

QUALITATIVE RESEARCH FOR CHILDREN'S SWIMMING POOL AREAS IN WATERPARKS BASED ON SELECTED POLISH EXAMPLES

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Abstract

The aim of this article is to show different types of design solutions for children swimming pool areas. The research material was developed based on the literature studies and quality research of existing water parks located in Poland. For the purposes of the article a preliminary studies of 31 major facilities were made. Second, three representative examples to study in detail were selected. Next observational studies of user behavior and usage were conducted. At the end the specified methods of evaluation were described and results of research were presented.

Acquired knowledge and experience indicate the possibility of efficient use of qualitative research in design practice during programming and design of water recreation facilities. In particular the use of the correct diagnosis of the needs of future users, for example: children, families with children, seniors etc.

Streszczenie

Celem artykułu jest ukazanie różnych typów rozwiązań projektowych stref rekreacji wodnej dla dzieci. Materiał badawczy został opracowany na podstawie przeprowadzonych badań literaturowych i jakościowych istniejących parków wodnych zlokalizowanych na terenie Polski. Na użytek artykułu wykonano oceny wstępne 31 największych obiektów. Następnie wybrano 3 przykłady reprezentatywne do badań szczegółowych. Następnie przeprowadzono badania obserwacyjne zachowań użytkowników i sposobu użytkowania. Na zakończenie opisano metody oceny i zaprezentowano wyniki badań.

Pozyskana wiedza i doświadczenie wskazują na możliwości efektywnego wykorzystania badań jakościowych w praktyce projektowej na etapie programowania i projektowania obiektów rekreacji wodnej. W szczególności wykorzystania w prawidłowym rozpoznaniu potrzeb przyszłych użytkowników np. dzieci, rodzin z dziećmi, seniorów itd.

Keywords: Aquapark; Children swimming pool areas; Design for children; Swimming pool; Waterpark.

1. INTRODUCTION

The paper is a fragment of research of existing waterparks. The research consist of such issues as for example: functional connections between zones in waterparks or water attraction offer for different groups of users: families with children, schools or seniors. Author plans to use this research to valuate children swimming pool areas in waterparks in other countries.

This article is to present possible design solutions of swimming pool areas for children in the existing

waterparks based on conducted research of facilities located in Poland: literature analysis (conducted to determine all possible types of designs for children swimming pool zones in waterparks) and detailed analysis of chosen leading examples based on POE simplified qualitative research method of the functional and observatory research (conducted to reveal differences between possible types of designs).

Qualitative research POE (Post Occupancy Evaluation) constitute one of the review tools of all existing facilities. This method is an quality assessment

of a building or facility during its use. This method allows to test the suitability of a building to complete its functions. It is based on five quality categories: technical, functional, behavioral, organizational and economic. Research can be performed for various purposes: customer satisfaction survey, observational studies, way-finding, etc. [1].

In terms of qualitative research two recent books are worthy of note: *Niezabitowska E.* [2014]: “Metody i techniki badawcze w architekturze” (Methods and research techniques in architecture) oraz *Fross K.* [2012]: “Badania jakościowe w projektowaniu architektonicznym na wybranych przykładach” (Qualitative research in architectural design based on selected examples). Both above publications describe in detail methods and techniques used to evaluate architectural projects and objects to help understand users opinions concerning buildings usage.

Recently in the literature such issues are being discussed as new concepts of approach to the design process directly related to the quality of the architecture; the concept of sustainable design, environmental design, universal design or participating design. Above issues does not include directly waterparks, but they cover various functions and general research methodology. They are universal enough so can be used in the assessment of existing and programming new facilities. Valuable are also publications concerning designing for older people. This group constitute a large number of users of waterparks. Understanding their needs is considered as a priority.

2. WATERPARKS

Waterparks is an indoor recreation facility, a kind of amusement park with swimming pools as the most important attraction. Waterparks consist of the following zones: an entrance zones, changing rooms and sanitary zones, swimming pools zones: recreational and sport zones with outdoor pool zones with attractions for children, elderly etc.; sauna zones, wellness&spa zones, waterslides complexes and food courts. In Poland we can distinguish seasonal facilities and opened year-round facilities.

The basic recipient of a waterparks attractions is a family. A child within the waterpark facility must remain under the care of a parent, thus, the object must be designed in such a way, to make it possible and convenient.

Waterparks as a public utilities must be designed for all people, including disabled users and small children), e.g. [4, 5]:

- providing parking spaces for cars in a manner that allows safe way to the building for and families with small children and disabled persons (collision-free walk ways),
- adaptation of the locker rooms for families with young children (coeducational locker rooms and changing rooms with spaces for baby changing as well as toilets and showers suitable for children and disabled persons),
- safety in wet zones (designing safe entrances to swimming pools with railings, non-slippery floors, designing good visibility between pool zones and in the communication zones),
- providing proper visual information in the facility,
- shortening communication lengths between the water attractions at the facility.

Mission of waterparks is not only entertainment, these facilities should promote a healthy lifestyle: sport and healthy nutrition.

3. USER PROFILE

The group of users covered by this paper refers to children aged few months to teenagers. Physical abilities and interests of these groups differ significantly. The principal purpose of waterparks facilities is to design attraction zones in such a way to make it possible for a family to spent time together. Designing spaces for children must cover the knowledge and understanding of their needs, interests and abilities. Consequently it is necessary to determine the user's profile, which was prepared on the basis of a children's developmental periods from early childhood to teens [6], developed by psychologist *T. Nowacki* [7]:

- A. Neonatal period (1-10 days) – a period immediate after birth, in which there is a lack of conscious physical activity.
- B. Infancy (10 days - 1 year) – the fastest growth in time, followed by exercises in: hand-eye coordination, eye-to-mouth coordination, learning of sitting, crawling, standing, walking, self-feeding. The main interest of children in this age are multi-colored objects. Learning takes place primarily by observation and repeating.
- C. Early childhood (1-3 years) – growth of the body is slowing down. In the 2nd half of the 2nd year a child is able to roll and kick of the ball, play with the other child, pull or push toys maintaining a chosen direction of motion. In a 3rd year a child can walk up and down the stairs, walk on narrow planks and in hand with other person. Children begin to speak.

Interest of children of this age is already much wider than in the previous group. They are related to exploration of an environment, improvement of object operation and observation of the function mechanisms of different objects. Child enters the playing phase.

D. Pre-school period (4-7 years) – growth of the body is slowing down, but a strong muscle development arises together with respiratory organs growth and brain structure improvement. Child in this age range can steadily walk, jump and control running. However, it is not able to perform several tasks simultaneously. At the age of 5 or 6, we can observe an increase of body fitness, strength, precision of movement, perception and intelligence. Interests: development of creativity and imagination, sensitivity to beauty, colours and forms; learning through playing: construction (stimulating independent thinking), illusionistic (role-playing), didactic (affects development of mental activities, perceptiveness exercises, recording of ideas and information about the social and natural environment), development of artistic creativity (eg. plastic, musical).

E. School age (8-12 years – boys, 8-11 years – girls): Children in this age have large motoric abilities, improvement of posture and coordination. They are interested in: roller skating, bike riding, great interest in nature (water and sand); toys are being gradually replaced by real tools, a lot of children like to start their collections (e.g. stamps). Most of the activities are group games: football, hide and seek. Children in the age of 9 show sport competitiveness, are good players as well as supporters. Change of day course can be observed: children in school are devoid of movement, their free time is primarily associated with physical activity. In this age a sense of morality is forming, development of free will, the ability to control emotions and to seek aims. This is the time when lifetime lasting friendships are developed, as well as a sense of responsibility, discipline, concentration, regularity and time management. In this time we observe a strong influence of peers, and growing need for spending time together. An important aspect influencing children is empowerment of regular parent supervision, which results in getting further from home. A frequent feature in this age is a need of risk and surprises. Negligence in this age may lead to hooligan behavior in the future.

F. Adolescence (13-16 years – boys, 12-15 years – girls): A child becomes an adult by social and physical maturation. This is a period of disequilibrium and imbalance in the nervous system (increased irritability, hyperactivity, fatigue and susceptibility to diseases). In the second phase of this period body motorics becomes similar to an adult, movements are deliberate, the figure and proportions of the body improve. There's a clear division between male and female figure motorics. Also emotional tensions and irritability appears, mood swings, (joy /sorrow), the ability of making fast decisions becomes characteristic. The role of the teacher increases, he becomes a subtle guider, that strengthens moral and aesthetic responses. The child has its own opinion to wide range of issues and ability to abstract thinking, also perception and ability to conduct independent research and observation improves. Image memory transforms into logical signs, the search for truth leads to the formation of consciousness and beliefs. Interest in sports, intellectual games, various activities, in which children can try their skills, is observed. This is the time where child's interest related to abilities are developed.

G. Children with disabilities are present in every society, so it is impossible to perform the analysis without the discussion of this group of users as well. In the case of physical disability, rehabilitation in water has a great importance due to improvement of underdeveloped skills. Playing in the course of rehabilitation is very important by gaining life experience and learning independence. In case of mental disability children have a limited ability to perceive objects, people and their surrounding. They have difficulty in realizing the border between their own body and the environment. They can be suspicious, aggressive and even self-destructive. Decision on water rehabilitation remains in the hands of a physician.

The need for playing for children is one of the most important activities. It should be understood as an ability of improvement of previously learned skills by observation of surrounding, objects, events and people. Play is the way of growth and development of individual preferences by achieving full independence. It also allows correct development of motoric and social skills, emotional and artistic maturity as well as intelligence.

4. DETERMINATION OF WATER ATTRACTIONS FOR THE ABOVE GROUPS' USERS

- I. The first group of children from their infancy to early childhood – in age from 3 months to 3 years (groups: B, C). These are users who cannot swim or move by themselves within the object and are under the care of adults. Water attractions designed for this group are:
 - group classes (for children from the age of 3 months) conducted together with parents. The basic aim is the familiarization of the child with water. Classes include muscular exercises that improve motoric coordination and rehabilitation of spine, muscles and joints. These classes are an introduction to swimming learning and are organized mostly in the swimming pool area or recreational pools area in water depth suitable for parents (standard depth 1.3 m with water temperature suitable for small children $>30^{\circ}\text{C}$);
 - water playgrounds with attractions: cascades, water umbrellas, water curtains, overflow buckets, fountains and waterslides. Children at this age learn by observation of the behavior of other users and start to participate in games with others. Playgrounds for smallest children are designed as paddling pools with water depth 0-0.3 m and temperature 35°C .
- II. The second group of users are children of an age between 3 to 7 years (group: D). At this age children learn to swim, but still remain under constant care of adults. The main area of interest is learning through playing. Children at this age are very busy. They like to walk, run, slide, jump, climb, build, hide, role play, practice their balance. They are interested in water overflowing experiments. Water attractions designed for this group are: water playgrounds described above (for this group water temperature can be lower and deeper: 30°C , 0.6m). This group's interests require attractions related to greater motoric coordination such as rope bridges (climbing) or pirate ships / castles (role-playing).
- III. The third group of users are children between the age of 7 to 12 years (group: E). Children in this age are perfecting their swimming skills, can move by themselves within the object and are not staying under constant care of adults. They have a strong sense of belonging to a group of peers. At this age important are group classes allowing competition: swimming or diving lessons. Swimming classes are

conducted in swimming pools with water depth 0.9-1.1 m, that could be designed as separate swimming pool or separated lines in standard swimming pool in swimming pool zone. Children at this age with swimming skills are tall enough to use, under the care of adults and, almost all water attractions in the facility: recreational pool areas (water depth 1.1 m), rivers, water curtains, fountains, climbing walls, wave pools, swimming pool areas, water slides complexes (taking into account minimum weight limits or users height).

- IV. The fourth group of children are teenagers over 12 years (group: F) They are independent users, moving by themselves within the facility, not staying under constant care of adults. Interest of children at this age group is focused on individual tastes: swimming improvement, rescue training, diving, water team sports (water volleyball, water handball, water basketball), wakeboarding. Additional attractions that are suitable for this group depend on the ability to swim.
- V. The fifth group consists of all aged disabled children (group: G) – children who do not move by themselves within the object and are staying under constant care of adults. For this group the most important are rehabilitation classes conducted by a lifeguard with or without parents. Such classes are organized mostly by the sports swimming pool area in the water depth determined by the children height in temperature of $28-30^{\circ}\text{C}$. The basic aim of rehabilitation is to familiarize children with water as well as overcome disabilities through exercises of the muscular system, improve motoric coordination and support treatment strategies.

5. RESEARCH METHODS

For the purposes of the article two stages of research were conducted:

- preliminary literature studies of waterparks conducted to determine possible types of children swimming pools zones and selection of examples for detailed studies. Detailed description of this research is presented in next paragraph;
- detailed qualitative research of chosen representative examples with detailed research, which reveals differences between these solutions (the results of the research are described in paragraph 7).

An additional aim of detailed research was the analysis of the correctness of usage of designed spaces - whether it was necessary to add improvements of the

quality or safety not included in the project, or whether expanding the offer during usage of the facility was necessary.

Research of chosen selected examples were conducted by means of POE simplified research method and summarized in paragraph 8.

6. PRELIMINARY STUDIES

Preliminary literature studies were conducted as an analysis and compartment of waterpark functional systems, where the location, types and amount of attractions for children were taken into account. Examples of researched facilities were chosen by the factor of minimum water surface: 1,000 square meters. Waterparks with water surface area 1000-2000 square meters are average objects for Poland. Smaller waterparks are the size of the water 500-1000 square meters. Facilities in this category are characterized by lack of an offer for children, that is why revealing and trends was impossible. Analysis was based on information taken from technical journals, available facilities schemes, complementing the above information by the conversations with waterparks employees. 31 facilities from the territory of Poland met the above criteria.

Basing on the above research – 3 types of designs of children swimming pools were selected:

- Type A – Facilities with children swimming pool areas located in the center of most usable area in the waterpark - most often the recreational pool zones. Children swimming pool zone is most often equipped with water attractions such as: paddling pools, water playgrounds with slides and water

cannons. (Realizations: Aqua park “Panorama Morska” in Jarosławiec; Aqua park “Kaliszki” in Kalisz; Aqua park “MZKS Chrobry” in Głogów; Aqua park “Tropikana” in Gołębiewski Hotel in Karpacz; Aqua park in Kraków; Aqua park “Sandra Spa” in Karpacz; Terma “Maltańskie” in Poznań; Terma in Mszczonów; Terma in Uniejów)

- Type B – Facilities with children swimming pool zones designed as functionally separated from other zones. This solution provides almost all attractions for children inside the zone. Separation provides functional division from other zones with the possibility of viewing the inside by e.g. floor level differences, walls or glass partitions. (Realizations: Aqua Park in Zakopane; Aqua Park “Aquadrom” in Ruda Śląska; Aquapark in Sopot; Aquapark in Wrocław; Outside swimming pools in Andrychów; Aqua park “Gorący Potok” in Szaflary; Outside swimming pools “Start” in Bielsko-Biała; Terma “Białka” in Białka Tatrzańska; Terma “Bukovina” in Bukowina Tatrzańska; Aqua park “Trzebnicki” in Trzebnica; Outside swimming pools “Gorący potok” in Szaflary)
- Type C – Facilities without main or central children swimming pool area. Attractions for children in this facilities are designed as an addition to other water attractions designed for other users. (Realizations: Aqua Park “Fala” in Łódź; Aqua Park “Nemo – Wodny Świat” in Dąbrowa Górnicza; Recreational and Rehabilitation Center “Polkowice” in Polkowice; Swimming pools in Strzegom; Recreational Center in Zielona Góra; Recreational and Rehabilitation Center

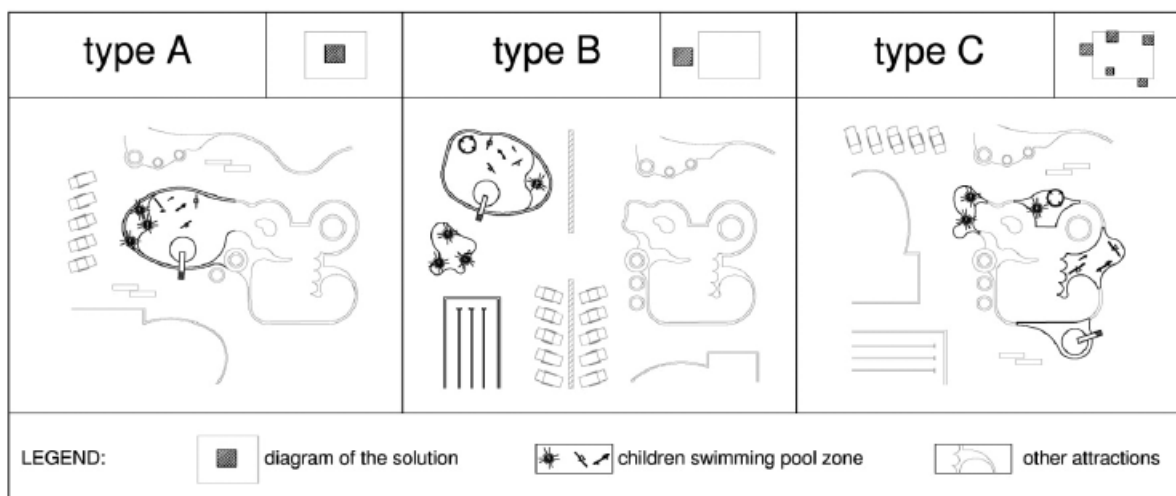


Figure 1.

Three possible types of designing children swimming pool areas in waterparks based on conducted research of preliminary studies

“Słowianka” in Gorzów Wielkopolski; Aqua park “Laguna” in Gryfino; Recreational complex “Atol” in Oleśnica; Aqua park “Jan” in Darłowo; Aqua park in Tarnowskie Góry; Terma “Cieplickie” in Jelenia Góra)

7. EXAMPLES

Detailed research was conducted based on three selected examples, which in the most complete way show individual features of types chosen in preliminary studies. The above research conclusions base have been on a visit in facilities during the most busy term, when all the attractions were available for clients, on Sundays from June till August in 2014, conducted so that the results could be comparable and optimal: Waterpark in Kraków [10] (type A) – children swimming pool zone is located in the center of the recreational area, as a water playground. It is equipped with following attractions: three waterslides connected together by platforms with water cascades, water cannon, fountain and pirate ship. Area is designed for children aged 2 to 7 years (groups: C and D – paragraph 4). Nearby the children’s area there are the following water attractions for the adults and other users: jacuzzi, resting area with lounges and food court. Other attractions in the facility for children can be only used under adults care (supervisors or lifeguards) and are mostly located in the recreation area and the swimming pool area (attractions can be used according to the instructions of their destination, taking into account height or weight limits): climbing walls, wave pool (depth: 1.3 m), basketball and water polo areas, rope park, river (depth: 1.1 m), water slide complex (8 units); additional attractions for children in the facility are: swimming lessons and martial arts lessons.

During the observation of users behaviour, it was noticed, that among all water attractions dedicated for children, water playground had the greatest interest. There was a significant number of adults playing together with their children (the structure allows the presence of adults). Other adults watched their children from the surrounding areas designed for them.

Zone is characterized by a high visibility from all around reflecting the safety of users. But this feature can also be associated with the possibility of interference with users from other zones. Other additional element observed in the area were safety mats placed around the zone, added by facility manager to reduce the possibility of collapsing by playing children.

Waterpark is one of the oldest realizations in Poland,

it was opened in year 2000. At the beginning children swimming pool area was equipped with two leveled castle with slides, giant colour whale and round climbing walls. This water equipment was not designed for the smallest children. Offer for youngest groups (C and D) was addend and now the playground is used most often by the youngest children.

Waterpark in Wrocław [11] (type B) – children’s swimming pool area located as a independent, separate, self-sufficient zone, functionally isolated from other zones. The area includes such attractions as: swimming pool (35°C, depth 0.5 m), paddling pool (35°C, depth 0.15 m), two training pools (depth 0.6 m and 1.0 m), pirate ship, water cascades, fountains, waterslides and artificial beach. The zone lacks water attractions designed for adults, there is only a resting area with loungers.

Other water attractions for children in the facility, that can be used only under the care of adults (supervisors or lifeguards) are located in the recreation area or the sport swimming pool area: wave pool (depth: 0-2.0 m) with water cannons, river (depth 0.7 m), waterslides complex (7 units), artificial beach, swimming lessons, aqua-holidays (day camps). Above water attractions require the use in accordance to their destination and instructions (including the weight or height limits).

During the observation a large number of children were observed inside the children swimming pool zone. Unfortunately there were no adults playing together with their children which shows a defect of such a solution design. Parents were watching their children and talking to each other. This solution does not integrate the family together. The zone is characterized by increased orientation on children in the facility, what influences their safety and limits childrens collision with other users.

Other additional element observed in the area were colorful inflatable water toys added by the facility manager to expand attractions.

Waterpark in Łódź [12] (type C) – attractions for children are designed in fragments and located in a recreation area:

- Round paddling pool for smallest children with slide, swing and nearby castle (water depth: 0.3 m); area is designed for children aged 1-3 years (group: C).
- Water pirate playground with big yellow octopus with interactive features, slide (length: 6 m, height: 1.60 m), water overflow elements, swings and fountains (water depth: 0.6 m); area is designed

for children aged 3-7 years (group: D).

- Water playground with a pirate ship (height: 2 m, length: 7.5 m), water cannons and slides (length: 7 and 9 m), area: 125 m² (water depth: 0.6 m); area is designed for children aged 3-7 years old (group: D).
- Water playground with two slides (height: 1.5 and 1.85 m, with roofed house with three platforms (height: 75-1.35 cm), water curtains in 4 colors (water depth: 0.6 m); area is designed for children from 3-7 years (groups: D).
- Seasonal outdoor round paddling pool with water overflow elements (water depth: 0.3 m); area is designed for children from 1-3 years (groups: C).

In the near surrounding of the zones there are resting areas with seats and lounges designed for parents, who can watch or play with children. Attraction zone for children is designed as neighboring to other areas destined for other users.

During the observation the entire recreational zone was characterized by a great usage freedom what reflected the integration of families thanks to shared play and the ability to move between different children playgrounds. All attractions for children are designed to be visible from all parts of the object. In such designs the necessity of vigilance and responsibility of parents and lifeguards is needed, as playgrounds are located next to the areas designed for other users with deeper water depth and possible collisions. Other attractions within the facility are destined for children under adult supervision (supervisors or lifeguards), they are located in the recreation area and the swimming pool area: Wave pool (depth: 0-1.5 m), river (depth: 0.7 m, height: 2 m) waterslides complex (6 units), swimming lessons. Above attractions require the use according to the instructions of their destination (taking into account the weight or height limits).

8. RESEARCH RESULTS

Based on the preliminary studies it was possible to determine different types of design solutions. Number of types in this stage of studies are similar, none is dominant in territory of Poland: type A – 9 facilities, type B – 11 facilities, type C – 11 facilities.

Differences between above types were shown in three aspects, accordingly to the localization of children swimming zone, functional connections with surrounding areas and amount of water attractions for children or parents inside or near by the zone.

Based on detailed qualitative POE simplified research method it was possible to revealed differences between chosen types. The most visible is the influence of type of design on the users behaviour inside children swimming pool children zone and nearby it:

- Type A – families with children concentrated in one central area, where a large number of parents are playing with their children or can observe them from the surrounding water attractions designed for them.
- Type B – separation of parents with children from other users in the building. Lack of water attractions designed for parents of children in the area.
- Type C – great usage freedom what reflected the integration of families thanks to shared play and the ability to move between different children playgrounds.

Other differences between types were shown in the visibility of the zone, noise and children integration through playing together with members of the family or age or interest groups of users.

9. CONCLUSION

Based on detailed qualitative POE simplified research method it was possible to reveal differences between chosen examples in the following aspects: visibility of the zone (depending on the location in the facility); children integration through playing together in age or interest groups of users; users behaviour (in aspects of: movement between water attractions, or integration by designing water attraction structures for children suitable also for adults).

It seems obvious that children pool zones should provide opportunity to play, explore, experiment, but a lack of educational offer was observed. Waterpark facilities realizations put emphasis on entertainment and development of physical and motoric abilities of children, without taking into consideration their cognitive skills. Despite the different approaches of designers, each of the zone types was designed as a safe, inviting to play and allowing entertainment for children in different age groups with health&safety and construction regulations.

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