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## **EFFECTIVE WORKPLACES:** bridging the gap between architectural research and design practice

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### **Abstract**

Architectural researchers and design practitioners mostly segregate in distinct communities with hardly any overlap, collaboration or exchange of ideas. This gap between research and practice leads to a wide-spread ignorance and inability to make practical use of evidence produced by research, resulting too often in poor designs and a self-absorbed research that cannot make a difference to peoples' everyday lives and spatial experience.

In order to bridge the gap between architectural research and design practice, UCL's Bartlett School of Graduate Studies and Spacelab Ltd. have committed themselves to a Knowledge Transfer Partnership on Effective Workplaces. Ideas and concepts on how to change architectural business to combine research and practice will be presented as well as the first analytical results from this newly started venture.

### **Introduction**

In the field of architecture we experience a considerable gap between those who design and produce built form on the one hand (like architectural practices) and those that research the spatial and social effects of built form on the other (like the Space Syntax community). Usually the two groups lack a common language and understanding: researchers may find architectural practice hard to grasp for its intuitive and experiential approach and criticize it with all failures to design for well-used and lively spaces whereas practitioners consider architectural research to be complicated, difficult to understand, time-consuming and at best trivial in its outcome.

However, if we wish to design for well used and effective spaces we need both sides collaborating and integrating as architecture is confronted with ever more challenges. In the design of workplace environments, just to name an example, architecture as an invariable, long life medium is asked to provide solutions to host everchanging organisations who continuously downsize or grow and whose work

tasks and businesses become more complex, flexible, even outsourced or globally relocated (Becker and Sims, 2000). In order to find architectural answers beyond a genius-architect's intuition, a comprehensible research could reveal the connections between social and spatial constitution on the one hand, and a reflective design practice could integrate this evidence-based knowledge into the material production of complex buildings as well as of urban developments on the other.

### **Changing Architectural Practice**

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The starting point for bringing research and practice together may be attaching research to everyday design practice for both sides to build up a common understanding at the front line of design tasks to solve.

The architectural firm Spacelab Ltd. and the Bartlett School of Graduate Studies at UCL have recently started collaborating on the basis of a Knowledge Transfer Partnership (KTP)<sup>i</sup> in order to integrate architectural research and analysis more into the design business. More specifically, Space Syntax methods shall be used in order to exploit knowledge on the powerful relationship between spatial configuration and social behaviours in workplace environments and hence influence design processes as well as products. The basic idea is striking and simple: by investigating the spaces, cultures, behaviours, and space usage patterns of an organisation, this detailed knowledge may help to suggest better design solutions that perfectly fit the clients' character and needs. Moreover, solid and comprehensible evidence can be provided to back up discussions with existing clients to argue for the most adequate solution, and new clients may be acquired that are interested in looking at space, property and effectiveness in line with an organisations' business objectives.

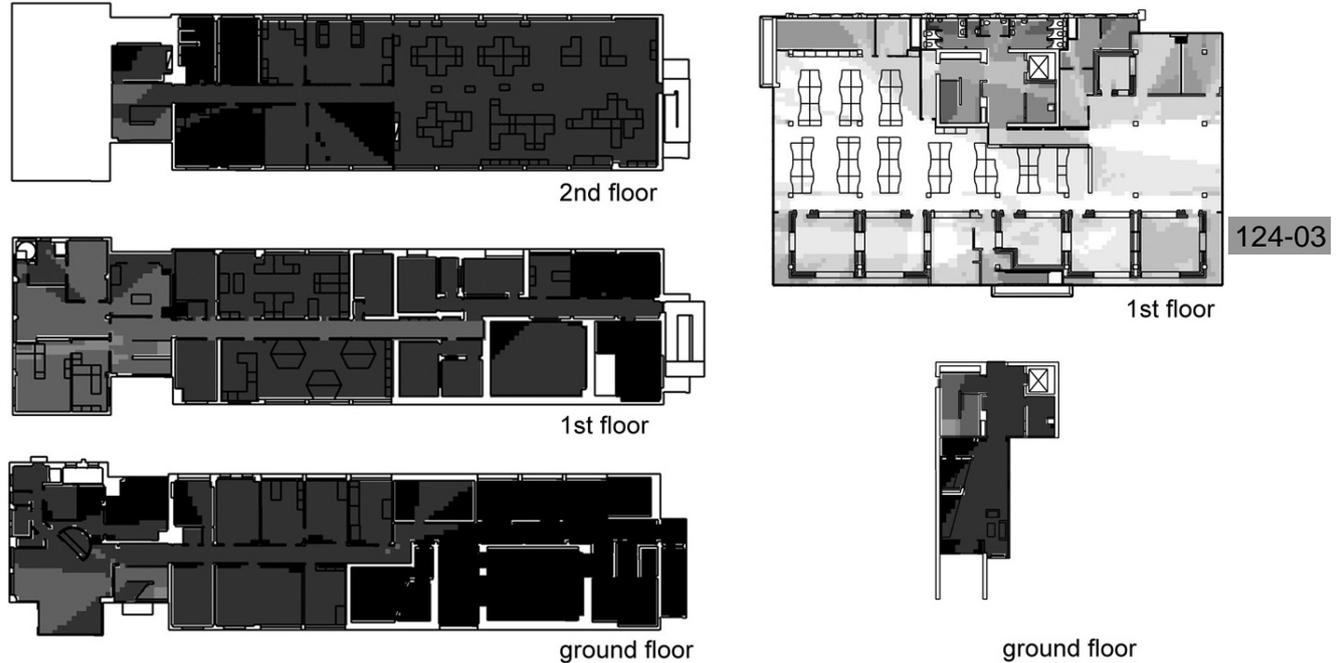
Of even more importance may be the opportunity to change architectural business: architecture could be turned from the predominant project management approach into a more operational and process management based discipline. By knowing more about the client than they know about themselves, it may be possible to continuously consult a client on the most adequate and efficient spatial solution fitting to his actual needs (that could change quite rapidly) as well as to offer designs for other properties the client may own. A client may hence not only buy an architectural service once, but become a repeat client.

### **Learning from a Case Study**

In order to link design practice and social and spatial research, a study of space observations and interaction questionnaires<sup>ii</sup> had been conducted alongside a Spacelab fit-out project for a UK based radio station. Data was gathered at two different stages: once before and once six months after<sup>iii</sup> the organisation moved into their new spaces. The study's aims were to show what difference the new design made to the organisation's character and functioning in general, and to its interaction patterns and social networks in specific.

The major change from the old to the new design was reducing the amount of unused spaces and offering a compact and efficient building layout. Instead of dividing people up on three floors, as was the case in the previously occupied building, everyone was brought together on one floor, mostly in one open space (except for the receptionist whose desk is located at the ground floor below). Thus the average visual integration of the whole space inhabited by the organisation, based on measurements introduced by Turner et al. (2001) and as calculated with Depthmap (Turner, 2006), could be more than doubled (from 1.975 to 5.223; if the small reception area on

the ground floor is not taken into account visual integration values rise to an average of 7.858). Likewise, accessibility<sup>iv</sup> of all locations like peoples' desks, the meeting rooms, studios, etc. could be increased by 180%.



**Figure 1:**

*Visual graph analysis of the old spaces (left) and the new spaces (right). Visual integration cores increase and move from corridors to work desks in the new design (brighter colours are more integrated)*

This significant change in the spatial structures being used every day by the organisation was followed by new patterns of behaviour. Not only did the overall levels of contact increase (pre: 3.0, post 3.7), people also adopted new patterns of interaction and collaboration. An administrator reported that she no longer used a phone directory to get hold of someone as was the common practice before the move, but instead simply looked out for people and walked over to their desks to solve queries and problems directly. At the same time as levels of interaction rose in the pre-post comparison, the scores of being found beneficial<sup>v</sup> to others' work increased by 12% (pre: 0.280, post: 0.313).

The differences the new design made can be seen even more clearly in the case of the receptionist. Although having been located as the only person on the ground floor previously too, many people passed by not only at arrival or leaving, but also on several daily routes, e.g. on the way to an outside smoking area or to the ground floor studios. Hence she was considered being seen nearly daily by everyone (4.74) as well as above-average beneficial (0.357). With the move she was still located at the ground floor but now all studio spaces were located next to the big open space where everyone sat. Additionally people headed to the lower ground floor close to the parking area for smoking, where they didn't pass the receptionist on the way. Her levels of contact dropped by 19% to 3.85, her usefulness score was reduced by 66% to below average 0.122. Since everyone else's levels of contact and being found beneficial had risen with the move, this exceptional outcome may be an effect of not only configuration, and hence the decision that as a receptionist she had to be located close to the entrance and away from everyone else, but also to aspects of space usage and the way the organisation is inhabiting its spaces. The choice to not stop to have a chat whilst on the way to or from smoking or the strong feeling of everyone being united and happily interacting on the first floor, unconsciously excluding her, may be reflections of this. However, it may as well be due to psychological factors that people don't recall seeing the receptionist daily and thus

are not aware about her usefulness. As was shown in many previous studies (Penn et al., 1999) frequency of being seen and being found useful correlate strongly and significantly. This relation can be proven here as well (pre:  $R^2 = 0.688$ ; post:  $R^2 = 0.649$ ).

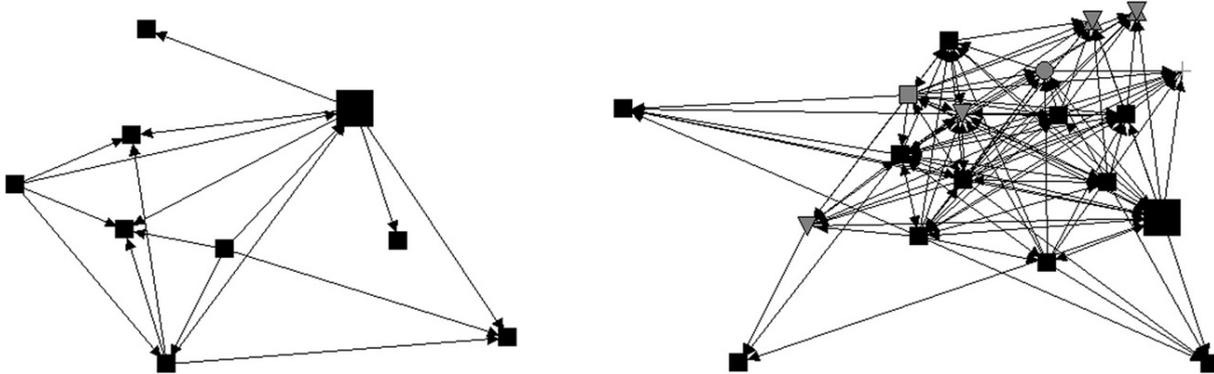
Moreover, the new design showed influence on the formation of the social networks of the organisation. A social network analysis (SNA) (Borgatti et al., 1999) revealed a strengthening of the feeling of mutual usefulness within the organisation: whereas in 2005 only 26% of nominations as beneficial were reciprocated, this figure rose to 38% in the 2006 post occupancy evaluation, i.e. sharing a common space and seeing each other more frequently may raise the awareness of other peoples' contribution to someone's own work efforts. It may also equalise the perceived differences between people and roles, thus resulting in more mutual ties.

Simultaneously, the social networks grow wider and reach across group and discipline boundaries with the move into the new design. Figure 2 shows the beneficial egonet<sup>vi</sup> of one of the freelancers working for the programmes section in a pre-post comparison. In 2005 he only has connections<sup>vii</sup> to colleagues from the same discipline, i.e. the programmes. Not only does the quantity of links double in 2006, but the connections now cover nearly all roles within the whole organisation, including the general management, marketing, sales and traffic.

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**Figure 2:**

*Egonet of one of the freelancers (big black square), 2005 pre analysis (left) and 2006 post analysis (right). Nodes are coloured and shaped according to disciplines of the people (black square: programmes, grey circle: management, grey cross: technical staff, grey triangle down: marketing, grey double triangle: traffic, grey square: sales)*



People being at the heart of the organisation don't experience the same change of networks, but for those being at the rim (like freelancers) it does make a difference to share the same space with everyone. To summarise, these findings suggest that the increased overall spatial integration may be reflected in increased overall levels of seeing others more frequently and finding them increasingly beneficial. Social networks are becoming more reciprocated with the influence of the new spaces and at the same time widening and condensing, especially for freelance staff members or those not regularly around and working out of usual office hours.

### Embedding Space Syntax into Life Design Projects

Spacelab has made first attempts to use Space Syntax as a design tool, for example in the design of another radio station based in Ireland. The project started off with the idea to get two different radio stations, owned by the same company, one operated on national level, the other locally, together into one building, which was a sensitive task because one of the stations feared to lose its identity by being positioned too closely to a competitor. Two different buildings were finally considered: the first one comprising only one floor, the second one spreading over three floors (from the 2<sup>nd</sup> to the 4<sup>th</sup>) of an office building. Due to an unfavourable location within the city and the feeling of being too integrated with each other on the one floor

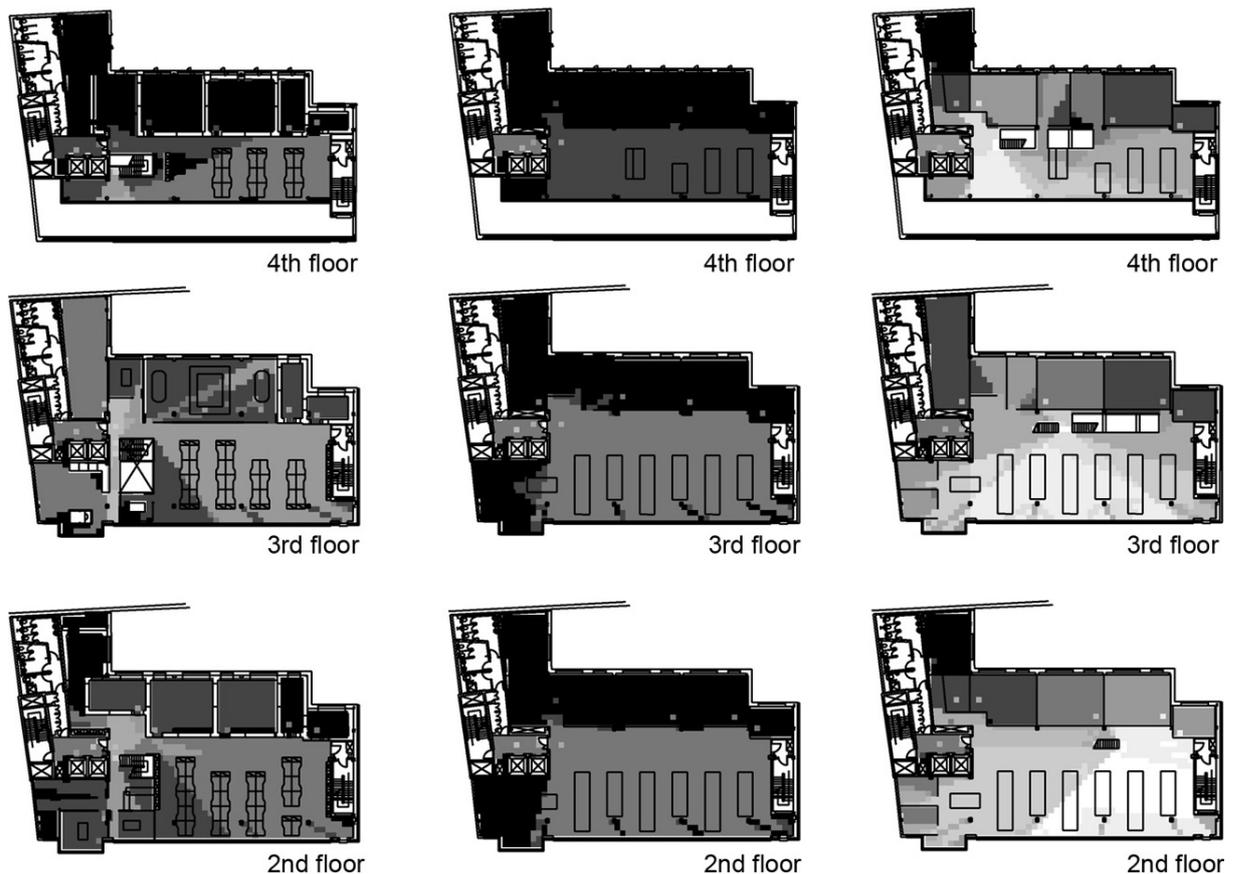
building (after first layout ideas including a visual graph analysis had been suggested by Spacelab), the three storied building was opted for. Two different alternatives were worked out: one which entered the space on the 2<sup>nd</sup> floor where the reception desk was located adjacent to a small switch staircase leading up to the other two floors. The second option placed the entry on top of the premise on the 4<sup>th</sup> floor with a straight staircase through the main open space leading downwards, with voids opening up sightlines between the floors.

Space Syntax, in specific a visual graph analysis as done by Depthmap on floor plans with furniture and transparent parts included (accessibility) and excluded (visibility) supported the design process – mainly by providing images – in a twofold way: firstly it helped to understand the advantages of the second layout with the long staircase producing a good integration distribution over all three floors, offering manifold possibilities to place the different teams requiring different work situations later in the process. Yet in this case the outcome of the syntax analysis didn't come as a surprise. Often an experienced designer may intuitively understand the effects of his/her designs in advance without having to see it built or simulated, especially if the project is rather small and easily overlooked. But by visualising the effects the non-discursive feelings of which would be the most adequate layout could be proven and thus the decision was reinforced. Secondly it eased the discussions with the client through providing evidence on the effects of the atrium. Thus the better design solution could be easily justified and argued for.

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**Figure 3:**

*Visual graph analysis showing the differences of the various alternatives. left: layout 1 with switch staircase and entry on the 2nd floor; middle: layout 2 linked only via lifts; right: final layout (2) linked via the staircase and atrium (entry on the 4th floor); (brighter colours are more integrated)*



### Future Plans

In the future the full range of Space Syntax analysis methods (among others like SNA) shall be used to influence the design process and help striving for the best design option for a client. In order to do so, an understanding as full and deep as possible of the manifold and multilayered influences of space on an organisation's behaviour needs

to be developed; this involves post occupancy evaluations as well as an analysis of life projects. In the end this may not only feed into the knowledge base of the research community and into an enhanced portfolio of Spacelab, it may also inform, influence and change the design process itself and thus the way architectural business is set up.

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- i. Knowledge Transfer Partnerships are a UK government funded programme that enables businesses to benefit from the wide range of expertise available at universities. Their research knowledge is applied to important business problems with both partners profiting from the project collaboration, see: <http://www.ktponline.org.uk/> for details.
  - ii. Space observations comprised repeated movement traces over periods of three minutes each hour of the working day and snap shots of stationary activity. The questionnaires consisted of a full list of all staff members where everyone ought to judge the amount of contact to everyone else on a scale from 1 (never) to 5 (daily). Additionally those found beneficial as well as those that were part of one's own regular work team ought to be identified.
  - iii. The 2005 pre study reached a return quota of 39% (28 respondents out of 72 staff of which 25 could be identified), in the 2006 post study 57% of the questionnaires were filled in (41 out of 72 with 33 identifiable).
  - iv. Accessibility was modelled on the basis of a Depthmap visual graph analysis with all furniture, glass walls etc. left as obstacles.
  - v. The beneficial score was calculated as the average of total beneficial nominations over number of participants, hence maximum possible number of nominations.
  - vi. An Egonet is the network of one person (Ego) that shows only the links Ego has to everyone else and hides all other nodes and ties.
  - vii. Meaning that either he found them beneficial or that others found him beneficial, see directions of arrows in the attached figure.