

INFORMATION TO USERS

This was produced from a copy of a document sent to us for microfilming. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the material submitted.

The following explanation of techniques is provided to help you understand markings or notations which may appear on this reproduction.

- 1. The sign or "target" for pages apparently lacking from the document photographed is "Missing Page(s)". If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting through an image and duplicating adjacent pages to assure you of complete continuity.**
- 2. When an image on the film is obliterated with a round black mark it is an indication that the film inspector noticed either blurred copy because of movement during exposure, or duplicate copy. Unless we meant to delete copyrighted materials that should not have been filmed, you will find a good image of the page in the adjacent frame.**
- 3. When a map, drawing or chart, etc., is part of the material being photographed the photographer has followed a definite method in "sectioning" the material. It is customary to begin filming at the upper left hand corner of a large sheet and to continue from left to right in equal sections with small overlaps. If necessary, sectioning is continued again—beginning below the first row and continuing on until complete.**
- 4. For any illustrations that cannot be reproduced satisfactorily by xerography, photographic prints can be purchased at additional cost and tipped into your xerographic copy. Requests can be made to our Dissertations Customer Services Department.**
- 5. Some pages in any document may have indistinct print. In all cases we have filmed the best available copy.**

**University
Microfilms
International**

300 N. ZEEB ROAD, ANN ARBOR, MI 48106
18 BEDFORD ROW, LONDON WC1R 4EJ, ENGLAND

8112102

KING, THEODORE I., II

A SURVEY OF CONCERNS PERCEIVED BY STUDENT WHEELCHAIR
USERS AT THREE MAJOR PUBLIC UNIVERSITIES IN MICHIGAN

Michigan State University

PH.D. 1980

**University
Microfilms
International** 300 N. Zeeb Road, Ann Arbor, MI 48106

PLEASE NOTE:

In all cases this material has been filmed in the best possible way from the available copy. Problems encountered with this document have been identified here with a check mark ✓.

1. Glossy photographs _____
2. Colored illustrations _____
3. Photographs with dark background _____
4. Illustrations are poor copy _____
5. Print shows through as there is text on both sides of page _____
6. Indistinct, broken or small print on several pages ✓ _____
7. Tightly bound copy with print lost in spine _____
8. Computer printout pages with indistinct print _____
9. Page(s) _____ lacking when material received, and not available from school or author
10. Page(s) _____ seem to be missing in numbering only as text follows
11. Poor carbon copy _____
12. Not original copy, several pages with blurred type _____
13. Appendix pages are poor copy _____
14. Original copy with light type _____
15. Curling and wrinkled pages _____
16. Other _____

A SURVEY OF CONCERNS PERCEIVED BY
STUDENT WHEELCHAIR USERS AT THREE
MAJOR PUBLIC UNIVERSITIES IN MICHIGAN

By

Theodore I. King, II

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Higher Education

1980

ABSTRACT

A SURVEY OF CONCERNS PERCEIVED BY STUDENT WHEELCHAIR USERS AT THREE MAJOR PUBLIC UNIVERSITIES IN MICHIGAN

By

Theodore I. King, II

Statement of the Problem

Institutions of higher education have been striving over the past few years to eradicate barriers which limit use of their facilities by wheelchair users. These efforts are attempts to comply with the Rehabilitation Act of 1973. It is generally accepted that gains have been made but no clear efforts have been attempted to find out if the problems addressed are those that have the greatest impact on wheelchair users and if these modifications have been sufficient.

By conducting a survey among the wheelchair users themselves at a representative sample of universities it was hoped that a better understanding of immediate needs could be ascertained which would assist the universities in better addressing these needs.

Methods

Three large public universities in Michigan were chosen as the higher education facilities from which to draw study participants: Michigan State University, Wayne State University and The University of Michigan. The defined

population consisted of student wheelchair users. All participants were enrolled as full or part-time students at one of these three universities. The students were originally contacted through the handicapper affairs offices at the universities to request their participation in the study.

Data collection was accomplished through use of the following: (1) the Multidimensional Health Locus of Control Instrument, (2) a questionnaire designed by the investigator to determine perceived concerns of a student wheelchair user at a major university, and (3) personal interviews with a subsample of the research population to clarify and expound on perceived concerns.

Major Findings

The areas suggesting major concerns by student wheelchair users in responding to the questionnaire were: lack of adequate snow removal, accessible housing cafeterias, accessible drinking fountains, accessibility to sporting events on campus and adequate help to facilitate self care activities (e.g., dressing and personal hygiene).

The independent variables that were identified by the investigator as influencing responses to the questionnaire were: sex, university attended, level of education, medical diagnosis, muscle involvement, manual vs. electric wheelchair use, years in a wheelchair at a university and locus of control. Sex and medical diagnosis were variables that yielded statistically significant differences in response patterns.

The major issues identified by students who were interviewed were: accessible bathrooms within classroom buildings, accessible campus housing, available handicapper parking spaces, library accessibility, adequate ramps to buildings with steps, accessible elevators and accessible doorways into buildings.

To Harold Daly

ACKNOWLEDGMENTS

I wish to give thanks to my doctoral committee members, Marylee Davis, Howard Hickey, Cas Gentry and Donald Freeman. Their advice and encouragement during my quest for the degree has been extremely helpful.

A special thanks is extended to my immediate family - my parents and my sister. Throughout my struggle to obtain several degrees in an effort to satisfy my own needs they have been at my side without question to offer their support in any way possible. The unity of such a strong family has been the reason for my ability to endure many hardships and achieve many goals.

Appreciation is also extended to the directors of the Handicapper Affairs Offices at the three universities involved in this study - Judy Taylor, Betsy Schrauder and James Kubaiko. Without the support of their offices and the willingness to give of their time this study would not be as valuable in assessing the true needs and concerns of wheelchair users at a university.

Finally, thanks to Necia Black from Michigan State University in serving as a research consultant for this study and her willingness to adapt to my time schedule so often.

TABLE OF CONTENTS

	Page
DEDICATION.	ii
ACKNOWLEDGMENTS	iii
LIST OF TABLES	vi
CHAPTER ONE: THE PROBLEM	1
Introductory Statement.	1
Purpose of the Study.	4
Statement of the Problem.	5
Questions	6
Definition of Terms	7
Significance.	8
Limitations	9
Organization of the Study	10
Footnotes to Chapter One	11
CHAPTER TWO: REVIEW OF LITERATURE.	12
Introduction.	12
Special Services.	12
The Rehabilitation Act of 1973.	15
Research Directly Related to Present Study.	17
Summary	24
Footnotes to Chapter Two.	25
CHAPTER THREE: DESIGN.	26
Introduction.	26
The Defined Population.	26
Sampling Procedures	28
Description of the Sample	28
The Research Instruments.	31
Variables	34
Data Analysis Procedures.	34
Summary	36
CHAPTER FOUR: ANALYSIS OF THE DATA	38
Introduction.	38
Question One.	38
Question Two.	41
Sex of Respondent.	43

	Page
Age of Respondent.	45
University Attended.	45
Academic Major	49
Level of Education	49
Medical Diagnoses.	51
Muscle Involvement	53
Use of Manual and Electric Wheelchairs	55
Number of Years as a Wheelchair User	59
Operating a Motor Vehicle.	62
Locus of Control	64
Question Three.	66
Summary	71
 CHAPTER FIVE: SUMMARY, IMPLICATIONS AND RECOMMENDATIONS.	 73
Summary	73
Implications of the Study	78
Recommendations for Future Research	79
 APPENDIX A: INTRODUCTORY LETTER TO STUDENT WHEELCHAIR USERS.	 81
 APPENDIX B: CHARACTERISTICS OF WHEELCHAIR USERS WHO PARTICIPATED IN THE STUDY.	 83
 APPENDIX C: MULTIDIMENSIONAL HEALTH LOCUS OF CONTROL INSTRUMENT	 87
 APPENDIX D: QUESTIONNAIRE TO DETERMINE PERCEIVED CONCERNS OF STUDENT WHEELCHAIR USERS AT A MAJOR UNIVERSITY	 90
 APPENDIX E: TABLE OF MEANS FOR EACH QUESTIONNAIRE STATEMENT.	 97
 BIBLIOGRAPHY.	 102

LIST OF TABLES

	Page
TABLE I: RESPONSES TO QUESTIONNAIRE GROUPED INTO TEN MAJOR CATEGORIES.	42
TABLE II: RESPONSES TO QUESTIONNAIRE BY SEX.	44
TABLE III: RESPONSES TO QUESTIONNAIRE BY AGE	46
TABLE IV: RESPONSES TO QUESTIONNAIRE BY UNIVERSITY . . .	47
TABLE V: RESPONSES TO QUESTIONNAIRE BY LEVEL OF EDUCATION	50
TABLE VI: RESPONSES TO QUESTIONNAIRE BY MEDICAL DIAGNOSIS.	52
TABLE VII: RESPONSES TO QUESTIONNAIRE BY MUSCLE INVOLVEMENT	54
TABLE VIII: RESPONSES TO QUESTIONNAIRE BY PERCENT USE OF MANUAL WHEELCHAIR	56
TABLE IX: RESPONSES TO QUESTIONNAIRE BY PERCENT USE OF ELECTRIC WHEELCHAIR	58
TABLE X: RESPONSES TO QUESTIONNAIRE BY NUMBER OF YEARS AS WHEELCHAIR USER.	60
TABLE XI: RESPONSES TO QUESTIONNAIRE BY YEARS IN WHEELCHAIR AT UNIVERSITY	61
TABLE XII: RESPONSES TO QUESTIONNAIRE BY DRIVING A MOTOR VEHICLE	63
TABLE XIII: RESPONSES TO QUESTIONNAIRE BY INTERNAL LOCUS OF CONTROL SCORES.	65

CHAPTER ONE: THE PROBLEM

Introductory Statement

"Galen, in the second century A.D., stated that 'Employment is nature's best physician and essential to happiness.'"¹

In this era of educational pursuits it has become recognized that to obtain a good job, one can generally assume that at least a high school education holds especial importance. For the physically handicapped it is even of greater importance to achieve a higher degree of education to assist in securing meaningful employment. Physically handicapped persons must rely mainly on their mental capacities in gaining employment and feeling that they are offering a meaningful contribution to the world in which they live.

In contrast to the role that brute strength played in the lives of our ancestors, it is how much you have in your head and how you can use it that pays off in today's modern world. Knowledge itself, however, is not salable or usable. To put your knowledge and experience to practical use, you must be able to speak or use your hands. If you can communicate, either orally or in writing, what's in your head can be put to use.²

Yearly, thousands of physically handicapped individuals enroll at institutions of higher learning across the United States. Some have only minor difficulties which rarely hamper their ability to gain an education. Others are severely handicapped and find college life a struggle both in the classroom and in their living environment.

According to Rusalem, two special factors in the education and rehabilitation of physically handicapped individuals may play roles in influencing the decision to attend college and the goals to be achieved at college.³ These factors are vocational rehabilitation and post-high school employment opportunities. In every state of the United States joint federal-state vocational rehabilitation agencies serve individuals with physical, emotional and mental handicaps. These agencies assist students in gaining an education to benefit them in securing employment through services extended to financing necessary assistive devices to aid handicapped students through school (e.g., buying eyeglasses, hearing aids or recording machines). Also, when there are fewer opportunities for handicapped students in the post-high school world, college attendance may be considered a logical choice.

On September 26, 1973, President Nixon signed the Rehabilitation Act of 1973 (HR 8070). Existing authority for the vocational rehabilitation program had expired in June 1972.

According to Section 504 of the Vocational Rehabilitation Act of 1973, 'No otherwise qualified handicapped individual in the United States, ...shall solely by reason of his handicap be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.'⁴

This legislation dictated changes not only in enrollment at institutions of higher education but mandated physical changes to eliminate barriers to physically handicapped

persons. This included items such as braille labels for the visually impaired and ramps for wheelchair users. Since each institution would require time to assess their facilities and make the necessary changes to adhere to the new legislation, approximately five years was given to these federally-subsidized programs to meet the requirements of this new legislation. Final regulations governing the act went into effect in June 1977 and colleges and universities were faced with many deadlines during the 1977-78 academic year.

The Rehabilitation Act of 1973 was clearly the biggest step the government had taken to assist in securing equal opportunities for handicapped persons interested in acquiring a college education. In the wake of its inception as a law, colleges and universities responded by setting up special offices designed to study the problems of handicapped students on their campus and to assist in complying with the regulations. This act meant that whether there was one or fifty students in wheelchairs on campus that buildings and programs must be made accessible to wheelchair students.

With the advent of the Rehabilitation Act, the return of many Vietnam veterans to campus with war-related disabilities, and the success of modern medicine, there has been a tremendous growth in the handicapped population on college campuses.

In an effort to comply with the Rehabilitation Act much time, effort and money has been spent to make colleges

and programs accessible to handicapped students. The implementation of special services through handicapper affairs offices has been the major thrust of higher education facilities in response to this recent legislation. Over the past five years institutions of higher education have made a concerted effort in making their programs accessible through contact with handicapped students and working in cooperation with other institutions facing the same changes. Many formal and informal studies within these institutions have assisted these institutions in providing better services to handicapped students. However, as colleges and universities seek to open their programs to this population of students, few studies have concentrated on the handicapped students' perceptions of the problems they face and the priority of such a list of current problems.

A study designed to identify these disabled students' perceptions as to current problems encountered at institutions of higher learning would assist in implementing better programs aimed directly at fulfilling student needs.

Purpose of the Study

The major purpose of this study is to determine the problems and needs perceived by wheelchair students at three major public universities. Secondarily, several independent variables (e.g., sex, age, medical diagnosis, time in wheelchair, etc.) will be compared with perceived problems to look for significance. In an effort to limit

the scope of the study and amount of data collected, to increase validity, a clearly defined group of physically handicapped students will be used for the study.

Statement of the Problem

Institutions of higher education (in an effort to comply with the Rehabilitation Act of 1973) have been striving over the past few years to eradicate barriers at their facilities which limit use by wheelchair users. It is felt that gains have been made but no clear efforts have been attempted to find out if the problems addressed are those which have the greatest impact on wheelchair users and if these modifications have been sufficient.

In conducting a survey among the wheelchair users themselves at a representative sample of universities it is hoped that a better understanding of immediate needs can be ascertained which would assist the universities in better addressing these needs. It is felt that the wheelchair users would have a clearer idea of what current problems exist and provide insight as to what directions the universities should channel their energies in not only complying with federal law, but also more adequately making the universities and their programs more accessible to wheelchair users.

Questions

In preliminary contacts by this researcher with several student wheelchair users they noted a serious lack of attention by various universities in eliminating "barriers" to allow greater accessibility for wheelchair users. These barriers included attitudes of instructors in adapting to wheelchair users in classrooms as well as physical barriers in being able to enter buildings and maneuver independently within them.

In reviewing the literature, support was found to suggest that unnecessary duplication of services occurs for the handicapped vs. non-handicapped students and that formal surveys and/or needs assessments were lacking to indicate what problems were perceived by the wheelchair users at the level of higher education.

For the purpose of this study ten major areas regarding "accessibility" concerns were felt to be important. These ten areas are: the health center, the library, campus events, study aids, campus terrain, transportation, campus housing, campus buildings, the attitude of the university toward handicappers, and student services.

The major questions to be addressed by this study are:

1. What unique problems are experienced by student wheelchair users when they attend a large public university?

2. Do certain characteristics of wheelchair users have an impact on their perception of problems at a university?
3. What changes, if any, do student wheelchair users feel a university should make in an effort to alleviate these problems?

Definition of Terms

1. Accessibility - Referring to the ease by which buildings and/or programs can be entered (obtainability).
2. Barrier-Free - Referring to a building and/or program that is completely accessible; lacking any type of physical or mental obstacle.
3. Disabled - Unable, unfit or disqualified; generally regarded as a negative term when referring to a person with a physical or mental handicap.
4. Handicapped - A person who experiences a physical or mental hindrance in being able to perform activities of daily living. Generally regarded as a less positive term than handicapper when referring to an individual with a physical or mental handicap.
5. Handicapper - A person with a physical or mental handicap who determines the degree to which their handicap will ultimately affect their life and can operate equally successfully as a person without the handicap. Regarded as a positive term when referring to a person with a physical or mental handicap.

6. Physically Handicapped Students - Students who have some form of physical disability which constitutes a distinct handicap to employment yet not complicated by recognizable emotional involvement.

7. Rehabilitation - "Restoration of the handicapped to the fullest physical, mental, social, vocational and economic usefulness of which they are capable."⁵

8. Habilitation - "Not restoring but achieving independence, self care, and work potential in the first instance; as, for example, in the child born blind or with cerebral palsy."⁶

9. Hemiplegia - Paralysis of one side of the body.

10. Paraplegia - Paralysis of both lower extremities and, generally, the lower trunk.

11. Quadriplegia - Paralysis of all four limbs.

Significance

In conducting this study two major outcomes are anticipated: first, to determine the perceived problems of wheelchair students at three major public universities and secondly, to determine the adequacy of special programs and services currently available to these students.

The ramifications of such a study include being able to determine priority problems that these specific handicapped individuals are experiencing at their campuses and, as a result, to offer better services to make the university more accessible and more responsive to the needs of

handicapped students. Though only three major universities will be examined, it is hoped that some measure of generalization can be made to extend the findings of the study to other universities across the United States.

Limitations

The major limitations of the current study include the small sample size and the questionnaire design.

The target population for the study includes wheelchair users at institutions of higher education. The defined population for the study are wheelchair users at Michigan State University, The University of Michigan and Wayne State University. The sample is that group of wheelchair users at these three universities who volunteered to participate in the study. This is a relatively small sample and will therefore limit generalizability of the results of the study to the target population.

The major instrument in determining perceived needs by the wheelchair users in the sample is a questionnaire designed by this investigator. The questionnaire contains forty-eight questions aimed at determining perceived needs of wheelchair users at a university. These questions were arrived at through discussions with wheelchair users and the special offices at the three universities designed to assist handicappers at their facility. Individuals with expertise in designing questionnaires were consulted and the questionnaire was pilot tested at Eastern Michigan University to

improve internal validity by clarifying wording of questions. The instrument is therefore not standardized and formal validity and reliability have not been determined. It is noted that prior to using this instrument only "face" validity was established. Results based on information from this questionnaire can only suggest relationships, not correlations.

Organization of the Study

In Chapter Two current literature is reviewed to support the need for undertaking the proposed study. In Chapter Three the design of the proposed research is discussed with an emphasis on examining the dependent and independent variables, data collection instruments and procedures, and analysis procedures. In Chapter Four the data that were collected are shared and analyzed. Chapter Five contains the summary, conclusions and implications suggested by the study as well as recommendations for future research.

Footnotes to Chapter One

¹W. Scott Allan, Rehabilitation: A Community Challenge (New York: John Wiley and Sons, Inc., 1958), p. 75.

²Howard A. Rusk, et al., Living With a Disability (Garden City, N.Y.: Blakiston Co., Inc., 1953), p. 71.

³Herbert Rusalem, Guiding the Physically Handicapped College Student (New York: Teachers College, Columbia University, Bureau of Publications, 1962), p. 407.

⁴Lone Phillips, "For Your Information," National Association of State Universities and Land-Grant Colleges, Circular No. 209, February 3, 1978, p. 1.

⁵W. Scott Allan, Rehabilitation: A Community Challenge (New York: John Wiley and Sons, Inc., 1958), p. 2.

⁶Allan, op. cit., p. 1.

CHAPTER TWO: REVIEW OF LITERATURE

Introduction

Despite an extensive literature search and review, this researcher discovered only four research studies which were directly relevant to the current study. Several short articles in professional journals offer specific insights that are incorporated into the study and are listed in the bibliography.

The review of the literature contains information relating to special services commonly offered by institutions of higher learning for minority group students, the development and rationale for the Rehabilitation Act of 1973, and major references identified as highly applicable to the current study.

Special Services

Universities have responded to the needs of their students (or potential students) over the past two decades by instituting many "special services" on campus. Some of these services include tutoring, legal aid, financial aid, personal counseling, career counseling, and job placement. Further, in an attempt to provide educational opportunity for all people universities have begun to satisfy the needs of a large number of minority groups including women, blacks, veterans, the poor, and the physically handicapped.

"Satisfying primary needs rather than long-range goals often dictates a reordering of priorities. The solution is not just money but the innovative use of peer-tutors, para-professionals, all available resources."⁷

In a study completed by Simmons and Maxwell-Simmons in 1978 they noted that many minority students have been successful in attending institutions of higher learning because of the college support programs and their own high motivation. Several suggestions were made to assist in increasing the retention of these students at the university level including: "The fostering of a good academic support program, dissemination of information and communications, establishing positive relations with high schools, encouraging institutional support and developing alternative and private funding sources, providing sensitive counseling, motivating students, fostering good community and parent relations, and providing staff training."⁸

Rusalem notes that for the wheelchair student many difficult problems surface on a campus. "Among them are the mechanics of living, inability to enter some buildings because of steps, inability of many means of public transportation, and inability to participate in such activities as walking and dancing."⁹ Though many problems cannot be eliminated totally, Rusalem identifies the responsibility of the university as seeking to give as much support as possible to the wheelchair student to allow him or her the opportunity to seek an education with as few major

difficulties as possible.

The earliest university program in the country designed to serve the needs of severely handicapped students was started at the University of Illinois, Urbana-Champaign in 1948. Several other universities have had at least one person assigned to deal with the problems of handicapped students as far back as the 1950's. In most instances, these programs came into existence due to the efforts of the handicapped students themselves.

Although the full impact of the new legislation, Rehabilitation Act of 1973, on colleges and universities is yet to be determined, the necessity for major structural modification to accommodate students with mobility impairments presents the major immediate obstacle in terms of costs. At the same time universities are facing the challenge of making all aspects of their program available to handicapped persons 'in the most integrated setting appropriate.' To meet this goal universities are setting up a whole range of services designed to serve specific needs to various categories of disabilities, generally coordinated through a central office on campus.

Among the services offered to handicapped students by such offices are: Help in the admissions process; orientation and mobility training; attendant recruitment and referral; counseling; wheelchair repair; provision of handbooks, accessibility guides and tactile maps; assistance with transportation difficulties; referral service for help with special problems not handled directly by the office; test proctoring; assistance with scheduling and other academic problems related to the handicap and the development of resource centers offering a wide array of study aids needed by handicapped students such as recordings of printed material, braille transcription, talking calculators and TV magnifiers.¹⁰

This description of special services distributed by the National Association of State Universities and Land-Grant

Colleges begins to get at the enormity of the task for such offices at universities designed to assist handicapped students.

The Rehabilitation Act of 1973

As early as 1970 the federal government became actively interested in the pursuit of a post-secondary degree by physically handicapped students. At that time the Special Services for Disadvantaged Students in Institutions of Higher Education Program was instituted, authorized under the Higher Education Amendments of 1968. Included in the definition of "disadvantaged students" were those students who are recipients of the vocational rehabilitation program benefits. Under this program, institutions of higher education were eligible to apply for grants to assist disadvantaged students in attending their facility.

More directly assisting handicapped students was the Rehabilitation Act of 1973 (H.R. 8070). Specifically Section 504 of the Act states that "no otherwise qualified handicapped individual, solely by reason of his handicap, shall be subjected to discrimination under any program receiving federal financial assistance."¹¹

According to Mistler (1978), to understand the regulations one must examine why there was a need for them. In the past, some institutions refused to admit disabled people and explained that the institution was unprepared for them. Money continued to be committed to building campus facilities

that were not architecturally accessible. In schools that admitted disabled people, there was little or no provision made to ensure equal access. For example, registration would often be held in an inaccessible facility yet no provision was made for help into the inaccessible facility and no alternate location was offered. Blind people frequently encountered difficulty in obtaining permission to use tape recorders in class. In other instances, deaf people were left without support to deal with communication problems. Campus housing was often inaccessible. Transportation was provided for students but the vehicles were usually inaccessible to disabled people.

Pertaining to Section 504 of the Act, the U.S. Department of Health, Education, and Welfare printed a booklet outlining the responsibilities of higher education facilities as mandated by the Act.

In colleges and other postsecondary institutions, recruitment, admissions, and the treatment of students must be free of discrimination.

Quotas for admission of handicapped persons are ruled out, as are preadmission inquiries as to whether an applicant is handicapped. However, voluntary post-admission inquiries may be made in advance of enrollment concerning handicapping conditions to enable an institution to provide necessary services.

Higher education institutions must assure accessibility of programs and activities to handicapped students and employees. Architectural barriers must be removed where the program is not made accessible by other means. A university, however, is not expected to make all its classroom buildings accessible in order to comply with program accessibility standards. It may have to undertake some alterations, or it may reschedule classes to

accessible buildings, or take other steps to open the program to handicapped students. Handicapped persons should have the same options available to others in selecting courses.

Other obligations of the institutions include:

- Tests which a college or university uses or relies upon, including standardized admissions tests, must not discriminate against handicapped persons. Tests must be selected and administered so that the test results of students with impaired sensory, manual or speaking skills are not distorted unfairly but measure the student's aptitude or achievement level, and not his or her disability.
- Students with impaired sensory, manual or speaking skills, must be provided auxiliary aids although this may often be done by informing them of resources provided by the government or charitable organizations.
- Colleges and universities must also make reasonable modifications in academic requirements, where necessary, to ensure full educational opportunity for handicapped students. Such modifications may include the extension of time for completing degree requirements, adaptation of the manner in which specific courses are conducted, and elimination of rules prohibiting handicapped persons from having tape recorders in class or dog guides on campus.
- Physical education must be provided in a non-discriminatory manner and handicapped students cannot be unnecessarily segregated in physical education classes.
- Infirmary services must be provided handicapped students on a par with those offered others.¹²

Research Directly Related to Present Study

In reviewing the literature, four dissertations were located with topics relating directly to this study and will be examined for content, results and implications for this study.

In 1965 E.H. Tait completed a dissertation at Colorado State College entitled "Problems Perceived by Physically

Handicapped Students Enrolled at Three Colorado Institutions of Higher Learning During the Spring of 1965."¹³ The purpose of the study was to identify, categorize, and evaluate disability related problems encountered by physically handicapped college and university students at three institutions. The population selected for the study was composed of the handicapped clients of the Division of Vocational Rehabilitation of the Department of Rehabilitation of the State of Colorado enrolled as full-time, four year degree-oriented students at the higher education facilities used in the study.

Background case study information and compilation of the lists of the physically handicapped students to be included in the study were obtained from the files of the local Vocational Rehabilitation District Office under whose jurisdiction the students were pursuing their college objectives. Personal interviews were conducted to obtain insights into the students' perceived problems using the Department of Vocational Rehabilitation Structured Interview Guide which was designed specifically for the study. Student perceptions relating to their academic and non-academic life on the campus were sought in an effort to determine problem areas as well as to accumulate information relating to this group of college students.

Of the 106 students included in the study, fifty students possessed a visible handicap, while fifty-six had a non-visible handicap. Twenty-three separate disabilities were present in the population studied. In general, the

author set forth the following conclusions upon completion of the study:

1. The role of the physically handicapped student on the campus needed to be better understood not only by the student himself, but by all others concerned with his program.
2. Physical education activities, if not suitably altered or waived, may constitute a real obstacle to these students.
3. For many physically handicapped students a one initial year enrollment at a junior college may be very beneficial; proportionally much more so than a two year enrollment.
4. Students with specific disabilities, for example, diabetes, have developed ways of getting along on their campus which would be helpful to new diabetic students to know.
5. The students, as a group, were satisfied with the offerings of their institution, were increasingly aware of the rigorous academic demands, were appreciative of the support given them by the Department of Rehabilitation of the State of Colorado, were resolute in their ambitions to complete their program, were, once acclimated and adjusted, much the same as any other college student on their campus.

This study served to demonstrate the need to actively seek out the handicapped students' perceptions as to problems they encounter on campus. By working specifically through the students, the investigator was able to identify previously undetected problems and/or offer suggestions for changes within the university structure to better assist the handicapped student.

Though several general problems and concerns were identified and are useful to formulating ideas for the present study, specific problems for certain handicaps were

not identified. Concentrating on a specific population (viz. wheelchair students) can offer more specific insight into problems encountered and offer more concrete solutions through the existing special service offices. In Tait's study all of the students interviewed were able to walk, though some required crutches. It should be noted that for the wheelchair student many problems exist which are not apparent to an individual who is ambulatory.

In 1972 K.B. Kloepping completed a dissertation entitled "The Prediction of Academic Achievement of Physically Disabled Students." The principle concern of this study was to determine what variables are significantly related to academic achievement in a physically disabled population.

While increasing numbers of physically disabled persons are attending school, almost no systematic attention has been given to the process by which these potential students are selected for college level work. Traditional selection criteria may be valid for this population, however, other factors may also be significant variables. Personal experience with disability, environmental obstacles which can produce frustration and anxiety, and attitudinal barriers may all have a significant impact on the individual.¹⁴

In reviewing this study it was hoped that an insight could be gained regarding physically handicapped students' decisions to attend college and what academic problems they encountered.

The ALPHA Biographical Inventory was one measure used in the research. It has been found to be a powerful predictor of academic achievement. Rotter's I-E scale and the Anxiety vs. Integration factor of the 16 Personality Factors

Questionnaire were two personality indices used in the research. The I-E scale measures the degree to which an individual is self-controlled or controlled by his or her environment. The Anxiety vs. Integration scale is a measure of trait-factor anxiety in the individual's personality. Cumulative college grade point average (GPA) was the criterion used in the research.

The results of this study indicated that the two best predictors of academic achievement for the physically disabled research population were the I-E scale and high school rank. The study suggested an external orientation on the part of the students possibly resulting in apathy, dependence, passivity, and psychological maladjustment behaviors associated with non-success in an academic setting. If an external orientation leads to non-success in academic achievement, then determining ways of altering specific behavioral patterns of an external orientation is a significant need.

One of the major limitations of this study, however, is that GPA may not be the best indicator of academic achievement. In terms of the present research it is important to note the value of the internal vs. external orientation of the students. This will be done through the use of an instrument to determine "locus of control" as will be discussed later in this literature review as well as in Chapter Three regarding design of the study.

In 1978 J.E. Varghese completed a dissertation entitled "An Investigation of Special Programs for Handicapped Students at Institutions of Higher Learning in Michigan with Special Emphasis on Three Major Public Universities." This study is especially pertinent to the present research effort as the same three universities were used in the research.

This was a descriptive study to examine the special programs for handicapped students operated by Michigan State University, The University of Michigan and Wayne State University. The main thrust of the study was to investigate the question: "Do the special programs for the handicapped students at these three major public universities in Michigan duplicate the services offered by the same universities to their non-handicapped students through regular channels?"¹⁵

Surveys, questionnaires and personal interviews were utilized to gain information for the study. Information was collected regarding programs, staff, funding and students. The investigator discovered much duplication of services between the special programs and services offered by the three universities to their non-handicapped students through regular channels. It was felt that the special programs office should function more as a facilitator and liaison; playing an advocacy role on behalf of the handicapped student population.

The investigator was not able to find any comprehensive needs assessment study done among the college and university

handicapped population and strongly recommended that a needs assessment be conducted at the earliest opportunity in order to develop the full potential of handicapped students in the realm of higher learning. He also recommended that it should be discerned if existing services and facilities at a college or university could be used by its handicapped student population as they exist today, or with limited modifications.

In 1979 Mary Ellen Wierenga completed a dissertation entitled "The Interrelationship Between Multidimensional Health Locus of Control, Knowledge of Diabetes, Perceived Social Support, Self-Reported Compliance and Therapeutic Outcomes Six Weeks After the Adult Patient Has Been Diagnosed With Diabetes Mellitus." The portion of this study which is pertinent to the present study revolves around the concept of locus of control.

Locus of control as a concept relates to whether or not individuals expect to possess or lack power over what happens to them. The role of reinforcement and reward has been recognized as a stimulus for individuals to obtain and perform knowledge and skills. However, what one person perceives as a reward may not be interpreted the same way by someone else. The extent that individuals perceive the reward following from or contingent on, their own behavior or attributes (internal), as opposed to, the extent that they feel the reward is controlled by forces outside of themselves and may occur independently of their own actions (external) influences their interpretation of reward.¹⁶

As locus of control may be an important independent variable for the present study, the Multidimensional Health Locus of Control instrument utilized by Wierenga will also

be used as an instrument by this investigator. Whether the students in the present study are influenced more by "internal" or "external" environmental factors may be important in their determination of perceived problems at the university they attend.

Summary

In reviewing the literature it is quite evident that little has been published regarding wheelchair users at institutions of higher education.

In studying the use of "special services" for minority groups at universities the literature suggests that such services have been beneficial to these groups. Likewise, most universities currently have offices to assist the handicapped student population at their institutions.

In reviewing several dissertations directly related to determining the needs of handicappers at a university, it is noted that though special offices for handicappers exist, they may not be adequately meeting the needs of the target population. Lack of some essential services and unnecessary duplication of others is suggested.

A survey of wheelchair users at universities is important in assisting universities in determining whether the special programs offered for their handicapper population are appropriately addressing their needs.

Footnotes to Chapter Two

⁷"Special Needs Conference: Providing Educational Opportunity For All People," Flint, Michigan, 1975.

⁸Ron Simmons and Cassandra Maxwell-Simmons, "Principles of Success in Programs for Minority Students" (Stevens Institute of Technology, Hoboken, N.M., 1978).

⁹Herbert Rusalem, Guiding the Physically Handicapped College Student (New York: Teachers College, Columbia University, Bureau of Publications, 1962), p. 38.

¹⁰Lone Phillips, "For Your Information," National Association of State Universities and Land-Grant Colleges, Circular No. 209, February 3, 1978, p. 2.

¹¹"Section 504 of the Rehabilitation Act of 1973: Fact Sheet," U.S. Department of Health, Education, and Welfare, Office of the Secretary, Office for Civil Rights, Washington, D.C., July, 1977, p. 1.

¹²"Section 504 of the Rehabilitation Act of 1973: Fact Sheet" (U.S. Department of Health, Education, and Welfare, Washington, D.C., 1977).

¹³David H. Tait, "Problems Perceived by Physically Handicapped Students Enrolled at Three Colorado Institutions of Higher Learning During the Spring of 1965," Colorado State College, 1965.

¹⁴Kent B. Kloepping, "The Prediction of Academic Achievement of Physically Disabled Students," The University of Arizona, 1972.

¹⁵Joseph E. Varghese, "An Investigation of Special Programs for Handicapped Students at Institutions of Higher Learning in Michigan with Special Emphasis on Three Major Public Universities," Wayne State University, 1978.

¹⁶Mary Ellen Wierenga, "The Interrelationship Between Multidimensional Health Locus of Control, Knowledge of Diabetes, Perceived Social Support, Self-Reported Compliance and Therapeutic Outcomes Six Weeks After the Adult Patient Has Been Diagnosed With Diabetes Mellitus," Michigan State University, 1979, pp. 32-33.

CHAPTER THREE: DESIGN

Introduction

The major purpose of this study is to ascertain the problems perceived by wheelchair students at major public universities. Questionnaires were used to gather data on attitudes regarding specified problem areas. A secondary purpose of the study is to identify relationships between selected independent variables and the concerns students identified.

The Defined Population

The target population for the study was defined as any student attending an institution of higher education who requires the use of a wheelchair for mobility either partially or totally.

The defined population for the study included all student wheelchair users at Michigan State University, The University of Michigan and Wayne State University. Michigan State University's main campus is located in East Lansing, Michigan, with a total student enrollment of approximately 45,000. The campus has an essentially flat terrain. There is a Handicappers' Affairs Office to assist student handicappers which has been in existence for eight years. A small number of the campus dormitories have been made

accessible for wheelchair users as well as some of the campus apartments.

The University of Michigan is located in Ann Arbor, Michigan, with a total student enrollment of approximately 35,000. The Disabled Student Services Office has been in existence for six years. The main campus area is separated into a central and north campus area approximately two miles apart. The campus terrain is hilly in parts and would make wheelchair propulsion difficult. Some of the dormitory rooms have been made accessible to wheelchair users.

Wayne State University is located in the metropolitan Detroit area and has an approximate enrollment of 35,000 students. The Educational Rehabilitation Office to assist student handicappers has been in existence for approximately eighteen years. The campus terrain is essentially flat. Some of the dormitory rooms have been made accessible to wheelchair users as well as some of the campus apartment complexes.

All three campuses are located in the southern portion of the lower peninsula in Michigan and have similar climates with four distinct seasons. The average annual snowfall at the three campuses is approximately fifty to sixty inches.

The final sample consisted of student wheelchair users who consented to participate in the study who were enrolled as full or part time students at one of the three universities used in the study. Because only thirty-three students agreed to participate in the study, it is difficult to

suggest that the sample is truly representative of the target population. It should also be noted that the sample is further "biased" in the sense that students who agreed to participate in the study were informed that they would be asked to identify problem areas in attending a university in a wheelchair. Therefore, students who had grievances might have been more willing to participate than those who were content with the university's facilities.

Sampling Procedures

The handicapper affairs offices at each of the three universities involved in the study were contacted. Each of the offices agreed to send out an introductory letter (see Appendix A) in January 1980 to all student wheelchair users identified at their university requesting that they participate in the study. If the wheelchair students were willing to participate, a form was sent back to the investigator stating their interest and giving their name and address. In this way the universities were able to maintain anonymity of wheelchair students they were aware of on their campus and the students had complete control over their decision to participate or not participate in the study.

Description of the Sample

After the introductory letters had been sent to the students, they were allowed one month to respond to the

request. The handicapper affairs offices then sent a second letter to the students who had not responded within that period of time. From the two mailings the following number of students volunteered to participate in the study: ten of seventeen students (58.8%) who received letters from Michigan State University, twenty-five of forty-four students (56.8%) from Wayne State University and five of eight students (62.5%) from The University of Michigan.

The research instruments were sent to these forty students in March of 1980. The students were allowed three weeks to send back the instruments and letters were sent to request returns from those who had not responded by the requested deadline. By the end of April 1980 thirty-three of the forty students (82.5%) responded by filling out and returning the data collection instruments. A phone call was made to the remaining seven students requesting participation but no further returns were forthcoming.

Appendix B contains a description of the demographic characteristics of the sample including: sex, age, university attended, academic major, academic level, medical diagnosis, muscle involvement, percent use of manual wheelchair, percent use of electric wheelchair, number of years as a wheelchair user, number of years as a wheelchair user at a university and operation of a motor vehicle.

Of the total number of respondents, twenty (60.6%) were male and thirteen (39.4%) were female. The age of the participants ranged from eighteen to fifty with a mean of

27.53 and a median of 26.5. Michigan State University was represented by eight students (24.2%), Wayne State University by twenty-one students (63.6%) and The University of Michigan by four students (12.1%). The thirty-three students listed a total of twenty-three different majors. Only one major was represented by three students - guidance and counseling. Six majors were represented by two students each while the remaining sixteen majors were represented by only one student each.

The students were separated into academic level at the university with the following results: three freshmen (9.1%), four sophomores (12.1%), eight juniors (24.2%), nine seniors (27.3%) and nine graduate students (27.3%). The medical diagnoses listed by the students were counted as follows: eighteen spinal cord injuries (54.5%), seven cerebral palsy (21.2%), two polio and two spinal osteoarthritis (6.1%) and one each for cerebral edema, osteogenesis imperfecta, neurological and muscular dystrophy (3.0%). Two students (6.1%) classified themselves as hemiplegic, fourteen (42.4%) as paraplegic and thirteen (39.4%) as quadriplegic. Eighteen of the twenty-eight (64.3%) who used a manual wheelchair did so over 95.0% of the time. Nine of the thirteen (69.2%) who used an electric wheelchair did so over 95.0% of the time.

The length of time participants had been using a wheelchair for mobility ranged from 1.2 years to thirty years. The mean length of time in a wheelchair was 8.44 years; the

median was 5.08 years. The range for length of time using a wheelchair at the university was from 0.3 years to 8.5 years with a mean of 3.34 years and a median of 3.02 years. Nineteen of the students (57.6%) reported that they operated a motor vehicle while the remaining fourteen (42.4%) stated that they did not drive.

The Research Instruments

Data collection was accomplished through use of the following: (1) the Multidimensional Health Locus of Control Instrument (see Appendix C), (2) a questionnaire designed by the investigator to determine perceived concerns of a student wheelchair user at a major university (see Appendix D), and (3) personal interviews with a subsample of participants to clarify and expound on certain areas of the questionnaire on perceived concerns. Questions used for the personal interviews may be found on page 67.

The Multidimensional Health Locus of Control Instrument is standardized and was used exactly as written and used in Wierenga's (1979) study. The instrument was designed to differentiate between individuals whose locus of control is determined by internal factors (themselves), external factors (others) or who feel their well-being is controlled mostly by chance.

There are six questions focusing on each of the three control factors. The instrument is constructed such that the higher the combined score for the six questions

regarding any particular factor, the stronger role that factor plays in determining locus of control.

As reported by Wierenga (1979), the alpha coefficient reliability for the Multidimensional Health Locus of Control Instrument was found to be: (1) internal - .767, (2) powerful others - .673 and (3) chance - .753. The means and standard deviations were almost identical for each subscale. As an initial indication of predictive validity, correlations were computed between health status and the scores obtained by the instrument. As expected, health status correlated positively with "internal" ($r = .403$, $p < .001$), negatively with "chance" ($r = -.275$, $p < .01$) and did not correlate with "powerful others" ($r = -.055$). Definitive evidence of the validity and reliability of the instrument will not be fully realized until it is used more extensively.

The questionnaire to determine perceived concerns of student wheelchair users at a major university was designed by this investigator. Assistance in the design of the questionnaire was received by speaking to wheelchair users at three universities other than those used in the study, interviewing the directors of the handicapper affairs offices at the three universities used in the study, and advice from a research consultant in the College of Education at Michigan State University. The first draft of the questionnaire was revised following feedback from the investigator's doctoral committee members. The second draft of the questionnaire was then pilot tested with

student wheelchair users from Eastern Michigan University to determine difficulties with comprehension and to determine what additional problem areas should be added to the instrument. Statistical analysis of the validity of the questionnaire instrument was not accomplished and only "face" validity was established.

All areas regarding "accessibility" were considered in designing the questionnaire. Ten major categories were identified: the health center, the library, campus events, study aids, campus terrain, transportation, campus housing, campus buildings, the attitude of the university toward handicappers, and student services. Questions were developed for the survey questionnaire to solicit responses which indicated attitudes by the student wheelchair users regarding these ten areas. An additional section for general comments was added at the end of the questionnaire to allow the students to comment about other specific concerns that they did not feel were addressed in the questionnaire.

The questions used in the personal interviews were formulated after initial examination of the data collected by the questionnaire and certain problem areas were identified. Three students from each of the universities were interviewed. The students were asked each question individually and given a chance to respond while the investigator recorded the responses by taking notes.

Variables

The dependent variables in the study included the responses to the questionnaires and the responses to the interview questions.

The independent variables included:

1. The university attended
2. Extent of wheelchair use
3. Level of education
4. Level of trauma (muscle involvement)
5. Number of years in a wheelchair at a university
6. Academic major
7. Sex
8. Age
9. Locus of control

Data Analysis Procedures

Locus of control was determined for each student and major problems perceived by the students were identified through use of the questionnaire. A computer was used to analyze responses to items on the questionnaire through comparison of mean responses. Where appropriate the independent variables were separated into two categories for comparison purposes (e.g., wheelchair users twenty-five years or younger vs. twenty-six years or older). The perceived concerns were compared to the independent variables to determine if there were differences in the pattern of responses across conditions in each variable (e.g., male vs.

female).

The questionnaire designed to determine perceived problems by the student wheelchair users utilized a seven point Likert-type scale. The means were determined for each of the questions as answered by the participants in the study to determine problem areas. In comparing responses to the questionnaire with the independent variables the data were collapsed from the seven point scale to a three point scale to indicate high agreement, moderate agreement and low agreement with the statements. This was done to make statistical comparisons possible by increasing the number of respondents in a given category. Though limited power exists due to the small sample size, chi-square distribution and analysis of variance (one-way classification) tests were computed to determine if observed differences in response patterns were statistically significant. The chi-square test provides a conservative test of statistical significance and the analysis of variance test provides a more liberal test. The chi-square analysis is more conservative in that the data from this study will readily satisfy the assumptions on which the test is based (e.g., ordinal vs. interval scale). However, the test is less powerful than analysis of variance. That is, the likelihood of making a Type II error (accepting a false hypothesis) is greater.

A subsample of the respondents was selected at random and interviewed (three from each of the universities) to

gain more insight as to why they identified certain areas as concerns and how they felt these situations could be improved. The investigator recorded similarities in the responses to the interview questions.

Summary

The purpose of the study was to ascertain the problems perceived by wheelchair students at major public universities.

The handicapper affairs offices at each of the three universities were contacted and agreed to send out an introductory letter with a consent form to all student wheelchair users known to them asking for their participation in the study. Locus of control instruments and questionnaires were then sent to willing participants to determine locus of control and perceived problems at the university. These instruments can be found in the appendices. The locus of control instrument is standardized and taken from the study conducted by Wierenga (1979). The questionnaire to determine perceived problems was constructed by the investigator with the assistance of the directors of the handicapper affairs offices at the three universities in the study and through input from the investigator's doctoral committee members.

An initial analysis of the questionnaire responses regarding perceived problems was used to formulate several personal interview questions which were asked to three students from each institution. This procedure was

instituted to assist in clarifying the results and to gain further information regarding the major problems identified.

Chi-square and analysis of variance tests were computed to determine if observed relationships between the perceived problems and the nine independent variables were statistically significant.

CHAPTER FOUR: ANALYSIS OF THE DATA

Introduction

This chapter presents and analyzes the research findings. Information will be shared and analyzed as it was collected from three specific sources: the Multi-dimensional Health Locus of Control Instrument, the questionnaire designed by the investigator, and the personal interview questions. In reporting the data the three major questions of the study will be addressed.

1. What problems unique to student wheelchair users are experienced when they attend a large public university?
2. Do certain characteristics of wheelchair users have an impact on their perception of problems at a university?
3. What changes, if any, do student wheelchair users feel a university should make in an effort to alleviate these problems?

Question One

What problems unique to student wheelchair users are experienced when they attend a large public university?

The questionnaire designed by the investigator contained forty-eight specific questions regarding services at the university. All questions were posed in a positive

manner so that if the respondent agreed to the statement then it would not be interpreted as a problem. The responses were in the form of a seven point Likert-type scale with "1" as strongly disagree and "7" as strongly agree. If a question did not apply to a respondent then it was left blank and not considered when determining the mean for that question. In reporting data in the form of tables later in this chapter it is noted that the number of respondents across categories is not consistent due to some of the questions not being answered by all participants.

Appendix E contains a list of the forty-eight questions along with the number of respondents to each question and the mean response level. In answering the question of what problems student wheelchair users experience at a university, the means of the individual questions were compared. It was found that seven of the questions were scored with an average of 5.5 (between "slightly agree" and "moderately agree") or greater. These were questions numbered 2, 7, 8, 9, 10, 18 and 19. These areas may be interpreted as not being perceived as problems by the majority of the students in this study. These specific questions dealt with the issues of accessible doorways to buildings, adequate sidewalks without stairs, adequate curb cuts, lack of hills to negotiate in a wheelchair, adequate assistance for class registration, and access for career counseling services.

Five questions scored "negatively" in that the average score was less than four ("neutral") on the questionnaire.

These were questions numbered 11, 25, 31, 34 and 45. These areas may be interpreted as the major perceived problems as determined by the student wheelchair users in this study. These specific questions dealt with the issues of adequate snow removal, accessible housing cafeterias, accessible drinking fountains, accessibility to sporting events on campus and adequate help to facilitate self care activities (e.g., dressing and personal hygiene).

The forty-eight questions were grouped into ten major categories for comparison purposes as follows:

<u>Category</u>	<u>Questions</u>
Health Center	41
Library	42, 43
Campus Events	34, 35, 36
Study Aids	38, 39, 40
Campus Terrain	7, 8, 9, 10, 11
Transportation	12, 13, 14, 15, 16
Campus Housing	25, 26, 27, 28, 29
Campus Buildings	1, 2, 3, 4, 5, 30, 31, 32
Attitude	6, 33, 37, 44, 45, 46, 47, 48
Student Services	17, 18, 19, 20, 21, 22, 23, 24

Though some of the categories were represented by only a small number of questions, they were felt to be important enough as single concerns to look at separately. There would therefore be higher reliability with items having more questions when comparing overall mean response levels. To keep the means for each of the ten categories comparable,

the sum of the mean responses for all questions within each category was divided by the number of questions within that category. This value therefore represents the mean response level (seven point scale) for all items within a given category.

Table I provides a summary of how each of the participants responded to items in the ten major categories. The two categories with the lowest means were "campus events" (4.25) and "health center" (4.37). This means that the student wheelchair users were most apt to consider campus events and the health center as their major concerns. The two categories with the highest means were "student services" (5.16) and "campus terrain" (5.17). This suggests that of the ten major categories the students felt that their needs were best met in the services which are being provided for them and the lack of difficulty in locomotion around campus.

Question Two

Do certain characteristics of student wheelchair users have an impact on their perception of problems at a university?

In an attempt to answer this question, the demographic data obtained from the respondents were compared to the responses to the questionnaire as compiled into the ten major categories previously described. In reporting this data in the form of tables in the next section of this chapter, the seven point scale is collapsed into three

TABLE I
RESPONSES TO QUESTIONNAIRE GROUPED
INTO TEN MAJOR CATEGORIES

	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean
Health Center	8	16	6	4.37
Library	16	10	7	4.59
Campus Events	8	15	4	4.25
Study Aids	9	16	1	4.41
Campus Terrain	17	14	0	5.17
Transportation	11	14	0	4.98
Campus Housing	9	15	1	4.76
Campus Buildings	14	17	0	4.89
Attitude	10	15	1	4.76
Student Services	15	13	0	5.16
Totals	117 (41.4%)	145 (51.4%)	20 (7.0%)	4.73 (Avg.)

categories where: a response of seven or six on the questionnaire is labeled "high agreement," a response of five, four or three is labeled "moderate agreement," and a response of two or one is labeled "low agreement." The reason for collapsing the data in this manner is due to the small numbers of respondents and the many blank cells resulting if the tables are reporting the full seven point scale.

Results of chi-square and analysis of variance tests are also reported in the tables. As noted in Chapter Three these analyses provide evidence of the statistical significance of relationships between a given independent variable and responses to items in each category of the questionnaire. The chi-square tests are based on the three categories of agreement cited above; the analysis of variance tests, on the other hand, consider mean response levels on the full seven point scale. Though the comparison of the means in many instances suggested relationships between responses to the questionnaire and the independent variables, the statistical analysis seldom suggested that these relations were statistically significant.

The results of these comparisons are as follows:

Sex of Respondent:

When responses to the questionnaire are analyzed according to sex of the wheelchair user some obvious differences may be noted (see Table II). In nine of the ten categories, the male tended to agree with the statements

TABLE II
RESPONSES TO QUESTIONNAIRE BY SEX

	MALES (n = 20; 60.6%)				FEMALES (n = 13; 39.4%)				χ^2	f-ratio
	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean		
Health Center	5	10	2	4.70	3	6	4	3.92	1.66	1.28
Library	10	8	2	5.00	6	2	5	3.96	4.61	2.13
Campus Events	7	8	1	4.98	1	7	3	3.18	4.81	9.96**
Study Aids	7	8	0	4.69	2	8	1	4.03	3.24	1.56
Campus Terrain	11	7	0	5.30	6	7	0	4.98	.21	.61
Transportation	9	6	0	5.27	2	8	0	4.56	2.44	2.00
Campus Housing	7	6	0	5.41	2	9	1	4.05	4.34	6.89*
Campus Buildings	10	10	0	5.32	4	7	0	4.11	.12	6.40*
Attitude	5	9	1	4.68	5	6	0	4.86	1.01	.11
Student Services	11	6	0	5.57	4	7	0	4.53	1.17	5.10*
Totals	82 (49.4%)	78 (47.0%)	6 (3.6%)	5.09 (Avg.)	35 (30.2%)	67 (57.7%)	14 (12.1%)	4.22 (Avg.)		

* = <.05

** = <.01

more than the females. The only exception was attitude of the university where females felt that the overall attitude of the university in meeting their needs was better than as the males perceived it.

The results of chi-square tests of observed differences in response patterns among males and females suggest that none of these differences are statistically significant. The analysis of variance tests, however, suggested that the mean response levels for males and females are significantly different for campus events, campus housing, campus buildings and student services. These results suggest that female wheelchair users at a university have more concerns than male wheelchair users.

Age of Respondent:

The students were separated into two age groups (approximately at the median) for comparison purposes - twenty-five years or younger and twenty-six years or older (see Table III). In comparing the means for each of the ten categories of responses as well as the average mean score for all categories, there did not appear to be a relationship between age and perceived problems. The average mean score for all ten categories was 4.71 for the younger group and 4.76 for the older group of students.

University Attended:

In comparing the responses of students according to which university they attend (Table IV) some observations may be considered important. However, the small numbers of

TABLE III
RESPONSES TO QUESTIONNAIRE BY AGE

	25 YEARS OR YOUNGER ($n = 13$; 40.6%)				26 YEARS OR OLDER ($n = 19$; 59.4%)			
	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean
Health Center	2	7	2	4.17	6	8	4	4.50
Library	9	2	2	5.07	7	7	5	4.24
Campus Events	3	6	0	4.40	5	8	4	4.16
Study Aids	3	5	0	4.70	6	10	1	4.25
Campus Terrain	8	5	0	5.04	9	8	0	5.27
Transportation	2	7	0	4.36	9	6	0	5.40
Campus Housing	4	5	0	4.64	5	9	1	4.84
Campus Buildings	4	7	0	4.57	10	9	0	5.10
Attitude	5	3	0	5.29	5	11	1	4.48
Student Services	5	5	0	4.83	9	7	0	5.38
Totals	45 (44.5%)	52 (51.5%)	4 (4.0%)	4.71 (Avg.)	71 (41.8%)	83 (48.8%)	16 (9.4%)	4.76 (Avg.)

TABLE IV
RESPONSES TO QUESTIONNAIRE BY UNIVERSITY

	MICHIGAN STATE UNIVERSITY (<u>n</u> = 8; 24.2%)				WAYNE STATE UNIVERSITY (<u>n</u> = 21; 63.6%)				THE UNIVERSITY OF MICHIGAN (<u>n</u> = 4; 12.1%)			
	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean
Health Center	2	4	2	4.12	6	10	3	4.63	0	2	1	3.33
Library	4	1	3	4.31	11	7	3	4.83	1	2	1	3.87
Campus Events	3	2	0	5.20	5	11	3	4.14	0	2	1	3.33
Study Aids	1	4	0	4.33	8	9	1	4.59	0	3	0	3.44
Campus Terrain	4	4	0	5.02	12	7	0	5.30	1	3	0	4.80
Transportation	3	4	0	4.80	8	8	0	5.21	0	2	0	3.80
Campus Housing	3	3	0	5.00	6	9	1	4.85	0	3	0	3.80
Campus Buildings	2	5	0	4.18	12	8	0	5.45	0	4	0	3.37
Attitude	3	2	0	5.45	7	10	1	4.63	0	3	0	4.37
Student Services	3	3	0	5.02	12	7	0	5.46	0	3	0	3.58
Totals	28 (43.0%)	32 (49.2%)	5 (7.6%)	4.74 (Avg.)	87 (47.0%)	86 (46.4%)	12 (6.4%)	4.91 (Avg.)	2 (6.2%)	27 (84.4%)	3 (9.3%)	3.77 (Avg.)

students responding from Michigan State University ($\underline{n} = 8$) and The University of Michigan ($\underline{n} = 4$) do not provide definitive evidence of relationships. Thus statistical analyses were not completed for this variable.

Overall, wheelchair users at The University of Michigan rated their facility as having the most problems while wheelchair users at Wayne State University rated their institution as having the least problems of the three universities. In comparing overall responses to the ten categories between the three universities the following results were obtained. Michigan State University students indicated 43.0% high agreement, 49.2% moderate agreement and 7.6% low agreement. Wayne State University students indicated 47.0% high agreement, 46.4% moderate agreement and 6.4% low agreement. The University of Michigan students indicated 6.2% high agreement, 84.4% moderate agreement and 9.3% low agreement. The average mean scores for the three institutions in responding to all ten categories were: Michigan State University, 4.73; Wayne State University, 4.91; and The University of Michigan, 3.77.

Of particular interest is the mean score average in each of the ten categories at The University of Michigan as eight of the ten categories reflected a mean score of less than 4.0 ("neutral"). At the other two universities no mean score for an individual category was below 4.0. Specific perceived problem categories at The University of Michigan were the health center and campus events. Michigan

State University students rated the health center and campus buildings as their major concerns. Wayne State University students were most concerned in the areas of campus events and study aids.

Academic Major:

Due to the large number of academic majors listed by the participants in the study and the resultant lack of numbers of students within those majors, comparisons based on academic major and responses to the questionnaire were not completed.

Level of Education:

Comparisons between level of education and responses to the questionnaire are shown in Table V. Due to the small numbers of students within each of the undergraduate levels, freshmen through seniors were combined and compared with graduate students. Due to the large discrepancy in numbers of students within the categories (undergraduate students = 24, graduate students = 9) and the close average mean for all ten categories between the two groups of students, specific relationships are difficult to suggest.

The graduate students reflected more disagreement overall with the statements on the questionnaire. The overall average mean for the undergraduate students was 4.87 as they reflected high agreement 44.9% of the time, moderate agreement 48.8% and low agreement 6.3% of the time. The overall average mean for the graduate students was 4.49 as they reflected high agreement 32.5% of the time, moderate

TABLE V
RESPONSES TO QUESTIONNAIRE BY LEVEL OF EDUCATION

	UNDERGRADUATE STUDENTS (<u>n</u> = 24; 72.7%)				GRADUATE STUDENTS (<u>n</u> = 9; 27.3%)			
	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean
Health Center	5	13	4	4.45	3	3	2	4.50
Library	13	6	5	4.68	3	4	2	4.17
Campus Events	6	11	2	4.54	2	4	2	3.79
Study Aids	8	10	1	4.68	1	6	0	3.76
Campus Terrain	13	10	0	5.13	4	4	0	5.25
Transportation	8	10	0	4.99	3	4	0	4.97
Campus Housing	7	10	1	4.76	2	5	0	4.74
Campus Buildings	10	12	0	5.16	4	5	0	4.68
Attitude	9	10	0	4.97	1	5	1	4.25
Student Services	13	8	0	5.36	2	5	0	4.77
Totals	92 (44.9%)	100 (48.8%)	13 (6.3%)	4.87 (Avg.)	25 (32.5%)	45 (58.4%)	7 (9.1%)	4.49 (Avg.)

agreement 58.4% and low agreement 9.1% of the time. The largest discrepancies to be noted in comparing within the ten categories are seen in campus events and study aids where the graduate students perceived more problems than the undergraduates. For campus events the mean score was 4.54 for undergraduates and 3.79 for graduates. For study aids the mean score was 4.68 for undergraduates and 3.76 for graduates.

Medical Diagnoses:

In comparing medical diagnoses with responses to the questionnaire only spinal cord injury and cerebral palsy were used. The other categories of diagnoses contained too few individuals to consider comparison significant. As mentioned previously, eighteen students listed their diagnosis as spinal cord injury whereas seven listed cerebral palsy. Table VI compares these two diagnoses with responses to the questionnaire. The cerebral palsy students indicated more disagreement with the statements in seven of the ten categories (library, campus events, study aids, transportation, campus housing, campus buildings and student services). Both the chi-square and the analysis of variance tests suggested that differences in responding to items in the library category were statistically significant ($p < .05$).

The spinal cord injury students indicated 44.0% high agreement, 53.3% moderate agreement and 2.7% low agreement with the statements on the questionnaire. The cerebral

TABLE VI
RESPONSES TO QUESTIONNAIRE BY MEDICAL DIAGNOSIS

	SPINAL CORD INJURY (<u>n</u> = 18; 72.0%)				CEREBRAL PALSY (<u>n</u> = 7; 28.0%)					
	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean	χ^2	f-ratio
Health Center	3	9	3	4.20	2	4	1	4.57	.25	.19
Library	10	8	0	5.36	3	0	4	3.57	13.55*	5.88*
Campus Events	5	9	1	4.64	1	3	1	3.53	.89	1.85
Study Aids	5	8	0	4.69	1	3	1	3.93	2.97	1.14
Campus Terrain	10	7	0	5.26	5	2	0	5.28	.01	.00
Transportation	6	6	0	5.05	2	4	0	4.90	.44	.05
Campus Housing	4	9	0	4.86	2	3	1	4.23	2.42	.73
Campus Buildings	9	9	0	5.15	2	3	0	4.10	.00	2.57
Attitude	5	8	0	4.78	4	1	0	5.75	.15	1.95
Student Services	9	7	0	5.34	3	2	0	4.67	.00	.94
Totals	66 (44.0%)	80 (53.3%)	4 (2.7%)	4.93 (Avg.)	25 (43.1%)	25 (43.1%)	8 (13.8%)	4.45 (Avg.)		

* = <.05

palsy students indicated 53.1% high agreement, 43.1% moderate agreement and 13.8% low agreement with the statements. Overall the average mean score for the spinal cord injury students was 4.93 while for the cerebral palsy students it was 4.45 for all ten of the categories.

The library, campus events and study aids all ranked as major concerns for the cerebral palsy individuals whereas the health center was the highest concern for the spinal cord injury students. The cerebral palsy students noted campus terrain and overall attitude of the university in meeting their needs as the most agreeable categories. It should be noted that cerebral palsy individuals generally have communication problems as well as physical problems in comparison to the spinal cord injury students. This may be the reason for their perception of greater problems at the universities.

Muscle Involvement:

In Table VII muscle involvement of the students' handicap or disability is compared to the responses given to the questionnaire. The three categories for muscle involvement were: hemiplegia, paraplegia and quadriplegia. Only two hemiplegics were identified in the research population and, therefore, were not included for comparison purposes. Fourteen paraplegics and thirteen quadriplegics were identified. The paraplegics indicated 48.7% high agreement, 48.7% moderate agreement and only 2.5% low agreement with the statements when all ten categories were combined.

TABLE VII
RESPONSES TO QUESTIONNAIRE BY MUSCLE INVOLVEMENT

	PARAPLEGIA (<u>n</u> = 14; 51.8%)				QUADRIPLÉGIA (<u>n</u> = 13; 48.1%)				χ^2	f-ratio
	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean		
Health Center	3	8	1	4.58	2	6	4	3.92	2.29	.82
Library	8	5	1	5.11	5	3	5	4.08	3.83	1.91
Campus Events	4	7	1	4.55	3	5	2	4.07	.63	.44
Study Aids	4	6	0	4.73	2	7	1	3.97	1.74	1.61
Campus Terrain	8	5	0	5.34	7	6	0	5.05	.00	.40
Transportation	6	5	0	5.18	2	6	0	4.65	.21	.80
Campus Housing	4	7	0	5.16	3	6	1	4.22	1.17	2.14
Campus Buildings	8	5	0	5.32	3	9	0	4.23	2.06	4.25
Attitude	5	5	0	5.14	4	6	0	4.86	.50	.22
Student Services	8	5	0	5.32	4	6	0	4.76	.36	.96
Totals	58 (48.7%)	58 (48.7%)	3 (2.5%)	5.04 (Avg.)	35 (32.4%)	60 (55.5%)	13 (12.0%)	4.38 (Avg.)		

The quadriplegics indicated 32.4% high agreement, 55.5% moderate agreement and 12.0% low agreement with the statements.

The students identifying themselves as paraplegics had an overall average mean in responding to the questionnaire of 5.04. Their major concerns were the health center, campus events and study aids where the mean score was less than 5.0; whereas in the other seven categories their mean scores were above 5.0. The quadriplegic students perceived their greatest needs in the areas of the health center and study aids where the mean scores were less than 4.0. The only category to have a mean score of greater than 5.0 was campus terrain for quadriplegics. Their overall average mean for responding to the questionnaire statements was 4.38.

In comparing the overall average means the paraplegic students were more agreeable to the questionnaire statements than the quadriplegics though chi-square and analysis of variance tests did not suggest any statistically significant differences between the responses of the two groups. This result may reflect the fact that quadriplegics encounter more difficulties due to the level of muscle involvement in comparison to paraplegics and, therefore, require more assistance from the university in meeting their needs.

Use of Manual and Electric Wheelchairs:

Tables VIII and IX compare the percent use of manual and electric wheelchairs with responses to the questionnaire.

TABLE VIII
RESPONSES TO QUESTIONNAIRE BY PERCENT USE OF MANUAL WHEELCHAIR

	80% OR LESS (<u>n</u> = 10; 35.7%)				95% OR GREATER (<u>n</u> = 18; 64.3%)			
	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean
Health Center	5	2	3	4.33	2	11	2	4.38
Library	6	1	3	4.44	9	7	2	4.64
Campus Events	4	5	1	4.33	4	7	2	4.20
Study Aids	4	4	1	4.25	4	9	0	4.48
Campus Terrain	5	5	0	4.98	8	8	0	5.24
Transportation	4	5	0	4.82	6	7	0	5.06
Campus Housing	4	4	1	4.40	5	8	0	4.93
Campus Buildings	5	5	0	4.68	8	10	0	4.98
Attitude	4	5	0	4.89	4	8	1	4.70
Student Services	5	5	0	5.04	8	6	0	5.22
Totals	46 (47.9%)	41 (42.7%)	9 (9.4%)	4.62 (Avg.)	58 (39.7%)	81 (55.5%)	7 (4.8%)	4.78 (Avg.)

Manual wheelchair users were grouped into students who used manual wheelchairs eighty percent or less and those who used manual wheelchairs ninety-five percent or more of the time. The means for each of the ten categories in comparing the two groups were extremely close though the average mean reflected a slightly greater agreement with the questionnaire statements for those students who used manual wheelchairs ninety-five percent or greater for mobility (4.78) as opposed to those using manual wheelchairs eighty percent or less for mobility (4.62). Overall, students who used manual wheelchairs eighty percent or less for mobility indicated 47.9% high agreement, 42.7% moderate agreement and 9.4% low agreement with the questionnaire statements. Those students using manual wheelchairs ninety-five percent or greater for mobility indicated 39.7% high agreement, 55.5% moderate agreement and 4.8% low agreement with the statements.

The electric wheelchair students were grouped into students who used electric wheelchairs fifty percent or less and those who used electric wheelchairs ninety-five percent or more of the time for mobility. In this case, the group that used electric wheelchairs more often agreed with the statements to a greater degree in eight of the ten categories - all but the library and campus terrain. The overall average mean also reflected this difference of opinion as it was 3.63 for students using electric wheelchairs fifty percent or less and 4.58 for students who used

TABLE IX
RESPONSES TO QUESTIONNAIRE BY PERCENT USE OF ELECTRIC WHEELCHAIR

	50% OR LESS (<u>n</u> = 4; 30.8%)				95% OR GREATER (<u>n</u> = 9; 69.2%)			
	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean
Health Center	0	1	2	2.00	3	4	2	4.55
Library	1	2	1	4.12	4	1	4	4.05
Campus Events	1	1	1	3.67	1	6	1	4.00
Study Aids	0	2	1	2.89	3	5	0	4.39
Campus Terrain	2	2	0	5.15	5	4	0	5.02
Transportation	0	3	0	4.00	2	4	0	4.47
Campus Housing	0	2	1	2.67	2	5	0	4.98
Campus Buildings	0	3	0	3.79	3	5	0	4.26
Attitude	0	2	0	3.87	5	4	0	5.18
Student Services	1	2	0	4.12	4	4	0	4.87
Totals	5 (16.1%)	20 (64.5%)	6 (19.3%)	3.63 (Avg.)	32 (39.5%)	42 (51.8%)	7 (8.6%)	4.58 (Avg.)

electric wheelchairs at least ninety-five percent of the time for mobility. Due to the small numbers in each of the two categories, however, statistical analyses were not completed.

Students who used electric wheelchairs fifty percent or less for mobility indicated 16.1% high agreement, 64.5% moderate agreement and 19.3% low agreement with the questionnaire statements. Students who used electric wheelchairs ninety-five percent or more of the time for mobility indicated 39.5% high agreement, 51.8% moderate agreement and only 8.6% low agreement with the statements.

These results suggest that electric wheelchair users may perceive more problems in attending a university in comparison to manual wheelchair users. It also suggests that the more a person uses an electric wheelchair, the fewer problems they may have in attending a university.

Number of Years as a Wheelchair User:

The total number of years as a wheelchair user and the number of years in a wheelchair at a university are compared to the responses to the questionnaire in Tables X and XI. The students were separated into two groups for the number of years as a wheelchair user - five years or less and six years or greater. The overall average means for responding to the questionnaire statements were close for these two groups (4.60 vs. 4.74). No indications are apparent that responses to the questionnaire vary as a function of the number of years a person has used a wheelchair.

TABLE X
RESPONSES TO QUESTIONNAIRE BY NUMBER OF YEARS AS WHEELCHAIR USER

	5 YEARS OR LESS (\underline{n} = 17; 51.5%)				6 YEARS OR GREATER (\underline{n} = 16; 48.5%)			
	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean
Health Center	3	10	3	4.11	5	6	3	4.67
Library	10	4	3	4.50	6	6	4	3.94
Campus Events	4	10	1	3.93	4	5	3	4.15
Study Aids	5	9	1	4.26	4	7	0	4.02
Campus Terrain	7	9	0	4.96	10	5	0	5.31
Transportation	6	9	0	4.91	5	5	0	5.29
Campus Housing	4	9	1	4.34	5	6	0	5.13
Campus Buildings	7	9	0	4.91	7	8	0	5.13
Attitude	6	8	0	4.87	4	7	1	4.64
Student Services	9	8	0	5.23	6	5	0	5.14
Totals	61 (39.3%)	85 (54.8%)	9 (5.8%)	4.60 (Avg.)	56 (44.1%)	60 (47.2%)	11 (8.7%)	4.74 (Avg.)

TABLE XI
RESPONSES TO QUESTIONNAIRE BY YEARS IN WHEELCHAIR AT UNIVERSITY

	2 YEARS OR LESS (<u>n</u> = 12; 36.4%)				2.5 YEARS OR MORE (<u>n</u> = 21; 63.6%)			
	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean
Health Center	3	7	1	4.53	4	9	5	3.66
Library	7	3	2	4.20	9	6	5	3.66
Campus Events	2	7	0	4.40	6	6	4	3.75
Study Aids	3	6	0	4.88	5	10	1	3.95
Campus Terrain	4	6	0	4.81	11	7	0	5.08
Transportation	4	6	0	4.71	6	8	0	4.39
Campus Housing	3	6	0	4.66	6	9	1	4.52
Campus Buildings	4	6	0	4.45	9	11	0	4.40
Attitude	2	7	0	4.74	7	8	1	4.47
Student Services	5	5	0	5.27	9	8	0	4.63
Totals	37 (37.4%)	59 (59.6%)	3 (3.0%)	4.67 (Avg.)	72 (42.1%)	82 (47.9%)	17 (9.9%)	4.25 (Avg.)

The students were also separated into two groups for comparison purposes for number of years as a wheelchair user on campus - two years or less and two and one-half years or greater. The mean score for four of the ten categories (health center, library, campus events and study aids) was below 4.0 for students who used a wheelchair on campus for two and one-half years or more whereas none of the mean scores was below 4.0 in the ten categories for the students using wheelchairs for two years or less at a university. The overall average mean for all ten categories was also higher for the students using wheelchairs at a university for a shorter period of time (4.67) in comparison to the group using wheelchairs for a longer period of time at the university (4.25). This suggests that the students using wheelchairs for two and one-half years or more may perceive more problems at a university than wheelchair students using wheelchairs for two years or less at a university. This difference may also suggest that students using wheelchairs at the university longer may have "felt" these problems for a longer period of time. Another possible explanation is there may have been changes during the past two years which have alleviated some of these problems and concerns which caused the newer wheelchair users to not experience the same difficulties.

Operating a Motor Vehicle:

Table XII compares the responses of student wheelchair users who operate a motor vehicle and those who do

TABLE XII
RESPONSES TO QUESTIONNAIRE BY DRIVING A MOTOR VEHICLE

	DRIVES (<u>n</u> = 19; 57.6%)				DOES NOT DRIVE (<u>n</u> = 14; 42.4%)			
	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean
Health Center	2	12	2	4.25	6	4	4	4.50
Library	9	7	3	4.53	7	3	4	4.68
Campus Events	5	8	2	4.36	3	7	2	4.11
Study Aids	3	11	0	4.33	6	5	1	4.50
Campus Terrain	8	9	0	5.03	9	5	0	5.33
Transportation	6	8	0	4.97	5	6	0	5.00
Campus Housing	5	9	0	5.24	4	6	1	4.14
Campus Buildings	8	10	0	5.06	6	7	0	4.67
Attitude	3	9	1	4.44	7	6	0	5.08
Student Services	9	7	0	5.34	6	6	0	4.94
Totals	58 (37.2%)	90 (57.7%)	8 (5.1%)	4.75 (Avg.)	59 (46.8%)	55 (43.6%)	12 (9.5%)	4.69 (Avg.)

not. The individual means for the ten categories suggest that questionnaire responses do not vary as a function of this independent variable. The overall average mean for responses to the questionnaire was 4.75 for wheelchair users who drive as compared to 4.69 for wheelchair users who do not drive. These data suggest that operation of a motor vehicle is not a significant factor in the perception of problems at a university for wheelchair users.

Locus of Control:

The Multidimensional Health Locus of Control Instrument was used to determine the students' locus of control - internal (themselves), external (powerful others) or chance. All of the participants in the study scored highest on the internal locus of control factors. This may be due to the fact that as wheelchair users they must be strongly motivated and controlled internally to confront the problems of attending a university in a wheelchair.

Though each of the participants scored highest on an internal locus of control on the Multidimensional Health Locus of Control Instrument, the scores ranged from sixty-three to one hundred percent. In view of this wide range of scores, the group was divided into two categories (high and low internal locus of control scores) and used to compare responses to the questionnaire designed by the investigator. Table XIII summarizes this comparison.

The group with the highest internal locus of control scores (eighty percent or greater) was more agreeable with

TABLE XIII
RESPONSES TO QUESTIONNAIRE BY INTERNAL LOCUS OF CONTROL SCORES

	LESS THAN 80% (<u>n</u> = 13; 39.4%)				80% OR GREATER (<u>n</u> = 20; 60.6%)				χ^2	f-ratio
	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean	High Agreement (7,6)	Moderate Agreement (5,4,3)	Low Agreement (2,1)	Mean		
Health Center	3	6	4	4.08	5	10	2	4.59	1.66	.53
Library	4	4	5	3.96	12	6	2	5.00	4.40	2.13
Campus Events	3	7	2	3.92	5	8	2	4.51	.24	.82
Study Aids	2	8	1	4.00	7	8	0	4.71	3.24	1.84
Campus Terrain	5	8	0	4.92	12	6	0	5.34	1.42	1.10
Transportation	4	6	0	4.78	7	8	0	5.12	.00	.43
Campus Housing	3	7	1	4.25	6	8	0	5.16	1.73	2.54
Campus Buildings	4	8	0	4.53	10	9	0	5.12	.46	1.37
Attitude	6	7	0	4.93	4	8	1	4.59	1.47	.42
Student Services	5	7	0	4.73	10	6	0	5.49	.51	2.59
Totals	39 (32.5%)	68 (56.7%)	13 (10.8%)	4.41 (Avg.)	78 (48.1%)	77 (47.5%)	7 (4.3%)	4.96 (Avg.)		

the statements on the questionnaire in nine of the ten major categories (all except "attitude"). Overall this group had an average mean of 4.96 while the group scoring lower on internal locus of control had an average mean of 4.41. The group with less than eighty percent as a score on internal locus of control indicated 32.5% high agreement, 56.7% moderate agreement and 10.8% low agreement with the statements on the questionnaire. The group who scored eighty percent or higher on internal locus of control indicated 48.5% high agreement, 47.5% moderate agreement and only 4.3% low agreement with the statements.

Though chi-square and analysis of variance tests did not reveal significant differences, the results seem to suggest that the more the students perceive themselves as controlling their own environment or health (internal locus of control), the less problems they perceive at the university in overcoming physical, emotional and mental barriers as student wheelchair users.

Question Three

What changes, if any, do student wheelchair users feel a university should make in an effort to alleviate these problems?

In an attempt to answer this question, personal interviews were conducted with a subsample of the study participants. After analyzing the data received from the questionnaire, nine students were contacted personally by the investigator in May 1980 to expound upon the major

problems perceived by the student wheelchair users involved in the study. The nine students interviewed were a stratified random sample from the students who returned completed questionnaires. Three were selected from each of the three campuses.

The interview questions focused on the specific areas in the questionnaire which the participants in the study selected as their major problems. As mentioned previously, five questions scored "negatively" overall in that the average score was less than four ("neutral") on the questionnaire. These areas may be interpreted as the major concerns as determined by the student wheelchair users in this study. These specific questions dealt with the issues of adequate snow removal, accessible housing cafeterias, accessible drinking fountains, accessibility to sporting events on campus and adequate help to facilitate self care activities.

The interview schedule included the following questions:

1. How often is snow removal (lack of) a determining factor in your ability to travel around campus in your wheelchair?
2. In what ways is campus housing inaccessible to a wheelchair user?
3. How do you circumvent the problem of inaccessibility to drinking fountains on campus?
4. How are campus events (concerts, sports events, etc.) inaccessible to a wheelchair user?
5. What are your major concerns that the university should address to make attendance at the university easier for you as a wheelchair user?
6. In what ways is the office for handicapper affairs at your university meeting your needs? In what ways should they improve?

In responding to the question regarding snow removal most of the students noted that this past winter was not a major problem due to the limited amount of snow. From previous experiences, however, most noted that the major problems exist with lack of adequate snow removal at drop-off points when transported by the campus handicapper van service, ramps, curb cuts and some doorways. A major problem for wheelchair users is that the type of equipment used by the universities in removing snow leaves a small ridge on either side of the sidewalk which has to be negotiated when turning a corner onto another sidewalk, entering a building or crossing a street. One student mentioned that the problem exists somewhat due to the fact that often the building entrances which are made accessible to wheelchair users are not the main entrances. Therefore a wheelchair student by necessity must travel around to a side door or back door of the building to an area which is usually not kept as clean in regards to snow removal.

Three of the students indicated that they have had no contact with campus housing and were not able to comment on accessibility problems. The remainder of the students were highly vocal on this issue as they felt that the universities are not responding to making campus housing accessible to wheelchair users. They note that the universities have spent time and energy into making a few of the housing units accessible though problems were identified as still existing within those units. A major

complaint is that all housing units are not accessible, therefore often prohibiting them from attending functions in other housing units or from visiting friends in other campus housing units. In general, the student wheelchair users interviewed felt that they do not have the same options available to them as non-wheelchair users and that this is discriminatory. One student mentioned that prior to attending the university he had been in contact with the handicapper affairs office and was "promised the world" in terms of accessible campus housing but nothing was available when he moved to the campus area and he now resides in a local apartment complex.

All of the students interviewed remarked that nearly ninety-five percent of the drinking fountains on campus are inaccessible to wheelchair users. To circumvent the problem most carry their own cup with them or use the snack bars to get a drink when needed. It was suggested by some that a cup dispenser be placed next to the fountains to allow accessibility.

Four of the students interviewed stated that they did not attend many campus events and therefore did not comment on accessibility problems. The others mentioned their difficulty in obtaining tickets though this problem is not unique to student wheelchair users. Another problem mentioned in attending campus events is that wheelchair users usually have to sit on the ground level for concerts or sporting events and they do not feel that this usually is the

best vantage point for viewing an event. They again mentioned that they do not feel they have the same options as students who do not use wheelchairs. One student mentioned that she does not attend such events because she is unable to sit with her non-handicapped friends. Two students noted that changes need to be made for recreational sports facilities to allow accessibility not only to the building itself but to locker rooms, showers and all floors within the building.

Other major concerns cited by the students interviewed were:

1. Usually only one bathroom is accessible within a campus building - usually a classroom building. The buildings should not be considered accessible unless all facilities within the buildings are accessible. Also, more than just one or two residence halls or campus apartment complexes should be accessible to allow more options.
2. There need to be more accessible parking spaces for student wheelchair users who operate a motor vehicle. The parking areas should be closer to the classroom buildings which are commonly used by students.
3. The libraries need to be made more accessible to student wheelchair users.
4. Many of the ramps that were first constructed to make buildings accessible are too steep and need to be rebuilt.
5. Many of the doorways into buildings are wide enough to be accessible to wheelchair users but the doors are often not constructed to allow independent opening for someone in a wheelchair.
6. Many of the campus elevators are inadequate as they are too small to be able to turn around while in a wheelchair and are often not in operation.

In response to the question regarding services offered by the office for handicapper affairs at the university, seven of the students felt that the handicapper affairs offices were trying to do too much at once. It was suggested that the offices could best function on behalf of the students by reorganizing and concentrating their efforts on the major problems perceived by the students. In this way, some of the major concerns could be better addressed rather than alleviating only a portion of the problem in many areas. Two students felt that the office could best serve their needs through use of an ombudsman to handle their concerns as they arose. They often find instructors who are unaware of the regulations surrounding the Rehabilitation Act of 1973, Section 504, and therefore have difficulty with expectations within certain classes. Five of the students interviewed noted that they act as their own advocate and bypass the handicapper affairs office. These five students see a need for an active group of student wheelchair users to assist in effecting changes at the university. They admit that they do not take the time to involve themselves often enough due to the time and energy required to attend classes and keep up with the class assignments.

Summary

In this chapter the information collected from the Multidimensional Health Locus of Control Instrument, the

questionnaire designed by the investigator and the interviews with nine of the participants in the study was described. The independent variables in the study were compared with the responses to the questionnaire to identify significant relationships that might facilitate future research. The independent variables which suggested relationships were: sex, university attended, level of education, medical diagnosis, muscle involvement, manual vs. electric wheelchair use, years in a wheelchair at a university, and locus of control. However, sex and medical diagnosis were the only variables that yielded statistically significant differences in response patterns. The comparisons between the independent variables and the responses to the questionnaire were displayed in the form of tables depicting responses as categorized into ten major subgroupings from the questionnaire statements. Several additional problems were noted in the personal interviews with recommendations for modifications to alleviate these concerns.

In Chapter Five the results of the study will be summarized along with major conclusions and recommendations for future research.

CHAPTER FIVE: SUMMARY, IMPLICATIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to ascertain the problems perceived by wheelchair students at major public universities. The major questions addressed by the study were:

1. What problems unique to student wheelchair users are experienced when they attend a large public university?
2. Do certain characteristics of wheelchair users have an impact on their perception of problems at a university?
3. What changes, if any, do student wheelchair users feel the university should make in an effort to alleviate these problems?

The subjects for the study were originally contacted through the handicapper affairs offices of the three universities used in the study: Michigan State University, Wayne State University and The University of Michigan. Forty students from these universities volunteered to be participants in the study. Of these forty, thirty-three responded to the instruments sent to them for data collection.

The data collection instruments included the Multi-dimensional Health Locus of Control Instrument, a questionnaire designed by the investigator and personal interview

questions. All participants responded to the Multidimensional Health Locus of Control Instrument and questionnaire. Nine students (three from each of the universities) responded to personal interview questions to clarify information obtained through the mail.

The dependent variables for the study included the responses to the questionnaires and interview questions. The independent variables for the study included:

1. The university attended
2. Extent of wheelchair use
3. Level of education
4. Level of trauma (muscle involvement)
5. Number of years in a wheelchair at a university
6. Academic major
7. Sex
8. Age
9. Locus of control

Differences in responses to the questionnaire were analyzed for each of the independent variables. Forty-eight specific questions regarding services at the university were incorporated into the questionnaire. All questions were posed in a positive manner so that if the respondent agreed to the statement then it would not be interpreted as a problem. The responses were on a seven point Likert-type scale with "1" representing "strongly disagree" and "7" representing "strongly agree."

In determining perceived problems by wheelchair users at a university, the mean scores were calculated for each question for all respondents. Seven of the forty-eight questions had a mean of 5.5 (between "slightly agree" and "moderately agree") or greater. These areas may be interpreted as not being perceived as problems by the student wheelchair users at this time and included issues of accessible doorways to buildings, adequate sidewalks without stairs, adequate curb cuts, lack of hills to negotiate in a wheelchair, adequate assistance for class registration and access for career counseling services.

Five questions scored "negatively" overall in that the average score was less than four ("neutral") on the questionnaire. These areas may be interpreted as perceived problems by student wheelchair users. These specific questions dealt with the issues of adequate snow removal, accessible cafeterias within campus housing, accessible drinking fountains, accessibility to sporting events on campus and adequate help to facilitate self care activities (e.g., dressing and personal hygiene).

The forty-eight questions were also grouped into ten major categories for comparisons with the independent variables. The ten categories were:

1. Health Center
2. Library
3. Campus events
4. Study Aids

5. Campus Terrain
6. Transportation
7. Campus Housing
8. Campus Buildings
9. Attitude
10. Student Services

The data support the following:

1. Male wheelchair users may perceive fewer concerns at a university than female wheelchair users.
2. Perception of concerns may be a function of the specific university due to physical differences on campus and the attention of the university toward handicappers.
3. Graduate student wheelchair users may perceive more concerns at a university than undergraduate student wheelchair users.
4. Medical diagnosis and muscle involvement may be factors in determining perceived concerns of student wheelchair users as students with greater physical problems require greater accessibility.
5. Manual wheelchair users may perceive fewer concerns at a university than electric wheelchair users.
6. Student wheelchair users may perceive more problems the longer they attend a university.

7. Student wheelchair users with a high internal locus of control tend to perceive fewer concerns at a university than wheelchair users scoring lower on internal locus of control.

These suggested results must be interpreted cautiously at this time due to lack of statistical significance in most cases. Sex and medical diagnosis were the only variables that yielded statistically significant differences in response patterns.

To determine what changes would be suggested by student wheelchair users and to gain further insight as to the problems suggested in the data collected from the questionnaire, nine students were interviewed by the investigator. From the nine interviews conducted as part of this study, the following concerns were rated high:

1. Adequate snow removal to allow greater accessibility to wheelchair users.
2. Improvement of campus housing accessibility to allow greater options to wheelchair users.
3. Greater accessibility to drinking fountains on campus.
4. Greater accessibility to campus events (viz. sporting events and concerts).
5. Greater accessibility to all aspects within campus buildings (viz. bathrooms).
6. Greater number of handicapper parking spaces nearer classroom buildings.

7. Libraries made more accessible.
8. Reconstruction of some of the older ramps to lessen the grades.
9. More accessible and functional elevators.
10. Doorways to allow independent opening for wheelchair users.
11. Limiting the scope of the handicapper affairs offices to focus on a few of the major problems.

Implications of the Study

This study shares results which indicate to a university that special problems continue to exist for student wheelchair users. It suggests that needs assessments at a university may be important in determining what the priority problems are that exist and the best ways of alleviating them. If student wheelchair users currently perceive major problems in attending a university, then other handicappers (e.g., visually impaired, hearing impaired) may also experience problems which are significant to them and hamper their ability to attend a university.

This study also suggests that some of the modifications that have been completed are not adequate to meet the needs of student wheelchair users. Though the university may, for example, make some residence halls accessible to wheelchair students, many of these halls remain inaccessible therefore not permitting visitation by wheelchair users.

This study indicated several specific perceived problems by student wheelchair users which should be addressed more closely by the universities. These concerns include: snow removal, accessible student housing, accessible drinking fountains, accessibility to campus events, more assistance with self care tasks and overall greater accessibility to and within campus buildings. The data suggest that the handicapper affairs offices may be tending to focus on too many problems at one time and, therefore, are not doing an effective job of alleviating many of the major difficulties encountered by wheelchair users. It is suggested that the needs of the handicappers may be better met by determining what the priority needs are and then focusing on a few of the major problems rather than trying to address all of them.

Recommendations for Future Research

As a result of this study the following recommendations are made for future research:

1. A study to focus on the services currently provided by the handicapper affairs office at a university and the effectiveness of current programs may assist in providing better services to its handicapper population at the university. Are these offices tending to spread themselves "too thin" and not adequately meeting the majority of needs of handicappers at a university?

2. Formal needs assessments would be helpful with other specific disabilities to better determine problems encountered by these students at a university and assist in more adequately meeting their needs.
3. Many studies should be conducted to determine if correlations exist between several independent variables and perceived problems at a university by student wheelchair users. According to the results of this investigation, the independent variables that suggest strong correlations with perceived concerns include: sex, university attended, medical diagnosis, muscle involvement and locus of control.

APPENDIX A
INTRODUCTORY LETTER TO STUDENT
WHEELCHAIR USERS

18 Jan 80

Dear Wheelchair User:

I am currently a doctoral student at Michigan State University. I have gained acceptance from my doctoral committee regarding my proposed dissertation. The dissertation is centered around the perceived problems of wheelchair students at Michigan State University, The University of Michigan and Wayne State University. In essence, it is a "needs assessment" designed to identify and prioritize problems perceived by wheelchair users at these three major public universities.

My plans for data collection include mailing initial surveys to willing participants in the study to obtain general concerns. These surveys would be followed by a personal interview of approximately thirty minutes to an hour to clarify information obtained from the surveys and to assist in identifying the reasons for existing problems.

To increase validity of the study it is important to involve as many wheelchair users as possible who are attending these institutions. The handicapper services office at your university has consented to mail this introductory letter to all wheelchair students known to them at the university. I have not been given any names or addresses to maintain confidentiality of records and your individual privacy.

I would appreciate hearing from you as soon as possible in response to my request that you participate in this research effort. Research such as this is important if we are to improve current services offered to handicappers on campus.

Enclosed is a form to be returned directly to me via the self-addressed, stamped envelope if you would be willing to respond to a survey questionnaire and meet with me for thirty minutes. I hope to send out the initial survey in early February and would, therefore, appreciate a quick response to this request.

Thank you for your consideration in joining this research effort. I hope to be hearing from you soon.

Sincerely,

Ted King

APPENDIX B
CHARACTERISTICS OF WHEELCHAIR USERS
WHO PARTICIPATED IN THE STUDY

Total Number of Participants: 33

Sex: Males - 20 (60.6%)
Females - 13 (39.4%)

Age: Range - 18 years to 50 years
Mean - 27.53 years
Median - 26.5 years

University Attended:

Michigan State University - 8 (24.2%)
Wayne State University - 21 (63.6%)
The University of Michigan - 4 (12.1%)

Academic Major:

23 different majors listed from the 33 respondents.
One major was identified by 3 students - Guidance
and Counseling.

Six majors were represented by 2 students in each:

Finance
Accounting
Social Work
Political Science
Liberal Arts
Sociology

The remaining academic majors listed were only
represented by one student in each:

Electrical Engineering
Urban Problems
English
Computer Science
Business
Industrial Psychology
Industrial Engineering
Special Education
Psychology
Vocational Rehabilitation
Law
Architecture
Telecommunications
Social Service Administration
Mass Communication
Recreation

Two of the students did not list an academic major.

Academic Level:

Freshmen - 3 (9.1%)
Sophomores - 4 (12.1%)
Juniors - 8 (24.2%)
Seniors - 9 (27.3%)
Graduates - 9 (27.3%)

Medical Diagnosis:

Spinal Cord Injury - 18 (54.5%)
 Cerebral Palsy - 7 (21.2%)
 Polio - 2 (6.1%)
 Spinal Osteoarthritis - 2 (6.1%)
 Cerebral Edema - 1 (3.0%)
 Osteogenesis Imperfecta - 1 (3.0%)
 Neurological - 1 (3.0%)
 Muscular Dystrophy - 1 (3.0%)

Muscle Involvement:

Hemiplegia - 2 (6.1%)
 Paraplegia - 14 (42.4%)
 Quadriplegia - 13 (39.4%)
 No Response - 4 (12.1%)

Percent Use of Manual Wheelchair for Mobility:

<u>Percent</u>	<u>n</u>
0	5
1	3
5	3
50	3
80	1
95	1
99	1
100	16

Percent Use of Electric Wheelchair for Mobility:

<u>Percent</u>	<u>n</u>
0	20
1	1
13	1
25	1
50	1
95	3
99	3
100	3

Number of Years as a Wheelchair User:

Range - 1.2 - 30 years
 Mean - 8.44 years
 Median - 5.08 years

Number of Years as a Wheelchair User at a University:

Range - .3 - 8.5 years
 Mean - 3.34 years
 Median - 3.02 years

Operate a Motor Vehicle:

Yes - 19 (57.6%)

No - 14 (42.4%)

APPENDIX C
MULTIDIMENSIONAL HEALTH LOCUS OF
CONTROL INSTRUMENT

MHLC SCALE - FORM A

NAME: _____

DIRECTIONS: FOR EACH ITEM, CIRCLE THE NUMBER THAT REPRESENTS THE EXTENT TO WHICH YOU DISAGREE OR AGREE WITH THE STATEMENT. CIRCLE ONLY ONE NUMBER PER ITEM. THERE ARE NO RIGHT OR WRONG ANSWERS.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1. If I get sick, it is my own behavior which determines how soon I get well again.	1	2	3	4	5	6
2. No matter what I do, if I am going to get sick, I will get sick.	1	2	3	4	5	6
3. Having regular contact with my physician is the best way for me to avoid illness.	1	2	3	4	5	6
4. Most things that affect my health happen to me by accident.	1	2	3	4	5	6
5. Whenever I don't feel well, I should consult a medically trained professional.	1	2	3	4	5	6
6. I am in control of my health.	1	2	3	4	5	6
7. My family has a lot to do with my becoming sick or staying healthy.	1	2	3	4	5	6
8. When I get sick I am to blame.	1	2	3	4	5	6
9. Luck plays a big part in determining how soon I will recover from an illness.	1	2	3	4	5	6
10. Health professionals control my health.	1	2	3	4	5	6

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
11. My good health is largely a matter of good fortune.	1	2	3	4	5	6
12. The main thing which affects my health is what I myself do.	1	2	3	4	5	6
13. If I take care of myself, I can avoid illness.	1	2	3	4	5	6
14. When I recover from an illness, it's usually because other people (for example, doctors, nurses, family friends) have been taking good care of me.	1	2	3	4	5	6
15. No matter what I do, I'm likely to get sick.	1	2	3	4	5	6
16. If it's meant to be, I will stay healthy.	1	2	3	4	5	6
17. If I take the right actions, I can stay healthy.	1	2	3	4	5	6
18. Regarding my health, I can only do what my doctor tells me to do.	1	2	3	4	5	6

APPENDIX D

**QUESTIONNAIRE TO DETERMINE PERCEIVED
CONCERNS OF STUDENT WHEELCHAIR
USERS AT A MAJOR UNIVERSITY**

FOR THE FOLLOWING SET OF QUESTIONS CIRCLE THE NUMBER THAT REPRESENTS THE EXTENT TO WHICH YOU DISAGREE OR AGREE WITH THE STATEMENT. CIRCLE ONLY ONE NUMBER PER ITEM. THERE ARE NO RIGHT OR WRONG ANSWERS. IF A QUESTION DOES NOT APPLY TO YOU, SIMPLY LEAVE IT BLANK.

- 1 Strongly Disagree
2 Moderately Disagree
3 Slightly Disagree
4 Neutral
5 Slightly Agree
6 Moderately Agree
7 Strongly Agree

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
2. The doorways within buildings on campus are accessible to wheelchairs.	1	2	3	4	5	6	7
3. The various floors in buildings with more than one level are accessible to wheelchairs.	1	2	3	4	5	6	7
4. There is an accessible bathroom in campus buildings.	1	2	3	4	5	6	7
5. The physical arrangement within classrooms allows wheelchair accessibility.	1	2	3	4	5	6	7
6. The campus handicapper affairs office is aware of the majority of student wheelchair users' needs.	1	2	3	4	5	6	7
7. There are adequate sidewalks on campus to allow wheelchair transportation.	1	2	3	4	5	6	7
8. Curb cuts are available for wheelchair users on campus.	1	2	3	4	5	6	7
9. Alternate routes are available where sidewalk stairs present difficulty on campus for wheelchair users.	1	2	3	4	5	6	7
10. The campus terrain is flat enough so that hills do not create problems for wheelchair users.	1	2	3	4	5	6	7
11. There is adequate snow removal during the winter months to allow wheelchair usage.	1	2	3	4	5	6	7
12. The vehicles providing transportation for student wheelchair users have the proper equipment for easily handling wheelchairs.	1	2	3	4	5	6	7

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
13. There are an adequate number of campus vehicles providing transportation for student wheelchair users.	1	2	3	4	5	6	7
14. The method of scheduling for use of campus transportation services is adequate.	1	2	3	4	5	6	7
15. Campus transportation vehicles are generally punctual.	1	2	3	4	5	6	7
16. Adequate handicapper parking spaces are available on campus for use of personal vehicles.	1	2	3	4	5	6	7
17. Physical barriers are not a problem at the university in accomplishing registration of class procedures.	1	2	3	4	5	6	7
18. Adequate assistance is available to help with filling out class registration forms if necessary.	1	2	3	4	5	6	7
19. Physical barriers do not restrict the use of career counseling services for wheelchair users.	1	2	3	4	5	6	7
20. The career counseling services offered are adequate to meet the needs of student wheelchair users.	1	2	3	4	5	6	7
21. Physical barriers do not restrict the use of curriculum advising for proper classes and classload for wheelchair users.	1	2	3	4	5	6	7
22. The curriculum advising services offered are adequate to meet the needs of student wheelchair users.	1	2	3	4	5	6	7

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
23. Physical barriers do not restrict the use of personal counseling services for wheelchair users.	1	2	3	4	5	6	7
24. The personal counseling services offered are adequate to meet the needs of student wheelchair users.	1	2	3	4	5	6	7
25. Campus housing contains cafeterias which adequately meet the accessibility needs of wheelchair users.	1	2	3	4	5	6	7
26. Bathrooms within campus housing contain adequate space to maneuver a wheelchair.	1	2	3	4	5	6	7
27. The furniture and fixtures within bathrooms in campus housing are adequate to meet the needs of wheelchair users.	1	2	3	4	5	6	7
28. The space within campus living quarters (bedroom and study area) is adequate to maneuver a wheelchair.	1	2	3	4	5	6	7
29. The furniture and fixtures within campus living quarters (bedroom and study area) are adequate to meet the needs of wheelchair users.	1	2	3	4	5	6	7
30. Coin telephones at the university are accessible to wheelchair users.	1	2	3	4	5	6	7
31. Drinking fountains at the university are accessible to wheelchair users.	1	2	3	4	5	6	7
32. Elevator buttons at the university are within reach of a wheelchair user.	1	2	3	4	5	6	7

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
33. The handicapper affairs office at the university is generally meeting the needs of student wheelchair users.	1	2	3	4	5	6	7
34. Sports events are adequately accessible to student wheelchair users.	1	2	3	4	5	6	7
35. Concerts and other cultural events sponsored by the university are accessible to student wheelchair users.	1	2	3	4	5	6	7
36. Social functions (i.e., parties, special dinners, etc.) sponsored by the university are accessible to wheelchair users.	1	2	3	4	5	6	7
37. I feel the university as a whole is making a strong effort to accommodate the needs of student wheelchair users.	1	2	3	4	5	6	7
38. Adequate staff are available at the university to assist with tutoring needs for wheelchair users.	1	2	3	4	5	6	7
39. Adequate physical media (e.g., tape recorders) are available at the university to assist with needs of wheelchair users.	1	2	3	4	5	6	7
40. Adequate staff are available at the university to assist with note-taking when needed to meet the needs of wheelchair users.	1	2	3	4	5	6	7
41. Adequate health services are available at the university to meet the needs of student wheelchair users.	1	2	3	4	5	6	7

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Neutral	Slightly Agree	Moderately Agree	Strongly Agree
42. Physical barriers do not restrict the use of library services at the university.	1	2	3	4	5	6	7
43. Adequate staff are available to assist wheelchair users with use of the library services (e.g., book retrieval).	1	2	3	4	5	6	7
44. The services currently offered by the handicapper affairs office at the university are helpful to wheelchair users.	1	2	3	4	5	6	7
45. Adequate help is available to facilitate self care activities for student wheelchair users (e.g., dressing, hygiene, transfers).	1	2	3	4	5	6	7
46. The special services available at the university influenced my decision in attending.	1	2	3	4	5	6	7
47. Teachers at the university are generally sensitive to the needs of student wheelchair users.	1	2	3	4	5	6	7
48. I would recommend attendance at this university to other wheelchair users.	1	2	3	4	5	6	7

PLEASE LIST ANY OTHER CONCERNS YOU HAVE AS A STUDENT WHEEL-
CHAIR USER AT THE UNIVERSITY NOT ADDRESSED BY THIS QUESTION-
NAIRE:

APPENDIX E
TABLE OF MEANS FOR EACH
QUESTIONNAIRE STATEMENT

<u>Question</u>	<u>n</u>	<u>Mean</u>
1. The entrances to buildings on campus are accessible to wheelchairs.	33	5.333
2. The doorways within buildings on campus are accessible to wheelchairs.	33	5.606
3. The various floors in buildings with more than one level are accessible to wheelchairs.	32	5.156
4. There is an accessible bathroom in campus buildings.	32	5.313
5. The physical arrangement within classrooms allows wheelchair accessibility.	33	4.333
6. The campus handicapper affairs office is aware of the majority of student wheelchair users' needs.	32	5.344
7. There are adequate sidewalks on campus to allow wheelchair transportation.	33	5.576
8. Curb cuts are available for wheelchair users on campus.	33	5.909
9. Alternate routes are available where sidewalk stairs present difficulty on campus for wheelchair users.	31	5.677
10. The campus terrain is flat enough so that hills do not create problems for wheelchair users.	33	5.545
11. There is adequate snow removal during the winter months to allow wheelchair usage.	33	3.152
12. The vehicles providing transportation for student wheelchair users have the proper equipment for easily handling wheelchairs.	29	4.828
13. There are an adequate number of campus vehicles providing transportation for student wheelchair users.	29	5.448
14. The method of scheduling for use of campus transportation services is adequate.	28	5.036
15. Campus transportation vehicles are generally punctual.	26	5.308

<u>Question</u>	<u>n</u>	<u>Mean</u>
16. Adequate handicapper parking spaces are available on campus for use of personal vehicles.	32	4.031
17. Physical barriers are not a problem at the university in accomplishing registration of class procedures.	32	4.656
18. Adequate assistance is available to help with filling out class registration forms if necessary.	32	6.125
19. Physical barriers do not restrict the use of career counseling services for wheelchair users.	31	5.548
20. The career counseling services offered are adequate to meet the needs of student wheelchair users.	31	4.452
21. Physical barriers do not restrict the use of curriculum advising for proper classes and classload for wheelchair users.	32	5.156
22. The curriculum advising services offered are adequate to meet the needs of student wheelchair users.	32	4.969
23. Physical barriers do not restrict the use of personal counseling services for wheelchair users.	30	5.233
24. The personal counseling services offered are adequate to meet the needs of student wheelchair users.	29	4.586
25. Campus housing contains cafeterias which adequately meet the accessibility needs of wheelchair users.	26	3.923
26. Bathrooms within campus housing contain adequate space to maneuver a wheelchair.	29	5.103
27. The furniture and fixtures within bathrooms in campus housing are adequate to meet the needs of wheelchair users.	28	5.214
28. The space within campus living quarters (bedroom and study area) is adequate to maneuver a wheelchair.	29	5.241

<u>Question</u>	<u>n</u>	<u>Mean</u>
29. The furniture and fixtures within campus living quarters (bedroom and study area) are adequate to meet the needs of wheelchair users.	27	4.741
30. Coin telephones at the university are accessible to wheelchair users.	32	4.781
31. Drinking fountains at the university are accessible to wheelchair users.	32	3.750
32. Elevator buttons at the university are within reach of a wheelchair user.	33	5.000
33. The handicapper affairs office at the university is generally meeting the needs of student wheelchair users.	32	5.125
34. Sports events are adequately accessible to student wheelchair users.	30	3.800
35. Concerts and other cultural events sponsored by the university are accessible to student wheelchair users.	30	4.500
36. Social functions (i.e., parties, special dinners, etc.) sponsored by the university are accessible to wheelchair users.	28	4.393
37. I feel the university as a whole is making a strong effort to accommodate the needs of student wheelchair users.	33	4.879
38. Adequate staff are available at the university to assist with tutoring needs for wheelchair users.	27	4.407
39. Adequate physical media (e.g., tape recorders) are available at the university to assist with needs of student wheelchair users.	27	4.741
40. Adequate staff are available at the university to assist with notetaking when necessary to meet the needs of wheelchair users.	28	4.250
41. Adequate health services are available at the university to meet the needs of student wheelchair users.	30	4.367

<u>Question</u>	<u>n</u>	<u>Mean</u>
42. Physical barriers do not restrict the use of library services at the university.	30	4.182
43. Adequate staff are available to assist wheelchair users with use of the library services (e.g., book retrieval).	33	5.000
44. The services currently offered by the handicapper affairs office at the university are helpful to student wheelchair users.	32	5.313
45. Adequate help is available to facilitate self care activities for student wheelchair users (e.g., dressing, hygiene, transfers).	26	3.846
46. The special services available at the university influenced my decision in attending.	32	4.125
47. Teachers at the university are generally sensitive to the needs of student wheelchair users.	33	5.182
48. I would recommend attendance at this university to other wheelchair users.	32	5.375

BIBLIOGRAPHY

- Allan, W. Scott. Rehabilitation: A Community Challenge. New York: John Wiley and Sons, Inc., 1958.
- Anderson, S.B., Ball, S., Murphy, R.T., and Associates. Encyclopedia of Educational Evaluation. San Francisco: Jossey-Bass Publishers, 1975.
- Arneson, Kathleen C. "The Rehabilitation Act of 1973," The Social and Rehabilitation Record, Vol. 1, No. 1 (Dec.-Jan., 1973-74).
- Berdie, Ralph F. "Counseling for Physically Disabled Students," Journal of Higher Education, XXVI, No. 9 (December, 1955), 475-478.
- Berman, Jules H. "The Rehabilitation Act of 1973," Washington Bulletin, Vol. 23, Issue 21 (November 12, 1973).
- Biehl, G. Richard. Guide to the Section 504 Self-Evaluation For Colleges and Universities. Washington, D.C.: National Association of College and University Business Officers, 1978.
- Condon, Margaret, E. "Extracurricular Activities of Physically Handicapped Students," Personnel and Guidance Journal, XXXVII (September, 1958), 53-54.
- Condon, Margaret E. "Program Adjustments for the Physically Handicapped at the College Level," Personnel and Guidance Journal, XXV (September, 1956), 41-42.
- Condon, Margaret E. "Survey of Special Facilities for the Physically Handicapped in College," Personnel and Guidance Journal, XXXV, No. 9 (May, 1957), 579-583.
- Condon, Margaret E., and Lerner, R.S. "Rehabilitation Counselor in Higher Education," Journal of Higher Education, XXVI, No. 4 (April, 1955), 208-210.
- Denzin, N.K. The Research Act: A Theoretical Introduction to Sociological Methods. Chicago: Aldine Publishing Company, 1975.

- Eastmond, J.N. "Implementation of a Model for Needs Assessment in Higher Education," Dissertation for Ph.D., The University of Utah, 1976.
- Gollay, Elinor, and Bennett, Alwina. The College Guide for Students with Disabilities. Massachusetts: Abt Publications, 1976.
- Graden, Hank, et al. "The Campus Scene: Attendants Trained to Aid Handicapped Students," Journal of Rehabilitation, (November-December, 1973), 11-13.
- Kaufman, R.A. Educational System Planning. Englewood Cliffs: Prentice-Hall, 1972.
- Kerlinger, F.N. Foundations of Behavioral Research. New York: Holt, Rinehart, and Winston, 1973.
- Kloepping, Kent Burrell. "The Prediction of Academic Achievement of Physically Disabled Students," Dissertation for Ed.D., The University of Arizona, 1972.
- Lerner, Ruth S., and Martin, Marion. "What Happens to the College Student with a Physical Handicap," Personnel and Guidance Journal, XXXIV, No. 2 (October, 1955), 80-85.
- May, Barrie Jo, and Furst, Edward J. "Evaluation and Revision of an Inventory for Measuring Attitudes Toward Mainstreaming," Washington, D.C., Office of Education, 1977.
- Mistler, Sharon. "Planning for Implementation of Section 504 at Colleges and Universities," Washington, D.C., Rehabilitation Services Administration, March, 1978.
- "Overcoming Barriers to Higher Education." Regional Spotlight, Vol. XII, No. 2, Winter 1978.
- Phillips, Lone. "For Your Information," National Association of State Universities and Land-Grant Colleges, Circular No. 209 (February 3, 1978).
- Popham, W.J. Educational Evaluation. Englewood Cliffs: Prentice-Hall, 1975.
- Purdy, George D. "A Comparison of Handicapped College Students and College Students in General," Georgia University, Athens, March, 1967.

- Quatrano, Louis A. "Interrelationship of Disabled College Student's Attributes, Program Use, and Study Attitudes," Paper presented at the Annual Convention of the American Psychological Association (84th, Washington, D.C., September 3-7, 1976).
- Roth, Jane Elizabeth. "Theory and Practice of Needs Assessment With Special Application to Institutions of Higher Learning," Dissertation for Ph.D., The University of California, Berkeley Campus, 1978.
- Rusalew, Herbert. Guiding the Physically Handicapped College Student. New York: Teachers College, Columbia University, Bureau of Publications, 1962.
- Rusk, Howard A., and Taylor, Eugene J. Living With a Disability. Garden City, N.Y.: Blakiston Co., Inc., 1953.
- Scholoss, Irvin P. "Congressional News: Rehabilitation Act of 1973," American Foundation for the Blind: Washington Report, 1973.
- "Section 504 of the Rehabilitation Act of 1973: Fact Sheet." U.S. Department of Health, Education, and Welfare, Office of the Secretary, Office for Civil Rights, Washington, D.C., July, 1977.
- Simmons, Ron, and Maxwell-Simmons, Cassandra. "Principles of Success in Programs for Minority Students." Stevens Institute of Technology, Hoboken, N.J., 1978.
- "Special Needs Conference: Providing Educational Opportunity for All People." Flint, Michigan, October 16 and 17, 1975.
- "Special Services for Disadvantaged Students in Institutions of Higher Education Program: Application Information and Program Manual." U.S. Office of Education, Division of Student Special Services, Washington, D.C., 1970.
- Stern, Martin. "Handicapped Students Make Progress Acting on Own Behalf," Ann Arbor News, Michigan, September 19, 1973.
- Tait, David H. "Problems Perceived by Physically Handicapped Students Enrolled at Three Colorado Institutions of Higher Learning During the Spring of 1965," Dissertation for Ed.D., Colorado State College, 1965.

- Tucker, W.V., and Olson, R.E. "Some Experiences in Educating Physically Handicapped Students," Personnel and Guidance Journal, XXXXI (May, 1963), 803-807.
- Varghese, Joseph E. "An Investigation of Special Programs for Handicapped Students at Institutions of Higher Learning in Michigan with Special Emphasis on Three Major Public Universities," Dissertation for Ed.D., Wayne State University, 1978.
- Wierenga, Mary Ellen. "The Interrelationship Between Multidimensional Health Locus of Control, Knowledge of Diabetes, Perceived Social Support, Self-Reported Compliance and Therapeutic Outcomes Six Weeks After the Adult Patient Has Been Diagnosed With Diabetes Mellitus," Dissertation for Ph.D., Michigan State University, 1979.