ABSTRACT

The web offers the means to reach out to potential customers and clients. It enables the establishment of a communication link that allows designers to probe the preferences of their customers, and potential clients to be heard in the design process. It can also serve as a communication platform for customers and other interested parties to share and express ideas and concerns. Opening up the design process to future stakeholders and other concerned parties is particularly accommodating in the aspiration to a consensus model, as is the case in Dutch architecture. In this paper, we present an example of a Dutch residential development project in which the web served to reach out to potential clients. It involved visitors through a sequence of design “games” in the site planning process. Resulting data were analyzed and provided to the design team, and consequent design decisions found their way into subsequent games. By supporting additional communication among visitors and users, including the design team, visitors would be able to assess their own ideas against others, potentially improving the overall quality of contributions. Such support was envisioned though not implemented in the example. In this paper, we present the actual communication model adopted and consider its extension to support a virtual community for design communication with interested clients in a residential development project.

1 INTRODUCTION

At the core of an effective architectural design process is a dialogue between designer and client to ensure that the resulting artifact is conform to the client’s needs. When the building client, whether a single person, a family, or a company, is also the future user of this building, then it is possible to accommodate the needs and preferences of the prospective users in the design. In the case of property developers as clients to the design process, such customization with respect to the future users may not be possible. In the office market, reasonable assumptions can be made based on technological needs and the types of organizational structures accounted for. In the residential market, such assumptions are harder to make and can prove ineffective.

The Netherlands has a long history of government-initiated residential developments, and a clear evolution of the planning and building types can be seen. The 1960’s were marked by high-rise apartment buildings, in an attempt to make effective use of the available land and create a feeling of buildings in the middle of green areas. Changing perceptions led to low-rise apartment buildings instead, and an
attempt was made at offering most or all of the apartments a private ground level entrance, in order to alleviate a sense of insecurity that can be found in anonymous building circulation areas. As a result of demands for private outdoor spaces instead of public greenery, apartment buildings subsequently made place for row housing, with an increasing variety among neighboring dwellings. In recent developments, this urge for one’s own house has resulted in disconnected bungalow-type housing, in a mixture with other forms of row housing and low-rise apartment buildings. These changes have happened partially because of concerns of monotony, variation, identity, and more practical construction issues such as prefabrication. Designers need to initiate and face constant progress, and work closely together with social scientists.

Dutch architecture is dominated by a consensus model; in contrast to many other countries, the Netherlands does not allow an even controlled anarchy to reign in the housing market (Ibelings 2000). This consensus model extends over the client, the developer, the architect, the municipality, and other powers of influence. Recently, the Dutch government has urged designers and developers to offer future users also more of a say in the final outcome. This evolution is already noticeable. Often, this is accomplished by increasing a customer’s choice, for example, by offering the customer a larger variety of housing types, housing designs, or executions of the same design. In its simplest form, this may be a catalogue of instances a customer may choose from. On the other hand, the customer may be allowed the freedom to design his or her own home, though within a set of rules or constraints governing such aspects as type, size, color, materials or construction techniques. Such rules may reflect regulations, a strive for quality, or cost management. Some development projects offer their clients this freedom in the design of the interior of their (“Do-It-Yourself”) apartment or house. Clients may be required though to cooperate with an (interior) architect assigned and employed by the developer.

A very specific approach of offering constrained freedom is through a parametric framework of design. In this case, the architect provides a single design with a possibly infinite variation as embodied in parameters that may take either a discrete or infinite number of values and govern such aspects as size, shape, color, materials, etc. Variomatic is an example of a parametric design by Dutch architectural office Oosterhuis.nl (figure 1). The Variomatic design is fully flexible in shape, size, and interior organization. Its shape can be continuously altered in height, depth, and width, and the curvatures of the roof and façade surfaces can also be changed. Because of this extended and fluid flexibility it can be considered impossible that any two designs will be identical. The Variomatic design is currently being implemented as part of two larger residential developments in the towns of Zoetermeer and Deventer.

Without substantially increasing the costs of such a development, the web is offering designers and developers the means to reach out to their future or potential customers and recreate the dialogue between designer and clients. This method does not require synchronous contact, and clients can be empowered to create schematic designs of their future home at different scales. In some cases users can be invited to
exchange ideas and follow up on someone else’s idea. These data and relationships can subsequently be analyzed and the result used to influence the design in general ways. In the case of Variomatic, each potential customer can design their own instance of the Variomatic design over the web (www.variomatic.nl).

In this paper, we consider another example presented by WoonWerf.nl. WoonWerf.nl is a residential development project near the Dutch town of Dordrecht. WoonWerf.nl also specifies a website that served as an online means of communication between the developer and design team, and potential clients. In a series of games and questionnaires on various themes, visitors were able to design their own master plan and elaborate on various aspects of this design. This allowed them to portray their wishes and preferences to the design team concerning the design and development of the residential area. All information gathered in this way was analyzed in order to serve the design team in their development of an urban plan for the site. The resulting urban plan was presented to the community on the same website. Additionally, each participant received individual feedback on the relationship of this plan to their individual choices.

Initially, the intention existed to support a virtual community by presenting respondents’ choices and results to other visitors and enabling discussion groups to be formed with respect to specific designs or issues. Unfortunately, this intention did not survive as such in the final development of the website. By empowering communication among visitors and users, including the design team, visitors could be able to assess their own ideas against others, thereby improving the overall quality of contributions. An additional analysis of this communication could further support the design and decision making process.

In this paper we present the actual WoonWerf.nl communication model and explore additional techniques that strengthen and nurture the role of the virtual community in the design process in the context of design communication with interested clients in a residential development project.
WOONWERF.NL

WoonWerf.nl is a residential project of Dutch development company TRS Ontwikkelingsgroep at the location of a former shipyard near the city of Dordrecht. A Web site (www.woonwerf.nl) enabled the developer and the design team to communicate with interested clients on the development of the WoonWerf area. In particular, it presented the developer with an additional communication channel for informing the public on various aspects of the project, including design results, and for inviting the same public to respond to specific queries for information on issues and aspects that were particularly relevant at that time in the design process. In a series of games and questionnaires presented on the site, on a variety of different themes, visitors were able to design their own master plan and elaborate on various aspects of this design in order to portray their preferences to the design team. The various themes are ambiance, layout, public spaces, facilities, safety, sustainable development, and services. These themes were consecutively activated, such that subsequent “games” could rely on design decisions made as the result of information received on an earlier theme. All information gathered in this way for each theme was analyzed and provided to the design team. The final design results in the form of an urban plan for the site are presented to the public on the same site. Additionally, each participant received individual feedback on which of her choices were retained in the final plan and on the reasons why the other choices could not be upheld.

In the sequence of games and questionnaires, the user starts by making a selection from three residential ambiances: active, relaxed, and cared-for. The choice of an ambiance influences the program and defines the ratio between housing and work units in the site plan. In the next theme, the user is presented with a game offering an overview of the site and presenting a range of components with which to develop the site (figure 2). These range from different housing types, e.g., apartment buildings, row housing, and bungalow-type housing, over different working unit types, e.g., office buildings, shops, and individual live/work dwellings, to greenery, water, roads, and parks. The available components are also dependent on the ambiance. In order to assist the user in his or her design, four feedback sliders at the bottom-right of the game interface (figure 2) portray the fulfillment of various aspects that should be taken into account in the design. These include the number of housing and working units but also reflect on the financial possibility for realizing the project and on the expected general satisfaction among the future inhabitants of this community. Financial realization and satisfaction both depend on the selection of housing types and other elements, and often stand in contrast. High-rise is very cost-effective but detrimental to community satisfaction. Elements of nature on the other hand, such as ponds, trees, and parks improve satisfaction considerably but cost money. Only stores have a positive effect on both. In general, a balance needs to be sought in order to fulfill on all requirements. Figure 3 shows a possible layout design for an active ambiance: the number of units are sufficient with an expectation of fair profit and community satisfaction.
This and all subsequent images are courtesy of DPI Animation House.

Figure 2: Snapshot of the WoonWerf.nl layout game

Figure 3: Snapshot of an exemplar layout design
The following themes invite information on various aspects of the built environment within the WoonWerf area. Within the public space theme, the user is queried on his or her preferences with respect to public spaces, and their components, characteristics, and qualities, in relation to water, greenery, and social space. Figure 4 shows the interface for the facilities theme: for each from a list of facilities including, among others, a pharmacy, a public pool, a day care center, and a theater, the visitor can select to include this facility in the WoonWerf development or, instead, locate it outside of the area’s boundary. The safety theme presents a questionnaire on aspects that may or may not increase a feeling of safety within the area. The sustainable development theme asks for people’s interest to participate in environmental measures in the areas of energy, water, greenery, infrastructure, and waste. The user is always presented with three options ranging from a standard measure to a very environmentally-friendly measure, each time with an estimate of the investment cost and of the yearly savings. In this way, the user can value for oneself to which extent he or she wants to invest in environmentally-friendly measures and at what cost. Finally, the services theme attempts to assess the interest for extra services that can be provided to the future owners, such as surveillance, daycare, central delivery, etc.

From an analysis of all the information gathered through the games and questionnaires on the various themes, the design team proceeded with the development of an urban plan for the site. From the selections of a residential ambiance, it became obvious that no single ambiance would satisfy a majority of the respondents. Instead, a mixture of all three ambiances was chosen in the site design.

![Figure 4: Snapshot of the interface for the facilities theme](image-url)
The result is an emphasis in the urban plan on low-rise housing with separate areas for cared-for as well as work accommodations (figure 5). All work units are collected in the southern part of the site in order to improve accessibility and reduce any inconvenience, e.g., because of traffic. Traffic is organized accordingly with on-site traffic kept to a minimum and including underground parking areas (figure 6). On the slopes of the former shipyard, a combination of different functions finds space in a high-rise construction (figure 7). As became obvious from the submitted designs, a large majority of users selected this area for high-rise construction and a mixture of functions.

Figure 5: Urban plan for the WoonWerf.nl site

Figure 6: Traffic organization on the WoonWerf.nl site
After the presentation of this urban plan and its choices, and the individual feedback to the participants, these were invited to think about the look of the building exteriors. In the meantime, an architect has been selected to translate the urban plan into an architectural plan for the entire site. The interior organization of each dwelling will be up to the future owner, with assistance from an interior architect.

3 DATABASE SUPPORT

This example can be considered as representative of current attempts in the Netherlands to use the web in an effort to shorten the distance of communication between the future owner(s) and the architect or design team, and to offer the customer more input into the design process. In this, WoonWerf.nl adopts a collective approach with respect to the design but also considers the individual in its communication. As a media, the web enables to reach out to the individual as well as a community, using various techniques for communication and presentation. In the WoonWerf.nl website, the community is supported through a discussion board, the individual through a series of games and questionnaires. The website is completed with a library and archive, including up to date information on the project’s development.

3.1 The Actual Database Model

Enabling communication to the individual through a website requires each user to be individually recognized, some or all of the user’s actions to be recorded and stored,
and the presentation of the website’s content to be adapted to the specifics of this communication. As a result, user registration and authentication, database support, and dynamic web pages form a least common denominator in terms of requirements on the website’s development. In the design of the WoonWerf.nl website and support, users, games and corresponding designs, questionnaires, discussion forums and personal information spaces (for buyers only) were initially distinguished as the main database components to facilitate this communication. Of these, discussion forums, in relationship to access to other participant’s designs, were specifically envisioned in order to support a virtual community. In the final website design, access to other participants’ designs is not supported and only a single, general discussion board is provided.

User registration and authentication can be extended with an activity log in order to provide information on a user’s participation level, and with a distinction of users into different categories with different access permissions, e.g., distinguishing between visitors, registered users, potential clients and management. In relation to a number of themes, user’s activities are primarily divided into games, resulting in designs, and questionnaires, with corresponding answers. Both consider a selection from a given set of alternatives as the main activity. In the case of a game, the selection nodes are organized into a grid with the alternatives being identical for each grid cell. Constraints on selective grid cells and/or selective alternatives, may restrict the number of combinations possible. In the case of a questionnaire, questions are ordered into a list and each question specifies its own alternative responses. The activity of a game results in a design, the activity of a questionnaire into a response set. In both cases, the activity’s result is stored into the database in conjunction with relevant authoring information. With respect to the analysis of the results, this authoring information is only relevant with respect to the relation between results of a same author for different themes and the individual feedback upon the completion of the design by the design team.

In the analysis of the various responses to a questionnaire, it mostly suffices to determine the various statistics, e.g., the number or percentage of responses that selected the same alternative for a specific question. The same type of analysis can be applied to the designs of a game, though with the exception that either a single grid cell or any composition thereof, up to the entire grid, may be the topic of the analysis. In the layout game, three main areas were identified for this purpose, that is, the area around the slopes of the former shipyard, the area around the water (but not the river), and the area near the main road. For each area, an analysis was completed to determine the most and least selected components, in order to identify the most popular allocation for each area. Additionally, it was queried how many respondents enlarged the water zone, how many respondents selected to place elements of nature (i.e., parks, trees, water, etc.), in which areas respondents selected to place work units, service apartments, and high-rise buildings, to which heights the high-rise buildings were constructed, how many times respondents selected to place the road component, and to which extent the designs fulfilled on the requirements with respect to the
feedback sliders. The distinction into three main areas was also used in order to express the relationship between the final design and the participant’s own design in the individual feedback to each participant.

3.2 An Extension for Virtual Communities

The initiation and support of a virtual community primarily aims at offering the user a richer or more satisfying experience and at increasing the quality of the users’ activities and their results for the design team. The success of a user participation site is ultimately dependent on the number of visitors and their participation in the various activities, in this case, games and questionnaires. An attractive interface, visually but even more importantly in terms of set-up and interaction, such as in the case of the layout game, can go a long way towards enticing visitors to participate and invest some time in the activity. A considerable investment of time by the user is even more important in order to ensure that the information provided truly reflects the user’s concerns and ideas. Designers are trained through education and practical experience to consider a wide range of aspects when making a design selection or decision, and to evaluate the impact of these choices upon different domains. Participants, however, may form answers or decisions based on singular concerns that fail to take other aspects into account. In order to avoid such one-sided choices, users should be motivated to spend more time considering their answers more thoroughly, either on their own or in discussion with others. While the former may be difficult to monitor or support, the latter can easily be supported within a virtual community.

By presenting respondents’ choices and results to other visitors and by enabling discussion groups to be formed with respect to specific designs or issues, the emphasis can be shifted from communication between the individual visitor and the design team towards communication among the virtual community of visitors and users. The result of this communication can be analyzed by the design team in order to further support the design process.

Facilitating communication within a virtual community requires mainly two components. The first is a means for communication, e.g., through discussion groups. The second is an incentive for communication, e.g., in order to comment or react to other participant’s designs. The latter can be facilitated by providing access to these designs in the form of maps or lists, organized or ordered by various criteria. These criteria can be related to the information contained within the respective designs or its associated (authoring) information, such as, most recent designs, designs of a same author, designs that contain a specific component or use this component the most, or the least, or designs that are most similar to a given one. At the same time, the ability to access other’s designs, and to assess, comment on, or even use a design as a starting point for one’s own design, all offer additional criteria to order and organize designs. These include the number of times a design has been requested for viewing, the number of derived designs, the number of comments, and the number of assessments, including the minimum, maximum, and average assessment value.
Obviously this is nothing new and has been successfully applied elsewhere, for example to support collaborative design in an educational context (e.g., Papanikolaou and Tunçer 1999). Interactive critics facilities, where participants (and guests) can rate design products according to one or more criteria, and possibly annotate their assessments, can assist greatly in ensuring an objective evaluation of individual contributions. By publicizing at least the average of all ratings for a particular product in combination with these annotations, participants can be motivated to improve upon their work (Papanikolaou and Tunçer 1999), or to argue their design with rationale. In the original design of the database model for the WoonWerf.nl website, it was envisioned that discussion forums related to specific designs could be started by commenting on an existing design, allowing individual messages to additionally refer to another design of the author’s choice, in order to clarify or argue the respective message.

4 CONCLUSION

The WoonWerf.nl example presents an approach to increase customer involvement in the design process by identifying a body of potential future residents and determining both their collective and individual needs and preferences with respect to the overall development and the individual dwellings. The web offers an outstanding medium to build up such a community of potential customers and to start a dialogue between the members of this community and the design team concerning all aspects of the planning and design process. Such a dialogue can be strengthened by enabling at the same time a discussion within the community on these same aspects. It marks a trend that will certainly find more widespread adoption in the building industry.

5 ACKNOWLEDGEMENTS

The design of the WoonWerf.nl website is done by DPI Animation House, Den Haag. The authors were involved in this project for the design of the database.

6 REFERENCES