THE CHALLENGE OF COLLABORATION IN DESIGN MANAGEMENT PROCESS AND THE POSSIBILITIES OFFERED BY BIM PLATFORM

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The complexity of design management process have increased significantly the last decades due to the great number of design specialties involved in building production. In this sense, it is observed the necessity to rethink the design process, it should migrate from the traditional routine to a more collaborative process.

Architects and engineers are currently concerned with the development of global solutions which involves the entire lifecycle of the building from conception and its relationship to the environment through production and related issues, use and operation, to its requalification or demolition. In this sense, it is necessary to rethink the design process by developing studies around decision-making methods incorporating collaboration in project management.

Concurrently, advances in Information and Communication Technology (ICT) have enabled the establishment of new schemes for design teams (management, integration). The possibility of work in a collaborative way from the BIM (Building Information Modeling) model, associated to the possibilities offered by the information and communication technologies, presents new alternatives to the design teams.

However, it is observed that the main problem faced by professionals is not related to the complexity of new techniques, but it is the incapacity of working together in a collaborative manner. As said by Deutsch (2011) BIM implementation implies working with others in support of the Project goals. Integrated design doesn't automatically follow BIM adoption – but having the capacity already in place to collaborate with others predicts the successful adoption of BIM.

In order to identify how the self-organization of architecture students occurs when facing the challenge of a collaborative project, an academic experience was realized with last year undergraduates. The group was divided into 15 teams of up to 6 professionals, and each student assumed the responsibility for one of the project disciplines with the objective of developing a single-family residential building of 50m².

The design specialties defined in each group were: architecture, structure, hot and cold water systems, sanitary sewage and rainwater installations. In addition to these four specialties, there was a student responsible for defining the environmental quality profile of the building based on the requirements of the AQUA certification – Brazilian adaptation of the French HQE method (High Quality Environment). In each team, a student assumed the role of the design coordinator.

The academic project has been developed over three months with weekly face-to-face meetings and virtual meetings held according to the organization of each group, using the digital tools and platforms of their choosing, without any interference of their advisor.

Figure 1 shows the tools chosen and the statistics of use. It is worth mentioning that the use of Revit focused only on 3D modeling and the use of CAD tools that could help in collaboration and compatibility, such as the XREF (External Reference), were not used due to the lack of

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knowledge on the part of the students and the job organization. Nevertheless, the use of SketchUp was only for presentation's purpose.

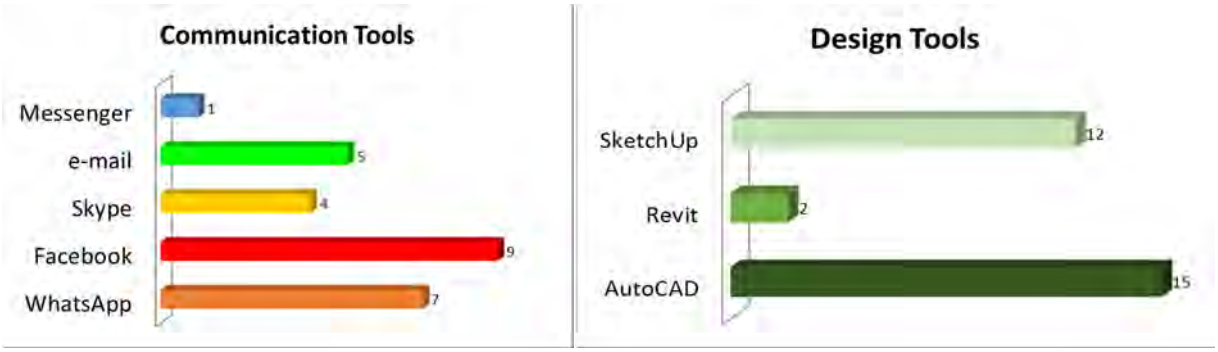

Figure 1 - Selected digital technologies

The main results of this experience revealed lack of collaboration during the design process:

- The choice of the drawing, analysis and presentation tools were defined by the participant's ability to use them, not the one that best suited the proposed work.
- In general, designs did not present integrated solutions, and the architecture design did not incorporate the elements / equipment of the other disciplines, making global project perception difficult.
- In many cases, there was rework for lack of communication and lack of collaborative work habits.
- In general, there was no compatibility check during the development on account of the lack of integration in the process
- Lack of general collaboration, noise in communication and unilateral or bilateral decisions.

Considering that the work done in a collaborative way is one of the foundations in the implementation of the BIM process, the question that needs to be analyzed after this case study is: how to insert the ability to work collaboratively with architecture undergraduate courses?

Therefore, a new experience is being planned. The creation of a workshop is being thought of with a group of graduate students of architecture and engineering alongside market professionals to assess the possible benefits and obstacles when adopting the BIM process in the elaboration of a building project and its management. This workshop will include various specialties and their relationships with the elaboration of the schedule (BIM 4D) and the budget of the work (BIM 5D), using the main Information and Communication Technologies (ICTs) through a collaborative integrated process.

REFERENCES

DEUTSCH, Randy. BIM and integrated design. Strategies for architectural practice. John Wiley & Sons, Inc. 2011. Hoboken, New Jersey, USA.