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# Modeling of collective architectural conception

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Cooperation, coordination and collaboration via  
basic online tools

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Cooperation, coordination and collaboration via basic online tools**

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## Summary

In my research, I am interested in different forms of collective work: collective actions, community initiatives, participative architecture, collaborative design, etc. In a general way, my objective is to understand, from a cognitive science point of view, how a group of people builds an architectural object.

Starting from the architecturological language (Boudon, 2004) as a base for the thesis, the question is: How do basic online tools assist architecture groups in the collective architectural conception process? The question is located at the intersection of different research fields: architectural research, CSCW (Computer Supported Cooperative Work) and cognitive ergonomics.

This question groups different scientific challenges. Firstly, it proposes to study what Thomas Kvan calls “rare collaborative moments” (Kvan, 2000). According to the author, the collaboration situations (where the exchange of information and ideas is done in a collective way) are produced with difficulty. Therefore, this research proposes to: study how these moments are produced, describe the collective work moments.

Secondly, Achten and Beetz talk about the need for research oriented towards the use of collaboration technologies (Achten & Beetz, 2009). They underline that most of the research produced in the field of CSCW are oriented towards the technical aspects and not the use aspects. According to the authors, too few of the papers study the “reality check” of these technologies, which is to verify how the technologies apply to the work process. What is more, the researchers observe that at present there is no commonly accepted definition of the term “collaborative design”. If the various researchers define collaboration as a generally “desired” item, none of the papers define the obstacles or difficulties in obtaining collaboration. In consequence, this thesis proposes to study the use of online tools. This is because for the most part the technologies are already developed and used in real situations of collective work.

The paper on online activism by Earl and al. shows that the Internet opens the possibility for new social behaviour (Earl, Kimport, Prieto, Rush, & Reynoso, 2010). According to the authors, these findings are yet to be analysed by researchers. They explain that in order to analyse these behaviours new tools and research methods have to be invented in order to collect and interpret the data. In consequence, this thesis proposes to study the relationship between online tools and collective work.

My objective with the future thesis is to build a modeling of the collective architectural conception process. By this I understand a complexity that unites three entities: actors, tools and the architectural object. I have chosen to build this modeling within the language of architecturology because it offers specific knowledge of the architectural process, from a cognitive point of view. The knowledge and methods of architecturology would allow me to question the influence of technologies and collective work on the architectural object. Therefore, I could eventually measure the impact of these elements on the architectural practice.

This dissertation represents a first step of the thesis, an exploratory research phase. It consists in describing the subject of the thesis: definition of the research question, positioning the research within the existing fields, exploration of the research body, exploration of the research methods.

The content of the dissertation is divided into three parts: the state of the art, the exploration of the research body and a preliminary conclusion. First of all, through the state of the art I proposed to describe the notion of collective architectural conception in relation to existing knowledge. This part of the dissertation is further divided into two parts, associated to the notions of architectural conception and collective conception. By combining the two, I hope to build a starting point for a thesis that will give me the operating concepts and the analysis grid for the following empirical studies.

The research body exploration is a survey of the universe of architectural practice in order to identify the most pertinent situations to be analyzed in future stages of the thesis. Presented as a work in progress

within the dissertation, this exploration serves to identify recurrences according to selection criteria. The criteria are: the diversity of online tools used in the process, the frequency of collective conception situations, the diversity of actors involved, the size of the work team and the frequency of virtual collective conception situations.

The conclusion of the dissertation has the following objectives: synthesize the work done within dissertation and prescribe the future steps for the thesis. A particular attention is given to the different research paths open by this preliminary research.

#### Possible applications of the future thesis in architecture

The knowledge produced with the modeling of the collective architectural conception process assisted by online tools has the objective to make progress within the language of architecturology. What is more, it could bring complementary knowledge to the adjacent research fields: architectural research, CSCW and cognitive ergonomics.

In the same time, the knowledge could serve within various participative architectural projects or collaborative design moments. By understanding how collective work behaves in architecture, the modeling could be used to develop tools and methods that are adapted to the needs of each particular collective work situation, be it in co-presence or at a distance.

The modeling could be used as well for the development of future tools for the collective work. It could serve as an evaluation grid and/or as a resource on the use of tools in the project fabrication process.

Last but not least, the knowledge on the collective architectural conception could be used as a teaching instrument in the architectural formation. The tools that have been studied and the work situations that have been analyzed could serve as examples and as starting points for experiments within architectural workshops.

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## Bibliography

- Achten, H., & Beetz, J. (2009). What happened to collaborative design? *Computation: The new realm of architectural design* (pp. 357-366). Istanbul: 27th eCAADe Conference Proceedings.
- Alexander, C. (1971). *Notes sur la synthèse de la forme* (1964). Paris : Dunod.
- Ali, A. H. (2011). The Power of Social Media in Developing Nations: New Tools for Closing the Global Digital Divide and Beyond. *Harvard Human Rights Journal*, 24 (1) , 186 – 219.
- Allwood, J., Traum, D., & Jokinen, K. (2000). Cooperation, Dialogue and Ethics. *International Journal of Human-Computer Studies*, 53 , 871-914.
- Ben Rajeb, S. (2012). *Modélisation de la collaboration distante dans les pratiques de conception architecturale. Caractérisation des opérations cognitives en conception collaborative instrumentée*. Ecole Nationale Supérieure d'Architecture de Paris La Villette. Paris: MAP-MAACC, UMR MAP 3495.
- Boudon, P. (2004). *Conception*. Paris: Editions de la Villette.
- Boudon, P. (1991). *De l'architecture à l'épistémologie*. Paris: PUF.
- Boudon, P. (1974). *Figuration graphique. Fascicule 3a : Semiologie des figures et syntaxe des formes*. AREA: COPEDITH.
- Boudon, P. (1992). *Introduction à l'architecturologie*. Paris: Dunod.
- Boudon, P., & Decq, O. (1976). *Figuration graphique en architecture. Fascicule 3b : Architecturologie des sigles*. Paris: AREA, COPEDITH.
- Boudon, P., Deshayes, P., Pousin, P., & Schatz, F. (1994). *Enseigner la conception architecturale. Cours d'architecturologie*. Paris: Editions de la Villette.
- Carroll, J. M., Neale, D. C., Isenhour, P. L., Rosson, M. B., & McCrickard, D. (2003). Notifcation and awareness: synchronising task-oriented collaborative activity. *International Journal Of Human-Computer Studies*, 58 , 605-632.
- Chastel, A. (1987). *Léonard de Vinci, ingénieur et architecte*. Montréal.
- Cingolani, F. (2012, 11 14). *Dreamhamar: Construction d'une communauté autour d'un espace physique et gestion des systèmes complexes en architecture participative*. Consulté le 06 05, 2013, sur <http://dnarchi.fr/pratiques/dreamhamar-construction-dune-communaute-autour-dun-espace-physique-et-gestion-des-systemes-complexes-en-architecture-participative/>
- Conan, M. (1990). *Concevoir un projet d'architecture*. Paris : Harmattan.
- Cottone, P., & Mnatovani, G. (2003). Groundin "subjective views" Situation awareness and coreference in distance learning. Dans G. Riva, F. Davide, & I. W., *Being There: Concepts, effects and measurement of user presence in synthetic environments*. Amsterdam: Ios Press.
- Earl, J., Kimport, K., Prieto, G., Rush, C., & Reynoso, K. (2010). Changing the world one webpage at a time: conceptualizing and explaining Internet activism. *Mobilization: An International Journal*, no. 15(4) , 425-446.
- Falzon, P., & Darses, F. (1996). La conception collective: une approche de l'ergonomie cognitive. Dans F. E. Terssac G., *Coopération et Conception*. Toulouse: Octarès.

- Fay, D., & Frese, M. (2000). Self-starting behaviour at work: Toward a theory of personal initiative. Dans Heckhausen, *Motivational psychology of human development: Developing motivation and motivating development* (pp. 307-337). Amsterdam: Elsevier.
- Gaver, W. (1992). The affordances of media spaces for collaboration. CSCW'92. New York: ACM.
- Grabow, S. (1983). *Cristopher Alexander, The search for a new paradigm in architecture*. Stocksfield, Boston, Henley, London: Oriel Press.
- Guillen, M. F., & Suarez, S. L. (2005). Explaining the global digital divide: Economic, political and sociological drivers of cross-national internet use. *Social Forces*, 84(2) , 681-708.
- Houdart, S., & Minato, C. (2009). *Kengo Kuma. Une monographie décalée*. Paris: Donner Lieu.
- Kvan, T. (2000). Collaborative design: what is it? *Automation in Construction*, 9:4 , 409-415.
- Lecourtois, C. (2011). Architecturological and epistemological research on collaborative design. *International Journal of Design Sciences and Technology*, 18(1) , 31-47.
- Lecourtois, C. (2005). Architecturologie appliquée à une sémiotique de l'esquisse architecturale. SCAN'05, Séminaire de Conception Architecturale Numérique (p. 15). Paris: ENSA Paris La Villette.
- Lecourtois, C. (2006). Conception de l'espace et espace de conception. *TIGR, Nouvelles approches de l'espace dans les sciences de l'homme et de la société* (p. 17). Reims: Institut de Géographie de Reims.
- Lecourtois, C. (2012). Modéliser la complexité de la conception architecturale numérique. Architecturologie et modèles complexes. *Complexité(s) des Modèles de l'Architecture Numérique, Actes du 5ème séminaire de Conception Architecturale Numérique* (p. 11). Paris: PUN.
- Lecourtois, C. (2006). Recherche fondamentale et/ou pratique architecturale. EURAU 2004 (p. 6). Marseille: ENSA de Marseille.
- Martin, G., Déttienne, F., & Lavigne, E. (2001). Analysing viewpoints in design through the argumentation process. Dans M. Hirose (Éd.), *Proceedings of INTERACT'01*, (pp. 521-529). Tokyo.
- Mattessich, P. (2012, 3 6). *Cooperation, Coordination and Collaboration Table*. Consulté le 9 6, 2013, sur Conservation Gateway: <http://www.conervationgateway.org/Files/Pages/cooperation-coordination-.aspx>
- Mayeur, A., & al. (2010). Concevoir à plusieurs et à distance en architecture: vers de nouvelles pratiques professionnelles? *Actes du Séminaire Globalisation et Territorialisation: question de travail*. Paris: Paris 1 Sorbonne.
- Panitz, T. (1997). *Collaborative versus cooperative learning: comparing the two definitions helps understand the nature of interactive learning*. ERIC Clearinghouse.
- Peirce, C. S. (1978). *Ecrits sur le signe* (éd. L'ordre Philosophique). (G. Deledalle, Éd., & G. Deledalle, Trad.) Paris: Le Seuil.
- Petrie, C. (2008). Collective work. *IEEE Internet Computing* , 80-82.
- Senciuc, A. (2013, 07 15). *Assisting collective architectural conception – research poster*. Consulté le 09 17, 2013, sur Alexandru Senciuc | architecture between theory, practice and technology: <http://alexandrusenciuc.com/2013/07/15/assisting-collective-architectural-conception-research-poster/>
- Senciuc, A. (2012). *La mobilisation invisible: de l'activisme en ligne vers l'espace public*. mémoire recherche, Ecole Nationale Supérieure d'Architecture Paris La Villette, Art Architecture Philosophie, Paris.
- Simon, H. A. (1991). *Sciences des systèmes. Sciences de l'artificiel*. Paris: Dunod.

- Sloterdijk, P. (2006). *Ecumes*. (O. Mannoni, Trad.) Paris: Hachette Litteratures.
- Soubie, J.-L., Burato, F., & Chabaud, C. (1996). La conception de la coopération et la coopération de la conception. Dans G. Terssac, & E. Friedberg, *Coopération et Conception*. Toulouse: Octarès.
- Stasser, G., & Taylor, L. (1991). Speaking turns in face-to-face discussions. *Journal of personality and social psychology*, 60 , 675-684.
- Terssac, G., & Chabaud, C. (1990). Référentiel opératif commun et fiabilité. Dans J. Leplat, & G. Terssac, *Les facteurs humains de la fiabilité dans les systèmes complexes* (pp. 110-139). Toulouse: Octarès.
- Valkenburg, R. C. (1998). Shared understanding as a condition for design team. *Automation in construction*, 7 , 111-121.
- Venturi, R. (1999). *De l'ambiguïté en architecture*. Paris: Dunod.
- Visser, W. (2002). Conception individuelle et collective : Approche de l'ergonomie Cognitive. Dans M. Borillo, & J.-P. Goulette, *Cognition et création : Explorations cognitives des processus de conception* (pp. 311-327).

## Research Body

- Arquitecturas Colectivas. (2010). *La Red | Arquitecturas Colectivas*. Consulté le 09 15, 2013, sur Arquitecturas Colectivas: <http://arquitecturascolectivas.net/la-red>
- Ecosistema Urbano. (2012, 06). *Dreamhamar about*. Consulté le 09 14, 2013, sur Dreamhamar: <http://www.dreamhamar.org/about/>
- Hesseldahl, A. (2011, 01 31). *As Egypt's Last Internet Connection Goes Down, Alternatives Appear*. Consulté le 09 16, 2013, sur AllThings D: <http://allthingsd.com/20110131/as-egypts-last-internet-connection-goes-down-alternatives-appear/>
- Medina, N. (2013, 03). *¿Por qué apoyar Arquitecturas Colectivas?* Consulté le 09 15, 2013, sur Vimeo: <http://vimeo.com/59922479>
- Miniwatts Marketing Group. (2001). *World Internet Statistics*. Consulté le 09 11, 2013, sur Internet world stats: <http://www.internetworldstats.com/stats.htm>
- Telecomix. (s.d.). *Telecomix About*. Consulté le 09 16, 2013, sur Telecomix: <http://telecomix.org/#about>
- Urban Fabric Organization. (2012). *Betatests - Opencities*. Consulté le 09 16, 2013, sur Open Cities: <http://paris.opencities.net/betatests/details/villes-sans-limite/>
- Urban Fabric Organization. (s.d.). *UFO*. Consulté le 09 16, 2013, sur Urban Fabric Organization: [http://urbanfab.org/index\\_fr.html](http://urbanfab.org/index_fr.html)