ANALYSIS OF MENTAL MAPS FOR IDEAL APARTMENTS TO DEVELOP AND SIMULATE AN INNOVATIVE RESIDENTIAL INTERIOR SPACE

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ABSTRACT  Even though results of applied research have been ideally expected to be read and used by practitioners, written suggestions have been less persuasive, especially in visual field such as environmental design, architecture, and interior design. Therefore, visualization of space has been frequently considered as an ideal alternative way of suggestions and an effective method to disseminate research results and help decision makers. In order to make the visualized target space very solid and mundane, the scientific research process to define the characteristics of the space should be precedent. This presentation consists of two parts: first research part; second a design and simulation part. The purpose of the research was to identify the ideal residential interior characteristics on the basis of people’s mental maps for ideal apartments. To achieve this goal, quantitative content analysis was used, using an existing data set of floor plans drawn by housewives. 2,215 floorplans were randomly selected among 3,012 floorplans collected through a nation-wide housing design competition for ideal residential apartments. 213 selected variables were used to analyze the floorplans. Major contents were the presentational characteristics of mental maps and the characteristics of design preference such as layout, composition, furnishing etc. As a result, current and future possible trends of ideal residences were identified. On the basis of the result, design guidelines were generated. An interior spatial model for small size unit using CAD was developed according to the guidelines. To present it in a more effective way, computer simulated images were made using 3DS. This paper is expected to generate the comparison of various methods for presenting research results such as written documents, drawings, simulated images, small scale models for endoscopy and full scale modeling.

INTRODUCTION  Until recent year, it was common for construction companies to focus only on the quantity of housing in Korea. Also the uniformly mass-produced apartment interior environment has caused to frequent mobility as well as indiscreet renovation (Kim,1993). Recently, however, rapid development of apartment complexes has had a significant impact on the consumers’ ability to choose preferred residential interior environments. Moreover, the increase in remodeling of uniformly mass-produced apartments has also had an overwhelming effect on consumer taste. As a result, housing construction companies in the competitive housing market have become more eager to satisfy the interests of changing consumer demands. In addition, it has promoted many researchers and construction companies to consider a new methodological development that is more in touch with residents needs.
If we consider:

a) the significance of the housing interior environment for the quality of life as an everyday living setting,
b) the lack of mental environmental image research about micro level space, it becomes easy to see how the development of a mental map analysis method would be worthwhile.

PURPOSE OF THE RESEARCH The purpose of this research was to scrutinize the characteristics of the present housing culture, to predict the future housing culture and to suggest useful concepts in housing development by using "housewives" mental images of ideal apartment. This is considered as a fundamental research to justify the validity and solidity of the designed and simulated interior.

METHODOLOGY Content analysis was used as the method. The data were mental maps, that is, floorplans drawn by housewives. The mental map is a kind of paper and pencil test in the environmental psychology, which shows a person's experience and need by drawing. Compared to the questionnaire and interview, this relatively new technique can be used very effectively to identify user needs. Data were provided by a housing construction company that held nationwide competitions every year for housewives. Participants were recruited through advertisements using various mass-media outlets, such as daily newspapers and popular magazines. Of the total 3,012 floorplans, 2,215 floorplans were selected by Proportional Stratified Random Sampling Method. 213 selected variables were used to analyze the floorplans. They consisted of residents' characteristics, presentational characteristics of mental maps, design preference characteristics, such as layout, composition, furnishing, aesthetic and traditional aspects. The analyzing instrument was developed through reliability test in three times.

RESULT OF THE RESEARCH Taking into consideration the degree of popularity and cross historical trends, the results were divided into two parts: one to describe the present trends and the other to predict the future trends. The conclusions are as follows:

1. In terms of the characteristics of present housing cultures, the research revealed that respondents wanted more rooms that could accommodate various functions. They still preferred 'south faced' houses, but the proportion decreased. They also preferred bedrooms to be located at both sides of, or scattered around, the central public space. Some placed importance on the effectiveness of housing functions, while others urged for gardens in the interior space.

2. With regard to predicting future housing, the respondents wanted to eliminate the closeness and overcome the limited space by expanding the verandah for active and visual use. Also there was a tendency to emphasize the number of bathrooms; that is separate the facilities by function. The respondents were also enthusiastic about some of the more traditional aspects of older housing designs, such as type of main entrance door, garden, aquarium, floor materials and seating style arrangement. Some progressive and diverse design features appeared more in the facades than the interiors.

3. If we take into consideration of objectives of housing construction companies and user needs, it becomes clear that future building projects will require more advanced features, such as additional rooms, more kitchen and bathroom space and various other ways to achieve a sense of spaciousness, effective functioning, and tradition.

DESIGN DEVELOPMENT The significance of this research lies in that it used mental map data and content analysis technique to access user needs and housing norms of current Korean society.

Since the floorplans gave information about what consumers/users wanted for their interiors, the results were expected to be used to develop user-oriented unit designs of mass-produced apartments. To give more practical and specific information, data were further analyzed according to house size, since floor plan characteristics largely depend on house size. Four popular apartment size ranges were selected: small (app. 850 f2), lower middle (app. 1200 f2), upper middle (app. 1700 f2), and large size (app. 2500 f2). Data were sorted by house size to give a clearer picture of the residents and their preferences. On the

basis of analysis, checklists for relevant size of house, design concepts and guidelines for new alternative were generated. As results, four prototype floorplans were developed. Among them, a small apartment plan is introduced here.

SIMULATION Since the design concepts used here were innovative compared with ones found in existing plans, it was necessary to simulate the interior environment to give clearer picture and to communicate with relevant decision makers more effectively and to help them make decision in easier way. As examples two perspectives are shown in figure 3. Since residential interior is a micro space which requires some imaging ability to project the space in 3-dimensional way to clearly understand its 2D plan, 3D simulation seems also very effective. Judging from the researcher's past experience in presenting research result to decision
makers in the field in various ways such as in written form, graphic form, 3D CAD form and scaled model in parallel with oral presentation, this one with additional simulated computer images was found very successful. It led the discussion very active and interesting, generating lots of questions and feedback, prompting energetic decision for implementing the suggested idea. It was very useful to show interior images such as spaciousness, color, texture and flexibility which can hardly be shown through conventional scaled model. The model, however, can be more effective if computer is used to produce the surface images for mapping and the endoscopy is used to view it more realistically. (See figure 3 and a)

REFERENCES