

Understanding the process of personalisation in contemporary single-family housing developments in architectural education

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ABSTRACT: An important facet of contemporary single-family housing developments is an observable repetitiveness. This architectural tendency to create extensive areas for living through the multiplication of a singular house is juxtaposed with individual needs of each inhabitant. Through understanding where, how and why users adjust architecture to their own needs, designers can try to incorporate that information in their work and create places prepared for future personalisation. This approach can fulfil one of the fundamental human needs, to make a place their own, within the preconceived architectural design. Understanding this aspect of spatial development, and treating each project as a manifestation of the architect, as well as the user's idea, was the basis of the study presented in this article. Analytical tools need to be introduced to allow young designers to understand user engagement and methods developed to reconsider the user-architect relation. For that purpose, students' designs produced during a single-family housing course, are analysed in the context of personalisation, and some methods of incorporating this process into teaching are also examined.

INTRODUCTION

Users are an inherent part of architectural design. Their relationship with architecture is especially important in single-family housing developments, where an individual becomes an owner of a place. A building is not a home without its inhabitant. Each user shapes the place in which they live, adapting it to their individual needs [1]. The realisation of a theoretical vision of an architect will inevitably undergo some changes due to the user's needs of that architecture. Understanding and incorporating this inevitability of change into architectural education should be an integral part of a holistic approach. The way architects think about personalisation is an important facet of how spaces are ultimately designed.

Analysed here is the personalisation of living spaces on the border between private and public, where individual transformation is the most visible and influential in common areas. The goal is to develop and analyse appropriate methods for incorporating personalisation into design education.

In this article, a typology of personalisation in contemporary single-family housing developments is presented. The typology has resulted from a comparative analysis of developments in a few biggest cities in Poland. The identified types of actions have become a basis for a quantitative analysis of student projects created as part of a single-family housing course held in the Faculty of Architecture at Wrocław University of Science and Technology (FA-WUST), Poland. This part of research shows the ways of consideration and the levels of inclusion of individualisation that are currently visible in architectural education. Finally, qualitative case studies of different methods of understanding and implementing users' personalisation within education are presented. Those methods were used during the course in single-family housing developments in the FA-WUST, with two student groups led by the author. The methods are analysed in respect to the typology of personalisation aspects.

INDIVIDUALITY AND ITS INFLUENCE ON SINGLE-FAMILY HOUSING DEVELOPMENTS

According to Przesmycka, the contemporary, new single-family housing market is heavily dominated by typical and repetitive solutions. Only 1 in 20 buyers chooses an individual project [2]. This means that most developments are not based on the individual needs of potential users, but are a monotonous repetition of one standard design. The scale of this trend demonstrates the importance of incorporating individuality issues in contemporary education, so that future architects have the skills to develop an architecture responsive to the individual user's needs within the repetitive structure.

In this study, architectural characteristics of contemporary single-family housing developments were analysed through a comparison of 55 sale offers of single-family developments in Poland in 2020 [3]. Over 50% of those consisted of

21-100 buildings, 36% consisted of 3-20 buildings and 11% consisted of over 100 houses. Bigger developments included variations of the model house plan, while smaller ones repeated the same model. Opportunities for house individualisation within the plan were limited and could be achieved by adaptations to the project, e.g. by changing a garage into a room or an attic conversion into a living space.

In 2020, the author explored single-family housing developments in three of the bigger cities in Poland [3]. The explored developments consisted of 30 to 60 houses built in Wrocław, Poznań and Toruń after the year 2000. They were comparable from an architectural point of view and allowed for differentiation of individualisation within chosen clusters. In total 1,462 personalisation-oriented changes were observed in 126 buildings. This scale of data enabled the categorisation of these changes for educational purposes.

Reasons for personalisation were divided into three main categories:

- aesthetical change;
- functional change;
- manifestation of *self*.

The aesthetical change refers to two aspects: decoration and aesthetical adjustments. Figure 1 shows the percentage distribution of these two aspects.

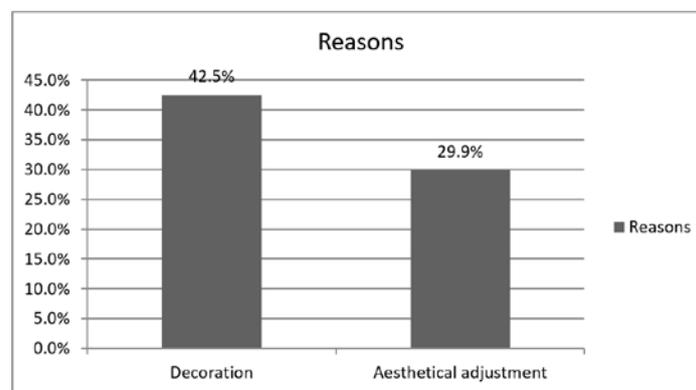


Figure 1: Typology of aesthetical reasons for change.

Almost half of all observed individualisations were related to the decoration aspect. Those changed elements were not necessary for proper building usability, but reflected individual preferences and were incorporated in many different ways. Typical examples include individualised landscape shaping or user choice of window curtains. Less often they referred to: setting decorations on parapets, adding decorative window foliage, adding Christmas lamps, hanging decorations on doors, adding small fences, decorative stones or lighting. Those were, at times, very distinctive but not necessarily extensive expressions of the user's individuality. This tendency could be deliberately incorporated into a design process.

The second aspect of the aesthetical changes, adjustment, pertained to architectural elements that were designed by the architect, but adjusted by the user or to the aesthetical choices of essential elements not included in the preliminary design process. Those changes were visible in all areas between the private and public part, e.g. choice of stair finishes, installation of mailboxes and intercoms, choice of fences and doors, formation of paths leading to the main door. In that group, the aesthetical adjustments of elements already incorporated were much less distinctive in the researched areas, and probably resulted from the level of detail shown within each project. Those aspects of architectural design were small but nevertheless crucial for a holistic and unified spatial vision.

The functional change refers to five aspects: security; functional addition; furnishing; storage; functional adjustment. Figure 2 shows the percentage distribution of these five aspects and of the manifestation of *self* category.

Almost half of all interventions were guided by the individual need for a different one than the offered level of safety or privacy. This was mostly accomplished by installing user-selected window curtains or fences around private areas. Additionally, security information, alarms and lamps were mounted. Those elements demonstrated a clear diversity of choices in similar spatial relations between the private and public area, and could be considered in architectural design.

Other functional changes referred to additions to the basic house equipment, like mailboxes, intercoms, but also using available spaces for storage or garbage collection. This showed some shortcomings in the contemporary architectural design in regard to: providing sufficient level of design information, acknowledging the growing need for sufficient storage space, designating areas for trash bins. Thus, it seems important to include those aspects in contemporary design documentation.

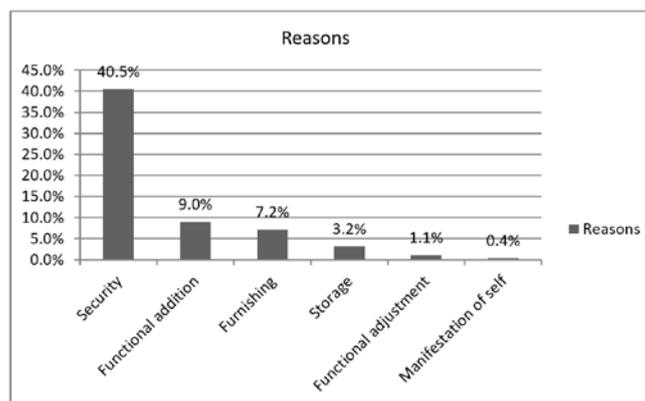


Figure 2: Typology of functional reasons for change.

The smallest group of interventions related to various functional additions: photovoltaic panels, ventilation, air conditioning, antennas, benches, garages, gazebos, trampolines, advertisements. This group of interventions pointed to technological problems, but also reflected the need for a functionally flexible house model.

In some cases, functional adjustments were clearly visible, e.g. replacing a garage with a living room. This last group seemed to be done in co-operation with architects and was a good example of incorporating individual users' needs in design.

The last category of changes were manifestations of personal beliefs (political, cultural, religious). Those were rare but distinctive occurrences that underlined how architecture is a carrier of users' ideas.

The researched areas showed that visible changes can be grouped according to the needs of each user. However, they were also self-expressions of individual users, showing that each person is unique. This relates to the need for self-realisation and making a place one's own [4], as well as the challenge to create spaces for living that reflect the user's actual needs within the preconceived system [5].

PROCESS OF PERSONALISATION IN EDUCATION

The process of personalisation plays a big role in contemporary living spaces, but is rarely considered in contemporary design. In order to understand its role in education, student projects created for a course on single-family housing developments were analysed. The projects were prepared by students at the FA-WUST between 2019 and 2020, and were part of a competition for the best project in that course.

Firstly, the percentage of projects referring to personalisation was determined. Seventy-seven out of 87 projects dealt with a habitat, leaving only 10 projects that referred to a single, individual house and that was not representative for further analysis. Even though individualisation seems to be inevitable after a building is given to a user, only 30% of all projects referred to this process. A similar percentage defined the designated user on a very basic level, including the number of household members and their occupation. This shows that most students do not treat single-family housing developments as the juxtaposition of buildings for many diverse individuals.

Among the considered projects, the possibility of functional manipulation was mostly introduced through modular elements that can be freely set or rearranged. This changeability or *choosability* was possible through the creation of modular building parts, rooms, walls. Some students created gardens arranged in different ways. In a few projects, some parts of landscape or connectors between buildings were also designated for free development by users. Additionally, options for commercial displays on the border between the private and public area was introduced.

Aesthetical individualisation was fulfilled mostly through making common areas available for free adaptation and individually created gardens. Personalising the house elevation within the predetermined architectural framework was also possible.

An important facet of analysed works was the acceptance of commonness in designed spaces. The inclusion of functional or aesthetical individuality did not always mean that this aspect expressed the user's ideas. However, over half of the works already referring to personalisation juxtaposed idealised design with commonness, for example randomly selected furniture, laundry, family picnics, house plants, diverse curtains. This shows the importance of education about the incorporation of personalisation in contemporary design. Thus, architecture should be designed in consideration of what it is going to be in reality and not just as an idealised image.

ASPECTS OF PERSONALISATION IN THE CONTEXT OF ARCHITECTURAL EDUCATION

Five basic aspects of personalisation in single-family housing developments were identified. It is vital to consider them within architecture and include in the educational process. These aspects are based on the typology of reasons for change in architecture and the analysis of projects prepared by students at the FA-WUST between 2019 and 2020.

Aspect 1: consideration of an individual - this is the most basic reference to personalisation. If the user is unknown, a target group is created or a theoretical user developed, recognising that the uniqueness of each individual is the basis for understanding various human needs.

Aspect 2: personalisation for the incorporation of individual functional needs - spatial research of single-family housing developments has shown that functional changes and adjustments were often introduced within the preconceived design. It was partially related to the design that did not include detailed information, but also to the inevitability of spatial adjustments according to individual needs. Functional personalisation options within typical projects enable the incorporation of functional variations.

Aspect 3: personalisation for the incorporation of individual aesthetical preference - similarly to aspect 2, individual changes in common space were observed. This refers to the need for decorating, as well as aesthetically adjusting the house. A natural process for the house interior seems to be also a crucial aspect of the exterior, in a border between the private and public area. Aesthetical personalisation options within typical projects refer to their aesthetical variations.

Aspect 4: manifestation of self - this aspect refers not only to the acceptance of variations within the functional and aesthetical features of architecture, but also to the acceptance or incorporation of user self-expression within a designed space. Thus, this aspect refers to understanding space as the juxtaposition of several visible manifestations of individuals, and not just to a consideration of a spatially changeable, adaptable design system.

Aspect 5: inclusion of commonness - a particular aspect of personalisation is the spatial incorporation of commonness. With this inclusion, a project can no longer be viewed just as a pure design, but the influence of diverse users and reality of everyday life must also be considered.

METHODS OF INCORPORATING PERSONALISATION IN ARCHITECTURAL EDUCATION

In the course of two classes for single-family housing developments held by the author at the FA-WUST between 2018 and 2020, three methods of understanding and incorporating personalisation within architecture were developed and analysed. Their goal was to help with understanding individuality, as well as to enable students to create and show architecture within the process of change. Those methods may support the continuation of well-thought projects of architect-designed buildings after the architect's work is completed.

Altogether, 16 projects of second-year design studios were prepared and 15 were included in the analysis of the proposed methods' effectiveness. One project was excluded due to its unique functional character that extended beyond the scope of this study. Eight projects created between 2018 and 2019 are numbered from 1A to 1H. The following seven projects created between 2019 and 2020 are numbered from 2A to 2G. Results of each design studios are considered separately and together.

During those classes, students were asked to design single-family living spaces. Projects created individually or in pairs consisted of 16 to even 66 houses, each with an independent concept of what contemporary spaces for living should look like. The basic literature regarding single-family housing was individually supported with the analysis of such concepts as: the Spatial City by Friedman [6], Half a House by Aravena [7] and works of Lacaton and Vassal [8].

Within the course projects, an analysis of the effectiveness of the following three methods was carried out: personas and user stories, usage scenarios, architecture within stages. The selected aspects of personalisation were marked for each method by the plus sign, if the method was used as part of the final project and by the minus sign, if it was omitted. Furthermore, each method was graded on a 3-point scale to determine its effectiveness, 1 being the lowest and not effective, 2 being good, and 3 a very good score. The points were defined in detail for each aspect as shown in Table 1.

Table 1: Three-point scale to determine the effectiveness of each method.

Aspect	1 point	2 points	3 points
1	Basic profile	Detailed information	User story
2	No personalisation	Choice available	Individual/constant adaptation
3	No personalisation	Choice available	Individual/constant adaptation
4	Not included	Partially included	Integral part of the project
5	Not included	Partially included	Integral part of the project

Method 1 - Personas and User Stories

Students had to use appropriate tools to get to understand users, their individuality and unique needs, which is a necessary part of the educational and design process. About 1/3 of all researched student projects created a profile of a person for whom their project was dedicated. However, this mostly consisted of choosing a basic family model, defining number of people, their age and relation, while each individual should be considered further, including for example one's psychological and sociological needs and one's life style [9]. In that capacity the creation of personas and user stories was introduced in both groups.

User stories are used, for example, for software development to define what users can do or how they behave. For educational purposes in architecture a similar tool can be used. Students were first asked to develop a persona, a concept of the user, and then create a story of how this theoretical user behaves considering their life style and needs. Both facets of the method should focus on:

- basic information about the person (e.g. name, age, work, interests, cultural heritage);
- day-to-day life (what an average day of this person looks like e.g. drinks coffee, tea, guarana, orange juice; eats dinner at home or goes out; in the evening watches a movie or goes dancing);
- spatial experiences (e.g. spends most of the time in front of their desk, stands a lot while making dinner);
- special characteristics (e.g. collects something, likes looking through the window).

The method used in the first group focused on a written form, while the second group was mostly supported by continuous discussions. For students, it could be useful to base their theoretical descriptions on someone familiar to better comprehend the needs of the persona. It was also important to give room for free research, rather than define every information students needed to provide. In that way, they could unveil some personal aspects not considered before. Table 2 below includes the distribution of points given for each aspect within method 1.

Table 2: Assessment of method 1.

Project number	1A	1B	1C	1D	1E	1F	1G	1H	Avg 1	2A	2B	2C	2D	2E	2F	2G	Avg 2	Avg
Aspect 1	+2	-	+1	+3	-	-	+1	+1	1.6	+2	+2	+3	+3	+3	+3	+3	2.7	2.2
Aspect 2	+2	-	+2	+3	-	-	+2	+2	2.2	+2	+2	+3	+1	+3	+3	+3	2.4	2.3
Aspect 3	+1	-	+1	+1	-	-	+1	+1	1.0	+1	+1	+3	+1	+1	+3	+3	1.9	1.4
Aspect 4	+1	-	+1	+1	-	-	+1	+1	1.0	+2	+1	+3	+1	+3	+3	+3	2.3	1.6
Aspect 5	+1	-	+1	+1	-	-	+1	+1	1.0	+1	+1	+3	+1	+2	+3	+3	2.0	1.5
Total	1.4	-	1.2	1.8	-	-	1.2	1.2	1.4	1.6	1.4	3.0	1.4	2.4	3.0	3.0	2.3	1.8

This method proved to be difficult for some students, in reference to consideration of deeper user needs. They easily provided the basic information, which did not lead to a more specific analysis of personalisation. In this method it is important to create stories that encompass more than only the generic data and this was the most difficult part. After initial problems, this method was mostly applied through discussion in the following year. Additional questions were provided and discussions repeated during the semester. This showed an important improvement and a much better understanding of personalisation. Students provided unique information regarding the user's lifestyle, interests, behaviours, deeper beliefs, and even mentioned how to incorporate commonness into one's surrounding.

The effectiveness of this method proved either very poor or very good for some projects. It is the first step in discussion about personalisation, crucial to start a deeper analysis of individuality. Even though describing solutions in writing proved hard to young architects, it is important to work on that ability. This method is worth further development and consideration in the introduction of personalisation within architectural education.

Method 2 - Usage Scenarios

The visual facet of architecture is very important, as it is often easier to understand a concept if it is shown even by a simple drawing. As such, students were asked to consider sets of sketches to describe their concepts. This was an additional task. The sketches created as usage scenarios were intended to explain: how an inhabitant uses a space, what happens there, how it is changing, what a person will do with or within a designed space. An important part of this task was to show it as a scenario of designed situations.

Table 3: Assessment of method 2.

Project number	1A	1B	1C	1D	1E	1F	1G	1H	Avg 1	2A	2B	2C	2D	2E	2F	2G	Avg 2	Avg
Aspect 1	+2	+1	-	+3	+2	+1	-	-	1.8	+3	+2	-	-	+3	+3	+3	2.8	2.3
Aspect 2	+2	+3	-	+3	+3	+3	-	-	2.8	+3	+2	-	-	+3	+3	+1	2.4	2.6
Aspect 3	+2	+3	-	+1	+3	+3	-	-	2.4	+2	+2	-	-	+3	+1	+1	1.8	2.1
Aspect 4	+1	+1	-	+2	+3	+3	-	-	2.0	+3	+1	-	-	+3	+3	+1	2.2	2.1
Aspect 5	+1	+1	-	+1	+3	+3	-	-	1.8	+2	+1	-	-	+2	+3	+3	2.2	2.0
Total	1.6	1.8	-	2.0	2.8	2.6	-	-	2.2	2.6	1.6	-	-	2.8	2.6	1.8	2.3	2.2

Method 2 was not used by several groups. However, it was helpful in supporting those works that incorporated it. Through this method students were most often able to show different aspects of personalisation, mostly with a good or very good level of understanding the process. Showing architectural diversity was especially well supported by those scenarios. The students presented:

- modular and changeable architecture (enabling users to select modules and/or change them);

- creation of areas for free adaptation (gardens, common areas);
- creation of a framework for personalisation (systems for individual spatial intervention);
- aesthetical differentiation leading to visual commonness.

Especially certain groups of students developed great skills in *telling architecture* through a series of images creating comprehensive stories about the user's life within the designed structure. Thus, the second method was effective for understanding and incorporating personalisation within students' works.

Method 3 - Architecture within Stages

The final method used to support the understanding of personalisation was to create a juxtaposition of standard architectural drawings within different stages of transformation. Depending on the developed concept and its transformation stage, students were supposed to present:

- several types of buildings with their unique users;
- the type of building that could be used by different users;
- space changing throughout the day;
- space changing through years.

Table 4: Assessment of method 3.

Project number	1A	1B	1C	1D	1E	1F	1G	1H	Avg 1	2A	2B	2C	2E	2F	2G	2H	Avg 2	Avg
Aspect 1	+2	+1	+1	+2	+2	+2	+2	+2	1.8	+2	+2	+3	+2	+2	+3	+3	2.4	2.1
Aspect 2	+3	+3	+2	+3	+3	+3	+3	+2	2.8	+3	+2	+3	+1	+3	+3	+3	2.6	2.7
Aspect 3	+2	+3	+1	+2	+3	+3	+3	+1	2.3	+3	+1	+3	+1	+2	+3	+2	2.1	2.2
Aspect 4	+2	+2	+1	+2	+3	+3	+3	+1	2.1	+3	+1	+3	+1	+3	+3	+3	2.4	2.3
Aspect 5	+2	+2	+1	+1	+3	+3	+3	+1	2.0	+3	+1	+3	+2	+2	+3	+3	2.4	2.2
Total	2.2	2.2	1.2	2.0	2.8	2.8	2.8	1.4	2.2	2.8	1.4	3.0	1.4	2.4	3.0	2.8	2.4	2.3

This method proved to be the most effective. It was used by all students in some capacity and with satisfactory results. It was fairly easy for them to understand the process through this method because of its informational format used before in their education. It was also possible to use this method within the basic drawing requirements of the course. Even simple plans created for different users within the same concept were an effective step to incorporate diversity and start further analysis of the need for personalisation.

CONCLUSIONS

Personalisation is an inherent part of contemporary single-family housing developments. The researched living areas show that it is important to make students understand what happens with architecture after the architect's work is completed, considering the scale of potential changes and apparent users' needs. The analysis of living spaces in Poland presented in this article, enabled the identification of significant aspects of this phenomenon. These aspects were used to evaluate the efficiency of three methods used during a course at the FA-WUST. All these methods proved to be a helpful tool to start teaching students about personalisation in living areas, but the most effective method was the one based on the types of architectural drawings that students were already familiar with. These methods can help students to create spaces for living, where individuality can be achieved within the preconceived architectural form.

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