



*Employees are highly visible.*



*Open meeting spaces support ad hoc meetings.*



*Technologically adaptable: A raised floor system provides a convenient cavity for wires and HVAC.*

**“A new environmental consciousness is fueling a demand for healthy indoor environments and increased energy savings. All these changes require a new approach to office-space planning.”**

– AWL Literature

## *A Laboratory for Workplace Adaptability*

### **Goals**

The Adaptable Workplace Lab (AWL) was created for the National Office of Real Estate Portfolio Management and designed as an extremely flexible workspace supported by advanced systems. The 10,000 sq ft Lab is on the 7<sup>th</sup> floor of the GSA headquarters building. The central goal was to create a collaborative and open environment that enables organizational agility. A second key goal of the project was to test how well a wide range of technologies and design features - lighting, HVAC, connectivity, interior systems and the space delivery process - support the goals of adaptability. Key performance issues included enabling staff to work remotely, managing high levels of churn, supporting work/life balance, and providing for a high quality indoor air and thermal environment.

### **Obstacles**

Some obstacles to success came from the way in which the workplace was delivered. The space had not been completed when the occupants moved in. This prevented engineers from making final modifications to optimize and properly commission the HVAC systems which were unfamiliar to users. The innovations in HVAC systems and controls were not fully tested and resolved. This led to an increase in complaints about thermal comfort and environmental quality. The briefing of the Lab space was driven by an emphasis on performance of technological components and less by what the occupant’s actual needs would be. The users found the noise levels of the open space to be problematic for speech privacy, distractions and getting work done. The project was further challenged by a tight schedule.

### **Innovation**

The initial focus was on the performance of systems – HVAC and technology. A raised floor system allowed for the integration of a communications infrastructure and the HVAC ductwork. Removable floor panels allowed the space to be re-configured quickly and at low cost. The systems were evaluated through detailed diagnostics to understand deficiencies and areas for improvement. The Carnegie Mellon research team made specific recommendations to improve the various systems.

Five different furniture systems were tested. Modular furniture was provided that can be easily be re-arranged as desired. Many innovations were explored: enclosure, mobility, flexibility, modification, and technical support. One group reported having re-configured all of its furniture within 90 minutes. Overall, the Herman Miller system was favored because its partitions on wheels could be moved by the end-user (though the pear shape of the desk was disliked). An initial report of the furniture systems suggested dissatisfaction with the provision of local storage and the lack of a 2<sup>nd</sup> desk chair for two person meetings.



## Discovery / Analysis Methods & Measures

### Instrumentation & Questionnaire Studies

Both investigated the effectiveness of the following environmental factors: thermal quality, air quality, visual (light) quality, spatial quality and acoustical quality

### Center for Building Performance & Diagnostics: POE of AWL

A study team from Carnegie Mellon investigated user satisfaction in terms of spatial, thermal, visual, acoustic and air quality issues. Tools included: detailed user survey, interviews, user groups, diagnostics of environmental parameters and workplace walk-throughs.

### Future Studies of AWL

An additional study of the AWL is intended to investigate time and materials used, individual productivity (health, attraction and retention), and environmental sustainability. Future study interests include: cost of delivery relative to baseline benchmarks, comparisons with a control group in the same building, and the effects of the space and design on work processes.

## Environmental Issues Themes & Solutions

### Organizational Flexibility

A main goal was to reduce constraints to reconfiguring the space as required. A high level of user control of space configuration was expected.

### Thermal Control

Key goals were to deliver ventilation independent of thermal conditioning, to design for continuous change in thermal zone size and control, and to provide high levels of user/ individual control of local thermal conditions. Studies found that poor mechanical design provided neither thermal comfort nor adequate user controls as envisioned. The flaws can be easily fixed.

### Lighting

The separation of task lighting from ambient lighting was found to be successful. Daylight contributes well. Controls are not successful.

### Environmental Sustainability

The project was designed to maximize natural ventilation and use renewable resources. Recyclable materials were used and adhered to LEED principles were possible. Energy conservation techniques include high efficiency generation, minimized duct losses, simple runs.

## Organizational Issues & Solutions

### Collaborative Environment

A more open environment, informal team spaces and project rooms are intended to increase accessibility of colleagues within and across groups. Over 30% of the AWL consists of collaborative and shared spaces. Users highly valued the number, availability and configuration of the conference rooms. Open meeting areas were the most successful.

### Connectivity

The raised access floor was intended to enable fast and easy plug and play for the users as well as make it simple to make future modifications to the work space. A grid framework provides a backbone for voice, data and electricity. The plug and play framework was found to be successful in enabling re-configuration and should allow easy future adaptation. The reduction of outlets in the floor boxes from 4-6 was shortsighted.

### User research challenges

The occupying tenant was changed during the course of the project and their specific requirements were not researched. The focus on technology performance independent of the users resulted in the open space design not suiting the final users needs for acoustic privacy.

## Research Roles

### Carnegie Mellon University

Interviews

### Center for Building Diagnostics and Performances, Carnegie Mellon

Physical Measurement

### CMU & Charles Salter Associates

Environmental Quality Report (EQR)

Workplace Performance Survey (WPS)

POE Report

### Judi Heerwagen Associates

Interviews

### Vivian Loftness

Research Contact