure 3. Strength relations between components

Through the information provided in the internet, we can see the relationship of 8 components to disclose any information most widely available and interlinked to develop a system [21, 22, 23], where implementation ICT exists based on this framework, see Figure 3, where frequency of words forms the basis for generating the value of strength relations. Then, the value was sorted from highest to lowest,

and for 9 top relations we have a network whereby component F as root (core) and component A as scope.

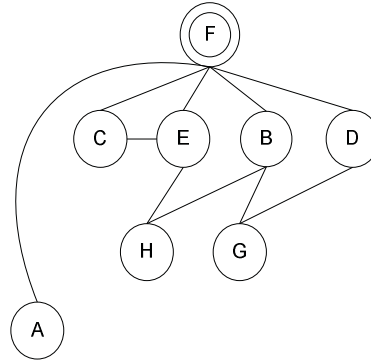


Figure 4. Network of components

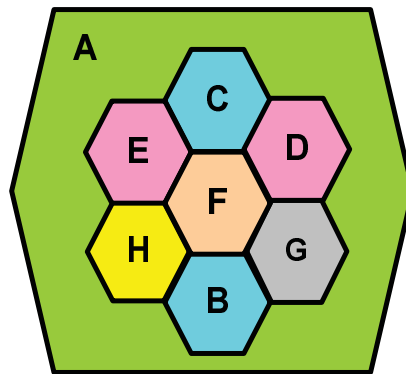


Figure 5. A framework with focus to ICT and scope is stakeholder (generation)

A framework as result of this discussion is a framework that focuses on applying ICT as facilities and infrastructure (F) within the scope of stakeholders. The stakeholder not consist of individual, student, group, functionary, researcher, lecturer, or professor, but stakeholder also refer to next generation. Therefore, a framework to apply ICT for bequeathing the cultural heritage to the next generation is based on Figure 5.

5. Conclusion

The approach involves defining cultural heritage, 8 components and the construction of a model obtained several options about framework to deliver the old cultural to new generations. Based on the resulting to new generations. Based on the resulting selection of some computing framework that focuses on ICT and scope of the new generation. The future work is the developing of information system.

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