Characteristics of User Redesign Process: A Study of Changes Made by Users in Architect-Designed Housing

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Abstract: Housing is dynamic. It changes with time. A sample of 60 houses in the Shagari Low Cost housing scheme in Kaura Namoda was studied in order to find out the characteristics of changes made by the users. Physical observations and questionnaires were used as the major instruments of data collection. The results show that 91% of occupants have made various changes to the original designs without the help of professional designers, and some of the changes have completely transformed the outlook of the houses in locational planning, materials and form. This implies that a post architectural design phase exists, suggesting that the design process can be divided into two phases; the initial design by the architect and the subsequent redesign by the user. The paper presents preliminary findings on the general characteristics of user redesign and concludes that a clear process can be established. The architectural design process can, therefore, be expanded to include the user redesign process in order to reflect the entire lifespan of the building.

Key words: Architectural design process, changes, expanded design process, housing, user redesign.

1. Introduction

Built environments have great potentials for change. Change induced by dwellers is necessary at all levels for a healthy, vital steadily improving environment Habraken [1]. Brand [2] discusses how various types of buildings change, concluding that institutional buildings are the most resistant to change, commercial buildings change kaleidoscopically while domestic buildings are the steadiest changers as they have to respond daily to the interaction of man and the house.

Housing environments change constantly owing to a number of factors which include changing family size and structure, changing tastes, development of new technology, fashion, and so on. Habraken [1] explains that housing has great potentials for change and that this fact is a major factor that architects should consider in the design of housing. He calls on designers not to see housing as a finished product like with the rest of architectural artefacts but to consider the process of change. The right attitude in design of housing should be - one cannot finish things; one can only make them possible. Similarly, Granath [3] calls on architects to design architecture in such a way that it supports participation in the use of architecture. Architecture, especially housing, should be responsive to changes.

Users modify their housing environments consistently. These changes often distort the original intentions of the architect. Changes by users are therefore significant in defining the housing design process. Therefore, the architect’s inability to eventually predict user needs that are not clearly stated and the changing tastes of the user have often culminated in changes in the design during occupation. Boudon [4] studied Le Corbusier’s Quartiers Modernes Fruges, a rental housing scheme built in Pessac in 1926, and discovered that the occupants changed the character of the initial designs in order to express their personality. This study points to the fact that no matter how creative a designer may be, his designs could undergo changes by the users if they are not involved in the design process. The involvement of the user in changing the original designs is a part played by the user that has been overlooked but that is significant to the design process.
The focus of this paper, therefore, is to study the general characteristic of changes made by a sample of users of the Shagari Low Cost housing scheme in Kaura Namoda, Zamfara State, Nigeria and therefore attempt to chart the processes that produced the changes as having a distinct characteristic and to place it on an expanded architectural design process proposed by Suleman [5].

2. Background of Study Area

The study was conducted at the Shagari low cost housing scheme in Kaura Namoda. The Shagari Lowcost housing schemes were built all over the country in the early 1980s and were meant to house the low income population. The design is basically a one bedroom core house with a toilet and bath and a kitchenette (see Fig. 1). The major concept was to produce an initial minimal space that could be expanded incrementally by the user.

The Shagari low cost at Kaura Namoda is located at the north western part of the town, off the Kaura Namoda - Shinkafi road. It consists of 100 housing units. In the 1980s when the Shagari low-cost housing was constructed, it was widely rejected throughout the country based mainly on location, insufficiency of space and lack of basic infrastructure. In Kaura Namoda the houses were rejected and were finally offered to the Federal Polytechnic which also rejected them. They were therefore sold to individuals. In the 1990s when increase in population of the polytechnic brought acute shortage of staff housing, the polytechnic had to acquire most of the housing units in the Shagari estate at exorbitant rates and turned them into staff quarters on affordable rents.

3. Methodology

For the study to be meaningful, various types of data needed to be generated; data establishing that significant changes occur in houses designed by architects, data showing the general process of user redesign, and data from which a general process of user redesign can emerge. Therefore, different data collection methods were used including physical observations, questionnaires, interviews and protocol analysis.

The initial plan was to show that changes do significantly occur in housing designed by architects. As a result physical observations were thought of as the most appropriate way to study changes made by occupants to architect-designed houses. Observed changes were documented through notes, sketches and photographs and measured drawings. An aspect of physical observation recommended by Zeisel [6] and which is central to this study is observing adaptive traces. “Adaptive traces are significant for designers because they are direct manifestations of design by
users” Zeisel [6]. Visual data were used mainly to prove that users do effect changes in housing, and that the changes are significant as they affect all aspects of the building. Questionnaires were also administered to occupants to find the condition of their housing at occupation and the current state. The questionnaires also focused on the process of change. A random sample of 60 houses, representing 60% of the houses, was chosen for the study. Some few houses were chosen purposefully to record the details of the changes that had been effected by the users.

Interviews were also conducted with occupants specifically on the process of change they adopted. The unstructured method of retrospective protocol analysis was adopted. Retrospective protocols of selected users were taken using a tape recorder and these were later transcribed and coded and finally compared to the three stages of the architectural design process — analysis, synthesis and evaluation — in order to establish the process the users applied.

4. Results

Preliminary results from physical observations and questionnaires are presented in this section.

4.1 Physical Observations

Observations showed that a lot of changes have occurred in the estate. Despite this the estate has maintained its general outlook except for few houses where the complete outlook of the house has been changed. Changes were dominated by changes of functions of spaces, and increase in room sizes which affected the structure of the building. Decoration was also affected as people changed finishes applied to the houses. Owing to the lack of pipe borne water in the estate, toilets, bathrooms and kitchens were generally relocated outside the houses. Figs. 2–8 show various modifications of the original plans.

Fig. 2 shows the original plan converted to a 3-bedroom house with the living room and bedroom retained while other facilities are relocated with additions made. The conversion changed the entire outlook of the house. Window hoods were added for sun shading. Fig. 3 shows the house converted to 3 bedrooms with a shop. This has also affected the front view. Fig. 4 shows addition of a high fence and gate, while Figs. 5–8 show different configurations of 2-bedroom options as effected by various users.
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Fig. 3  Plan and view of redesigned house with shop addition.

Fig. 4  Plan and view of redesigned house converted to 3 bedrooms with high fence wall and gate.

Fig. 5  Plan and view of house converted to 2 bedrooms.
These changes are significant as some of the houses have completely been changed beyond their initial outlook, showing that user redesigns are part of the development of the house. They cannot therefore be ignored; they form part of the design process.

4.2 Questionnaires

Of the 60 questionnaires distributed, 48 representing 80% were returned. From the questionnaires, it was discovered that 91% of respondents had made changes to the original design and the 9% that were yet to make changes indicated plans to make changes in the near future. Detailed findings from the questionnaires are presented in Tables 1–5 below.

<table>
<thead>
<tr>
<th>Type of Change</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Increase in number of rooms</td>
<td>55</td>
</tr>
<tr>
<td>Size of spaces</td>
<td>15</td>
</tr>
<tr>
<td>Change affecting form</td>
<td>9</td>
</tr>
<tr>
<td>Changes affecting materials/finishes</td>
<td>11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intuition</td>
<td>29</td>
</tr>
<tr>
<td>Experience from lived-in problems</td>
<td>49</td>
</tr>
<tr>
<td>Suggestions from laymen (family, friends, etc)</td>
<td>7</td>
</tr>
<tr>
<td>Assistance of professional</td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of Constraint</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>77</td>
</tr>
<tr>
<td>Technical competence</td>
<td>11</td>
</tr>
<tr>
<td>Plot size</td>
<td>10</td>
</tr>
<tr>
<td>Availability of materials</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 4  Factors that caused changes.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeking solution to problems</td>
<td>29</td>
</tr>
<tr>
<td>Increase in family size</td>
<td>49</td>
</tr>
<tr>
<td>Change of taste</td>
<td>20</td>
</tr>
<tr>
<td>Change in economic status</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 5  Major Areas Affected by Changes.

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedrooms</td>
<td>47</td>
</tr>
<tr>
<td>Kitchens</td>
<td>22</td>
</tr>
<tr>
<td>Store</td>
<td>14</td>
</tr>
<tr>
<td>Toilets</td>
<td>11</td>
</tr>
<tr>
<td>Living Room</td>
<td>3</td>
</tr>
<tr>
<td>Others (e.g. addition of shop)</td>
<td>3</td>
</tr>
</tbody>
</table>

5. Characteristics of User Redesigns

From the physical observations and questionnaire the following deductions were made:

5.1 Change in Housing is Inevitable

Item 2 in Table 6 shows that a total of 91% of the houses have undergone various changes that have completely affected the original designs. Changes affected the function of spaces away from what was originally planned by the architect. It cannot therefore be said to be the same building; it has been redesigned by the occupant. This implies that changes are inevitable in occupied houses and are a very significant part of the design process. This is instructive to designers; rather than looking at houses as static objects, designers should view them as dynamic. This view is consistent with that expressed in Habraken [1], calling on designers of housing not to see it as a final product but consider the possibility of future change.

5.2 Changes affect All Aspects of Design

Architectural design concentrates mainly on three aspects; function, form (structure), and aesthetics. The survey discovered that all these aspects of design were affected. Though most changes were functional, there were also changes in structure caused by addition of rooms and changing of roof structure. Aesthetics is affected by changes in finishes and painting and creation of new forms. Figs. 2–8 show the various changes in plan and form.

5.3 No Professional Assistance in Redesign

Most of the respondents indicated they did not consult any professional in the redesign of their houses. Item 3 in Table 6 shows that only 4% of respondents got professional advice. This indicates that the redesigns were made by the users themselves thus using the architect’s initial design as a starting point for their designs. Producing their designs without the help of professionals is also significant. It brings out the creativity of the user in solving the problem “created” by the architect. The redesign by the user is part of the evolution of the building and should form part of the entire design process.

5.4 Hands-on (Trial-and-Error) Approach

Item 9, Table 6 shows that only 22% of respondents communicated their ideas through sketches, while 88% did not use sketches. This is a major difference between the architect’s design and the redesign of the user. Unlike the architect who uses drawings and sketches, user redesigns are mental unaccompanied by sketches. Most of the changes are made on site as the builders work. Mistakes are corrected as observed (trial-and-error). This is usually costly as it implies undoing some of the work through demolition and
reconstruction. Table 3 shows that the major constraint faced by occupants is cost (77%). This is likely because of such trial and error approach. Lack of sketches also affects evaluation. Ideas on paper can more likely be easily understood and criticised than mental ideas. Sketches are very useful in design as they help “reflective criticism” Lawson [7]. One major importance of sketching in the design process is that it serves as external memory and reduces the load on internal memory of the designer and thus helps the designer to recall easily by looking through the sketch Suwa et al. [8].

5.5 Problem-Driven Design Approach

Architectural designs are intuitive problem-solving processes. Ideas for user redesign stem mainly from experience of problems with the design. 49% of respondents affirmed this while 29% got ideas by intuition, 7% got ideas from other laymen and 15% from professionals (Table 2). Item 6 in Table 6 shows that only 20% of respondents produced alternative solutions, while 80% did not produce alternative solutions. User redesigns are therefore “problem-driven” while that of the architect is regarded as ‘solution driven’. Problem driven designs are seen as design in which “the designer focuses closely on the problem at hand and only uses information and knowledge that is strictly needed to solve the problem. The emphasis lies on defining the problem, and finding a solution as soon as possible”, and solution-driven design as designs in which “the designer focuses on generating solutions, and only gathers information that is needed to further develop a solution. The emphasis lies on generating solutions, and little time is spent on defining the problem, which may be reframed to suit an emerging solution.” [9].

5.6 Users not Involved in Original Designs

Item 1 in Table 6 shows that none of the users was involved in the design of the house occupied. In fact, none had knowledge of the designer. Architects have been criticised for designing without involving the users and calls have been made for the involvement of users in the design of their houses [6, 10–14].

5.7 Changes Caused by Needs

Increase in family size was the major reason advanced for the need for changes by 49% of the respondents, while 29% of changes were caused by need to solve some problems. Other reasons are change in taste (20%) and change in economic status (2%) (Table 4). This is further confirmed by the dominance of addition of rooms as the major type of change (47%) as may be seen in Table 5. This further affirms that as long as changes in taste occur due to changes in status and family size for example, the house cannot remain static; it must change with changing tastes.

5.8 Direction of Changes Affected by Original Designs

Item 3 in Table 6 shows that 68% of respondents agree that the direction the changes took was detected by the original designs. 32% felt the original designs had nothing to do with changes made. This is instructive to architects to realise they need to make allowance in their designs for future changes. It also calls for studies to identify likely direction of user redesigns to help the architect make his initial design flexible to accommodate the anticipated future changes.

6. Inferences from Characteristics of Changes

From the study, the general process user redesigns take is as follows:

1. Experience lived-in problems from architect-designed house
2. Analyse problems
3. Form mental picture of required changes
4. Input from friends and family
5. Effect changes

A clearly well-defined process of user redesign is similar to that of the architect. It is necessary to note
that because the user has lived long with the problem, it is well-defined; he knows clearly what he wants. Solving well-defined problems, such as mathematics, tends to be linear. It is possible therefore that the user redesign process, unlike the cyclical design process of the architect, could be linear. Staying with the problem for long means there has been some synthesis before the solution could have been derived, however, lack of procedural knowledge and absence of sketching have limited the ability to synthesise. The synthesis stage appears not well developed but forms part of the problem analysis. Lack of alternative solutions completely eliminates the evaluation stage. It is possible to conclude tentatively therefore that user redesign process is a linear process composed of a strong analysis and a weak synthesis that are fused together producing a final solution. Further analysis through retrospective protocols will be helpful in clearly defining the process of user redesign.

7. Conclusion

The study has shown that changes in buildings are inevitable. Users make changes on designs initially made by the architect to meet their changing tastes. These changes often result in complete transformation of the initial model created by the architect into something completely different. Changes made by the user are often independent of the architect. This process of user redesign has its own distinct characteristics from that of the architect. This shows that the input of the user is very significant and should be reflected in the design process to cover the entire lifespan of the building. The study points to a possible two-staged design process; the first stage by the architect that has been found from studies to be cyclical, leading to the ‘final product’, and the second stage of user redesign which uses the architects ‘final product’ as its starting point to create a final solution. This calls for further research, for example, using retrospective protocol analysis, to plot an acceptable process of user redesigns, and finally incorporating the resulting user redesign process in the architectural design process to produce a comprehensive design process that would reflect the entire lifespan of the building.

References