



ID 325 INTERIOR BUILDING SYSTEMS

Project 1: Case Study of Existing Interior Environment

INTENT AND OVERVIEW

The built environment offers many lessons to aspiring and practicing designers. In this project you will study the thermal and luminous environment of an existing interior space. The intent is to develop observational and critical thinking skills that will serve you throughout your career. The process involves visiting and documenting an existing space; developing questions and hypotheses about selected aspects of building performance; establishing methods to investigate appropriate questions; implementing those methods using instruments, observations, and/or interviews; analyzing findings; suggesting modifications for the improvement the performance of the space; and, finally, preparation of a case study report that describes all of the above. Samples of case studies from other universities can be found on the World Wide Web at: <http://www.uoregon.edu/~hof/>

TEAMS

Work in groups of three; this will reduce the workload as well as give you as chance to discuss the issues with your teammates.

PROJECT FORMAT

It is your task to clearly tell the story of the spatial configuration as well as the thermal and luminous environments of your chosen space. Your project should be organized and submitted in the form of an 8 ½ x 11 bound document and a PowerPoint presentation (submitted on CD). Process work (sketchbook) must be included in the final presentation documents.

The project will be graded on content (completeness and accuracy), process, and clarity of presentation; it is 30% of your term grade.

ASSISTANCE

Reference Books:

Mechanical and Electrical Equipment for Buildings, 9th Ed. by Stein and Reynolds
Building Control Systems, Second Edition, by Vaugh Bradshaw
Bringing Interiors to Light, by Fran Kellogg and Fred J. Bertolone
Concepts in Architectural Lighting, by David Egan
Detailing Light, by Jean Gorman
Architectural Graphic Standards, Charles Ramsey

PART I: A draft should be completed by 9/23/03. Review it with your Professor or T.A. before moving forward.

SELECT A SPACE

Choose a public space where one might sit and read for an hour. Examples might be a library, coffee shop, or bookstore. Surprisingly, selecting a space for a case study is fairly simple. Almost ANY space should suggest many questions about its performance. With this in mind, it makes sense to

select a space that is (1) which is reasonably easy to get to and to get into and (2) is interesting, fun, and/or challenging.

DOCUMENT THE SPACE

Document your space with the following drawings to scale: they may be drawn freehand, drafted, or by AutoCAD.

- Floor plan of the space – show walls, windows, furniture; note significant materials
- Reflected ceiling plan – show changes in ceiling planes, lighting, HVAC
- Significant sections and elevations

Provide a diagram of the building with relevant site information with the study space highlighted

Photograph your space (or draw interior perspectives).

Observe user patterns (do certain seats seem to be occupied more or less frequently, are users “controlling” environmental factors, etc)

Maintain a sketchbook of details, notes, impressions, questions, etc.

OBSERVE THE THERMAL ENVIRONMENT

Identify, describe and diagram the following:

- Heating/cooling and ventilation system – What is the HVAC system? How is heat and air distributed? Does the thermal environment seem comfortable? Does the air seem too humid or dry, stale? Noticeable odors?
- Orientation of the space and its exposure to climate and solar energy – Is the thermal environment being affected by window or door placement? Does the orientation of the space seem to affect the thermal comfort?
- Materials – Are there materials in this space that contribute to the thermal performance?

OBSERVE THE LUMINOUS ENVIRONMENT

Identify, describe and diagram the following:

- Electric lighting – Make note of the types of luminaries and lamps. Do you feel like there is enough light for the tasks performed in the space? Is there too much (glare)? Are there variations in light levels? Are there user controls?
- Daylight – Is daylight available? Do light shelves, diffusing surfaces, window treatments etc. manipulate the daylight? Are there issues associated with glare, heat?
- What materials, finishes and colors are contributing to the luminous environment?

FORMULATE QUESTIONS

Let your curiosity get the better of you... formulate some simple questions that might be answered through physical measurement (i.e.: light levels, thermal comfort parameters, etc) and / or interviewing and observation. One of these questions will lead to a hypothesis that will be tested in Part II.

PART II: A draft should be completed by 10/06/03.

DEVELOP ONE OR MORE HYPOTHESES

A hypothesis is simply a testable statement about some phenomenon. In effect, it is a question converted to a statement that can be scientifically investigated. The word scientific does not necessarily imply complex, or mathematical, or involving expensive equipment; it means rational (as in logical). A good hypothesis should address only ONE issue and should involve only ONE

“clause” (no “ands,” “ors,” “ifs,” “buts,” “therefores”). A typical hypothesis might read: “The window sill is rotting because condensation often forms on the inside of the window pane in cold weather.” The statement (hypothesis) can be proved or disproved (if disproved, the sill is still rotting . . . there just must be some other reason). If you want to address more than one issue, write more than one hypothesis.

While forming your hypothesis, keep the following things in mind:

- The hypothesis should be focused on either the thermal or luminous environment.
- The hypothesis should be reasonably “*narrow*” – for example, dealing with comfort parameters in the reading room is preferable to the entire building.
- The hypothesis should be *testable* in the time available for this assignment – in other words, don’t propose measuring summer or monthly average performance of some variable; however, it would be reasonable to look at day and night conditions at a particular time of the year
- The hypothesis should be *measurable* (either quantitatively or qualitatively) – in other words, avoid hypotheses that come from “rhetorical” questions (What was the designer thinking?)

It is reasonable to develop several testable hypothesis that collectively support an observation or build an argument.

DEVELOP A METHODOLOGY

A good methodology is the key to a potentially successful case study. The purpose of the methodology is to collect information (background information and data from the site) that will allow you to prove or disprove your hypothesis. You must collect enough information, but should not collect too much information. Having a clear and focused hypothesis will make life easier at this stage. You will...

- Design an approach
- Review the methodology to ensure that it achieves what is intended;
- Obtain or develop appropriate equipment, questionnaires, survey procedures, or observation techniques to support the methodology;
- Install equipment and/or conducting surveys in accordance with a pre-established work plan (necessary to minimize multiple trips to the building and/or alienating occupants);
- Gather data and check it for “reasonableness”.

Have your methodology reviewed and approved by your Professor or T.A. prior to collecting data! Think of your methodology as a design problem. A “desk crit” will likely strengthen your approach. We will coordinate the details of equipment check out based on your requirements and proposal.