

THE QUALITATIVE RESEARCH FOR THE ARCHITECTURAL DESIGN AND EVALUATION OF COMPLETED BUILDINGS – PART 1 – BASIC PRINCIPLES AND METHODOLOGY

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Abstract

The subject consists of two parts. The first one discusses the theoretical basis and methodology of using qualitative research in programming and design. The second part presents some examples of buildings' assessment, with an indication of the methods and techniques of research, and discusses the main results.

Theoretical grounds are based on literature studies and evaluations of dozens of objects with different functions conducted by the authors. Presented research was carried out: qualitative (in terms of technical quality, functional, organizational, behavioral, economic), observations, surveys, interviews (with users, managers, experts, investors), way-finding and participatory. Own design experiences were also used, including pre-designing study of objects with similar functions, as well as the conclusions of the assessment of designed objects. Experience gained during classes with students of architecture in the subject of qualitative research was also crucial. Authors' views in the field of architectural design and teaching students of architecture were also presented.

Streszczenie

Temat ujęto w dwóch częściach. Część pierwsza omawia podstawy teoretyczne oraz metodologię w zakresie badań jakościowych z zastosowaniem w programowaniu i projektowaniu. Natomiast część druga prezentuje wybrane przykłady wykonanych ocen budynków ze wskazaniem zastosowanych metod i technik badawczych oraz omówieniem najważniejszych wyników. Podstawy teoretyczne oparto na badaniach literaturowych oraz przeprowadzonych przez autorów ocenach jakościowych kilkudziesięciu obiektów o różnych funkcjach. Wykonano badania: jakościowe (w zakresie jakości technicznej, funkcjonalnej, organizacyjnej, behawioralnej, ekonomicznej), obserwacyjne, ankietowe, wywiady (z użytkownikami, zarządcami, ekspertami, inwestorami), way-finding, partycypacyjne. Wykorzystano także własne doświadczenia projektowe, w tym wykonane badania przedprojektowe obiektów o podobnych funkcjach, a także wnioski z ocen zaprojektowanych obiektów. Istotne są również doświadczenia uzyskane podczas zajęć ze studentami architektury w zakresie badań obiektów. Zaprezentowano osobiste poglądy autorów w zakresie projektowania architektonicznego i nauczania studentów architektury.

Keywords: Programming in architecture; Quality evaluation; Design methodology; Architectural design; Quality in architectural design; Facility management.

1. INTRODUCTION AND LITERATURE

The built environment is a source of valuable knowledge for designers, which is about the buildings and users. Currently, architects need the professional cognizance to design and it is also required for investors and end-customers. With a choice of research methods and techniques knowledge can be acquired from the built environment. Qualitative research is a source of universal methods for assessment of whole objects, as well as selected elements of the building: zones, interiors, outdoor spaces, and above all, it provides recognition of users' opinion. They are useful in planning, programming and architectural design. The approach to design using research fits into the current trend, associated with quality assessment in architecture known as: research by *design and design by research*.

Modernity in architecture is predominantly expressed in innovative, fashionable external forms, technical innovations and building packed with the latest technology. For architects, building aesthetics is definitely one of the primary objectives, if not the first. It seems that a few architects are aware that according to a survey by CBOS entitled "People of Poland about architecture" external appearance of the building is important for only 12% of respondents [9]. Also, according to Maslow's hierarchy of human needs, aesthetic ones are in the last 7th place after the: physiological, safety, belonging and love, recognition, self-actualization, knowledge and understanding needs [14]. During observation of the environment, there can be seen works of architecture, full of harmony, composition, that please professionals (architects). Surely the user's position may be less spectacular, but more human-friendly and one that satisfies their needs. The optimal solution is to combine both high architectural masterpiece and the creation of object that meets the expectations of users. But how do we know what the needs and users' expectations are? The answer to this question is the qualitative research in conjunction with architectural design, included in this chapter. If architectural design assumes that it should respond to the needs of users, it should be understood as the qualitative design. It requires professional knowledge, which can be obtained through qualitative research. They are useful in the design of urban planning, architecture, construction or installation. In conclusion, the built environment through qualitative research is an important source of knowledge for the design. Architects, of course, are constantly observing the existing built environment. They are keeping an eye

on the latest trends in design, evaluate their own and other projects and facilities, but it is often a superficial assessment, aimed primarily at aesthetic, interesting facts, details, fashionable solutions etc. Architects rarely reach for the professional methods to full cognition of the knowledge or opinions of the users or administrators. The approach to design using research fits into the current trend associated with quality assessment in architecture known as *research by design* and *design by research*. In the world, qualitative assessments are known since 60-, 70- and 80-ties of the last century.

Theoretical analyses were based on literature studies and conducted by the authors' quality evaluations on more than 50 objects with different functions: recreational, commercial, educational, social, hotel, service, medical [6] [7] [11]. Given research was performed as: qualitative (in terms of technical, functional, organizational, behavioral and economic qualities), observations, surveys, interviews (with users, managers, experts, investors), way-finding and participatory. More than 20 years of author K. Fross' experience in design practice were also used, including pre-designing research of the objects with similar features and conclusions of the designed objects' assessment. Experience gained during the research facilities classes with architecture students was also relevant. The authors' personal views in the field of architectural design and teaching architecture students were also presented.

2. METHODOLOGY OF THE QUALITATIVE RESEARCH

The basic establishment is that the built environment is a direct source of valuable information about design, in other words it is the knowledge about buildings and users. This can be reached in simple fast and efficient way with the use of research methods and techniques. Fig. 1. presents an example of a typical panorama of large cities: Warsaw and Osaka. What can be seen in the photographs is a built environment. Both examples are functioning as the outstanding works of architecture, well-designed, functional, economical, energy-efficient, user-friendly facilities, as well as poorly designed and functioning, ineffective, so-called "sick buildings". "Sick building" does not have to be an old and dilapidated building, it can also be a new, contemporary or intelligent one. [12] [13]. Architects design buildings, on the other hand the users evaluate and rate them. The questions can be asked: are architects interested in: what is the



Figure 1.
Panoramas: Warsaw from Palace of Culture and Science and Osaka from the roof of train station. What can be seen in the photographs is a built environment [foto: K. Fross, 2012, 2014]

users' opinion about designed building, how does the building work, what problems indicates the manager of object? Do architects receive feedback from administrators (facility managers) of their designed buildings? In the normative design (traditional) there is a lack of feedback about the use and management of the facility. In the design promoted by the authors, using the research gives full exchange of knowledge and experience. But how do we know that the building is efficient, friendly, and meets the functional, organizational or behavioral expectations? That can be known by executing the qualitative research. By looking at the built environment, visible in the photographs of Fig. 1, and having available techniques and research methods, there should be seen: a source of knowledge about the buildings and their users and the information base for the design.

There are many known methods of qualitative assessment used to acquire the knowledge and evaluation of the built environment, such as: POE (Post Occupancy Evaluation), REN (Real Estate Norm), BQM (Building Quality Management), FSA (Functional Suitability Assessment), STM (Serviceability Tools and Methods), PBAP&MM (Physical Building Audit Procedures and Maintenance Management), BIU (Building-in-Use), BPE (Building Performance Evaluation), BREEAM (Building Research Establishment Environmental Assessment Method), EPIQR, TOBUS, INVESTIMMO, LIFECON, EUROLIFEFORM, SUREURO, ECB&CS (Energy Conservation in Buildings and Community System), EIA (Environmental Impact Assessment), GBC (Green Building Challenge), LSA (Land Suitability Analysis), LEED (Leadership in Energy and Environmental Design), LCA (Life Cycle Assessment), LCC (Life Cycle Cost), LCCA (Life Cycle Costs Analysis), MSDG

(Minnesota Sustainable Design Guide), SBE (Scenic Beauty Estimation), SIA (Social Impact Assessment), MSBG (The State of Minnesota Sustainable Building Guidelines), VIA (Visual Impact Assessment).

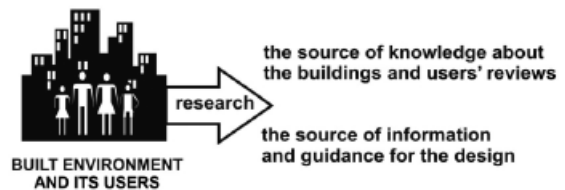


Figure 2.
Scheme – built environment as a source of knowledge for designing [K. Fross, 2012]

Currently in the world, qualitative research is budding and widely used in all highly developed countries. In Europe, the leading countries are: the United Kingdom and the Netherlands and outside - the United States, Canada, Australia and Japan. The following research is carried out in them: the assessment of quality during the use by method POE as monitoring of public facilities, qualitative research by methods BQA, REN, etc. or the functional adequacy. In urbanized societies using research is simply profitable. The use of research allows to monitor the current condition (which is the functioning of certain facilities primarily in terms of operating costs) and the use of experience (in order to create more efficient and economical buildings, taking into account the growing needs of users) [9].

One of the most popular methods is: POE – Post Occupancy Evaluation (Preiser W., Rabinowitz H., White E. 1988) and its continuation – BPE method – Building Performance Evaluation (Preiser W., Vischer J.C. 2005). Qualitative research (including

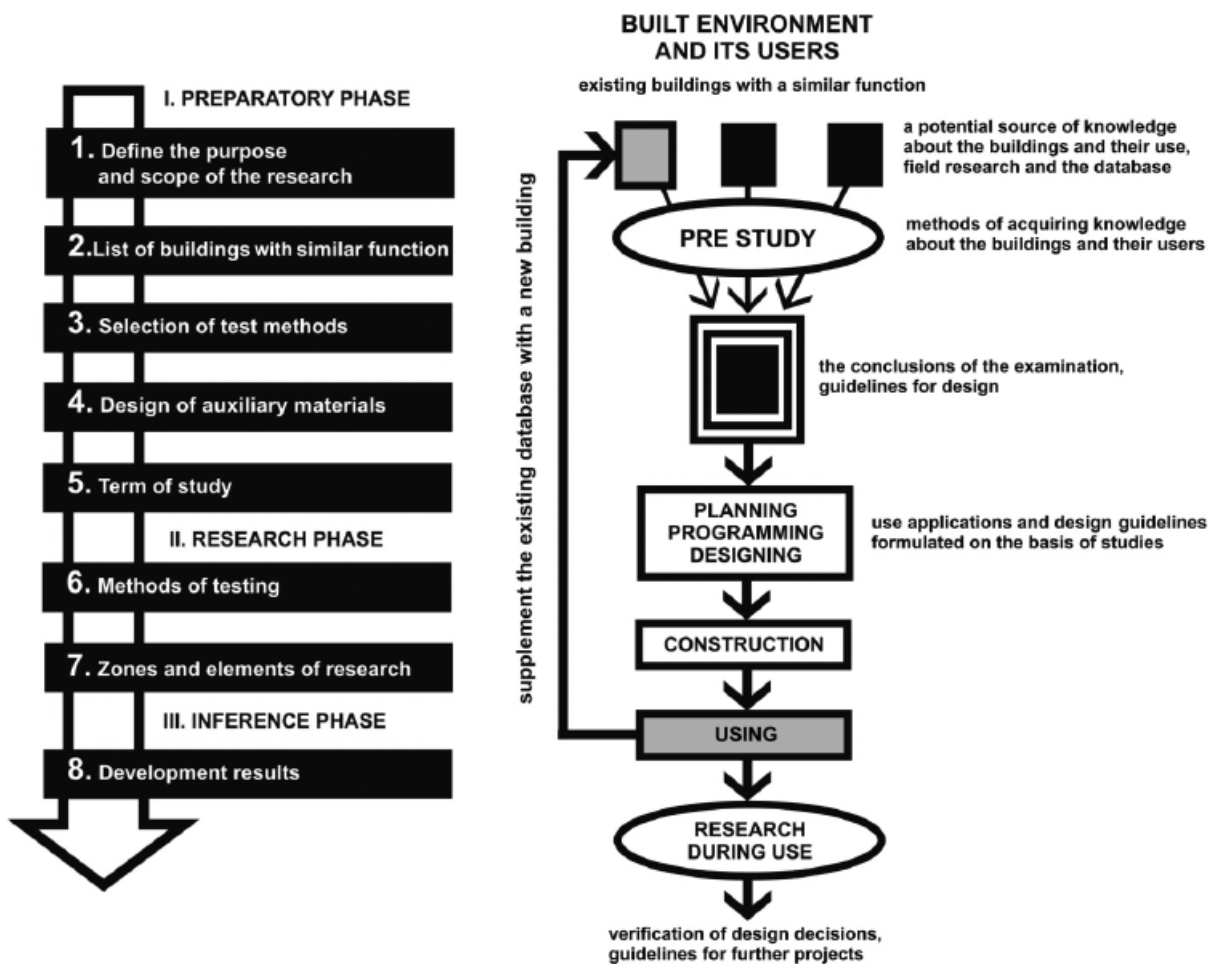


Figure 3. Author's research scheme for pre-designing "in 8 Steps" and schematic flow of knowledge in research design approach. [K. Fross, 2012]

POE) are elements of other research methods, such as: BREEAM (1990), Building Research Establishment Environmental Assessment Method (United Kingdom), HK-BEAM and LEED (1998) (Hong Kong and the USA), BEEPAC (1994) (Canada), ECO Quantum (1998) (Netherlands), ECO-PRO (1998) (Germany), ESCALE, EQUER (1998) (France), ECOEFFECT (1998) (Sweden), Ecoprofile (1998) (Norway) [2].

Also interesting is the H. Sanoff's ascertainment (1999) that professionals can be recognized not by what they do, but by the way of their proceeding. The essence of professionalism is a skill that can be defined on the basis of the required qualifications, appropriate methods (studies) and knowledge. The continuation of this can be further H. Sanoff's statement that the evaluation of environmental projects stems from the belief that professionals learn from

both the successes and mistakes. Evaluation (eg. a qualitative assessment) ensures feedback of the impact of the physical environment on the course of human behavior for the client and the architect. Immediate feedback allows easy correction of design errors [10]. Knowledge of requirements for buildings in the planning and programming stage allows avoiding major mistakes. Study that comes from quality assessments permits to check the level of meeting the criteria posed by users and investors. General conclusion is that qualitative research came together with remarked or signaled problems by the users of buildings during the exploitation. It became the method of exploring the causes of a given state of condition. Currently, inclusion of qualitative research to designing seems to be a necessity of modern times. Creating an environment that would respond to the greatest human needs, requires changes in the tradi-

tional sense of the profession of designer. This profession requires more and more versatility. Future designers are forced to acquire new knowledge and skills that will enable them professional flexibility [9]. Among the architects (in Poland) there is a popular opinion that architects-practitioners are designing, architects-scientists are dealing with the theory, and social scientists are performing research (surveys, interviews, observations, etc.). It is also commonly believed that the studies are time consuming, complicated and expensive and useful only for theorists not for practitioners, because architects know better how to design. In response to this state of things K. Fross has developed an easy, fast and effective method of pre-designing (in 8 steps) and for building in use (in 7 Steps) for verification of design decisions based on the simplified POE method and his own experiences. These methods are adapted to the Polish conditions. General principles of the pre-designing methods are shown in the scheme in Fig. 3 [4] [5].



Figure 4.
The observational research of usage and users' behavior in recreation parks "Tropical Island" in Marklowice and "Rafa" in Rydułtowy, years 2008-2012 [K. Fross, 2012]

3. SUMMARY AND FINAL CONCLUSIONS

Built environment and its users are an important source of information in research field. Using qualitative and observational research, information for programming and design can be obtained. Studies are carried out according to pre-defined rules and criteria. Objects and their users both make the field of research. The results included in a list of bad and good solutions allow to formulate guidelines for the design of the new facility. Aside from solitary architectural solutions, the expression of modernity can be contained in the use of research methods in the

design [3]. To meet the demanding expectations of the current market and the growing needs of users, contemporary architect should be both a designer and a researcher. That is why for a qualitative design the authors propose model of an architect-researcher who develops using research. Architect-researcher is a model of designer, who, individually or under his own leadership, performs the necessary pre-designing research of objects with similar function. On these fundamentals, he draws conclusions and formulate guidelines for the future design. After the completion of the object he continues to evaluate and observe to verify the design's decisions and to draw conclusions for new projects. This model extends the designer's interest to the stage of designed building exploitation. (Fross K., 2012) [2]. The essence of the subject captures S. Brand's quotation from 1995: "it seems that there is nothing new in that ideas and that most of it is self-evident. Of course, people know a lot about the buildings they use. Of course, it makes sense to learn from the experience and transfer information back to the people who design buildings so that they can do it even better next time" [1].

In summary the following general conclusions can be drawn:

1. Design based on knowledge obtained through assessment of existing facilities has an impact on improving the quality of design solutions, the final result which is the object itself, as well as users' satisfaction.
2. Assessment of existing buildings with similar features has a significant impact on the growth of knowledge about the function and can be complementary to the traditional approach to design.
3. Qualitative research is helpful in determining the project priorities which have strategic importance for the success of the investment.

During considerations about the subject two important aspects and sources of knowledge in the process of design and investment were highlighted:

1. Pre-designing research of objects with similar features enable the acquisition of database and experience as well as the formulation of design guidelines.
2. Verification study of designed building (in the initial period of exploitation) is presented as the evaluation of applied design solutions and proposals for the design of the new facility.

The first may have a significant impact on the quality of the design and success of the investment. The second is important in the process of self-improvement and gaining experience for designers.

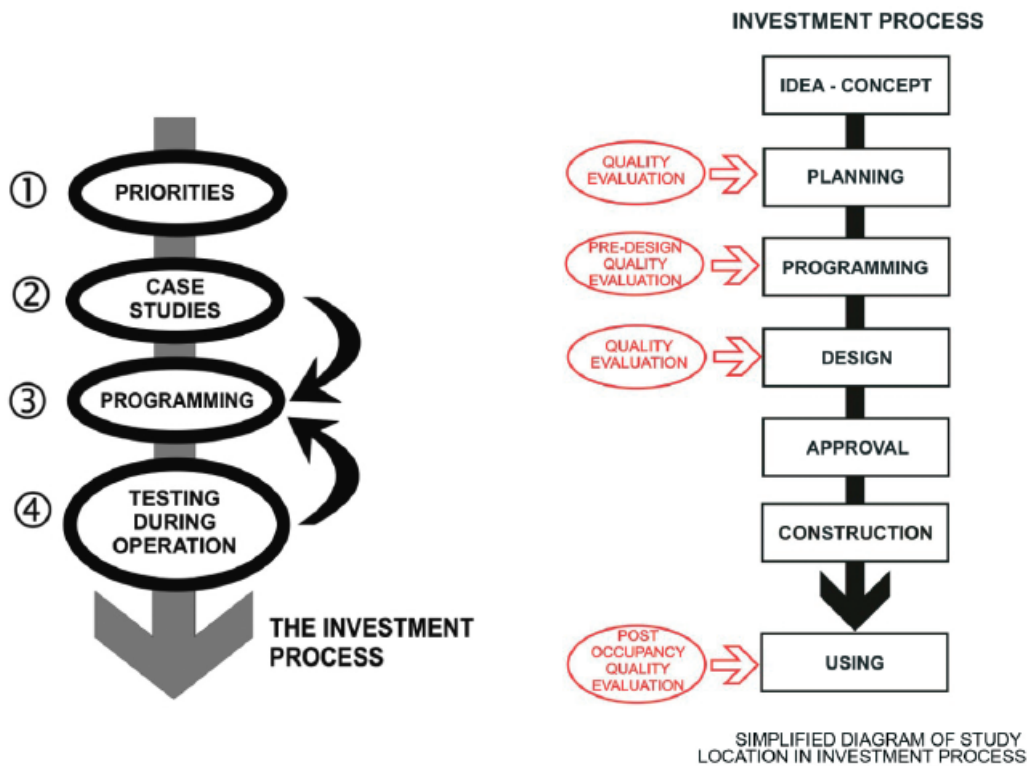


Figure 5. Qualitative research in the investment process [K. Fross, 2012]

More important conclusions for the design formulated on the basis of studies:

1. The built environment and its users are an important source of knowledge for the design and research field, executed objects are permanent evidence of project successes and mistakes.
2. By using a variety of research methods and tools, knowledge from the built environment and its users can be gained.
3. Deriving knowledge through research allows avoiding past mistakes and using proven solutions.
4. Qualitative research during the using of building are the proven methods which allow to determine the actual state and condition of the object – nothing can be hidden.
5. Using the built environment research increases the chance of achieving the investment aims, meeting the expectations of the users to obtain high quality and well-functioning facility.
6. Through designing with setting the prioritization of investments, treatment of the building as support for business activities and sources of income can meet the business purposes of the investor.
7. Perceiving the building as a commercial product, which is a subject to all rules of the market, such as demand, supply and competitiveness.
8. Meeting the needs of users through a well-designed program using the predesigning research and learning the level of customer satisfaction through checkups during exploitation.
9. While designing, drawing attention to the distant future by allowing to carry out change of function or expansion of the object.
10. Using “6S” principle, separation of individual elements of the building due to its different stability and the possibility of upgrading, repair or replacement at different times of object’s life.

In summary it can be stated that qualitative research is an effective way of acquiring knowledge of the built environment and its users. Qualitative research is a valuable complement to traditional approach to design based primarily on inspirations, analyzes or guidelines. This is consistent with the latest global trends in the design – the design with use of studies Research by Design and Design by Research.

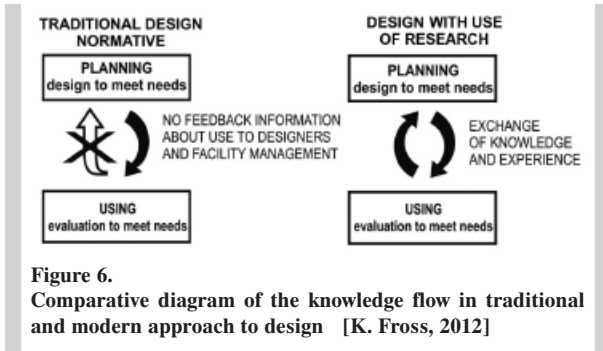


Figure 6. Comparative diagram of the knowledge flow in traditional and modern approach to design [K. Fross, 2012]

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