

EXPLORING COMMUNITY CAPITAL OF THE BALINESE SUBAK CULTURAL HERITAGE: A CONTENT ANALYSIS OF PARTICIPATORY MAPS

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Abstract—This paper explores the community capital (CC) of participatory maps and discusses their potential to stimulate community engagement, particularly for the conservation of cultural heritage. Surveys were conducted regarding cognitive, landscape and story maps created through the participatory mapping of Bali's subak landscape by undergraduate student teachers. Based on a content analysis, seven types of CC were found in the story maps (natural capital, built capital, cultural capital, financial capital, human capital, political capital, and social capital); five in the landscape maps; and four in the cognitive maps. The themes of a majority of the story maps dealt with threats to the subak and solutions to overcome these problems; those of the landscape maps featured fields of yellow rice and group activities among farmers; while the cognitive maps were most likely to address the environmental beauty of the rice fields. Thus in both type and theme, the story maps explored CC to a greater extent than the other types of maps. Nevertheless, the three types can all be used to engage local communities in identifying, discussing, and communicating to stakeholders regarding the potential, threats and solutions for overcoming problems of CC.

Keywords: development and environment, local community, cognitive map, landscape map, story map, content analysis

1. INTRODUCTION

Community capital (CC) is any resource or asset that can be used, invested or exchanged to create new resources [1]. The concept of CC presents a means of understanding how assets are mobilized to achieve community development goals, e.g. increasing quality of life, ecosystem health, or economic security for all residents in a given geographic area [2]. According to Cornelia Butler Flora [3], there are seven categories of CC, namely natural capital, built capital, cultural capital, financial capital, human capital, political capital, and social capital. Each type of CC is interconnected with all other types [4]. For example, to increase community knowledge and skill (human capital), we must invest several other types of CC such as built capital, financial capital, cultural capital, and political capital. Studies within a CC framework have been carried out elsewhere, including on social networking in cooperative learning [5], community enterprises [6], development of local food [7], human development index [8], and traditional diets [9].

The Subak cultural landscape was formed through an evolutionary process between the farming and cultural practices of Balinese farmers, based on a principle of balance between economic, ecological and social sustainability. Therefore the subak have inherited a variety of outstanding universal values, i.e., holistic values that can apply to all human beings of the current and future generations, regardless of religion, ethnicity, nationality, or political differences [10, 11]. Some of these values include the implementation of *Tri Hita Karana* (an ancient philosophical concept of Balinese Hinduism concerning the harmonious relationship between God, humans, and the environment), an egalitarian and democratic communal system, as well as subak temple networking [12, 13]. Based on these outstanding universal values, the subak possess a wealth of CC categories for study.

However, the CC of the subak is rarely mapped in detail by the local community. This is owing to the fact that the collection and dissemination of information about the environment and development in terms of "mapping" is still very much based on a "top down" approach [14]. Participatory mapping offers to change this, however, as "an interactive approach that draws on local people's knowledge, enabling participants to create visual and non-visual data to explore social problems"[15]. Thus, local communities become actively involved in constructing knowledge, and can directly reveal ways of understanding the complex relationships between ecosystems and human well-being, as well as the impact of environmental management on the patterns of their lives [16, 17].

This paper aims to explore the CC of subak based on participatory mapping by student teachers, and discuss the potential of these activities to promote the conservation of cultural heritage by young people.

2. RESEARCH METHODS

A. Survey of Participatory Maps

Surveys were conducted regarding three types of participatory maps (cognitive maps, landscape maps, and story maps) produced by 23 undergraduate students from the Biological Education Department, Mahasaraswati Denpasar

University during an ecopedagogy course based on a book titled “Subak Cultural Landscape” [18] that ran from February to July 2014. A cognitive map is defined as an image or graphical representation that allows one to observe, analyze, and compare mental models or abstract concepts [19, 20]. Public symbols describing the state of local geography and landscapes, and which reflect the assets, values and a vision for the future are referred to as landscape maps or community maps [21]. Lastly, story maps are graphic representations of the various components of a story or sequence of events, which clearly outline the mutual relationships between components [22].

B. Content Analysis

Data were analyzed using a content analysis method to draw conclusions through identifying the specific character of each message in a systematic and objective manner [23]. This type of analysis is based on the perspective of individual items that are combined in the form of text; therefore, content analysis can be performed on anything from drawings to photography [24, 25]. The steps taken in our content analysis were as follows: (1) the participatory maps were scanned to generate a list of items, e.g. objects drawn in cognitive maps, symbols in the landscape maps, or narratives in the story maps; (2) these were defined operationally, clearly and specifically according to their relevant CC categories; (3) our definitions of CC categories were examined to ensure the absence of overlap between them; (4) a substantive content analysis (of encoded items) was undertaken according to CC categories; (5) a statistical analysis was conducted on the results.

The operational definitions for categorizing items into CC types were adapted from several sources [2, 3, 4, 6]; as follows:

1. Built capital: infrastructure, machinery and tools to support other CC types, e.g. roads, irrigation canals, and cottages;
2. Cultural capital: the way people regard their surroundings, with both material and non-material implications, including community perspective, heritage, customs, habits, traditions, and shrines (sacred buildings used for worship by Hindus);
3. Financial capital: a variety of financial instruments invested to create additional value, including access to funds, savings, and other assets associated with prosperity;
4. Human capital: knowledge and ability to access other types of CC such as education, skills, and healthcare. Human capital in cognitive and landscape maps is represented by a picture (symbol) or several distinct pictures/symbols of humans, where it is assumed that the pictures (symbols) indicate the ability/skill depicted;
5. Natural capital: natural resources and processes in the ecosystem including water, soil, biodiversity, natural beauty, and the local landscape;
6. Political capital: the power to influence markets, states, civil society, and laws, including the power to negotiate with more powerful parties or institutions; for example, the ability of farmers to reject land conversion policies from local governments.
7. Social capital: relationships, trust, and networks between groups of people such as the willingness of children to help their parents work in the fields. Social capital in cognitive maps and landscape maps is represented by pictures (symbols) of groups of humans, where it is assumed that the images (symbols) reflect the relationships and cooperation between at least two people.

8. Data Analysis

We used inter-rater reliability and intra-rater reliability methods to ensure reliability of the data [26, 27]. For the inter-rater reliability method, items were jointly determined by the author and co-author, and each item was separately categorized by CC type. We then compared the results; if differences were discovered, discussion was held to arrive at a similar perception. Furthermore, items were re-categorized until we found the same type of CC for each item. The author conducted intra-rater reliability by encoding items into CC categories twice within an interval of one month. If there were differences in the coding of items, then the items were re-categorized. Data was validated through interviews and focus group discussions with student participants. The tendencies of map themes were analyzed qualitatively through coding, classification, and inference, and the percentages of each CC category were analyzed quantitatively using a frequency tabulation method.

3. RESULTS AND DISCUSSION

A. Cognitive Maps

In general, the perspectives on the Subak cultural landscape in cognitive maps tended to be visualized in the form of flat and/or terraced rice plants, with a background of mixed farms, mountains and the sun (Fig. 1a). We found only two cognitive maps in the form of flat paddy fields adjoining residential areas (Fig. 1b).

Meanwhile the type of CC in the cognitive maps consisted of natural capital, human capital, built capital, and cultural capital, while the other three types of CC (social capital, financial capital, and political capital) were not identified in these maps. Natural capital was present in all cognitive maps, via 11 items (i.e. rice, flat rice fields, terraced rice fields, gardens, mountains, the sun, clouds, houses, trees, coconuts, beef, bamboo, ponds, and lotuses). About one-third (30.4%) of cognitive maps contained 8 items; 17.4% contained 6 items; and the rest contained 3–5, 7, or 9–11 items of natural capital. Built capital was also found in all cognitive maps, including 5 different items

(houses/cottages, irrigation works, roads, wantilan, and cattle sheds). A total of 34.8% of cognitive maps contained 3 items; 26.1% contained 2 items; and the rest contained 1, 4 or 5 items of built capital.

Cultural capital was found in 39.1% of cognitive maps in the form of temples and kites. Human capital was only found in 17.4% of cognitive maps in the form of images of people engaged in various activities in the fields, such as planting rice, mowing grass, and sprinkling fertilizer.

B. Landscape Maps

The landscape maps produced by the participants tended to be similar to one another. This was owing to the fact that they were created based on observations of a similar region over the same period. However, when observed more closely, there were variations in the forms, scale, symbols, and CC items depicted (Fig. 2).

Five types of CC (i.e. natural capital, built capital, cultural capital, human capital, and social capital) were realized in the maps; while two types (financial and political capital) were not identified in the landscape maps. Natural capital was found in all landscape maps and consisted of 10 items (palm tree, rice fields, ducks, mixed farm, bananas, ponds, jackfruit, gardens, flowers, and chickens). Approximately one-third of the landscape maps (34.8%) contained 2 items of natural capital; 26.1% contained 1 item; and the remainder contained between 3–6 items of natural capital.

Built capital was identified in all landscape maps, and included five different items (roads, irrigation works, *wantilan* or community centers, cottages, stables and cattle). A total of 43.5% of landscape maps contained four items; 34.8% contained 5 items; and the remainder contained 2–3, or 6 items of built capital.

Cultural capital was also identified in all of the landscape maps, and consisted of three items (temples, *penjor*, and pindekan or bamboo propellers). About one-third (34.8%) of the maps contained 3 items; 26.1% contained 4 items; and the remainder contained 1–2 items of cultural capital. Human capital was symbolized in the form of a human (or several humans), and was found in 69.6% of landscape maps. Similarly, social capital (i.e. symbolized by a group of farmers) was identified in more than half (56.5%) of landscape maps.

C. Story Maps

The majority of themes in story maps (79.11%) addressed threats to the subak and their related solutions, while 20.83% depicted the range of activities on the subak. Threats to the subak included waste and garbage, the sale of paddy fields, and the declining interest of local youth in the subak. The range of depicted activities included the contrast between conventional (ploughing with cows) and modern (tractors) technology, planting and harvesting rice, as well as the implementation of *Tri Hita Karana*. Solutions for solving the above problems encompassed the effort to reduce litter through the principles of reuse, reduce and recycling (re-cycle). One of the story maps examined problems and solutions at the subak through the development of an entrepreneurial restaurant on the edge of the rice fields to prevent the sale of the paddy fields (Fig. 3).

The seven types of CC (natural capital, built capital, cultural capital, financial capital, human capital, political capital, and social capital) were all identified in the story maps, even though the number of items varied among CC types (Table 1). The most common items found were human capital (four of every five); followed by natural capital (three of every five); and built capital, cultural capital, and social capital (two of every five story maps, respectively). While financial capital was found in one of every five, political capital was present in only one of every ten story maps.

Presented below are the word and sentence fragments used as the basis for classifying items into the seven types of CC. Underlining indicates a word or series of words used as an item indicator for CC type.

1. Natural capital (natural resources, beauty, local landscapes):

“Very fresh air without pollution; birds singing and the sound of water; the ecosystem is very important for humans; Bali is famous for its natural beauty; there are frogs and fish, which means the water is not polluted; subak is a beautiful wetland area; obtaining human needs of nature; water polluted by ...; a lot of rubbish around subak; frog ... polluted by chemical pollution.”

2. Built capital (infrastructure supporting another type of CC):

“Long irrigation channels and branches; acquire new technology ...; modern technology helps farmers ...; construction of the green line; ... infrastructure development; build homes and industry ...”

3. Cultural capital (traditions, habits, heritage, customs, and lifestyles):

“Lifestyle farmer; subak one of the Balinese culture; temple surrounded by ...; shrine on the edge of rice fields; prayer intention that there is no obstacle; tri hita karana; always begin with prayers; tradition and culture ... in Bali; ... can not be separated from culture; lelakut surrounding farmland to prevent pest birds.”

4. Financial capital (savings, investments, and buying and selling):

“A lot of land being sold ...; if not sold ... where obtaining a meal; increase foreign ...; farmer ... forced to sell his farm; looking for a strategic investment, and profitable; farmer son become entrepreneur.”

5. Human capital (education, skills, and the ability to access other CC):

“... Students ... could examine ...; train ... English; subak ... learn about; spirit ... to do the work; agriculture ... watch us; ... doing our job; ... tell me more; ... to motivate farmers to keep their rice paddies.”

6. Political capital (the ability to negotiate with stronger parties):
“Farmer told the secretary that he will not sell his field; farmers refused to sell their fields to the two men.”
7. Social capital (cooperation, associations, trust, and networks):
“An American visitor asked the farmer, and his son; confided to his family; thank you for trusting me to manage the wetland; farmer and his son worked together; they discuss the problem with the group; the farmer tell his son to preserve subak.”

D. Discussion

Story maps were able to reveal all seven types of CC, while landscape maps and cognitive maps only displayed five and four types of CC, respectively. Themes in the story maps explored daily activities in the paddy fields, as well as the potentials, threats, and solutions to overcome problems. Meanwhile, landscape maps revealed only the state and activities of farmers in the rice fields, and cognitive maps tended to merely illustrate the beauty of the rice fields.

One advantage of the story maps was their inclusion of all types of CC through providing an opportunity for participants to explore both reality (map) and fiction (stories) [28]. In contrast, the two other types of maps could only present information in the form of two-dimensional images. The relative majority of story maps in this study may have been the result of the learning experience, where participants were led to create story maps only after first completing cognitive and landscape maps.

Regardless of the differences, all types of maps showed the potential to catalyze self-organization at the community level, which is an important component of empowerment [17, 29]. According to Fisman [20], a cognitive map is “the best way to understand the children, seeing them as an individual organism that functions in a complex ecosystem.” Cognitive maps therefore have the advantage of being able to model complex and abstract variables that cannot be measured numerically [30]. Similarly, landscape maps reveal the ability of local communities to construct detailed maps of their hunting grounds, whose creation may be impossible by other means [31]. Landscape maps can also indicate the capacity of local populations to inventory their resources effectively and efficiently, as required in conflict mediation and decision-making [16].

One strategy for using participatory maps to catalyze community engagement is through involving communities in the evaluation and discussion of the maps they have created, so as to encourage them to participate in making decisions about the landscape, and stimulate them to take steps to improve the landscape based on new techniques [14]. If we promote participatory mapping of CC, this would potentially contribute significantly to development and the landscape. Keiko Goto et al. [9] found that the promotion of cultural capital and social capital can improve the practice of healthy eating by children in Japan, through adopting the habits of eating traditional food (cultural capital) as passed from mothers to their offspring (social capital). Mapping performed by communities can also provide a precautionary reference in the development of CC. For instance, the evaluation of local food tourism programs in Wisconsin, USA, found an increase in cultural capital and natural capital, but discovered an imbalance in political capital due to the comparative strength of businesses vis-à-vis farmers [7]. Similarly, Pe’rez-Maqueo et al. [8] discovered a negative correlation between human capital and natural capital, in which a region with a high human development index suffered greater damage to its natural resources compared with other regions.

The main implication of this research is the importance of participatory mapping of CC for promoting ecopedagogy in regions possessing a variety of outstanding universal values, such as the subak cultural landscape [32]. Ecopedagogy “facilitate[s] an understanding of sustainable living by teaching the basic principles of ecology, a deep appreciation of the nature of life, through a multidisciplinary approach, participate, experience and observation” [33]. Diego Thompson [6] has suggested appropriate educational tools are needed for strengthening human capital to solve natural, economic and cultural challenges with new knowledge and skills.

The subak are a remarkable case study for modeling ecopedagogy within a specific learning context, using a multidisciplinary approach, and addressing societal cohesion [10, 34]. This is owing to the subak’s example as an integrated learning model that crosses boundaries between generations and their culture [35, 36]. Therefore, using subak as the subject of participating mapping of CC provides an opportunity for students to develop their potential to reach high levels of critical thinking, and provides the necessary skills for problem solving, and decision-making [37, 38]. Especially for student teachers – who in addition to being future leaders are also the educators of future leaders – the ability to think in terms of ecopedagogy gives hope to future generations through taking an active role in development and the landscape, using principles learned from the past to build the future [18, 39].

4. CONCLUSION AND RECOMMENDATION

The results of the content analysis showed that themes and CC types were explored to a greater extent in story maps than in cognitive and landscape maps. However, all types of maps have the potential to stimulate community participation in development and the landscape. This is because they can encourage people to actively engage in constructing forms of knowledge, solutions, communications, and decision-making.

The involvement of young people (especially student teachers) in CC mapping of the subak cultural landscape (and other ancient heritage sites with a variety of outstanding universal values) taught them about a variety of

potential advantages to be invested into local resources for their future development. Further studies are needed to evaluate the extent to which participatory mapping can effect the knowledge, skills, attitudes, and concerns of participants. Using digital technologies must also be given attention in future studies of participatory mapping. Application of these technologies has the potential to engage young people not only as users but also as creators, for example as photographers, digital mappers or videographers of their ancestral heritage.

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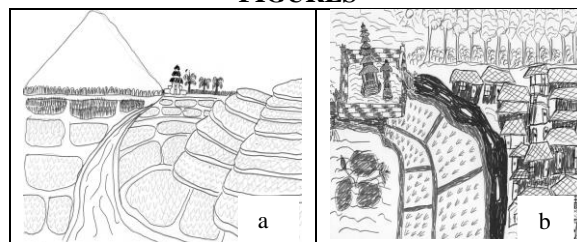
FIGURE CAPTIONS

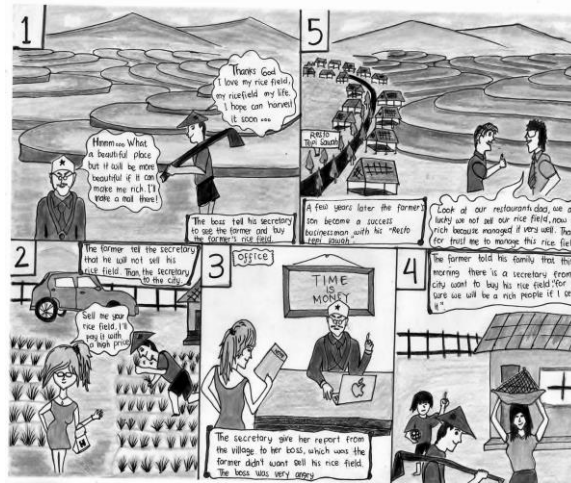
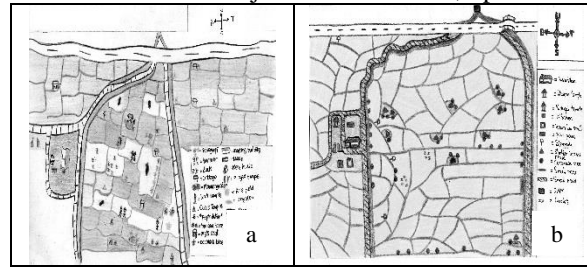
Fig. 1 Cognitive maps with a theme of the environmental soundness of the subak (a), and with most of the subak converted into residential areas (b).

Fig. 2 Comparison of landscape maps with social capital represented by symbolic groups of farmers (a); and without social capital (b).

Fig. 3 Story map of a farmer's son who succeeds in opening a restaurant at the edge of their rice fields.

FIGURES





TABLES

Table 1. Frequency of story map items by community capital type

No	Community capital type	Representation of community capital type by item (%)				
		Zero	One	Two	Three	Four
1	Human capital	21.7	52.5	8.7	13.3	4.3
2	Natural capital	34.8	39.1	21.7	4.3	—
3	Financial capital	52.5	21.7	4.3	4.3	—
4	Cultural capital	56.5	30.4	13.0	—	—
5	Built capital	52.5	39.1	8.7	—	—
6	Social capital	56.5	39.1	4.3	—	—
7	Political capital	82,3	8,7	—	—	—

Note: “Zero” indicates the frequency at which a given type of community capital was not represented; “—” indicates a type of community capital not represented in two, three or four items, respectively.