Roadblocks ahead in Computer Aided Project Planning

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Short paper

The paper treats with three scenarios that describe an ordinary, a possible and an expected – yet feasible – situation computer aided project planning in the architectural practice.

Scenario 1 – The ordinary situation in architectural offices

Most software and hardware used in building design originates to so called ´stand-alone´ applications. Thus, programs solely serve a single specific task. They are used isolated from other programs and the generated data is stored individually leading to a variety of archival interrogations.

Nonetheless, this way of working has some advantages in comparison to a consistent data-model. If any one of the system-components fails the remaining components are unaffected and continue to work. The various programs provide a manageable quantity of features requisiting justifiable expenditures of costs and training period. The demands made to the system performance are less than those made to a system with a consistent data-model. These applications provide the architect with the flexibility to equip his office with exactly the stand-alone tools and the staff that meet his demands.

Scenario 2 – The possible situation in CAAD

With today's software applications work processes in building design could be reformed and improved, reaching an effectiveness which is not possible to be achieved with stand-alone applications and the methods described in scenario 1. To participate from the capabilities of these applications the architect has to assume a certain risk and expenditure in training that should not be underestimated. Software specialists and system administrators are required to imagine the possibilities of an integrated information processing system in the architects office. New and uncommon systems expand the architects capabilities and range of duties. Considerable systems include digital stock-taking of existing buildings to provide accurate CAD-data directly from the survey on the building site [1]. In this and other cases, i.e. facility management, the architect

adopts new fields of activity, which provide him with increasing competence, improved sales potential on the market and in the end with new clients (see fig. 1: the possible situation). The main criteria and capability characteristics of scenario 2 which current systems are capable to meet will be described in the following.

- Survey as a basis for planning with CAAD in the revitalization and conservation process of existing buildings.
- Availability of complex CAD-systems with extended and specific architectural functionality (CAAD)
- Linkage between CAAD-data and databases (DBMS) providing information for room-books and administration of utilization.
- Linkage between CAAD-data and BOQ and tender-documents for the exchange of quantities and masses.
- Data exchange capabilities to directly deliver CAAD-data to other professionals and executive firms.

- Architectural visualization, presentation and simulation directly derived from the CAAD-package.
- Structured and classified office-organization, including a standardized filing- and archive system.
- Integration of programs to create and exchange digital BOQ- and tender documents as well as price indices.
- Establishment of networked computing equipment with appropriate security mechanisms and standardized access to global networks and net-services.

Scenario 3 – The expected situation

New strategies in CAAD require the architect to be receptive to new ideas and – which is even more important - to be able to clearly define his objectives, requirements and the hopes he pins on the use of computers in his practice.
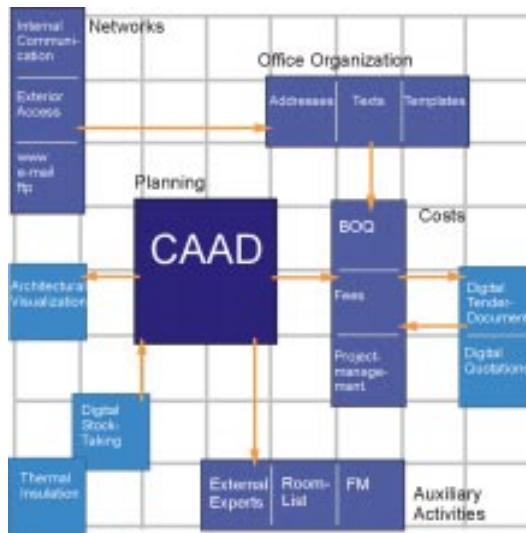

Figure 1:
the possible situation

The central idea of innovative and future-oriented CAAD-systems will lay in a modular conception. The performance of the system will be adjustable by the specific user, dependent on his current tasks and necessities. Centrally or de-centrally stored integrative building models will be standard (EDBMS – Engineering Database Management System), which will be accessed on request by individual tools the user defines on the basis of his specific needs. These queries will be realized throughout CAAD-functionality made available on the net, passing through continuous improvement of the developer. Instead of complex and isolated CAAD-programs provided by different suppliers, architects will make use of a variety of functions they could assemble arbitrary. To provide experts from other branches, i.e. heating or structural engineering, with the functionality they need, the system is always ready for extension with appropriate functions. Thus, troublesome conversion, data exchange as well as internal and external binding do not apply. Building information systems will be established which relieve digital survey. All aspects related to the building project will be captured, evaluated and structured on the building site.

As far as possible mapping of planning conditions will correlate to our mental perception. Each object modeled in the CAAD-system enacts geometric properties and representation as well as a connection to an object management system. This modular system could be extended, depending on the diversity of the planning task. Each specialist could access specific modules, which relate to his origin task and profession. To describe building objects the various modules make use of the technical terms the professional is used to. The modules themselves belong to domains, characterized by a superordinated communication or information interface, that mediates between the domains. Thus interpreting building data according to its technical terminology and pertinence (see fig. 2: the expected situation).

The intuitive and creative phases of architectural design work will be supported. The architect could
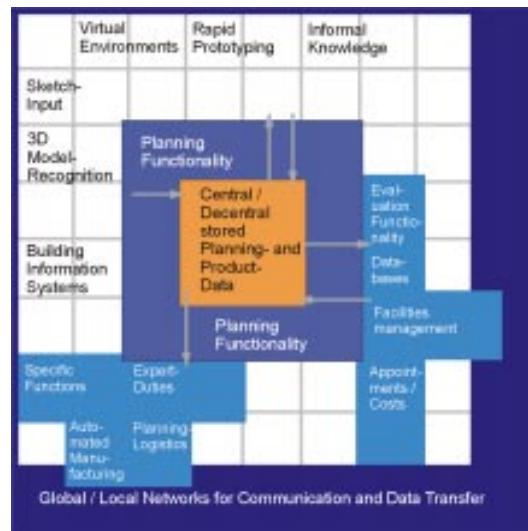

Figure 2:
the expected situation

make use of functions like virtual reality or rapid prototyping [2, 3, 4]. With the aid of these tools the architect generates visualizations and appraisals that will further be edited in the net-based CAAD-system. Classic design techniques like sketching and model-building will find their counterparts in new communication techniques like sketch recognition, gesture recognition and 3D-scanning. Complex product presentations, showing different aspects of the building, will become relevant, making good economic sense: the visual model of the building costs, the load bearing model, the model related to building physics – immersive, multi-sensorial, possible to be experienced, discussed and explored in its original size simultaneously with others.

Informal components will assist the architect to every occasion in each planning stage. Your personal agent informs you about norms and standards your building has to comply to. It delivers information about specific building components, (i.e. bricks) you'd like to use, its common and fast-selling formats, delivery times as well as addresses of potential manufacturers within the periphery of the building site. Information about building regulations are stored on the system or could be queried through the agent who automatically contacts online representations of building authorities in whose scope the building is situated. The delivered appropriate norms will find entry into the modules you hired for this dedicated architecture project. Case-based-reasoning methods allow the architect to lookup and examine proven solutions for design or construction severities and adjust and transfer them onto his planning situation – leading to a digital memory of preservable solutions [5].

The place where the design-work was actually done or where it is stored is not a crucial factor anymore – there is even no need to know about it. To save the whole project in a central place, storage capacity will be rent, including services for maintenance, archival and conversion. Office networks are - apart from security mechanisms - no longer distinguishable from global networks. Wherever you are security and access mechanisms occur and it is of no importance whether your workplace is still in the local office or anywhere else in the world [6]. It is out of question that traditional data communication will be an item of the past. However, the computer aided planning process will influence automated building processes only so far as it always takes human peculiarities and attributes into consideration.

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