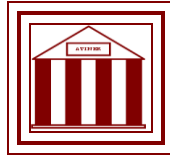


ATINER CONFERENCE PAPER SERIES No: ARC2013-0565

Athens Institute for Education and Research

ATINER



ATINER's Conference Paper Series

ARC2013-0565

**User Participation –
An Essential and Practical Way to
Flexible Housing**

**Shanshan Li
PhD Student
Politecnico di Torino
Italy**

Athens Institute for Education and Research
8 Valaoritou Street, Kolonaki, 10671 Athens, Greece
Tel: + 30 210 3634210 Fax: + 30 210 3634209
Email: info@atiner.gr URL: www.atiner.gr
URL Conference Papers Series: www.atiner.gr/papers.htm

Printed in Athens, Greece by the Athens Institute for Education and Research.
All rights reserved. Reproduction is allowed for non-commercial purposes if the
source is fully acknowledged.

ISSN 2241-2891

25/09/2013

An Introduction to ATINER's Conference Paper Series

ATINER started to publish this conference papers series in 2012. It includes only the papers submitted for publication after they were presented at one of the conferences organized by our Institute every year. The papers published in the series have not been refereed and are published as they were submitted by the author. The series serves two purposes. First, we want to disseminate the information as fast as possible. Second, by doing so, the authors can receive comments useful to revise their papers before they are considered for publication in one of ATINER's books, following our standard procedures of a blind review.

Dr. Gregory T. Papanikos
President
Athens Institute for Education and Research

This paper should be cited as follows:

Li, S. (2013) "**User Participation - An Essential and Practical Way to Flexible Housing**" Athens: ATINER'S Conference Paper Series, No: ARC2013-0565.

User Participation – An Essential and Practical Way to Flexible Housing

Shanshan Li
PhD Student
Politecnico di Torino
Italy

Abstract

The objective of this essay is to explain the user involvement and participation in Flexible Housing.

In the first section, the necessity of participation is emphasized in architecture and sociology levels. In the former, user participation is necessary for establishing a close relationship between user and the building environment; while in the latter it is essential for the tenants to express themselves.

And then, according to the difference of the economy and technology in various stages, the development of flexible housing can be divided into three branches: the pursuit for minimal dwelling; the adoption of industrialized solution; and the improvement of architectural quantity and respect on individual characters. Through the analysis on relevant researches and projects, the role of user in flexible housing can be traced.

At last, the methodology of user involvement is discussed in two branches: direct engagement versus indirect involvement. In the former, it allows users to be involved in the design process, while in the latter, the users withdraw from design work, and their participation is realized by consultation and alternation of existing results.

Key words: User Participation, Flexible Housing, History, Methodology

Corresponding Author:

Introduction

The participation of users is not something new in building. The spark of it can be traced back to the dynamic years around Post World War II era, when individual value was unprecedentedly appreciated by architects as well as sociologists. Meanwhile, it was involved as an essential principle of flexible housing in terms of not only architecture but also sociology.

At the level of architecture, participation is of great necessity for establishing a close connection between user and building environment. This idea is precisely illustrated by N. J. Habraken in the criticism of “mass housing” which excludes the involvement of householders at the very beginning. He convinces that people living in a “mass housing” environment can never possess their town, since there is not even a single part relating with their own activity¹. For being out of the sense of ownership and responsibility, “mass housing” residents are less able to tolerate the deficiencies and imperfections of their houses². This phenomenon can be learned from plenty of wise plans which failed for their opposition to the organic development of the future users.³

Ownership is of particular importance when the flexible system is established and maintained. For example, the architects are inclined to spend much time on the technical measures of moveable components with the aiming of creating the changeable space. But the design has no difference with the ordinary one if people never move it, since the movable elements cannot move themselves. What’s more, the subdivision of layout in flexible housing which depends on future tenants is of personal characteristics, but it is negated if users give the power of choice back to professionals. People need to be empowered at all levels, be aware of the issue, as well as understand how their houses operate. That’s the fundamental aspect of flexible environment which will be built and operated properly.

At the level of sociology, participation is a way for the users to express themselves. Building, especially housing, has long been regarded as an important mean of illustrating the user’s position in life as well as aesthetic value, and it is also his personal way to establish his ego. In the old times, the expression of personality is closely tied with epoch-background and the social property of occupants.⁴ It is specifically revealed in the traditional Chinese houses which separate the dwellings belonging to various classes, according to strict norms: houses attached to governing class are completely different with

¹Habraken N. J. (1972). *Supports: an alternative to mass housing*. London: Architectural Press. 13

²“Turner’s Third law is that deficiencies and imperfections in housing are infinitely more tolerable if they are your responsibility than if they are somebody else’s.” As quoted in Colin Ward. *Self Help and Mutual Aid in Housing. Participation in Housing*. Edited by Nabeel Hamdi & Bob Greenstreet (1981). Oxford: Polytechnic, Department of Town Planning. 7

³Giancarlo De Carlo. *Architecture’s Public. Architecture and Participation*. Edited by Peter Blundell Jones, Doina Petrescu & Jeremy Till (2005). New York: Spon Press. 16

⁴Habraken N. J. (1976). *Variations: the Systematic Design of Supports*. New York: Laboratory of Architecture and Planning at MIT. 8

the dwellings for common people in the aspects of location, size, color and decoration. However, in modern lives which taken function as priority, this basic demand is inclined to be ignored.¹ On the contrary of “mass housing” which is based on common value and predesigned way of life, Flexible Housing empowers its users to explore their real need, build their life-style and express their own value through the active involvement and participation. Nobody is more powerful than the users themselves in defining what they need urgently and which way of life they want to follow. And it is the freedom of expression that forms the root of the social aspect of flexibility.

Flexibility is a revolution to housing as it depends on the requirement and motivation of users. Prior to describing how clients are involved in their houses and community, there are two questions to be outlined: the first is the definition and principle of flexibility; and what’s more, the various roles of users which are expressed in the developing process of flexibility.

Flexible Housing and its User

The problem of housing design, for being tied to national lives, is the most important subject in modern era. As a gorgeous constitution of this topic, Flexible Housing is essentially a set of design technique based on the cognition that building and its surrounding environment are not static, on the contrary, they should be continually modified in order to keep the quality during their use. It is the demand for change that generates inevitably flexible design.

For the definition, Tatjana Schneider and Jeremy Till define Flexible Housing as “housing that can adjust to changing needs and patterns, both social and technological”². Meanwhile, they raise adaptability which is on the issues of use as the complement to flexibility which involves problems of form and technique. With regard to the above-mentioned two terms, no matter to the widely accepted idea by Steven Groak, or the practical description proposed by Jia Beisi, the active response to change is spontaneously revealed.

However, the source of change is open to debate. Although the scope of change spans widely from individual, social, economic, practical to technological, and not any change is catalyzed by a singular factor, the influence of human being with various emphases is always working. The role of user can be clearly traced in its three main branches: the pursuit for minimal dwelling after the First World War; the adoption of industrialized solution since the beginning of 20th century; and the respect on individual characters from 1960s.

The pursuit for minimal dwelling

In 1920s, due to the reconstruction after First World War and growth of urban population, European countries were perplexed by the urgent crisis for

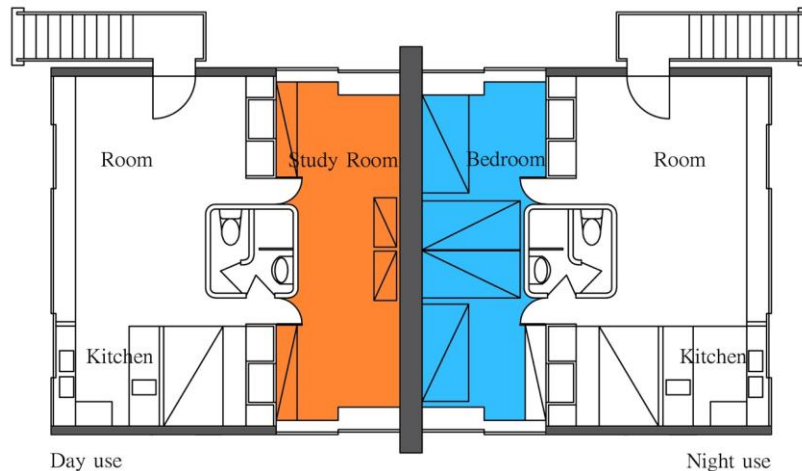
¹Ibid. 8

²Tatjana Schneider & Jeremy Till (2007). Flexible Housing. London: Taylor & Francis. 4

urban housing, especially for the working class. In order to provide sufficient dwellings at lowest costs, researches for minimal and multi-functional space drew the architects' attention. And most of these studies and practices were based on family constitution and human behavior.

The attention of human in this branch, however, focuses on the human activity as a whole. On the one hand, the special cases of physical dimension of human are excluded. Plenty of measurement and arrangement work are conducted to explore the minimum space for a multi-functional room, while the person in those studies is an average man, neither too tall nor too short, neither too thin nor too fat. On the other hand, the personal way of life is not taken into consideration either. For example in the most representative project *Maisons Loucheur* which is based on the analysis of human performance within a day, and is able to expanded a 46m² house to 71m² by multi-use of space at different times¹, Le Corbusier assumes that all the family members are keeping regular hours - so there is a large studying room which can be used as bedroom with four single beds at night. But for the member who is on night shift and needs to sleep by day, or who is used to working at home during night, the design is not acceptable. In other word, the individual demand and value are strictly excluded in those cases. (Figure 1)

Figure 1. *Day/ night use of Maisons Loucheur. Tatjana Schneider & Jeremy Till (2007). Flexible Housing. London: Taylor & Francis. 61*



The adoption of industrialized solution

At the same time, the rising demand for housing and the development of technology led to increased interests in standardization, which was illustrated to greater or lesser extent by industrial prefabricated. In these buildings, the majority of modular components were mass-produced on the assembly line production which was initially developed for the automobile industry by Hery Ford. And then the prefabricated elements were transported to building sites and assembled into a construction.

¹Ibid. 60

Besides the economic benefit, those buildings are closely tied with inherent flexibility. The identical parts are allowed to be arranged in an infinite number of ways and they can be easily interchanged with similar parts. What's more, the users' requirement can be involved in the choice and arrangement of components in order to personalize their dwellings in various extents. Consequently, it also lays the foundation for wider choices of the future client, in which the primary customization is inherited.

The respect on individual characters

The architectural thoughts were hyperactive in the 1960s when individual value was highly appreciated. The insightful architects and theorists began to rethink the drawbacks of our housing activity based on common lives, and then looked for the solution.

At the beginning of 1960s, the Dutch Architect N. J. Habraken proposed "Support" theory in his influential publication "Supports: an alternative to mass housing" (English edition in 1972). Having profound influence on flexibility, this book began with the criticism of uniformity in mass production and ignorance of user. To address this issue, he took "the return of consultation" and "involvement on the part of users, in the most literal sense"¹ as basic principles in his innovation. This principle was so deeply rooted in his theory and practice that "Support" building in his interpretation must be determined by two aspects - professionals and occupants. For one thing, the users were bound to be strictly differentiated from architects, since academic issues were out of their responsibility and interest. For another, to the specific control of users, his definition was somewhat intangible - not a single part in his building cannot be interfered by users. The absolute role of users were specially expressed in his preference to use the term "decision making" instead of "participation" in order to emphasize the leading character of householder while the role of professional returned back to an consultant who never made certain decisions but provided necessary condition and assistance.

Some initial and decisive contributions were made in the meanwhile. The theorist and architect Giancarlo De Carlo's statement was based on the criticism of universal value and illustrated the need for user involvement in the extreme ways, as the abolishment of "all the barriers between builders and users"². His early and significant exploration was represented by his practices of "steelworker's housing in Terni of 1968 which appeared conventionally Modernist but allowed many user options within" as well as "his more contextual housing at Mazzorbo in the Venetian Lagoon of 1986"³ in which he developed the decision-making subject as the community. The other theorist who illuminated the significant principle of user expression was John F. Turner. The essence of his writings and addresses can be distilled as three laws

¹Habraken N. J. (1972). Supports: an alternative to mass housing. London: Architectural Press. 3

²Ibid. 13

³Peter Blundell Jones. Sixty-eight and After. Architecture and Participation. Edit by Peter Blundell Jones, Doina Petrescu & Jeremy Till (2005). New York: Spon Press. 134

of housing, which specified the social truth of participation as a way for users to express and realize themselves, highlighted the absolute importance of user in housing, and illustrated participation as a effective way to prolong the tolerated life of their own house, respectively. Analogously, in the late 1960s, three principles of flexibility were defined by the French architects Luc and Xavier Arsène-Henry, which emphasized the dominant position of users in housing design¹ and established the early and basic connection between flexibility and user participation. And the principles were concretely illustrated in their large numbers of practice in which future tenants could determine the layout of their apartments. Besides, While Walter Segal in the UK, Lucien Kroll in Belgium, Eilfried Huth in Indonesia, Peter Sulzer and Peter Hübner in Germany also devoted themselves in to the theory and practice in this field at the moment.

In the years around 1960s, participation is closely associated with social “democratization”. As a consequence, the involvement of user is with apparent social and political property. Human is no longer a symbol or measurement tool in flexible housing. On the contrary, the user’s individual value is of absolute significance in those researches and practices, and their needs or views should be taken into design without exception. As a result, user participation then is inevitably with some radical nature. But it is admitted that flexibility, from then on, turns to the various requirements of occupants, as well as pays much attention on participation and user choice.

Discussion

Flexibility cannot be achieved in housing until a new concept of architecture comes out, and this conception is necessarily based on the user’s demand and participation. It is clearly revealed in its definition and development process that human-being plays a decisive role. Not only is it the result of social development, but it is also determined by the inherent principles of flexibility. It is those factors that make flexibility a concept not only tectonic but also social and, to be specific, humanistic as its emphasis on individual expression. In the development of Flexible Housing in the last one hundred years, the role of user is expressed as various character: from the scale measurement of space to the participants of their own house. Although this interest used to be shelved for some years for its large cost and inefficiency in development, Flexible Housing never denies the affect of user as well as the continuous efforts of bringing residents into focus.

¹“1. Everyone should be able to fit out his home as he wishes, including the right to make mistakes as part of that freedom... 2. Each person ought to be able to expree himself as a function of his choice. His home should be personalizable... 3. Each person should be able, in his home, to make a creative act by organizing his space, based on the context within which he finds himself. Even being a co-author brings a measure of satisfaction.” As quoted in Andrew Rabeneck, David Sheppard, and Peter Town. “Housing Flexibility?”. *Architectural Design*. 43, no.11,1973. 703.

How can participation be achieved

As its impetus, user's demand, is progressive and evolving, user participation cannot work with a preconceived or fixed model. Nor can it be achieved by apriorism or representation. As a result, the real participation should be understood as a self-regulation process driven by non-static spontaneity, in other word, it is a intangible process which constructs itself inferentially. But meanwhile, it is not completely liberal. The basic principle and control is unavoidable. That's where the scope and basic methodology can be traced.

The scope of participation

In the term of time dimension, the involvement of user is apparently lasting for the whole life of Flexible Housing. It is determined and in accordance with the connotation of flexibility which can be specified as "the potential to make changes prior to occupation as well as the ability to adjust one's housing over time after occupation."¹ To be specific, prior to occupation, participation allows future users to have some choice with a flexible approach, while after occupation people are enabled to utilize their home in various ways without tying to the predesigned specifics of room designations, but allow the clients to make adaptation and alternation to their home².

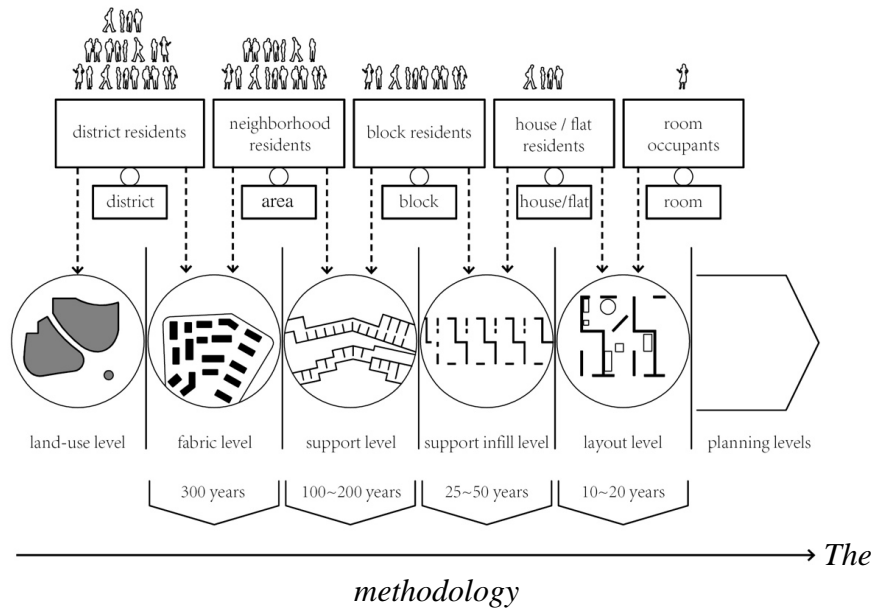
When it comes to the physical level, the scope of participation is precisely revealed in "Residential Open Building" as a chart which shows the generalized user's involvement spans the extents from land-use level, fabric level, support level, support infill level, to layout level. While the decision-making is changing from more collective with district residents to more individual with the room occupants. This standpoint is developed from N. J. Habraken's initial discussion of Support Building and adopted by Tatjana Schneider & Jeremy Till in their research of Flexible Housing. In their opinion, the aspect decided by users can be extremely wide, from the location and size of their house, to the type of window and the layout of partition, as well as the decoration of internal environment. Nevertheless, the householder can also participate in one or two parts in which they are interested.³ (Figure 2).

¹Tatjana Schneider & Jeremy Till (2007). Flexible Housing. London: Taylor & Francis. 4

²Tatjana Schneider & Jeremy Till (2007). Flexible Housing. London: Taylor & Francis. 5

³Kendall Stephen & Jonathan Teicher (2000). Residential Open Building. London and New York: E & FN Spon. 6

Figure 2. *Decision-making levels in Open Building.* Kendall Stephen & Jonathan Teicher (2000). *Residential Open Building.* London and New York: E & FN Spon. 6



As the scientific design method, the presence of participation is accompanied with the social division of user and architect as well as the systematic theoretical framework. In the early years when the user acts as the only role in housing activity, there is no participation to speak of.¹ For now, the balance of user and architect is still the main task and urgent problem of this subject. In the meantime, the real participation is essentially different from the autonomous practice without the guidance of theory. According to the way of working, participation can be divided into two main ways: direct engagement versus indirect involvement.

Direct participation allows users to be involved in the design process: they are possible to organize a project, design draft for exterior or interior and even participate construction. On the top of that, the users are obliged to make decisions instead of acting as observer, while architects take on the responsibility of interests coordinating and advice offering. This branch is extensively pursued in the late 1960s and the 1970s together with the academic researches on working process in order to realize the user's decision at greatest extent.

The milestone began its life as a lecture by Giancarlo De Carlo at Liege Conference (1969). In the lecture which was later published as "Architecture's Public" with a strongly political tone, he convinced that architecture was too important to be guaranteed by architects themselves, and took all the people who used architecture as the basic element for its public which represented architectural credibility. As a consequence, he advocated that architects must plan "with" people with the "procedural systems based on a continual

¹Cooper-Marcus. User Needs Research in Housing. *The Form of Housing*. Edit by Sam Davis (1977). New York: Van Nostrand Reinhold. 140

alternation of observations, propositions, and evaluations: i.e. the use of scientific method”. And ultimately, he concluded the process of participation as three phases - “the discovery of physiological and spiritual needs, formulation of hypotheses, and actual use”, while the three steps not only followed sequentially but also had a cyclical relationship.¹

His research was so representative that plenty of practices were actually working with this framework. Those projects were begun with the exploration of user’s demand through the specific forms of meetings, exhibitions, newsletters and workshop sessions. Then they moved to the second stage with the objective of dealing with interaction between the pressure of real needs and the image of spatial configuration. “In this process, needs are refined and configurations perfected until they reach a condition of equilibrium, even if some instability remains due to the innate mobility of the process.”² At last, the physical building was realized. But actually, the cycle could never come to the end until the building was abandoned. Instead, at the very moment new need arose, the client and architect would leave the existing formulation and shift to a new round of working process.

This practical process was creatively illustrated by Ottokar Uhl in his ‘Children House’ in Vienna which was designed for 16 families with children. This project was proposed by the users who intended to take the children as the heart of their living. And the whole work was conducted as three phrases. In the first phrase, the preparatory works were completed, for example inviting Ottokar Uhl as their architect, conceiving possible building forms, finding homestead, discussing principles of economics, and developing the main design rules. And then, the design work was carried on, including the determination of unit and its location, the consultant of neighborhood relationship, the design of children activity space inside and outside, the design for facades with the module of 30 cm, and so on. In this phrase, the architect provided suggestions instead of making decisions. Ultimately, the buildings were constructed under users’ supervision and regular inspection, while the flexibility was taken into consideration in the partitions and facade. The whole planning and construction process lasted for three years accompanying with 120 consultative conferences.

The participation expressed in the above-mentioned project was something in extreme since the actions of users were deliberately exaggerated while the role of architects seemed to fade. Similar but more conservative plan was made by Walter Segal whose working process was concluded by Ken Atkins, the chair of the first Lewisham Self Build Group, as the explain by architects, primary design by user, professional design by architect, choice of user, construction and user alternation.³ In order to make things convenient and

¹Giancarlo De Carlo. *Architecture’s Public. Architecture and Participation*. Edited by Peter Blundell Jones, Doina Petrescu & Jeremy Till (2005). New York: Spon Press. 18

²Giancarlo De Carlo. *Architecture’s Public. Architecture and Participation*. Edited by Peter Blundell Jones, Doina Petrescu & Jeremy Till (2005). New York: Spon Press. 18

³ “The architect used graph paper to help us represent the modular concept of a feet a inches, and asked us to draw a house within cash limits. This was about 100 square metres in area. We

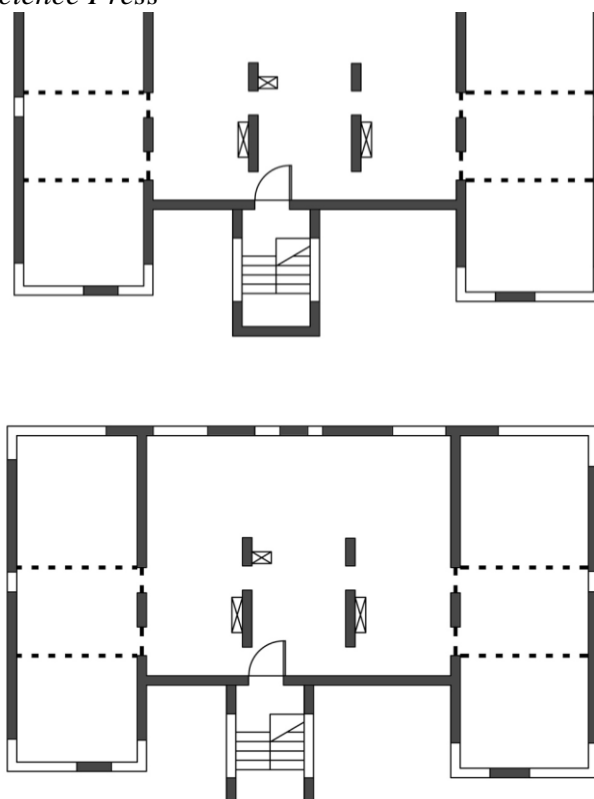
intuitive, in the mid-1960s, Walter Segal invented a timber construction method, which was so easy to handle that everyone can build and alter their own house even with only basic training of building skill. His approach was based on the combination of standard components and panels with “a post and beam timber frame”. Users could decide everything in the frame, including the division of internal space and appearance of external facades. The construction method adapted was dry trades such as bolts and crews while the walls and partitions were without load bearing. It was proved to be useful not only for the convenience of control, but also for the intuitive perception it provided especially for the people who were not familiar with the technological drawings.

With something in common with Walter Segal’s frame and infill concept, N. J. Habraken’s research was more systematical for his attention on theoretic basis as well as specific operational technique. His interpretation of residential building was concluded as the separation of “Support” from “Infill”: the former was to be designed by professionals while the latter was to be determined by individual occupant. The comprehensive interpretation was primarily carried out by Frans Van der Werf in Molenvliet support housing in Netherland, as well as Nabeel Hamdi together with Nicholas Wilkinson in Adelaide Support Housing in London. In the latter case, just after the completion of “Support”, relevant materials were sent to the future occupants in order to collect their demand for living and space. And then, according to users’ requirements, the “Infill” was installed, including wall, door, bathroom and washroom.¹ (Figure 3)

did this as a group and then went to Walter Segal’s house. He took all the ideas and drew up 50 or 60 different house plans and then we went back as individual families to choose and adapt our design.... Every wall is non-load-bearing so it’s adaptable and changeable. At any time during the process of building or after I’ve lived in it, if I feel I want to change it, I can take out any wall and change it.” As quoted in Jon Broome. *Mass Housing Cannot Be Sustained. Architecture and Participation*. Edited by Peter Blundell Jones, Doina Petrescu & Jeremy Till (2005). New York: Spon Press. 71.

¹ Bao Jiasheng (1988). *Support Housing*. Nanjing: Jiangsu Technology & Science Press. 15

Figure 3. *Support and Complete Result of Molenvliet support housing in Netherland. Bao Jiasheng (1988). Support Housing. Nanjing: Jiangsu Technology & Science Press*



In the recent thirty years, based on the deepening understanding of relationship between environment, architecture and human being, the objective of participation was turned to the development of building quality¹. The architects were responsible for the design process and building quality, while the way of participation tended to be indirect. In those cases, the users withdrew from design work while their participation was realized by the provision of ideas through consultation and the alternation of existing results. While the tasks of architects were collecting user's needs, providing positive condition for participation, and encouraging the users' involvement.

The above principles were perfectly interpreted by Ralph Erskine in his redevelopment design of Byker, Newcastle, England. At the very beginning of this project, the users in Byker were put as priority. In order to listen to them, a small site office with an open-door policy was set up for user consultation as soon as the project was initiated. By providing additional services of lost and found as well as drawing teaching, it was soon accepted by local residents. A great deal of consultant conferences with an informal form was held in the office, which played an essential role in the participatory process. There was a

¹Jia Beisi (2013). A View on the Development of Open Building and its Revelation on Residential Design in China Today. *Architecture Journal* (01): 20-26. 24

lot to learn from the consultation which was conducted at an extensive scope, from the guidance principle to the design details. On the one hand, the new architecture was explained, such as the location, layout, facade, and so on. While on the other hand, the suggested environment was examined by inhabitants, and the alternatives were worked out when they were inconsistent. Now the new Byker had come true. It was undoubted that the architects had designed better housing under the influence of the users, and gained invaluable experience for future projects.

However, for the large number of residential building, it was more effective and profitable to involve the users by the evaluation of design methods. In other words, what the architects do was to leave the possibility for participation. To the question that it can be realized or not, it depended on the users themselves. Instead of focusing on the non-static ideas, those researches moved gradually to the design of permanent parts. This conversion was clearly revealed in Bernard Leupen's argument of flexible housing which paid attention to the permanent in order to achieve subsequent freedom. In general, the permanence in his research was the element in relation to the structure, such as the service and access, on which the flexible deployment for future user was depended.¹ This conceive was wildly accepted and although the definition of permanence was indeterminate.

In the leading book "Flexible Housing", Tatjana Schneider and Jeremy Till concluded the involvement of user as three specific degrees: customization "which gave the future residents a degree of choice over their future home", participation which was potential for the users to modify their home prior to occupation, and adjustment which empowered "users to make adjustment on their own terms".² And it came to the method for participation, instead of the complex collecting work of undefined thinking, the main attention they paid was on the design for the fixed parts and the space in which the function was intangible and could be determined by the future clients. In other words, the main focus then was the evaluation of design methods with the aim of providing various choices for future tenants. In order to absorb users into participation work, they preferred to using moveable and changeable elements in order to simplify the working process of change and minimize the cost. Some architects even prepared the user-manual which illustrated the construction and alternation principles, as well as provided some possible options.

Similar attribution was also made by Jia Beisi. In "Adaptable Housing Design"³, his proposal was to increase adaptability with the aim of creating beneficial condition for future user's involvement. He convinced that the development of adaptability can meet the occupant's various demands for

¹Barry Russell (1981). *Building Systems, Industrialization, and Architecture*. London: John Wiley & Sons.

²Tatjana Schneider & Jeremy Till (2007). *Flexible Housing*. London: Taylor & Francis. 47

³Jia Beisi & Wang Weiqiong (1998). *Adaptable Housing Design*. Nanjing: Southeast University Press.

housing quality as well as the changing needs in the process of using within the same flat. What's more, he also proposed that the developers and professionals were bound to improve the adaptability of all the suites so that the future owners could determine the combination way of them.

Discussion

Compared with directive engagement, it seems that the indirect participation is a retroversion, especially when the attention is focused on the design of permanent instead of the user's ideas. However, as the matter of fact, it is positive for the improvement of building quality. After all, giving over the design work to the householders, most of whom have no professional training experience of architecture is a great venture. What's more, it is of utmost practical significance especially to developing countries which are in urgent demand for housing quantity and in the high speed of construction. For example in China, housing at present is a commodity of the developers instead of a product of the country. The businessmen get the land-use right with sky-high price, they want nothing but to complete the construction and earn money as soon as possible. That's why the standard layout and similar facades can be found everywhere. After the completion of whole building, the property management companies are bound to take responsibility instead of the builder and developer. As a consequence, the builders pay little attention to the long-term use or the individual characters of users. In this circumstance, the strict control of participation can, on the contrary, leads to wide implementation and satisfactory outcome.

Till now, the term of user participation is with long conversation and short action. Flexible Housing, due to its inherent property, is inevitably tied with the empowerment of users. It appeals for the innovation of thoughts more than specific measurements. A real Flexible House is bound to be determined by two aspects: architects and users while their relationship is double-acting. To the architects who are responsible for the works of design as well as the task of communicator and coordinator, they are supposed to create positive condition for participation as well as build necessary limit. As most of the users have never been professional trained, their architectural activity should be rationally controlled instead of excessively expanded. To the users, they should be actively and proactively involved. It is a new challenge not only for every architect but also for all the users in this field. Only under the condition that the architects and users are in good cooperation, a satisfactory result will be worked out.

Bibliography

Book

Bao Jiasheng (1988). *Support Housing*. Nanjing: Jiangsu Technology & Science Press.

- Barry Russell (1981). *Building Systems, Industrialization, and Architecture*. London: John Wiley & Sons.
- Harbraken N. J. (1972). *Supports: an alternative to mass housing*. London: Architectural Press.
- Harbraken N. J. (1976). *Variations: the Systematic Design of Supports*. New York: Laboratory of Architecture and Planning at MIT.
- Habraken N. J. (1998). *The Structure of the Ordinary: Form and Control in the Built Environment*. London: MIT Press.
- Jia Beisi & Wang Weiqiong (1998). *Adaptable Housing Design*. Nanjing: Southeast University Press.
- Jia Beisi (1993). *Housing in Long-term Effectiveness: the new thought of contemporary housing design*. Nanjing: Southeast University Press.
- Joseph Chuen-huei Huang (2008). *Participatory Design for Prefab House*. Saarbrücken: VDM Verlag Dr. Müller Aktiengesellschaft & Co. KG.
- Kendall Stephen & Jonathan Teicher (2000). *Residential Open Building*. London and New York: E & FN Spon.
- Nabeel Hamdi (1991). *Housing without Houses: Participation, Flexibility, Enablement*. New York: Van Nostrand Reinhold.
- Peter Blundell Jones, Doina Petrescu & Jeremy Till (2005). *Architecture and Participation*. New York: Spon Press.
- Tatjana Schneider & Jeremy Till (2007). *Flexible Housing*. London: Taylor & Francis.
- Turner John F. C. & Robert Fichter (1972). *Freedom to Build: dweller control of the housing process*. New York: Macmillan.

Journal article

- Jia Beisi (2013). 'A View on the Development of Open Building and its Revelation on Residential Design in China Today.' in *Architecture Journal* (01): 20-26.
- Jia Beisi (2011). 'The Characteristics of Buildings Designed by Baumschlager Eberle (BE).' in *New Architecture* (06): 59-63.
- Denise Morado Nascimento (2012). 'N. J. Habraken Explains the Potential of the Open Building Approach in Architectural Practice' in *Open Building International* (04): 5-13.