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Applying Participatory Design for the Reuse of Deserted Community Spaces

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***Abstract*—**The concept of community building started in 1994 in Taiwan. After years of development, it fostered the notion of active local resident participation in community issues as co-operators, instead of minions. Participatory design gives participants more control in the decision-making process, helps to reduce the friction caused by arguments and assists in bringing different parties to consensus. This results in an increase in the efficiency of projects run in the community. Therefore, the participation of local residents is key to the success of community building. This study applied participatory design to develop plans for the reuse of deserted spaces in the community from the first stage of brainstorming for design ideas, making creative models to be employed later, through to the final stage of construction. After conducting a series of participatory designed activities, it aimed to integrate the different opinions of residents, develop a sense of belonging and reach a consensus. Besides this, it also aimed at building the residents' awareness of their responsibilities for the environment and related issues of sustainable development. By reviewing relevant literature and understanding the history of related studies, the study formulated a theory. It took the "2012-2014 Changhua County Community Planner Counseling Program" as a case study to investigate the implementation process of participatory design. Research data are collected by document analysis, participants' observation and in-depth interviews. After examining the three elements of "Design Participation", "Construction Participation", and" Follow–up Maintenance Participation" in the case, the study emerged with a promising conclusion: Maintenance works were carried out better compared to common public works. Besides this, maintenance costs were lower. Moreover, the works that residents were involved in were more creative. Most importantly, the community characteristics could be easy be recognized.

***Keywords*—**Participatory design, Deserted spaces, Community building, Reuse.

I. Introduction

THE benefits of community involvement in the planning and design of deserted spaces are widely documented; they include enhancing the capacity of citizens to cultivate a stronger sense of commitment, increasing user satisfaction, creating realistic expectations of outcomes, and building trust (e.g. [1]-[7]).

The failure of traditional planning tools to engage community residents, which are the methods of user participation currently employed, actually disenfranchise the user because the methods of communication have not changed to accommodate a non-design oriented population [8].

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In the case of the "*Changhua County Community Planner Counseling Program*" process, the residents and the planners working in tandem had the effect of 'leveling the playing field' between the planners and the community. Residents truly became co-planners and co-designers in the process. The planners relied on the residents to learn about the community's cultural values, history and context.

Finally, the results of this study can be used for future reference to participatory design in community building.

II. Literature Review

A. Participatory Design

Participatory design originated during the 1960s and 70s. Participatory design is an approach to design attempting to actively involve all stakeholders in the creative process to help ensure the result meets their needs and is usable. It is an approach that is focused on the processes and procedures of design, and is not a design style. Robertson and Simonsen define participatory design as 'to investigate, reflect upon, understand, establish, develop and support mutual learning processes as they unfold between participants in collective "reflection-in-action" during the design process' [9].

The term 'community design' is an umbrella term covering community planning, community architecture, social architecture, community development, and community participation, all of which emphasises the involvement of local people in social and physical development of the environment they are living in [10]. Similarly, Francis defines 'community design' as a concept receiving different labels such as participatory design, social architecture, social design and architecture for people [11].

B. Construction Participation

We hope to have more people participate in Design of Deserted Space in Community and to build a communal relationship between people and environment through construction participation.

Participatory design is an attitude about a force for change in the creation and management of environments for people. Its strength lies in being a movement that cuts across traditional professional boundaries and cultures. Its roots lie in the ideals of a participatory democracy where collective decision-making is highly decentralized throughout all sectors of society, so that all individuals learn participatory skills and can effectively participate in various ways in the making of all decisions that affect them [12].

Traditionally, the space professionals have been given priority to regulate and design, while the local residents acted as

only a supplement. There is then an intermingling of the opinions of local residents under the notion of the participatory scheme design; to promote modes of community self-construction, such as the "employment of local labor, purchasing of local materials and execution of local projects" [13].

C. Maintenance Participation

Interrelated data points out that a lack of public participation in project plans results in the sense of a lack of belonging and recognition in the public space; subsequently resulting in lower usage rates and less maintenance. Hence, this study will demonstrate the point of "Participatory Design" to explore the relationship between the extent of public participation in community plans and subsequent maintenance and management.

Maintenance participation can not only save contract works expenditure, but also reduce the environmental pollution arising from the operation.

III. Methods

Research data were collected through in-depth interviews and observation of participants. The study sample for the survey consisted of the 27 community opinion leaders, who were invited to participate in the "2012-2014 Changhua County Community Planner Counseling Program".

A. Description of the Participatory Design Process

This study relied mainly on a participatory approach, but was supplemented with landscape classification and mapping, as well as various qualitative research methods. This strategy can be condensed into four categories (Fig. 1): (1) The Resident and the Planners Working in Tandem; (2) Landscape Analysis; (3) Workshop; and (4) Construction Participation. We then discuss the outcomes of this participatory landscape planning exercise, followed by some observations and reflections of the process [14].

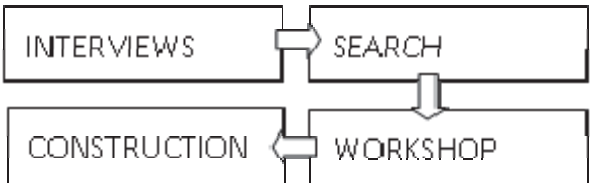

Fig. 1 Description *of the* participatory *design process*

B. Interviews

We designed and pre-tested an interview with the purpose of conducting an in-depth examination into issues occurring in the community to gain a better understanding of residents' perceptions and concerns regarding the Reuse of Deserted Spaces.

A. Landscape Analysis

We spent some time in the community to assess the issues that were identified in the interviews. During this time, we also conducted analysis of the landscape features, and assessed how to recognize the characteristics of the local people and the community.

Fig. 2 Pre-tested interview-1

Fig. 3 Pre-tested interview-2

B. Workshop

This study applied participatory design to make plans for the reuse of deserted spaces in the community from the first stage of brainstorming for use and design, to the building of creative models that would be employed later, and then to the final stage of construction.

We also found that after conducting a series of participatory designed activities to encourage more in-depth and lively discussions, this allowed participants to more clearly articulate when voicing their preferences for landscape conditions, and be generally more meaningful when communicating landscaping issues.

Fig. 4 Community characteristics

Fig. 5 Analysis landscape features

Fig. 6 Each participant had a concise version of the design

Fig. 7 Conducting a series of participatory designed activities

Fig. 8 Each participant Construction Participation-1

Fig. 9 Each participant Construction Participation-2

C. Construction Participation

Through construction participation we hope to encourage more community participation in the Design of Deserted Spaces in Community project and build a relationship between people and the environment, and also enhance public acceptance and enthusiasm of local affairs.

IV. Data Analysis

Research data is collected by document analysis, participants' observation and in-depth interviews. After examining the three elements of "Design Participation", "Construction Participation", and "Follow–up Maintenance Participation" in the study, the following promising conclusions were presented.

A. Correlation among Index Variables

In the context of the present study, it is hypothesized;

H1. Between the Participatory Design and the Construction Participation is positive correlation.

H2. Between the Construction Participation and the Maintenance Participation is positive correlation.

H3. Between the Participatory Design and the Maintenance Participation is positive correlation.

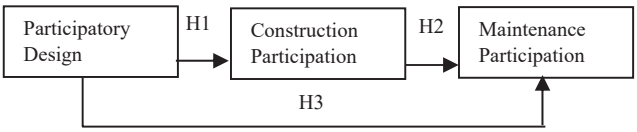

Fig. 10 Research Hypotheses

B. Participants and Interviews

The target sample for the survey consisted of the 27 community opinion leaders who were invited to participate in the "2012-2014 Changhua County Community Planner Counseling Program".

C. Experimental Design

Aside from the data collected by document analysis, observation of participants and in-depth interviews, a set of Likert-type scale questions (1—least important to 5—most important) were also included in our survey to elicit their perceived quality.

TABLE I
EXPERIMENTAL DESIGN OF THE DIMENSION ITEMS

Dimension Items	Questions	Scale of measure
Participatory Design	1.It is an opportunity for everyone to learn. 2.It is an open process. 3.It let residents respect their own local culture value. 4.The process of participatory design is interesting for the residents. 5.It let local communities identify their own culture.	Ordinal Scale
Construction Participation	1.I am keen to participate in the work of local community improvement. 2.Community volunteers will take the initiative in their volunteer work while they take part in the design discussion. 3.Cultivate the following ability of maintenance and care. 4.Utilizing regional resources creates more employment opportunities. 5.Increasing participation is helpful for community development.	Ordinal Scale
Maintenance Participation	1.I am willing to take responsibility for maintenance management and participate more. 2.Even though it is not clean-up day for the community area, I am willing to take part in maintenance management. 3.The design theme encourages volunteers to maintain the community area. 4.The volunteers have become willing to participate the maintenance management. 5.The system of allocating work became easier to promote.	Ordinal Scale
Baseline data	1.When did you take part in the work for community building? 2. Do you think Participatory Design integrates the community's opinions and needs? 3.The degree of volunteer participation in the workshop is… 4. The degree of volunteer participation in construction is… 5. The degree of volunteer participation in maintenance management is…	Nominal Scale

D. Descriptive Statistics

Descriptive statistics were used to describe the basic features of the data gathered in the study. They provide simple summaries about the sample and the measures.

1) Descriptive statistics of the Participatory Design

TABLE II
DESCRIPTIVE STATISTICS OF THE PARTICIPATORY DESIGN

Participatory Design	N	Min.	Max.	Total	mean	SD
1. It is an opportunity for everyone to learn	27	1	5	114	4.22	.847
2. It is an open process	27	3	5	114	4.22	.506
5. It allows local communities identify their own culture	27	2	5	118	4.37	.688
3. It allows residents to respect their own local cultural value	27	4	5	120	4.44	.506
4. The process of participatory design is interesting for the residents	27	4	5	120	4.44	.506

2) Descriptive statistics of the Construction Participation

TABLE III
DESCRIPTIVE STATISTICS OF THE CONSTRUCTION PARTICIPATION

Construction Participation	N	Min.	Max.	Total	mean	SD
4. Utilizing regional resources creates more employment opportunities	27	1	5	107	3.96	.854
2. Community volunteers take the initiative in their volunteer work while taking part in design discussions	27	4	5	118	4.37	.492
5. Increasing participation is helpful for community development	27	4	5	118	4.37	.492
3. Cultivates the concept of maintenance and care	27	4	5	118	4.37	.492
1. I am keen to participate in projects for local community improvement	27	4	5	122	4.52	.509

3) Descriptive statistics of the Maintenance Participation

TABLE IV
DESCRIPTIVE STATISTICS OF THE CONSTRUCTION PARTICIPATION

Maintenance Participation	N	Min.	Max.	Total	mean	SD
1.I am willing to take responsibility and participate more in maintenance management	27	1	5	116	4.30	.823
2.Even though it is not clean-up day of the community area, I am willing to take part in maintenance management	27	1	5	116	4.30	.823
5.The system of allocating task became easier to promote	27	2	5	117	4.33	.679
3.The design theme encourages volunteers to maintain community areas	27	4	5	117	4.33	.480
4. Volunteers have become more willing to participate in maintenance management	27	4	5	118	4.37	.492

E. Correlations Analyses

Attributes adopted in the Likert-type scale questions and statistical analyses were performed using SPSS 10.

The Pearson's correlation coefficient was chosen because it is a robust measurement for the strength and the direction of a relationship.

TABLE V
CORRELATIONS ANALYSES

		Participatory Design	Construction Participation	Maintenance Participation
Participatory Design	Pearson's correlation coefficient	1	.831**	.734**
	P-Value(Sig.)		.000	.000
	N	27	27	27
Construction Participation	Pearson's correlation coefficient	.831**	1	.842**
	P-Value(Sig.)	.000		.000
	N	27	27	27
Maintenance Participation	Pearson's correlation coefficient	.734**	.842**	1
	P-Value(Sig.)	.000	.000	
	N	27	27	27
	mean	4.3407	4.3185	4.3259
	Standard deviation	.41441	.44118	.57150

** Correlation is significant at the 0.01 level (2-tailed).

1) The Pearson correlation coefficient for Participatory Design and Construction Participation is 0.831 and was found to be significant ($P < 0.01$), which indicates a medium positive correlation between Participatory Design and Construction Participation.
2) The Pearson correlation coefficient for Participatory Design and Maintenance Participation is 0.734 and was found to be significant ($P < 0.01$), which indicates a medium positive correlation between Participatory Design and Maintenance Participation.
3) The Pearson correlation coefficient for Maintenance Participation and Maintenance Participation is 0.824 and was found to be significant ($P < 0.01$), which indicates a medium positive correlation between Maintenance Participation and Maintenance Participation.

F. Regression Analysis

Linear regressions were calculated to quantify relationships in an equation and to detect the amount of explained variation. Regression analysis is a statistical tool for the investigation of relationships between variables.

1. The First Model

For the first model, our results support the prediction that direct effects of Participatory Design and Construction Participation were significant (Table VI), and show a positive relationship between Participatory Design and Construction Participation ($p < 0.001$; Table VI).

TABLE VI
THE FIRST MODEL

ANOVA(b)						
	Model	Sum of Squares	df	Mean Square	F	Sig.(P-Value)
1	Regression	3.494	1	3.494	55.732	.000a
	Residual	1.567	25	.063		
	Total	5.061	26			

a. Predictors: (Constant) Participatory Design b. Dependent Variable: Construction Participation

2. The Second Model

For the second model, our results support the prediction that direct effects of Construction Participation and Maintenance Participation were significant (Table VIII), and a positive relationship between Construction Participation and Maintenance Participation ($p < 0.001$; Table VII).

TABLE VII
THE SECOND MODEL

ANOVA(b)						
	Model	Sum of Squares	df	Mean Square	F	Sig.(P-Value)
2	Regression	6.014	1	6.014	60.694	.000a
	Residual	2.477	25	.099		
	Total	8.492	26			

a. Predictors: (Constant), Construction Participation b. Dependent Variable: Maintenance Participation

3. The Third Model

For the third model our results support the prediction that direct effects of Construction Participation and Maintenance Participation were significant (Table VIII), and shows a positive relationship between Construction Participation and Maintenance Participation ($p < 0.001$; Table VIII).

TABLE VIII
THE THIRD MODEL

ANOVA(b)						
	Model	Sum of Squares	df	Mean Square	F	Sig.(P-Value)
3	Regression	4.578	1	4.578	29.249	.000a
	Residual	3.913	25	.157		
	Total	8.492	26			

a. Predictors: (Constant), Participatory Design b. Dependent Variable: Maintenance Participation

G.Results

The overall results support three general hypotheses:

TABLE IX
RESULTS

Hypotheses	Detail	Results
H1	Between the Participatory Design and the Construction Participation is positive correlation.	valid
H2	Between the Construction Participation and the Maintenance Participation is positive correlation.	valid
H3	Between the Participatory Design and the Maintenance Participation is positive correlation.	valid

V. CONCLUSION

This study shows that community engagement through the use of Participatory Design is an effective means of informing and impacting local policy related to sustainable community development. It shows that such a process can result in solutions for deserted spaces in community that are sustainable, inclusive, meaningful, and cost-effective.

The study arrived at a promising conclusion:

1) Maintenance works were carried out better compared to common public works.
2) Maintenance costs were reduced and residents were more willing to participate works associated with maintenance management.
3) Moreover, the works in which local residents were involved were more creative.
4) More local residents were involved in the design theme stage, which encouraged volunteer involvement in the maintenance of community areas.
5) Most importantly, Participatory Design allowed residents to respect their own local cultural values.

Fig. 11 Maintenance works were carried out better

Fig. 12 Works with resident involvement were more creative

Fig. 13 More local residents were involved

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