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SPONSORED PROJECT TERMINATION SHEET

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Date 2/23/82

Project Title: Preparation of an Instructional Module

Project No: D-48-638

Project Director: Dr. Wineman & Dr. Zimring

Sponsor: National Endowment for the Arts

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- Final Invoice and Closing Documents
- Final Fiscal Report
- Final Report of Inventions
- Govt. Property Inventory & Related Certificate
- Classified Material Certificate
- Other Financial Status Report (OMB Form 80-R0180)

Assigned to: ARCH (School/Laboratory)

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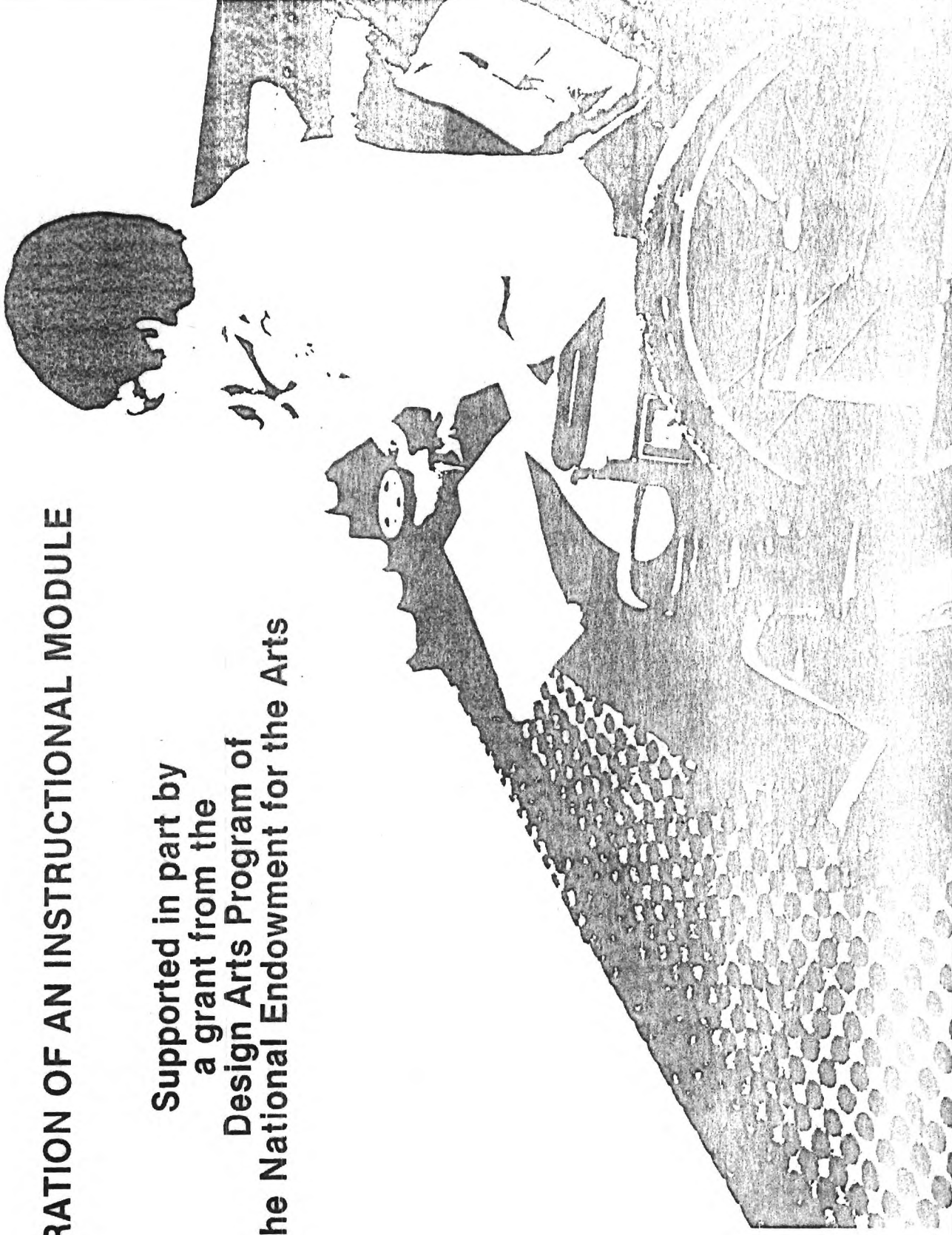
Research Security Services  
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 Computer Input  
 Project File  
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D-48-628

# PREPARATION OF AN INSTRUCTIONAL MODULE

Supported in part by  
a grant from the  
Design Arts Program of  
The National Endowment for the Arts



## PREPARATION OF AN INSTRUCTIONAL MODULE

### Executive Summary

With funding from the National Endowment for the Arts, the Georgia Tech College of Architecture has developed an instructional module for teaching second-year architecture students about program accessibility and the needs of the disabled. The instructional module is a series of lectures, discussions, and student exercises that can be utilized in classroom or studio courses. The module educates students regarding compliance with Section 504 of the 1973 Rehabilitation Act with particular emphasis on increasing accessibility for persons who may experience cognitive or perceptual difficulties in negotiating the environment.

A four-step procedure was followed in developing the module:

- 1) Planning
- 2) Development
- 3) Implementation
- 4) Evaluation

First, an initial planning workshop was held involving practicing professionals, representatives of handicapped groups, and members of the design faculty. The workshops provided an opportunity for participants to make suggestions about the instructional module, and to exchange ideas concerning the implementation of Section

504 of the 1973 Rehabilitation Act. Second, the curriculum was developed for the module, and support materials were assembled. Third, the instructional module was implemented as an integral component of a second-year design studio involved in the design of a neighborhood center. Fourth, the module was evaluated by all participants: an evaluation form was completed by students; a design competition was held to evaluate the final products of the studio; a wrap-up workshop was held with professionals, representatives of handicapped groups, and members of the design faculty. On the basis of these evaluations, revisions were proposed for the instructional module.

As the conclusion of this project, papers were presented at the annual Association of Collegiate Schools of Architecture Conference, and at the annual Environmental Design Research Association Conference.

## **PREPARATION OF AN INSTRUCTIONAL MODULE**

**Supported in part by  
a grant from the  
Design Arts Program of  
The National Endowment for the Arts**

**Prepared by:**

**Jean Wineman  
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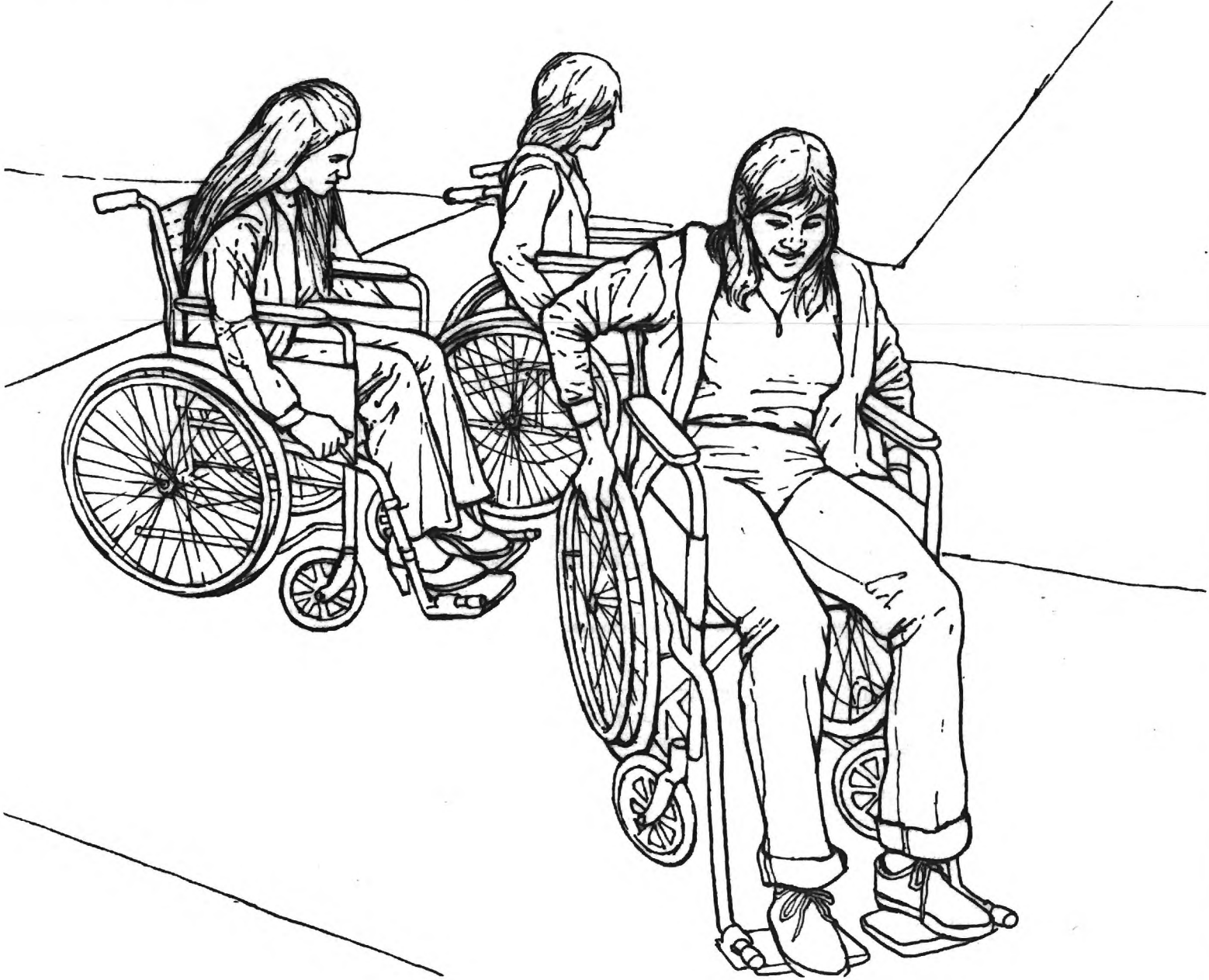
## Outline of Instructional Module

- I. A planning session was held involving practicing professionals, representatives of handicapped groups, and members of the design faculty.
  - A. Panelists were asked what designers concerned with the needs of the disabled should know. Several responses emerged:
    1. They should be aware that Section 504 requires program accessibility rather than barrier-free design; program accessibility often requires a less expensive response because the entire designed setting need not be modified.
    2. Designers should be aware of the basic characteristics of the disabled, including:
      - a. the basic distribution of disabled people in the larger population;
      - b. the abilities that result from various physical conditions such as deafness, visual impairment, cognitive-emotional difficulties, quadraplegia, paraplegia and other mobility problems, old age and other conditions;
    3. Designers should be aware of the relevant codes, guidelines and regulations including Section 504, the 1961 and proposed 1980 ANSI Standards, the 1968 Barriers Act, and other relevant Federal and state statutes and guidelines.
    4. Designers should be aware of design and engineering solutions to accessibility problems, including solutions appropriate to new construction and to renovation of existing buildings. The effects of modifications on all groups should be considered. For example, a cantilevered drinking fountain may be helpful to users in wheelchairs, but may be hazardous to visually-impaired users.
    5. Designers should also be aware of the limits of existing guidelines and standards. For example, existing literature does not address the hearing impaired, nor does it address the impacts of energy conservation measures on the physically disabled.
  - B. Panelists were also asked to identify readings they felt were important for designers. A selected bibliography follows this outline. In general it was proposed that students read the relevant laws, read one or more illustrated state guides (e.g., North Carolina, Illinois, Washington), and read material describing individual disabilities.



- C. Panelists were asked what exercises or simulations they have found to be effective in teaching the environmental needs of the disabled. Several of these are described in more detail, below. In general it was suggested that experiences should be of two types: first, simulations, where students negotiate the environment with devices that provide temporary disabilities, such as travelling in a wheelchair; second, discussions with disabled people who have had to deal with disabilities for extended periods.
  - D. In addition, panelists volunteered to participate in later sessions with students and to serve as jurists for design presentations.
- II. Six 3-hour class sessions were held with the students:
- A. Class One: Introduction
    - 1. An introductory lecture provided an introduction to the module and to several disabilities.
      - a. Brief descriptions were provided of the visually impaired, older people, mobility disabled, mentally retarded, hearing impaired and others. It was stressed that 1 of 11 Americans are disabled.
      - b. Relevant laws and codes were outlined including: 1961 ANSI Standards, 1968 Barriers Act, Sections 502, 503, 504 of the 1973 Rehabilitation Act.
    - 2. Several simulation exercises were done where students walked campus routes in pairs with one student experiencing a simulated disability, including using blindfolds, fogged glasses imitating aging problems, wheelchairs and walkers. (See descriptions of exercises in the Appendix.)
    - 3. Films were presented that outlined Section 504 and other issues. A brief list of films is presented below.
  - B. Class Two: Panel discussion with disabled people.
    - 1. Panelists were asked to address five questions:
      - a. How has the design of the environment affected your daily activity? Panelists stated

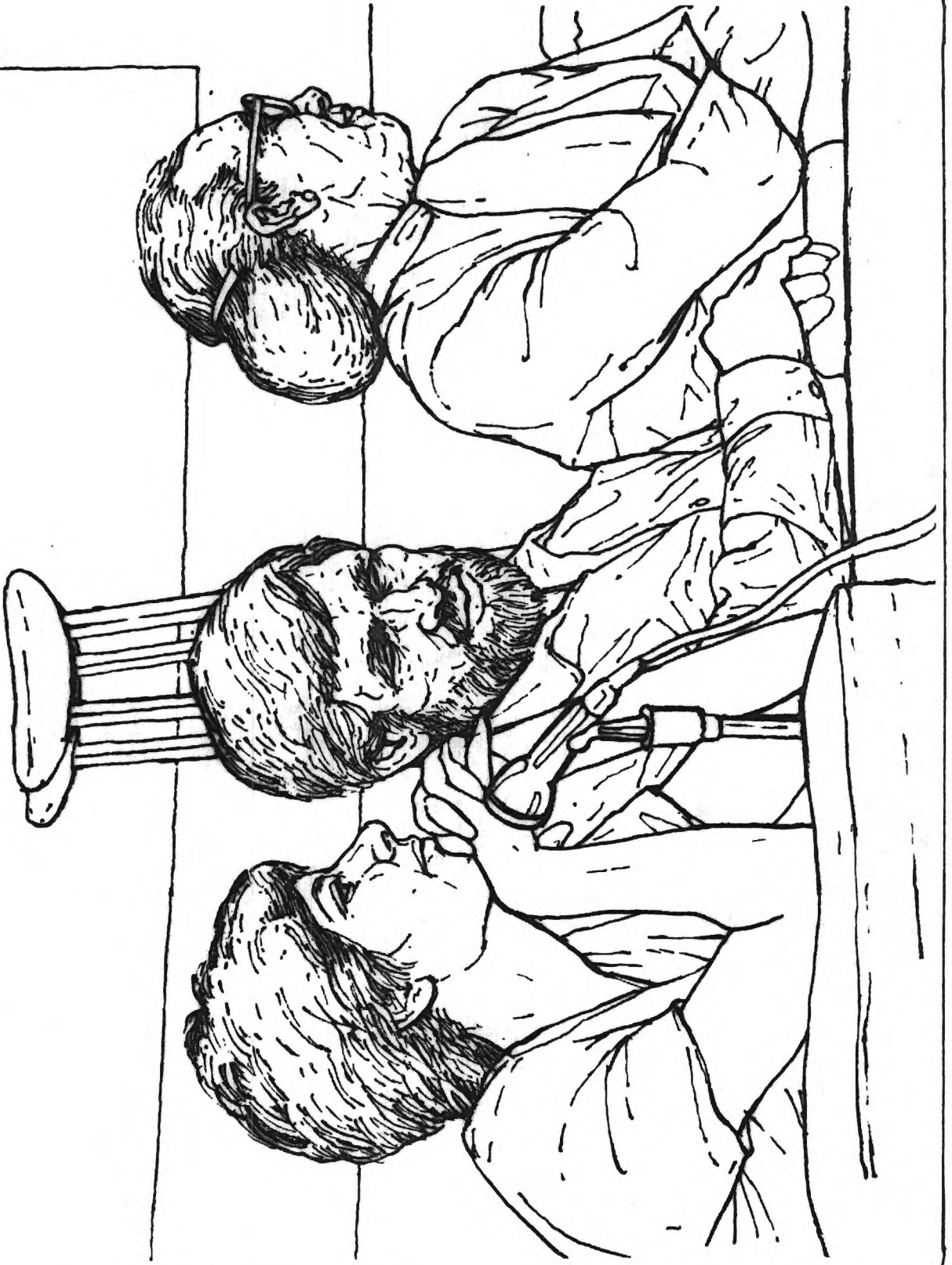
Simulation Exercises



Simulation Exercises



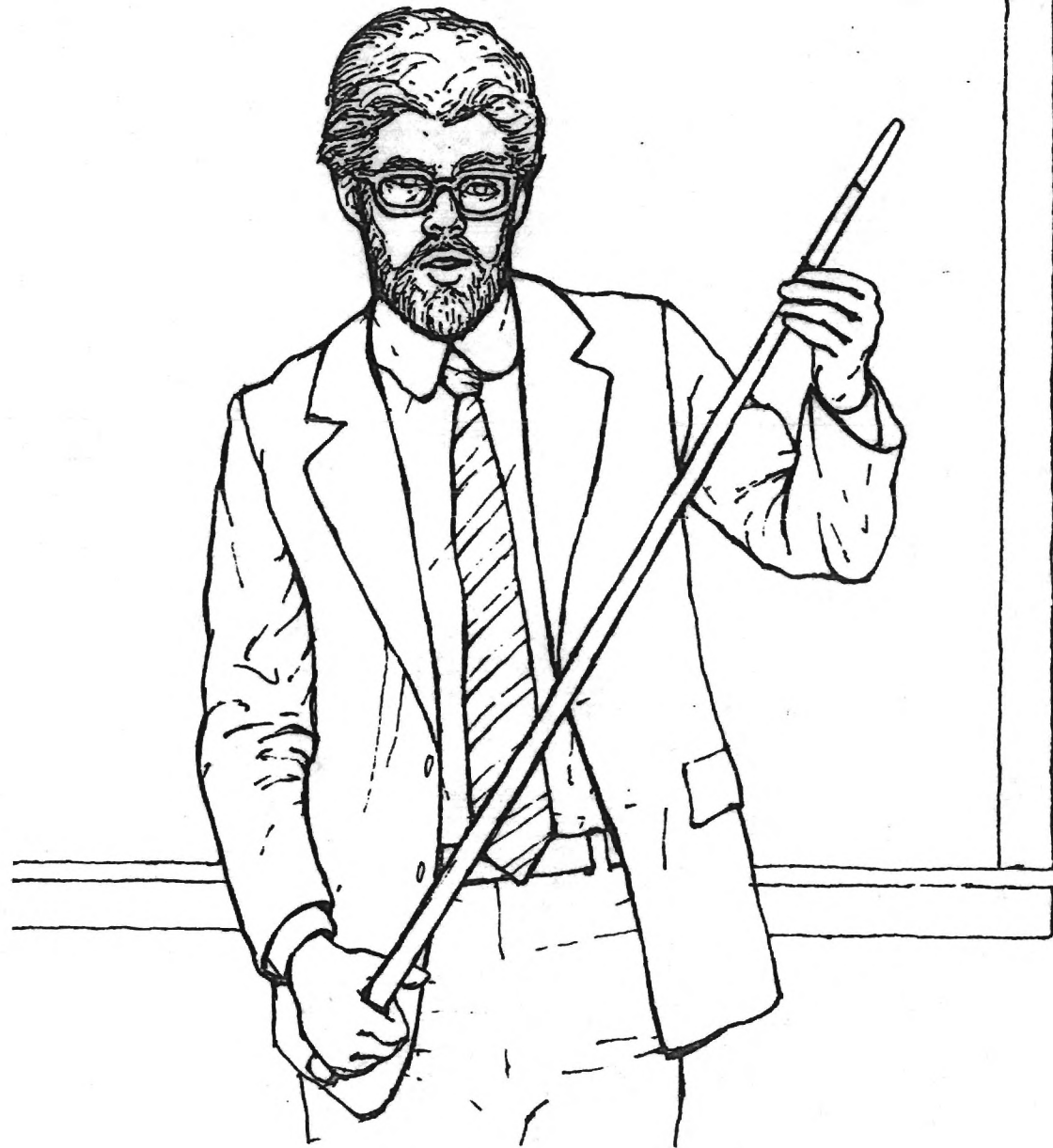
Panel Discussion



that they were affected in both large and small ways. Some buildings were totally inaccessible and as a result some experiences, such as most avant-gard theatre, were not available to them. Also, however, even some "accessible" theatres only provided accessibility for expensive orchestra seats, which were too costly for some participants. Other participants said that because of past experiences with inaccessible facilities they rarely even attempted to use public washrooms, drinking fountains or telephones.

- b. What issues are most important for architects to consider in providing program accessibility? These responses were similar to those provided in the planning session, above.
  - c. What buildings in Atlanta provide particularly good examples of accessible and non-accessible settings? The Memorial Arts Center received mixed marks; other arts facilities did not fare as well. Positive examples were the new Atlanta Airport, and the new Georgia Power Building.
  - d. What are the most important program accessibility issues in arts facilities and in community centers? (The students were designing a community center in a concurrent design studio.) Several issues emerged: ease of circulation for people with mobility problems, ample cues for the visually or hearing impaired.
  - e. What problems exist in the design of housing that affect the way you live, your daily activities? Problems identified included kitchens with cabinets too high or difficult-to-manipulate appliances, poor bathroom design, other features.
2. Small groups of students spent an hour with individual panelists. They went for a walk or had coffee and had a chance to get to know the panelists as fully competent adults.
- C. Class Three: Indepth information on disabilities, mainstreaming, normalization, and engineering solutions.
1. More detailed information was provided about four groups:
    - a. The elderly, including their perceptual problems (hearing, vision, olfactory), mobility problems, and social role (more likely to use public transit, to have free time during

Indepth Information



the day, to have limited income), and the increasing percentage of the population they represent.

- b. The mobility-impaired, including the nature of quadraplegia and paraplegia, the other problems that may accompany these problems (bladder control, low stamina), and their social role (are likely to travel by van, may be low-income, etc.)
  - c. The visually impaired, including a discussion of the congenital and adventitious sources of impairment (retinitis pigmentosa, glaucoma, etc.), the mobility and other problems that result from visual impairment, and the other accompanying deficits that may affect such people: old age, mobility problems, etc.
  - d. The mentally retarded, including the definition of retardation offered by the American Association for Mental Deficiency, discussion of the evaluation in treatment models from institutional to community-based, and the functional problems the mentally retarded would have in dealing with arts facilities and other buildings.
2. Two major social movements affecting the disabled were discussed: mainstreaming and normalization. Both of these suggest that the general perception of the disabled as bizarre or inferior will dissolve if the disabled are integrated into everyday society. It is the designer's role to allow this integration in a manner that is graceful and normal.
  3. A visually-impaired rehabilitative engineer presented engineering solutions to the problems of the disabled that affect the designer. These include: advances in wheelchair design, improved design for washrooms, electronic travelaids for the visually impaired, and others.
- D. Class Four: Legal responsibilities of the designer, discussion of published examples of buildings, assignment of accessibility-assessment.
1. An expert in program accessibility presented information on the legal responsibilities of architects with respect to the mandates of Section 504 and related standards, laws, regulations, and codes.

The review included the 1961 American National Standards Institute's pioneering standards on design for the handicapped, the 1968 Architectural Barriers Act (Public Law 90-480), The Rehabilitation Act of 1973 (Public Law 90-480), and state building codes. The architect's

Legal Responsibilities



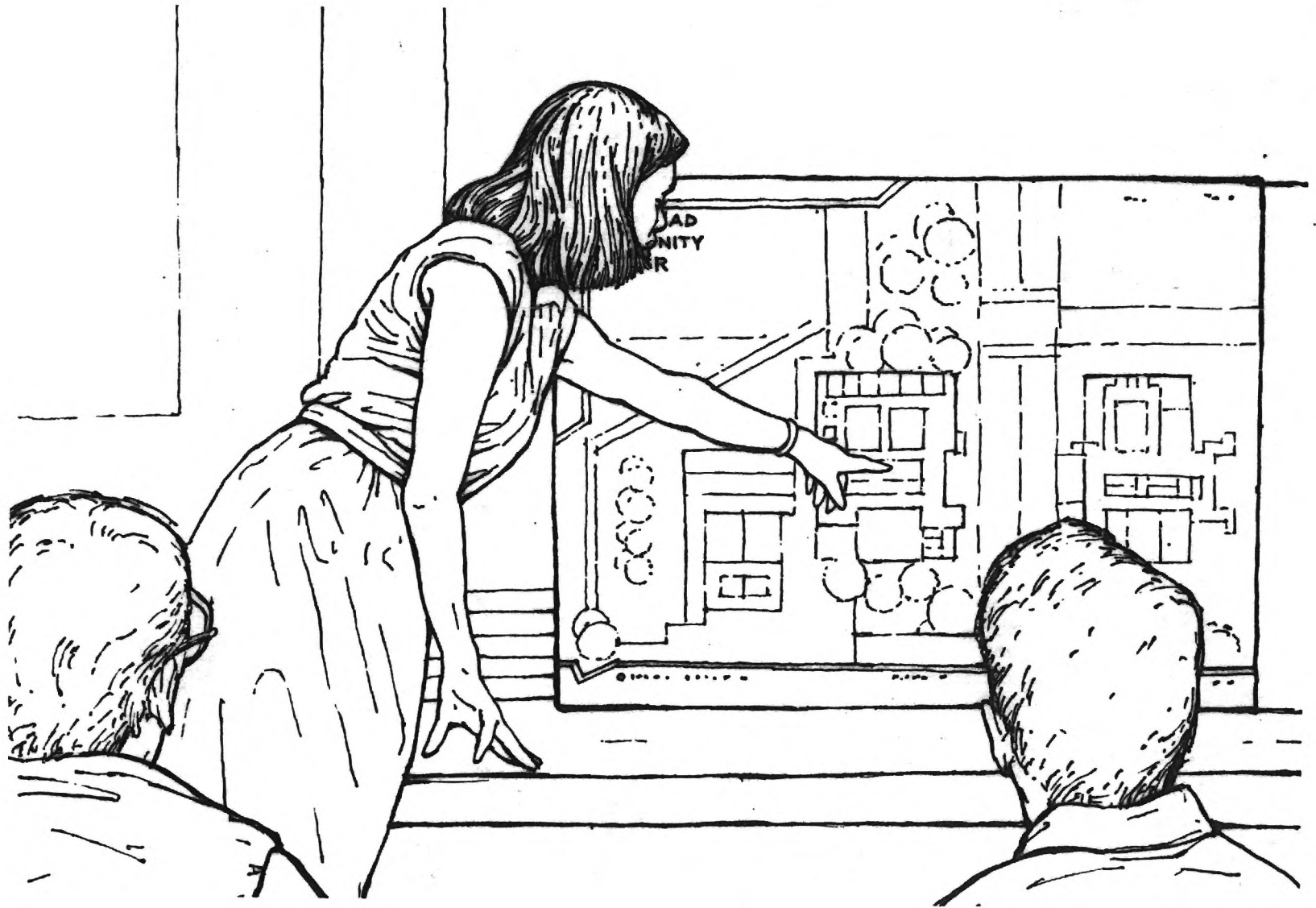


and client's liability in meeting the needs of handicapped groups was discussed, and the role of the Architectural and Transportation Barriers Compliance Board was reviewed.

2. Slides of a number of accessible buildings were presented. Many of these were by well-known designers, and hence seen as valuable role-models by students. Several of the buildings were illustrated in Progressive Architecture, July, 1978. Specific design issues were discussed including:
  - a. Anthropometric/ergonomic considerations, including: furniture design and arrangement, placement and design of display and instructional items in galleries and museums, etc.
  - b. The ambient environment, including: design of lighting systems, use of color, design of acoustical elements, control over temperature.
  - c. Emergency egress. Issues of egress during fires and disasters were considered, including alarm systems, smoke zones, circulation patterns, etc.
  - d. Circulation and plan configuration, including: implications of simple or complex plans for various groups such as the blind, implications of various circulation plans for low mobility groups such as the elderly, etc.
  - e. Vertical circulation such as stairs, ramps, escalators, elevators. This discussion included both technical concerns such as trend/riser dimensions and cues for the blind as well as generic issues such as distraction during use and accidents on stairs.
  - f. Horizontal circulation such as walkways and corridors. This discussion included consideration of dimensions, paving textures, provision of auditory and sensory landmarks, etc.
  - g. Gates and doors. Once again this included both technical issues, such as dimensions, as well as generic issues such as making doors identifiable to persons with low vision.
  - h. Handrails and railings. This discussion addressed the necessity for handrails and railings, their height and their placement.



Student Designs



3. The studio instructors were generally pleased with the outcome from the perspective of design quality as well as information gained. However, some concern was voiced about the student time required by the module; it was suggested the module might have been compressed.
- V. A final wrap-up session was held with the disabled participants, panelists, design professional, and members of the design faculty. Although the reaction was generally positive, several suggestions were made:
- A. The students should be required to purchase the relevant ANSI Standards and at least one illustrated State code (e.g., North Carolina). In addition, students should receive a copy of Section 504.
  - B. A broader sample of disabled participants could have been involved, including perhaps persons with auditory impairments.
  - C. Actual legal cases could be presented to students.

## BIBLIOGRAPHY

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### DESIGN FOR THE DISABLED

### A FEW SELECTED SOURCES

#### Resource Guides and Lists of References

##### Tools for accessibility (8 pp.)

National Center for a Barrier Free Environment  
Seventh and Florida N.E.  
Washington, D.C. 20002

##### Tooling up for accessibility (slides, text and tape cassettes)

National Easter Seal Society  
2023 West Ogden Avenue  
Chicago, Illinois 60612

##### Handicapped requirements handbook (loose-leaf with monthly updates)

Federal Programs Advisory Service  
2120 L Street, N.W., Suite 210  
Washington, D.C. 20037

##### Resource guide to literature on barrier-free environments (223 pp.)

Architectural and Transportation Barriers Compliance Board  
Washington, D.C. 20201

#### Illustrated Codes and Design Guides

##### Access for All, an Illustrated Handbook of Barrier Free Design for Ohio

Ohio Governor's Committee on Employment for the Handicapped and  
Schooley Cornelius Associates, Architects  
Columbus, Ohio

Accessibility Standards, Illustrated

Capital Development Board  
State Office Building  
401 South Spring Street  
Springfield, Illinois 62706

An Illustrated Handbook for Barrier Free Design, Washington State Rules and Regulations

R. Small and B. Allan  
Easter Seal Society for Crippled Children  
and Adults of Washington  
Seattle, Washington

An Illustration Handbook of the Handicapped  
Section of the North Carolina State Building Code

North Carolina Department of Insurance  
Wake County Courthouse  
P.O. Box 26387  
Raleigh, North Carolina 27611

Architectural Accessibility for the Disabled of College Campuses

S.R. Cotler and A.H. De Graff  
State University of New York  
State University Construction Funds  
Albany, New York

Barrier Free Site Design (by the U.S. Department of Housing and Urban Development Office of Policy  
Development and Research)

Superintendent of Documents  
U.S. Government Printing Office  
Washington, D.C. 20402

Handbook for Design: Specially Adapted Housing

Veterans Administration  
Washington, D.C.

Opening Doors, a Handbook on Making Facilities Accessible to Handicapped People

National Center for a Barrier Free Environment  
Washington, D.C.

Teaching Guides and Relevant Books, Pamphlets, and Articles

Battelle's Columbus Laboratories. Study and Evaluation of Integrating the Handicapped in HUD Housing. Washington, D.C.: Department of Housing and Urban Development, 1977.

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Cohen, U. and Hunter, J. Teaching Design for Mainstreaming the Handicapped. Wisconsin: School of Architecture and Urban Planning, The University of Wisconsin-Milwaukee.

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General Services Administration. Day on Wheels. Washington, D.C., 1975.

Gallandet College. The Barrier of Deafness. Report, November/December 1977, 3(6).

Harkness, S.P., and Groom, J.N. Building Without Barriers for the Disabled (2nd ed.). New York: The Architects Collaborative, 1976.

Hatch, D., and Bangs, G. An Overview on Public Access in Georgia. Atlanta: Governor's Committee on Employment of the Handicapped, 1978.

Lifchez, R. and Winslow, B. Design for Independent Living. New York: Whitney Library of Design, 1979.

Milner, M. Breaking Through the Deafness Barrier, Environmental Accommodations for Hearing Impaired People. Washington, D.C.: Gallandet College, 1979.

Schweikert, H.A. Jr. Wheelchair Barriers. Washington, D.C.: Paralyzed Veterans of America, Inc., no date.

Selim, G. Barrier Free Design. Ann Arbor, Michigan: University of Michigan, 1977.

U.S. Government Printing Office. A Place of Our Own, Tips for Mentally Retarded People Living in the Community. Washington, D.C., 1978.



## APPENDICES

Slide-Tape Show Script

Background Tape Outline

The Role of Research in Design Education:  
A case study (paper presented at the  
Association of Collegiate Schools of  
Architecture Annual Meeting, Asilomar,  
Calif., March 1981)

Participants in Workshops and Panel Discussions

Evaluation Forms

Publicity about the Project

**Slide - Tape Show**

Physically disabled people represent a significant proportion of the population -- 1 in 11 according to the 1970 census -- and, because of problems with perception, strength or coordination, often rely on appropriate designs for even moderate independence.

With funding from the National Endowment for the Arts, the Georgia Tech College of Architecture has developed an instructional module for teaching second-year architecture students about the needs of the disabled.

The instructional module is a series of lectures, discussions, and student exercises which can be utilized in classroom or studio courses.

The module will educate students regarding compliance with Section 504 of the 1973 Rehabilitation Act . . .

. . . with particular emphasis on increasing accessibility for persons who may experience cognitive or perceptual difficulties in negotiating the environment.

A four-step procedure was followed in developing the module:

- (1) Planning
- (2) Development
- (3) Implementation
- (4) Evaluation

First, an initial planning workshop was held involving practicing professionals, representatives of handicapped groups, and members of the design faculty.

The workshop provided an opportunity for participants to make suggestions about the instructional module, and to exchange ideas concerning the implementation of Section 504 of the 1973 Rehabilitation Act.

Second, the curriculum was developed for the module, and support materials were assembled.

Third, the instructional module was implemented as an integral component of a second-year studio involved in the design of a neighborhood center.

Fourth, the module was evaluated by all participants: an evaluation form was completed by students;

. . . a design competition was held to evaluate the final products of the studio;

. . . a wrap-up workshop was held with professionals, representatives of handicapped groups, and members of the design faculty.

On the basis of these evaluations, revisions were proposed for the instructional module.

The instructional module consisted of six three-hour laboratory sessions. The first four sessions were devoted to developing an understanding of the issues; the last two sessions were allocated for student presentations.

During the module the students were completing a coordinated design project, a neighborhood center, that would meet the needs of all users, including disabled people.

Multiple modes of teaching were employed to provide students with both factual information and an empathic understanding of the needs of the disabled.

Class sessions were organized around presentation of information in eight topic areas:

- (1) background information
- (2) sensitizing experiences
- (3) panel discussions
- (4) legal responsibilities
- (5) supporting materials and devices
- (6) social policy
- (7) current examples of building design
- (8) student presentations

Background information. Background information was presented on the characteristics and abilities of major groups of handicapped persons.

Information was presented on wheelchair users, persons with visual and auditory impairments, persons with developmental disabilities, and elderly persons.

Sensitizing experiences. The students participated in three "experiences" developed to sensitize students to some of the physical, social and psychological problems experienced by handicapped persons. The experiences

included: traveling with a blindfold,

. . . traveling with special eyeglasses (developed at the Institute of Gerontology, University of Michigan, to simulate the average eyesight of a person in their late seventies),

. . . and traveling in a wheelchair.

Panel Discussions. A panel of disabled persons, representing a range of disabilities, provided background about their disabilities and discussed ways in which the design of the environment helps or hinders their daily activity.

Following the panel discussion, students in groups of two or three accompanied one of the panel members on a short trip around the campus.

Legal responsibilities. A visiting expert presented information on the legal responsibilities of architects with respect to the mandates of section 504 and related legislation.

Supporting materials and devices. Materials and devices which assist handicapped individuals in independent

travel were demonstrated and discussed, including auditory, tactual, and electronic travel aids.

Social Policy. Current issues in social policy were discussed such as "mainstreaming" (the integration of handicapped individuals into the environment enjoyed by the able-bodied majority) and "normalization" (the provision of normal residential, work and recreation settings as a part of the care and treatment of developmentally disabled individuals and other groups traditionally segregated from society).

Current Examples of Building Design. Six leading examples of buildings designed for use by disabled people were presented and discussed.

Student Presentations. In teams of two or three, students evaluated the accessibility of buildings in the Atlanta area. Each team prepared written documentation of the accessibility characteristics of the buildings and made an oral and graphic presentation to the class.

Evaluations of the instructional module suggest four important areas of concern for anyone who is considering conducting a similar project:

(1) Involve disabled people in all aspects of the project. Disabled people bring a perspective to architectural

issues that cannot be replaced either by simulations or by able-bodied instructors.

(2) Integrate teaching sessions on the needs of disabled people into the students' normal design studios. If students are to see these needs as part of everyday design rather than as special and separate, these needs must be learned in the same manner that students learn about other aspects of architecture.

(3) Teach architecture students about the needs of disabled people early in the curriculum, and require that these needs be addressed in design throughout the students' education. These issues take time to be fully assimilated, and need to be continually reinforced and elaborated.

(4) Develop classes which are active and engaging. Multiple teaching modes are needed to provide the experiential variety necessary to increase awareness and sustain interest, while a comprehensive understanding is developed of relevant information and its application to design.



## BACKGROUND TAPE OUTLINE

This is the first of two tapes providing excerpts of a teaching module prepared at the Georgia Tech College of Architecture by Jean Wineman and Craig Zimring. The module, partially funded by the National Endowment for the Arts, teaches second-year architecture students about program accessibility and the needs of the disabled. These excerpts are intended to supplement the slide-tape show and written report.

### General Information

Background information was presented on the characteristics and abilities of major groups of disabled people.

### Panel Discussion

A panel of disabled people, representing a range of disabilities, provided background about their disabilities and discussed ways in which the design of the environment helps or hinders their daily activity.

### Legal Responsibilities

A visiting expert presented information on the legal responsibilities of architects with respect to the mandates of Section 504 and related legislation.

### In-depth Information About Disabilities

Information was provided about mobility impairments, age-related impairments, developmental disabilities, visual and auditory impairments.

### Supportive Materials and Devices

Materials and devices which assist handicapped individuals in independent travel were demonstrated and discussed, including auditory and tactual devices and electronic travel aids.

### Student Presentations

In teams of two or three, students evaluated the accessibility of buildings in the Atlanta area.

**The Role of Research in Design Education:  
A Case Study**

Jean D. Wineman  
Craig M. Zimring

College of Architecture  
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The rapid growth of organizations such as the Architectural Research Centers Consortium and the Environmental Design Research Association signal an important new influence on design education: architectural research. While there is no doubt that research underwrites architectural education financially, its intangible contributions to education are less well recognized. In this paper we discuss several ways in which the architectural research program has affected design education at Georgia Tech, focusing on the role of user-behavior research. We primarily consider one particular educational endeavor: an instructional module in which second-year architecture students learn about program accessibility and the design needs of physically disabled users.

Architectural research at Georgia Tech has affected design education in at least two fundamental ways. First, the research process exposes students to the development of new knowledge. In the College of Architecture a large number of students working as unpaid or paid research assistants gain an understanding of the "scientific method": hypothesis testing and systematic data collection, data handling and interpretation techniques. For example, the College of Architecture currently has a contract with the Department of Transportation to investigate ways to make highway overcrossings and undercrossings accessible to physically disabled pedestrians. Fifteen research assistants are engaged in the systematic and sometimes tedious process of collecting data on the physical abilities of over 100 disabled individuals. Such research enables the students to understand analytical approaches to solving problems, as well as realistically recognize the inherent successes and difficulties of these endeavors.

Second, research at Georgia Tech offers state-of-the-art information to faculty and students for classroom and studio teaching. Like many other architecture programs, the College of Architecture has expanded its curriculum to incorporate more diverse information into the program of study. Students now explore user behavior, energy, and design theory, as well as more traditional courses in design, mechanical systems, materials, and structures. Faculty involved in research and in contact with other researchers, can share current information with students and explain the derivation of this information.

The College of Architecture is exploring ways to incorporate research information into the design curriculum. One successful mode is the "instructional module" in which a series of lectures and discussions covering a particular subject are assimilated as a unit into a large lecture, seminar or studio course. Employing an instructional module allows experts in fields such as energy, design theory, or user behavior to reach a larger group of students than might otherwise be possible. Although these modules cannot substitute for complete courses, they do alert students to current issues.

The present module was initiated as the result of a Design Arts Grant from the National Endowment for the Arts. The Design Arts group and the Office of Special Constituencies were concerned that architects were not sufficiently knowledgeable about Section 504 of the Rehabilitation Act of 1973. They were especially concerned that architects understand the distinction between program accessibility and barrier-free design. Section 504 requires only program accessibility -- that each program rather than each space be accessible. Although desirable, barrier-free design may be beyond the budget for many design renovations

or new construction. In many cases, simple program accessibility would suffice.

### **Design for Physically Disabled People**

Physically disabled people represent a significant proportion of the population -- 1 in 11 according to the 1970 census -- and, because of problems with perception, strength or coordination, often rely on appropriate designs for even moderate independence. However, design for disabled people has only recently been incorporated into standards and codes, and has not typically been taught as part of design education. During the 1979-1980 academic year, an instructional module was created at Georgia Tech to teach second-year architecture students the needs of the physically disabled, focusing on the provisions of Section 504 of the Rehabilitation Act of 1973, and emphasizing the distinction between program accessibility and barrier-free design. The module explicitly drew on the active research program in the Georgia Tech College of Architecture focusing on the design needs of disabled people. The program has considered such issues as the requirements of the disabled pedestrian and the ergonomic needs of the disabled bathroom user.

What types of knowledge must a designer have about disabled people? A number of writers have recently suggested that it be of at least two types: (a) specific information about the needs of the disabled; and (b) empathy with their feelings, experiences and desires. Specific information includes several types: laws and codes, environmental adaptations, the nature of disabilities, and so on. When describing codes and standards, it is useful to provide students an historical outline, including the first standards addressing the

needs of the disabled people (the 1961 ANSI Standards), the Architectural Barriers Act of 1968 which required that the ANSI Standards be followed in Federally funded buildings, and the sweeping requirements for accessibility that came in 1977 with the implementation of Section 504 of the Rehabilitation Act of 1973. (Section 504 mandated program accessibility and accommodation for disabled people for all business and programs doing business with the Federal Government in excess of \$10,000 per year. This in effect required that almost all public buildings eventually be made accessible to disabled people.) In addition to legal requirements, designers must be aware of the full range of environmental modifications required by different disabled people. Design for disabled people has too often been simply characterized as special bathrooms, and the inclusion of ramps and wide corridors. In reality, appropriate designs must include many other features such as signage and cues for visually impaired people, rest areas for the elderly, easy-to-operate mechanical controls for people with limited strength and dexterity, a choice of vertical circulation, and so on.

A related problem is that designers and design students often have inadequate or distorted information about disabilities. The visibility of people confined to wheelchairs has tended to emphasize their disability. The environmental barriers which exist for people with other disabilities, such as hearing impairments, visual impairments, cognitive, emotional and psychological problems, and mobility problems, are less well-known. Whereas it is not necessary for the designer to gain a comprehensive medical knowledge of disabilities, it is important to have a general understanding of the range and cause of disabilities, and of the capabilities and

problems that result.

The designer also needs to gain empathy for disabled people. If designed spaces are to be pleasurable as well as practical, the designer must empathize with the user of the space. Because most designers have not shared the experiences of disabled people as part of everyday life, special discussions and exercises are often required.

### **Architectural Curricula**

Recently, architectural educators have recognized the need for information and empathy about disabled people to be incorporated into design curricula. Several descriptions of these curricula have appeared in the literature. For example, the recent book by Lifchez and Winslow (1979) describes a program developed at the University of California, Berkeley, which involves intensive interactions with disabled people. Lifchez runs an active training program at Berkeley where design students learn through interactions with disabled people. Also, Cohen and Hunter, at the University of Wisconsin, Milwaukee, have developed an extensive list of lessons and empathic exercises for use in such teaching programs (Cohen and Hunter, 1980).

At Georgia Tech, the needs of disabled people have been taught to architecture students for a number of years, but training has been scattered and idiosyncratic. A small grant from the National Endowment for the Arts permitted this training to be made more rigorous, and to be developed into a coherent instructional module.

### Summary of the Module

The instructional module consisted of six three-hour laboratory sessions integrated into the students' normal second year studio course. The first four sessions were devoted to developing an understanding of the issues, while the last two sessions were allocated for student presentations. The first four content sessions provided important information and discussion, sensitizing experiences, and supporting audio-visual materials. An outline of the topics as they were presented appears in Table 1.

During the module the students were completing a coordinated design project, a neighborhood center that had to meet the needs of all users, including disabled people. Two prizes were awarded for the designs that best incorporated the needs of users in an architecturally excellent design. Although all students completed the community center project, half of the class was randomly selected to experience the instructional module. The other half of the class was taught by traditional methods.

#### Background Information.

Both introductory and indepth information was presented on the characteristics and abilities of major groups of handicapped persons. In particular, information was presented on wheelchair users, persons with visual and auditory impairments, persons with developmental disabilities, and elderly persons. Environmental design and planning considerations which enhance the independence of these user groups were discussed.



**TABLE 1: OUTLINE OF INSTRUCTIONAL MODULE**

**Session 1: Introduction to the Project**

Introduction;  
Presentation of introductory background information on the characteristics and abilities of major handicapped groups;  
Sensitizing experiences:  
    wheelchair experience,  
    blindfold experience,  
    empathic glasses experience;  
Audio-visual materials.

**Session 2: Panel Discussion**

Panel discussion with handicapped individuals;  
Small group discussion and short trip with handicapped individual;  
Audio-visual materials.

**Session 3: Legal Responsibilities; In-depth Information; Materials and Devices**

Discussion of Section 504 and related legislation;  
Presentation of indepth information on the characteristics and abilities of major handicapped groups;  
Demonstration and discussion of assistive materials and devices.

**Session 4: Social Policy; Current Examples of Building Design**

Presentation of information on current social policy: mainstreaming and normalization;  
Disussion of leading examples of buildings designed for the handicapped.

**Sessions 5 and 6: Student Presentations**

Presentations by students of buildings evaluated in the Atlanta area.

### Sensitizing Experiences.

Three "experiences" were developed to sensitize students to some of the physical, social and psychological problems experienced by handicapped persons. These experiences included traveling with a blindfold, with special eyeglasses (developed at the Institute of Gerontology, University of Michigan, to simulate the average eyesight of a person in their late seventies) and in a wheelchair. A short route was identified on campus, and a particular task, such as "use the telephone," "purchase a candy bar," etc., was assigned to each participant. In pairs, students followed the route and carried out the tasks using each of the devices in turn: a wheelchair, a blindfold, a pair of eyeglasses. Care was taken to explain to students that these experiences do not duplicate the experience of a handicapped person, but help to familiarize the participant to some of their physical, social and psychological difficulties.

### Panel Discussions.

In a planning session during the development of the instructional module, experts in accessibility stressed that sensitizing experiences should be complemented by panel and small-group discussions with disabled individuals; it was felt that sensitizing experiences do not accurately represent the complexity of the everyday experiences of disabled people, and without personal contact the students might feel a false sense of competence. For the instructional module, a panel of disabled persons was convened representing a range of disabilities including visually impaired people and people with various mobility problems. Panelists provided some background about their disabilities and discussed ways in which the design of the environment

helps or hinders their daily activity. Following the panel discussion, students in groups of two or three accompanied one of the panel members on a short trip around the campus. Students had the opportunity to ask questions and discuss specific issues with panel members.

Legal Responsibilities.

A lecture-discussion was presented by a visiting expert on the legal responsibilities of architects with respect to the mandates of Section 504 and related legislation. Particular attention was focused on the concept of "program or activity accessibility" which suggests that a recipient of federal funds is not necessarily required to make each of its existing facilities or every part of a facility accessible to and usable by handicapped persons as long as each program or activity is accessible and usable.

Supporting Materials and Devices.

Materials and devices which assist handicapped individuals in independent travel were demonstrated and discussed, including auditory, tactual, and electronic travel aids.

Social Policy.

The impacts of social policy on opportunities for the handicapped were discussed. Current issues such as "mainstreaming" (the integration of handicapped individuals into the environment enjoyed by the able-bodied majority) and "normalization" (the provision of normal residential, work and recreation settings as a part of the care and treatment of developmentally disabled individuals and other groups traditionally segregated from society) were also discussed.

Current Examples of Building Design.

Six leading examples of buildings designed for use by disabled people were presented and discussed. Several of these buildings are illustrated in the July 1978 issue of **Progressive Architecture**.

Student Presentations.

Halfway through the instructional module, students were given an assignment to evaluate the accessibility of buildings in the Atlanta area. In teams of two or three, students were instructed to select a building type and a disability group, and to identify and evaluate two buildings: one that was a good example of accessibility for that disability group and one which was a poor example of accessibility. Each team prepared written documentation of the accessibility characteristics of the buildings and made an oral and graphic presentation (either slides or sketches) to the entire class.

**EVALUATION OF THE MODEL**

At the conclusion of the project, students were asked to evaluate the overall experience, particular class sessions, audio-visual materials, sensitizing experiences, and building-evaluation assignment.

Responses concerning the project as a whole ranged from rating the experience as "very useful" (a rating of 1) to "not at all useful" (a rating of 5) with most students evaluating the project as at least

moderately useful (mean evaluation was 3.00).\* The class sessions rated as most useful were the panel discussion and small group discussions with disabled individuals (mean rating of 2.5) and the sensitizing experiences (mean rating of 2.74). Evaluated as relatively useful (mean rating of 2.83) was the session on social policy and the discussion of current examples of accessible buildings. Least useful (mean rating of 3.39) was the session on legal requirements, in-depth background information, and materials and devices.

With respect to audio-visual materials, the films were evaluated as moderately useful (mean ratings of between 2.71 and 3.18). Most successful were the films: "A Day in the Life of Bonnie Consolo" (mean rating of 2.71) and "Visual Impairments" (mean rating of 2.82). The building evaluation project was rated as quite useful (mean rating of 2.58).

In general, students felt that the class sessions that presented indepth discussions of the laws and of disabilities were too long, and that the content should be condensed with direct design solutions provided. In addition, students suggested that their studio design professors be more involved in the module (the present authors organized the module but were not the studio instructors).

For the studio project, the studio instructors were originally worried that the quality of the designs produced by the class might suffer because of the time devoted to the instructional module. However, the jury, which included the present authors, the studio instructors, other designers, and disabled people, found

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\* Due to the similarity between means and medians (the data were not skewed), only means are reported.

that the designs of the students participating in the module were at least as good as the rest of the class. Also, the best designs by students in the module went beyond minimum standards and provided genuinely creative solutions. For example, one student used distinctive pillars as landmarks for the visually impaired; others incorporated ramps as fundamental and successful design elements.

#### DISCUSSION

There are lessons to be learned from the somewhat mixed success of the instructional module. First, the participation of disabled people in panel discussions and small group sessions was well received. They bring a perspective to architectural issues that cannot be replaced either by simulations or by able-bodied instructors. However, it is useful to involve disabled people who have had some previous experience with architectural issues; such people may be contacted through state offices for employment of the handicapped, through a regional office of the President's Committee on Employment of the Handicapped, or through the Easter Seals Society.

A second lesson is that teaching sessions on the needs of disabled people must be integrated into the students' normal design studios. If students are to see these needs as part of everyday design rather than as special and separate, these needs must be learned in the same manner that students learn about other aspects of architecture such as form and materials.

A third related lesson is that design for disabled people should be taught early in the curriculum, perhaps during the second year, and should be a requirement of design throughout the students' education. These issues take a long time to be fully assimilated, and need to be continually reinforced and elaborated.

A fourth lesson is that classes need to be active and engaging. The lectures on the law and disabilities were relatively poorly received despite their important content; although it may be necessary to hold relatively dry sessions such as these, it is critical that they be augmented with exercises, visual aids and discussion.

The importance of a variety of teaching modes is stressed in the work of Cohen and Hunter at the University of Wisconsin (Cohen and Hunter, 1980). These authors have identified four teaching modes in environmental design, each of which is represented within the present instructional module. These four modes are:

1. Creating Awareness -- "experiences which bring the designer closer to the life, activities, and environment of the user;"
2. Programming -- "gathering information, especially user-based and research-based information, synthesizing it, and translating it into forms that can then be used in the design process;"
3. Design Applications -- application of user-based and research-based information to design;
4. Post-Occupancy Evaluations -- "to discover the successes and/or failures of the facility, and to identify lessons for future similar building types."

Finally, it was found that whereas many resources are available to the design instructor, some materials have yet to be developed. Agencies aimed at improving accessibility are often very supportive in providing free written materials and often provide lecturers. Also, a large number of illustrated state codes are now available and many of these are highly visual and communicative. Several books and a guide to exercises has also been developed. However, because of the focus of Sections 503 and 504 of the 1973 Rehabilitation Act on employment, many films and materials are directed at the business person rather than at the designer. It would be useful to be able to choose from a fuller range of materials oriented toward architects.



### Conclusion

The instructional module provides a useful way to incorporate research into the design curriculum. The present example of a module to teach program accessibility and the needs of the physically disabled has provided the opportunity to introduce results of an active research program into a second year design studio. The students benefitted in three general ways from this exposure: first, they gained an understanding of the concept of "independence," the heuristic framework guiding the ongoing research program at Georgia Tech, which offered a structure around which they could organize specific information about the disabled. Second, the students acquired pragmatic information about program accessibility and barrier-free design. Third, they performed small research investigations and participated in empathic exercises to gain emotional understanding of disabilities and research on behalf of the disabled.

Current architectural education provides a limited view of the "professional architect." With the numbers and the range of students in architectural programs today, there is a need to expand this view to include other significant role models. As research becomes an integral component of architectural education, architectural research will become a more recognized career path.

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**Evaluation Forms**

COMPARED TO OTHER COURSES YOU HAVE TAKEN AT GEORGIA TECH, HOW WOULD YOU RATE THE FOLLOWING?  
(IF YOU WERE NOT PRESENT ON A GIVEN DAY, CIRCLE "N/A")

	<u>N/A</u>	<u>VERY USEFUL</u>		<u>ABOUT AVERAGE MODERATELY USEFUL</u>		<u>NOT AT ALL USEFUL</u>
I. THE EXPERIENCE OVERALL:	N/A	1	2	3	4	5
II. CLASS SESSIONS:						
A. Introduc/descript of unit:	N/A	1	2	3	4	5
B. Panel discussion w/handicapped people:	N/A	1	2	3	4	5
C. In-depth information about blindness, mental retardation, aging, wheel-chair-bound:	N/A	1	2	3	4	5
D. Information about the law (Section 504):	N/A	1	2	3	4	5
E. Mainstreaming, normalization and building descriptions:	N/A	1	2	3	4	5
III. FILMS:						
A. <u>The Surest Test</u> (film about wheel-chair-bound woman confronted by steps)	N/A	1	2	3	4	5
B. <u>A Day in the Life of Bonnie Consolo</u> (description of a woman without hands)	N/A	1	2	3	4	5
C. <u>A Different Approach</u> (musical film showing different short approaches to teaching handicapped needs)	N/A	1	2	3	4	5

2003 HANDICAPPED PROJECT (CONTINUED)

	<u>N/A</u>	<u>VERY USEFUL</u>		<u>ABOUT AVERAGE MODERATELY USEFUL</u>		<u>NOT AT ALL USEFUL</u>
D. <u>The Empathic Model</u> (slide-tape show simulating age-related vision and hearing problems)	N/A	1	2	3	4	5
E. <u>What to do When You Meet a Blind Person</u> (shows what to do and not do when meeting a blind person)	N/A	1	2	3	4	5
F. <u>Visual Impairments:</u> (film simulating various vision problems, showing the physiology of the eye and several real-life situations)	N/A	1	2	3	4	5

IV. EXERCISES:

A. Wheelchair travelling:	N/A	1	2	3	4	5
B. Blindfold travelling:	N/A	1	2	3	4	5
C. Empathic (fogged) glasses travelling:	N/A	1	2	3	4	5
D. Talking with disabled people in small groups:	N/A	1	2	3	4	5

V. PROJECT:

A. Survey, and evaluation of buildings:	N/A	1	2	3	4	5
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VI. OVERALL: We are very interested in any suggestions you can offer to improve future sessions of this class. What worked particularly well or particularly poorly? What techniques or information should we consider using next year?

**2003 HANDICAPPED INFORMATION ASSESSMENT**

**WE WOULD LIKE YOUR HELP IN DETERMINING HOW MUCH SOPHOMORES KNOW ABOUT THE NEEDS OF THE DISABLED. PLEASE TAKE ABOUT FORTY MINUTES AND FILL OUT THE FOLLOWING TWO SECTIONS:**

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**1. TECHNICAL INFORMATION:**

**A. Ramp slope for 30 foot ramp:**

1. 1 in 3
2. 1 in 7
3. 1 in 10
4. 1 in 12
5. 1 in 16

**B. Minimum corridor width for accessibility by the wheelchair-bound:**

1. 24"
2. 26"
3. 32"
4. 36"
5. 42"

**C. List 3 types of landmarks blind people can use, and mention in a few words why they are useful landmarks:**

1.

2.

3.

**D. List 3 design considerations especially important when designing for the elderly, and explain in a few words their importance.**

1.

2.

3.

**2. TWENTY-MINUTE SKETCH PROBLEM:**

Provide a sketch floorplan of a small pharmacy (drug store). The total store should be about 2,000 square feet. The store should include:

2	restrooms	120 sq.ft.
1	pharmacist's office	200 sq.ft.
	selling area	1260 sq.ft.
	soda fountain area	300 sq.ft.

This store will be used by a wide range of people, including able-bodied and disabled. Provide a key for your design. Next to each feature you use to make your design accessible to the disabled, put a number on the plan. On the bottom of the page, explain that feature in a few words.

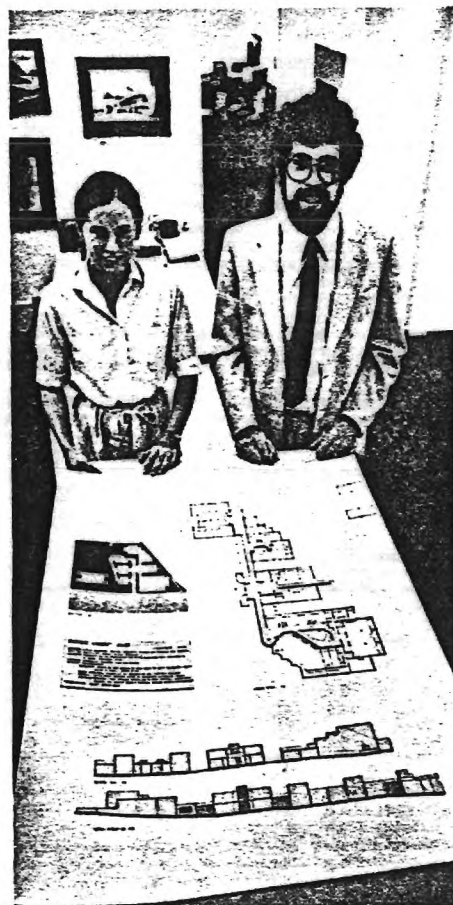


**Publicity about the Project**

# SAI Update

Special Audiences, Inc., Summer 1980

## Blueprinting the Future



Drs. Wineman and Zimring with barrier-free student design.  
photo by Roger Allen Gregg

A building designed to fit the needs of individuals with handicaps can be a thing of beauty too. That's the message architectural students at Georgia Tech learned recently — and one which they may translate into reality when they begin to practice.

Armed with a \$5,000 matching grant from the National Endowment for the Arts, environmental psychologist Dr. Craig Zimring and architectural researcher Dr. Jean Wineman geared up for providing a sophomore architecture class with an unusual experience: a course sensitizing students to the architectural needs of specific disabilities.

Students rode wheelchairs across campus, donned special glasses which simulated the vision of older Americans, listened while disabled persons discussed their experiences dealing with the physical environment and evaluated buildings for their access. Then they each designed an accessible community center containing an arts facility.

The result? Students designed floorplans which were simple to commit to memory, versus maze-like. They included features to help a disabled person find his or her way around, such as columns which could be counted or a fountain with the sound of water serving as a landmark for blind individuals and areas of strong color contrast for persons with limited vision.

"Most of these things will help all users to some degree," says Zimring. And when included at the design stage "they don't cost very much at all," he notes.

Equally important, showing students that a building accommodating the needs of disabled persons doesn't have to be deprived of architectural interest — it can be architecturally excellent — may help Georgians enjoy attractive new barrier-free buildings in future days.

Meanwhile, arts organizations throughout the state are coping with buildings which weren't designed for access. In Fitzgerald, under the Grand Theatre Project, a theatre seating 1,000 persons has been renovated to provide full access. In Atlanta, the city council and mayor have approved the allotment of \$100,000 in community development funds for access improvements in such local arts centers as the Neighborhood Arts Center and the Spring Street Consortium. Final funding approval is expected this fall from the U.S. Department of Housing and Urban Development. Matching funds will be provided by the involved arts centers. Securement of the city's approval was won by Special Audiences, Inc., and disabled citizens, with help from the Atlanta Department of Cultural Affairs.

Beyond physical access measures, arts groups also are relating their programs to the needs of disabled consumers. (See related stories in this and future issues of SAI Update.) The Georgia Assembly of Community Arts Agencies recently resolved "to promote accessible arts and encourage the implementation throughout Georgia of the Rehabilitation Act of 1973, Section 504." While a symbolic gesture, the resolution is indicative of the united front that community arts organizations are presenting on the issue of accessing the arts in Georgia.