



Available online at www.sciencedirect.com

ScienceDirect

Procedia - Social and Behavioral Sciences 172 (2015) 635 – 642

Procedia
Social and Behavioral Sciences

Global Conference on Business & Social Science-2014, GCBSS-2014, 15th & 16th December,
Kuala Lumpur

The architect, the client and effective communication in architectural design practice

Nima Norouzi^{a,*}, Maryam Shabak^b, Mohamed Rashid Bin Embi^c, Tareef Hayat Khan^d

^{a, b, c, d} Department of Architecture, faculty of Built Environment, University Technology Malaysia, Johor Bahru, Johor, 81310, Malaysia

^aIslamic Azad University, Jouybar Branch, Department of Architecture, Jouybar, Iran

^bIslamic Azad University, Noor Branch, Department of Architecture, Noor, Iran

Abstract

Communications related to architectural projects have become more complicated due to more complex design projects, the growth of technology and design information management systems and different backgrounds of stakeholders. These issues have had a significant effect on how buildings are designed and evolved Architecture to combine technical and social aspects of design. This study reviewed and focused in Design and facilities management, behavior and communication as well as interfaces issues. This study introduced the approaches and strategic methods of effective communication in architectural design practice from the view of technological and humanistic characteristics to manage communication challenges in architect-client relationship.

© 2015 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of GLTR International Sdn. Berhad.

Keywords: effective communication, architectural design practice, architect, client, information, and communication

1. Introduction

Ambiguity is a problematic issue that can lead to mistrust and damage communication. In order for the societal benefit of the built environment to be fully realized, the issue of communication must be addressed (Cole-Colander, 2003). Fleming (1996) and Roxburgh (2003) examined how clients and designers used proprietary knowledge to either bridge or exploit the gap between these two cultures. Communication that is not clear can result in unsatisfactory

* Corresponding author. Tel.: +60-12-793-1339.

E-mail address: nimanorouzi@outlook.com

design results for the client (Ayodele Elijah Olusegun, 2008). Thamhain (2013) identified different circumstances that lead to poor performance. All of these categories are similar because they are the result of humanistic concerns (Xie, Thorpe, & Baldwin, 2000). Settling semantic differences requires communicative efforts, especially when communication between the people involved had disintegrated. In terms of design, most communication problems are the result of the behavioral process that create it's foundation as organizational and people-oriented components that have a strong influence on the final design result (Coughlan & Macredie, 2002). Several socio-technical methods have been developed to explain how the people-oriented or human element affects communication (Coughlan & Macredie, 2002). Shen (2011) and Yu, Shen, & Chan (2005) proposed the following reasons for communication difficulties between designers and their clients:

- The client's viewpoint was not fully considered
- There was not enough communication between stakeholders
- Design requirements were not sufficiently managed
- The needs expressed by the clients often change
- There is a lack of feedback from the client

In an attempt to better communication between designers and their clients, (Shen, 2011) proposed the following solutions:

- Permit the client to feel as though their contributions are valued and Involve stakeholder
- Effectively administer changing design requirements
- Employ appropriate and easy to understand visualization technique

Communication problems between clients and architects can be categorized as technical and social. Solving communication issues that are based on social matters require a socially oriented approach. One possible framework for managing communication problems that can be categorized as social in nature is the development of techniques to allow the participation of users in every step of the design process (Sarvarazadeh, Lamit, Norouzi, & Shabak, 2013). Coughlan & Macredie (2002) suggested encouraging the participation of stakeholders through interactive and communication activities and creating supportive design tools and techniques.

2. Architect-client Interaction and communication activities in architectural design practice

Techniques for understanding client requirements that are socially oriented lead to the development of a collaborative environment. This allows the architect and the client to communicate as equals and decisions satisfy all parties (Coughlan & Macredie, 2002). Successful relationships between designers and their clients are commonly based on socially oriented models where knowledge can be more easily shared. The better level of communication seen in these situations, which means that understanding between stakeholders, is increased, and ambiguity decreases. Communication activities can be used to resolve requirement issues and facilitate the flow of information (Coughlan & Macredie, 2002). A communication activity is an activity where the end user participates in the development of the product (Hartwick & Barki, 2001). Productive communication activities attempt to acquire information, share and combine tasks (Walz, Elam, & Curtis, 1993), and coordinate efforts (Kraut & Streeter, 1995). Walz et al. (1993) proposed that the following behaviors should be a component of any communication activity:

- **Knowledge acquisition:** A relationship must be established between the knowledge and experience of the designer and the client. The technical options available for facilitating communication and creating a common goal must also be established.
- **Knowledge negotiation:** Knowledge negotiation is also known as sharing. Iterative processes contain requirements that must be understood by stakeholders and negotiated.

When these communication activities have been completed, they provide a framework for managing communication challenges. However, this framework must take into account the techniques used to facilitate communication.

3. Definition of Communication in architectural design practice

Communication finds its origins in the Latin word, "communis". In its broadest sense, communication is the transmission of information from one person to another (oann Keyton, 2006). (A. F. den Otter & Prins 2002) stated

that communication is, the “process of exchange of information between the sender and receiver to equalize information on both sides”. (A. Den Otter & Emmitt, 2008) stated communication as “sharing of meaning to reach a mutual understanding”. Maier & Thalmann (2008) clarified the meaning of communication by claiming it is a “cognitive and social process by which messages are transmitted, and meaning is generated”.

3.1. Communication as a function and behaviour

Another way to define communication is to focus on its function. Pietroforte (1997) indicated that the function of communication is to facilitate the achievement of common goals. In other words, communication is a way of influencing relationships between architect and client (Breu, Guggenbichler, & Wollmann, 2008a). According to (A. Den Otter & Emmitt, 2008), communication can be defined as a “human behavior that facilitates the sharing of meaning and that takes place in a particular social context”. Gabriel & Maher (2002) extended the definition of communication into the field of architecture when he stated, “Architecture is primarily about communication.” The basis of (Gabriel & Maher, 2002) claim lies in the fact that the theories espoused by architects are the result of solid communication between the architect and the client that ultimately is expressed in the built environment (Mayam Shabak, Norouzi, Abdullah, & Khan, 2014), (M Shabak, Norouzi, & Khan, 2013). The most important characteristic in any communication is a social relationship through which the assumptions and expectations of another can be explored and even explained. In regards to collaborative design, problems can be solved by using different forms of communication instead of relying only on more communication (F. Smulders, Lousberg, & Dorst, 2008).

3.2. Communication as a process

Some researchers have defined communication as a process because of its dynamic nature and because it includes the trading of opinions, ideas, and goals (Ayodele Elijah Olusegun, 2008). He added to this definition by pointing out that communication means more than obtaining information. It also means that the information must be credible, heard by the right people, and lead to an appropriate response. Breu et al. (2008a) confirmed that the communication is a complex process. In terms of building projects, it is a process that ultimately leads to information relevant to the project and that ensures success. To identify the role and meaning of a communication process, the current definition of information, communication, communication processes, and communication models must be established. Afterward, the characteristics and relationships between these factors can be investigated (Norouzi, Shabak, Embi, & Khan, 2014).

As a social process, a successful design process depends on a shared understanding between participants (Valkenburg, 2000); (Kleinsmann, 2006). Clark & Brennan (1991) further defined shared understanding as a “mutual knowledge, mutual beliefs and mutual assumptions” that exist between parties. A sender, receiver, message, and channel are all required if a communication is to take place. In terms of architecture, the architect is the sender and the client is the receiver, and the proposed design is the message (information). The channel can take the form of software that can take a paper drawing and turn it into a digital model using encoded information and symbolic language so that it can be transmitted. Understanding how communication occurs and how it can be effectively used is a critical skill for an architect (Moum, 2008).

3.3. Communication as an interface

Over time, several different communication models have evolved ranging from had written documents to Computer- Mediated Communication (CMC) such as telephones, fax, email, and video conferencing. In the field of architecture, communication between the architect and his client is based on a relationship that uses everything from verbal communication to computer generated technical architectural drawings to communicate. Digital technology in architecture has been used throughout the design process as a computer generated two-dimensional drawings, three-dimensional volumetric renderings, animations, and simulations. Architectural renderings and walk-through are additional and valuable forms of communication (Kitchens & Shiratuddin, 2007). Digital technology not only facilitates communication between the client and the architect, but it also enhances the architectural design process

(Gabriel & Maher, 2002). Effective communication relies on the use of the right media (Ean, 2011). As in the field of architecture, the advancement of information technology has impacted communication media (D'ambra, Rice, & O'Connor, 1998). Despite its dependence on computers, Computer-Mediated Communication (CMC) is classified as a form of human communication. It can be interactively allowing both the sender and the receiver to engage in two ways, interactive communication model.

4. Charting the architect-Client Relationship in design process

Several studies have examined the relationship between clients and designers and to examine how the behavioral attitudes of all involved can impact the success of the client-designer relationship (Siva & London, 2011). The most common complaints from clients who have used architectural services are related to misunderstandings and dissatisfaction (RIBA, 2007). Even though the client is pivotal in the design process they often do not understand design processes and are unaware of what information they need to pass on to the design team (Tzortzopoulos, Cooper, Chan, & Kagioglou, 2006); (Siva & London, 2011). Clients who find themselves involved with strange architectural, design processes often suffer from "habitus shock" or the feeling of stress and confusion caused by these unfamiliar processes. As the client learns more about these processes, they become more comfortable, and the architect and client's attitudes fall into line. The education of the client is a fundamental component of the successful client-architect relationship (Siva & London, 2011).

In addition to education, mutual respect is another important component of a successful client-architect relationship (Stater, 2002), (Tusa, 2002), (Long & Wilson, 2002). Too often successful build projects only came about after time-consuming negotiations and compromises (J. Chen, 2008). Architect-client meetings are one way to facilitate communication at each stage in the design process and to quickly find solutions to any problems that might arise (Emmitt & Gorse, 2006); (Otter & Emmitt, 2008). Meeting needs of highly demanding clients to create advanced architectural design project requires effective communication. Unfortunately, client-architect communication is not intuitively driven to accomplish this because there is a lack of mutual understanding (L. Chen, 2004).

5. The Architect, the Client and Their role in the changing working environment

Simply put, an architect is someone who plans, designs and models a building project. In order to bring a building design to fruition, an architect uses a wide variety of information from a variety of areas including technology, science, and art. Previously, conventional methods created problems because they are not well coordinated and intelligent; meaningful information was not provided to clients. Consequently, the building design process would not be supported, and poor decisions were made. The most important person in the architect-client relationship is the client. They require accurate information about the building design, and they are the one person who will have a close relationship with the architect (Tessema, 2008).

The development of technology since the Industrial Revolution has had a significant effect on the way buildings are designed and built. Architecture has also evolved to combine creative design, building techniques, and social aspects and, as a result, successful architects have the skill to integrate knowledge from various fields into the design process (Sariyildiz & Veer, 1998). As noted above, communication and social skill are important skill for an architect. Advances in technology mean that architects can capitalize on their communication and social skills to gather, organize, and assess information that will allow them to make the best decisions. The Australian Institute of Architects and Palea, Ciobanu, & Kilyeni, (2012) has recommended that the following traits should be possessed by an architect: The ability (a) to communicate effectively, (b) to coordinate and manage complex projects, and (c) to negotiate with a client to resolve issues.

Advances in information technology and the development of the Internet have had a profound impact on the role of an architect. Modern Information Communication Technology ICT can provide the tools for architects to coordinate designs, manage core information, and ensure the flow of information. ICT can be used to create a more effective design process (Lee, 2001). Despite the advances made in technology, increasing amounts of information that must be managed challenges architects. Additionally, the time required to complete projects has decreased. For instance, the use of ICT means that a quick communication between stakeholders can speed up the project as less time is wasted (Penttilä, 2006).

6. Definition, Classification and function of Information or knowledge in architectural design practice

Information is commonly defined as data or message that passes between a sender and a receiver (Bessonov, 2008). In terms of a building design, information can take the form of drawings and reports (Tessema, 2008). The information pertaining to the building process does not only include describing the client's wishes and turning them into a building. It also includes transmitting information to the right people, ensuring that the message is understood and that all the client's requirements are realized. In other words, the communication of information can be used as a channel to influence personal relationships and achieve a mutual goal (Pietroforte, 2010). Information regarding the experiences of the client can be used as inspiration for the design process and enhance communication between the client and the architect. Information can be obtained by asking about past and present experiences as well as future expectations (Sanders, 2002). Information can be subjective. In order to obtain relevant information, the architect is responsible for creating a venue for discussion with their clients. The quality of information will lead to better communication between stakeholders (Tessema, 2008).

The foundation of a successful building process is the strength of the generation, interpretation, distribution, coordination, management, and storage of design information (Gray & Hughes, 2001), (Emmitt & Gorse, 2009). The evolution of information to knowledge means that it was transmitted by a neutral media and passed to a human receiver (Moum, 2008). F. Smulders et al. (2008) categorized knowledge as: explicit, implicit, or tacit (silent). Explicit knowledge can be easily expressed and transmitted. However, it is implicit and tacit knowledge that are of the most importance in the design process. In this regard, F. E. H. M. Smulders (2006) suggested that the implicit component of a mental model is where knowledge is located and that this knowledge can be made explicit. Challenges can arise when the participants in a conversation are not aware of what implicit knowledge they should divulge to the other party. To overcome these difficulties, the parties involved in the conversation should maintain a cooperative attitude and avoid assuming that they understand what the other party is trying to say (F. Smulders et al., 2008)

In terms of the building process, architects have a better understanding of architectural problems and can develop solutions based on their knowledge. A well-educated client will have more knowledge and will thus be able better to understand the conceptual solutions proposed by the architect and make valid suggestions. The important point here is that stakeholders must take the time to communicate their implicit knowledge in a factual and clear manner rather than leaving their knowledge locked in the perceptual domain (F. Smulders et al., 2008).

7. The Critical Components of information factors in effective communication

There are three important factors used to define design information, and that can affect communication effectiveness. They are listed below:

- **Semantic:** It is important that the receiver of the message have the knowledge necessary to decode the message. Communication strategies benefit from smaller communication costs and faster communication times. The effectiveness of the message is significantly impacted by the attitudes of the sender and receiver and the relationship between them over the course of the exchange process (Pietroforte, 2010). The steps in the communication process can influence the quality of communication. When problems occur during a step, communication effectiveness can be damaged (oann Keyton, 2006).
- **Emotional:** Effective communication relies on the content of the message and its emotional impact. Emotional impact is related to response of the receiver to the message. It is necessary to span the gap between the content of a message and its emotional impact and give each component equal value if effective communication is to take place (Breu, Guggenbichler, & Wollmann, 2008b). Considering semantic and emotional factors will lead to a strong, stable, and effective bridge between message content and emotional impact (Breu et al., 2008b),
- **Technical:** How information is structured will affect how it is disseminated. When information is codified, it can be more quickly distributed over a wider area (Boisot, 1986). One important first step is to choose the right medium from a large number of mediums, to transmit the message (Lunenburg, 2010). The quality of the communication, information sharing and participation are all components of communication behaviour, and they facilitate relationship behaviour (Mohr & Spekman, 1994).

8. Approaches for improving communication performance in architectural design practice

Technical tools and social actions are the principle ways to improve communication (Marshall-Ponting & Aouad, 2004). Combining technology and human management approaches lead to effective and strategic methods. Effective communication is measured by looking at how well the functions of communication were applied and if the message was fully communicated. There are several important traits that are exhibited by successful architects in terms of how they communicate information to their clients. In terms of administrating communication-related design project, Thomas, Tucker, & Kelly (1998) and Breu et al. (2008a) established the factors listed below: (a) Management characteristics, (b) Message or information characteristics and (c) relationship characteristic. Each of these factors will be explained below:

- **Tools characteristic:** Building design information is affected by collaboration between stakeholders. When information can be fully coordinated and organized, it enables better communication between the client and the architect. The role of management can be seen in the Information technology used for the project including computer software and hardware and the communications media infrastructure that will be used as a framework for project-related communications. The communication infrastructure includes email systems, a project specific intranet system, and the processes for holding meetings (Breu et al., 2008a). It is crucial all the design documents needed to complete a building project are visually defined and represented in the design approach.
- **Message characteristics:** Messages can have many characteristic including credibility, accuracy, and timeliness. Credibility and accuracy can work together because if the receiver regards the message to contain accurate information, then they will deem it to be credible. In the field of architecture, accuracy describes how close the client's requirements are represented by the building design or other relevant documents. Timeliness is also important, as a message must be received as soon as possible so that it can be used. Timeliness is especially important at all design and construction stage where the information contained in the message may contain changes to the design (Thomas et al., 1998); (Breu et al., 2008a).
- **Relationship characteristics:** The relationship between the building design documents and the information provided by the client can improve communication between the architect and the client. Responsiveness refers to the architect's willingness to meet project requirements and answer client inquiries. It is important because it strengthens the client-architect relationship. As discussed earlier, successful relationships are based on mutual trust. Other characteristics of a successful relationship include similarities between parties and mutual knowledge. Conversely, unsuccessful relationships exhibit mistrust, differences between parties, conflicts, and misunderstandings (Ziegler, Ylitalo, & Mäki, 2004)

9. Conclusion

This study reviewed the researchers, which have concentrated on architect-client relationship, to bring into focus the important factors of effective communication that has classified into social and technical factors. Then, it attempted to identify the role of these factors in the effectiveness of this relationship, which benefits the researchers and practitioner to have a better views and perception about the prevailing circumstances of architect-client relationship. Furthermore, This study investigated the architect-client relationship from the view of communication study. Thus, the role of the architect, client, the exchanged design information and the used interfaces in architectural design practice as essential components of the communication process has established in architectural design context.

Considering the architectural design from the view of communication study will improve the quality of architect-client relationship, architectural design, and consequently the built environment. In this context the role of the architect, the client, and their personality have a strong effect on developing the client-oriented design approach, which stimulate the client consciousness about architectural design. Thus, Communication activities facilitate the flow of information and proprietary knowledge between clients and architects to either bridge or exploit the gap between these two cultures.

This study identified technical tools and social actions as ways to improve communication, which Combining technology and human management approaches leads to Effective and strategic communication methods. Thus, In terms of administrating communication-related design project, participatory design approach with considering of

following factors should be established: (a) tools characteristics, (b) information characteristics and (c) relationship characteristic.

Acknowledgement

The authors sincerely acknowledge Research Management Center (RMC) of Universiti Teknologi Malaysia (UTM) for the funding of the research through International Doctoral Fellowship (IDF).

References

- Ayodele Elijah Olusegun, A. V. O. (2008). Communications in the building industry of nigerian - implications for clients, (2004), 51–56.
- Bessonov, a. B. (2008). Communication processes: Role, place, content. *Scientific and Technical Information Processing*, 35(4), 159–171. doi:10.3103/S0147688208040011
- Boisot, M. H. (1986). Markets and Hierarchies in a Cultural Perspective. *Organization Studies*, 7(2), 135–158. doi:10.1177/017084068600700204
- Breu, F., Guggenbichler, S., & Wollmann, J. (2008a). Critical Factors For Managing Project Communication Among Participants At The Construction Stage. *Vasa*.
- Breu, F., Guggenbichler, S., & Wollmann, J. (2008b). The Effectiveness of Partnering Approach in Hong Kong Building Projects. *Vasa*.
- Chen, J. (2008). The development of a habitus shock model for architect-client relationships on house projects. ... of Architecture and the Built Environment, University of ..., (August).
- Chen, L. (2004). Architectural Visualization An Analysis from Human Visual Cognition Process. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.135.3081>
- Clark, H. H., & Brennan, S. E. (1991). Grounding in communication.
- Cole-Colander, C. (2003). Designing the Customer Experience. *Building Research & Information*, 31(5), 357–366. doi:10.1080/0961321032000088025
- Coughlan, J., & Macredie, R. (2002). Effective communication in requirements elicitation: a comparison of methodologies. *Requirements Engineering*, 7(2), 47–60. doi:10.1007/s007660200004
- D'ambra, J., Rice, R. E., & O'connor, M. (1998). Computer-mediated communication and media preference: An investigation of the dimensionality of perceived task equivocality and media richness. *Behaviour & Information Technology*, 17(3), 164–174. doi:10.1080/014492998119535
- Den Otter, A. F., & Prins, M. (2002). Architectural design management within the digital design team. *Engineering Construction and Architectural Management*, 9(3), 162–173. doi:10.1046/j.1365-232X.2002.00252.x
- Ean, L. (2011). Computer-Mediated Communication and Organisational Communication: The Use of New Communication Technology in the Workplace, 3.
- Emmitt, S., & Gorse, C. (2006). *Communication in Construction Teams* (p. 320). Routledge.
- Emmitt, S., & Gorse, C. A. (2009). *Construction Communication* (p. 224). John Wiley & Sons.
- Fleming, D. (1996). Professional-Client discourse in design: Variation in accounts of social roles and material artifacts by designers and their clients : Text - Interdisciplinary Journal for the Study of Discourse. *Interdisciplinary Journal for the Study of Discourse, Volume 16*(Issue 2), 133–160. doi:10.1515/text.1.1996.16.2.133
- Gabriel, G. C., & Maher, M. Lou. (2002). Coding and modelling communication in architectural collaborative design. *Automation in Construction*, 11(2), 199–211. doi:10.1016/S0926-5805(00)00098-4
- Gray, C., & Hughes, W. (2001). *Building Design Management* (Vol. 66, p. 177). Butterworth-Heinemann.
- Hartwick, J., & Barki, H. (2001). Communication as a dimension of user participation. *IEEE Transactions on Professional Communication*, 44(1), 21–36. doi:10.1109/47.911130
- Kitchens, K., & Shiratuddin, M. (2007). Interactive home design in a virtual environment, 10–19.
- Kleinsmann, M. S. (2006, September 5). Understanding collaborative design. TU Delft, Delft University of Technology.
- Kraut, R. E., & Streeter, L. A. (1995). Coordination in software development. *Communications of the ACM*, 38(3), 69–81. doi:10.1145/203330.203345
- Lee, S. (2001). Challenges in Building Design and the Construction Industry : The Future of Design and Construction in the Internet Age. *The Human Society and the Internet Internet-Related* ..., 225–236.
- Long, M. J., & Wilson, C. S. J. (2002). Talk to your client about architecture. *The Journal of Architecture*, 7(4), 339–348. doi:10.1080/1360236032000040848
- Lunenburg, F. (2010). Communication: The process, barriers, and improving effectiveness, 1, 1–11.
- Maier, R., & Thalmann, S. (2008). Institutionalised collaborative tagging as an instrument for managing the maturing learning and knowledge resources. *International Journal of Technology Enhanced Learning*, 1(1/2), 70. doi:10.1504/IJTEL.2008.020231
- Marshall-Ponting, A., & Aouad, G. (2004, February 1). An ND modelling approach to improved communication processes in construction. *Automation in Construction*. Elsevier.

- Mohr, J., & Spekman, R. (1994). Characteristics of partnership success: Partnership attributes, communication behavior, and conflict resolution techniques. *Strategic Management Journal*, 15(2), 135–152. doi:10.1002/smj.4250150205
- Moum, A. (2008). *Anita Moum Exploring Relations between the Architectural Design Process and ICT Learning from Practitioners' Stories*.
- Norouzi, N., Shabak, M., Embi, M. R. Bin, & Khan, T. H. (2014). Participation Problems and Communication Difficulties in Architectural Design Practice. *Life Science Journal*, 11(9), 984–990.
- Oann Keyton, P. S.-Z. (2006). *Case Studies for Organizational Communication: Understanding Communication Processes* (p. 421). Roxbury Publishing Company.
- Otter, A. Den, & Emmitt, S. (2008). Design Team Communication and Design Task Complexity: The Preference for Dialogues. *Architectural Engineering and Design Management*, 4(2), 121–129. doi:10.3763/aedm.2008.0072
- Palea, A., Ciobanu, G., & Kilyeni, A. (2012). Educational Skills in Training Landscape Architecture Students: Developing Communication Skills. *Procedia - Social and Behavioral Sciences*, 46, 4672–4677. doi:10.1016/j.sbspro.2012.06.316
- Penttilä, H. (2006). Managing the Changes within the Architectural Practice-The Effects of Information and Communication Technology (ICT).
- Pietroforte, R. (1997). Communication and governance in the building process. *Construction Management and Economics*, 15(1), 71–82.
- Pietroforte, R. (2010). Construction Management and Economics Communication and governance in the building process, (February 2012), 37–41.
- RIBA. (2007). Taking Action, (August).
- Roxburgh, M. (2003). Negotiating Design: Conversational Strategies Between Clients and Designers, 1–16.
- Sanders, E. (2002). From User-Centered to Participatory Design Approaches. *Design and the Social Sciences: Making ...*
- Sariyildiz, S., & Veer, P. Van Der. (1998). The role of ICT as a partner in Architectural Design Education. ... in *Design Studio Teaching EAAE/Sarvarazadeh, S. K., Lamit, H., Norouzi, N., & Shabak, M. (2013). The Existing Capacities for Citizen Participation in the Structural Transformations of the Historic Core of Shiraz. Life Science Journal*, 10(2), 61–68.
- Shabak, M., Norouzi, N., Abdullah, A. B. M., & Khan, T. H. (2014). Evaluating common spaces in residential communities: An examination of the relationship between perceived environmental quality of place and residents' satisfaction. *Life Science Journal*, 11(11), 127–131.
- Shabak, M., Norouzi, N., & Khan, T. (2013). An Attempt to Measure the Success of Residential Common Space: A Case Study in Malaysia. *International Proceedings of Economics* ..., 56, 148.
- Shen, W. (2011). *A BIM-based Pre-occupancy Evaluation Platform (PEP) for facilitating designer-client communication in the early design stage*. The Hong Kong Polytechnic University.
- Siva, J. P. S., & London, K. (2011). Investigating the Role of Client Learning for Successful Architect–Client Relationships on Private Single Dwelling Projects. *Architectural Engineering and Design Management*, 7(3), 177–189. doi:10.1080/17452007.2011.594570
- Smulders, F. E. H. M. (2006, March 14). Get synchronized: bridging the gap between design and volume production. TU Delft, Delft University of Technology.
- Smulders, F., Lousberg, L., & Dorst, K. (2008). Towards different communication in collaborative design. *International Journal of Managing Projects in Business*, 1(3), 352–367. doi:10.1108/17538370810883819
- Stater, B. (2002). It's just not cricket. *The Journal of Architecture*, 7(4), 361–369. doi:10.1080/1360236032000040866
- Tessema, Y. (2008). BIM for improved building design communication between architects and clients in the schematic design phase.
- Thamhain, H. J. (2013). *Management of Technology: Managing Effectively in Technology-Intensive Organizations* (p. 400). Wiley.
- Thomas, S. R., Tucker, R. L., & Kelly, W. R. (1998). Critical Communications Variables.
- Tusa, J. (2002). From the viewpoint of a client. *The Journal of Architecture*, 7(4), 349–353. doi:10.1080/1360236032000040857
- Tzortzopoulos, P., Cooper, R., Chan, P., & Kagioglou, M. (2006). Clients' activities at the design front-end. *Design Studies*, 27(6), 657–683. doi:10.1016/j.destud.2006.04.002
- Valkenburg, A. C. (2000, December 18). The reflective practice in product design teams. TU Delft, Delft University of Technology.
- Walz, D. B., Elam, J. J., & Curtis, B. (1993). Inside a software design team: knowledge acquisition, sharing, and integration. *Communications of the ACM*, 36(10), 63–77. doi:10.1145/163430.163447
- Xie, X., Thorpe, T., & Baldwin, A. (2000). A survey of communication issues in construction design. *Arcom.ac.uk*, 2(September), 6–8.
- Yu, A. T. W., Shen, Q., & Chan, E. H. W. (2005). An Analytical Review of the Briefing Practice in Hong Kong's Construction Industry. *International Journal of Construction Management*, 5(1), 77–89. doi:10.1080/15623599.2005.10773068
- Ziegler, K., Ylitalo, J., & Mäki, E. (2004). Communication in interorganizational collaboration: a case study. *Frontiers of E-Business Research (FeBR)*, 656–669.