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Andrews University

School of Education

**GUIDELINES FOR DEVELOPING A CAMPUS MASTER PLAN
DOCUMENT FOR SMALL COLLEGES
AND UNIVERSITIES**

A Dissertation

Presented in Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

by

Bradley Allen Jamison

1996

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APPROVAL BY THE COMMITTEE:

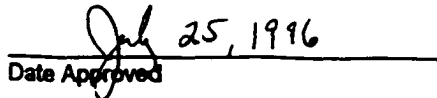

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ABSTRACT

**GUIDELINES FOR DEVELOPING A CAMPUS MASTER PLAN
DOCUMENT FOR SMALL COLLEGES
AND UNIVERSITIES**

by

Braley Allen Jamison

Chair: Edward Streeter

ABSTRACT OF STUDENT RESEARCH

Dissertation

Andrews University

School of Education

Title: GUIDELINES FOR DEVELOPING A CAMPUS MASTER PLAN DOCUMENT FOR SMALL COLLEGES AND UNIVERSITIES

Name of researcher: Bradley Allen Jamison

Name and title of faculty adviser: Edward A. Streeter, Ed.D.

Date completed: June 1996

Problem

From a review of dissertations in the field of campus master planning, no study was found that attempted to identify the essential elements, principles, configuration and format of campus master plans for guiding small colleges and universities in developing a master plan document. The lack of this type of study left a void in the campus planning process in regards to developing a campus master plan, its purpose, and how it contributed to the overall strength of a small college or university with little campus planning experience.

Method

This study identified two sources of information available in identifying essential elements, principles, configuration and format: the campus planning literature, and actual master plan documents. The first step was to review the literature for master plan document statements. Nineteen elements were identified along with varying sub-elements for each and listed according to their occurrence in literature. These elements were grouped together and termed the *typology*, which was used as the basis to synthesize data from actual master plans in order to test the presence of these 19 elements, plus identify other elements not included in the typology. The synthesis of the data found all 19 elements present to some degree in addition to one other element.

Results

A campus master plan document was developed from the summation of both the typology and the data master plans, globally representative. These results were organized to serve in a general sense for directing the composition, configuration and format of a campus master plan document. The intent of the study was serve as a guide or resource. Each institution will have unique features which would need to be incorporated into each institution's particular planning document. However, one objective of this research was that the document could be adaptable to different regions, cultures, and environments.

Conclusions

Campus master plan documents evolved over time and will continue to do so, partly because a document needs to be reflective of the local institution, situation, and needs. Any planning resource or materials used in the creation of a document need to be tempered by this purpose.

Most of the master plan documents created in the 1990s and beyond will be for existing campuses. Individuals involved in campus planning will be faced mostly with additions to existing conditions, correcting past mistakes, and attempting to have linear integration of different campus plans and efforts into a continuous process of past and present harmony, with the constant possibility of future expansion.

Campus master plan documents will need to be more of a loose-leaf and informal design, able to be updated and revised on a yearly basis. However, the overall themes of the plan need to remain consistent. The yearly updates reflect the changing dynamics of the institution, yet the long-range view of the document should not be radically changed by these.

Campus master plan documents have become increasingly shorter, possibly due to a higher percentage of colleges and universities contracting out master planning services to architects and consultants, usually with the charge of solving a particular problem. The resulting master plan documents, authored through these services, heavily reflected the problems needing solutions, without always keeping in view long range planning.

Finally, although this study focused on the campus master plan document itself, it was recognized that the planning process and the curriculum of the institution shape the document. The document is only a result or product of the process, and as such cannot be taken out of that context.

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CHAPTER I

INTRODUCTION, BACKGROUND, AND METHODOLOGY

Introduction

Campus planning is a process through which orderly and coherent evolution and growth of a campus and its facilities can occur. This process produces a campus master plan document, which in turn guides the proposed or desired development of the campus. Morley (1972) stated that functional educational facilities must be planned facilities. He felt systematic planning was necessary to document 'what is,' as a prerequisite to developing 'what should be' and found that the lack of a systematic method of planning led to the construction of inadequate educational facilities. Morley saw in some instances a direct relationship between the magnitude of a problem and the planning process: the greater the problem, the greater the lack of planning.

One major problem has been that, since 1963, rapidly expanding enrollments, followed by retrenchment in the late 1980s and 1990s, has left most small colleges and universities juggling to meet educational needs. Campus planning, as noted by Shaker (1984), was a tool to address these needs. His study, based on the premise that a university was a microcosm of society--a community within a community--involved in various complex and changing issues, agreed with Dober (1963), Pinnell and Wacholder (1968), and Morisseau (1964) that the practice of university campus planning enhanced the efficiency, cohesiveness, and economy of campus functions. It also provided the flexibility of short- and long-range campus needs and goals to change through review and evaluation. Campus planning could resolve many of the difficulties faced by educational institutions that lacked the comprehensive planning structure to provide order and coherence for growth or retrenchment.

Harbert (1968) and Dober (1963) also worked from the assumption that long-range, educational planning was essential to the orderly and efficient growth or retrenchment of an educational institution and its site. Dober, in 1963, felt not only that the order, coherence, and beauty of an overall campus form were missing in many campuses, but that buildings were constructed without an overall plan, which left the campus without form or flavor.

With campus planning—the tool used by educational institutions to direct change and growth in a responsible manner—the tangible evidence of the planning process was the campus master plan document (Barbour, 1973; Morris, 1984). The document's function was to express the results of the planning process in clear form. Keating (1988) observed the campus master plan as an overall guide to the future development of an organization or set of programs that was more than a description of an institution's future facility needs. The campus master plan's objective was to present schemes for the future development of campus facilities consistent with the institution's overall goals and philosophy, while maintaining a sense of orderly development of future buildings.

In a study on city master planning, Campbell (1963) found that a master plan could be an instrument to order and clarify the decision-making process. It could provide the basis for communication among the various organizations and groups involved, and it could encourage timeliness, rationality, and responsibility. Also, an underlying assumption of Campbell's (1963) study was that a physical planning program could not be implemented and adhered to unless the process included the continuing participation and approval of the community's primary agency of legal and elective authority—in the case of his study, the city council. Master plans reviewed and adopted by this authority served as official policy guides for decisions affecting physical development. Annual review and amendment maintained validity of the current plan. The preparation and maintenance of the master plan served to organize the work between staff and the planning commission. The plan was an instrument of communication between all bodies of authority in the institution. The master plan served the institution as a record concerning its problems, its policies, and its plans. It functioned as a reminder of the plans and helped resist momentary pressures that might detract from the overall long-range interests of the city. The master plan, thus, helped to keep the institution responsible to its constituents, while informing the community at large of its problems and achievements.

Pertaining to colleges and universities, Shaker (1984) found that a campus master plan documented their planned orderly, efficient, and coherent evolution and growth, illustrating the future, size, quality, and location of campus land uses and facilities. The campus master plan also helped replace academic slums and avoided creating new ones. It directed university growth, its scope of study extending beyond campus boundaries to encompass the surrounding areas. Its role included more than a definition of the physical plant; it articulated for a specified time frame the institution's philosophy and the goals defined as worthy of attainment, and translated them into more concrete and feasible objectives to better shape the campus. The master plan became a tool allowing administrators to make more immediate and responsible decisions. Finally, it was useful as an invitation to the alumni to donate

money. Dober (1963) referred to it simply as an honest search for a future providing continuity within change.

Background of the Problem

According to the literature, colleges and universities not having campus master plan documents has not been unusual. Klauder and Wise reported in 1929 that only one-fourth of the 200 leading colleges and universities surveyed in the U.S. had any type of general plan for orderly development. Thirty-five years later, Morisseau (1964) surveyed 831 institutions and still found less than 50% who had prepared a plan exceeding 5 years. Another survey (*Bricks and Mortarboards*, 1966) covering 45% of all degree-granting institutions confirmed Morisseau's study with the same findings. In addition it noted, "Even more serious than the shortsightedness of these plans is their narrow concentration on mere expansion, with little grasp of the dangers and opportunities that the future holds" (p. 165).

The literature indicated, however, more of a trend towards campus master planning. Leu (1985) reported that the Oregon State System of Higher Education (OSSHE) had a policy that every institution under the control of the State Board develop and adopt a master plan.

Planning Practices in Small Colleges and Universities

Studies on small private church-related colleges' and universities' planning practices revealed a greater lack of planning than among the leading institutions. Shand (1987) reported that "the evidence indicates that while individual institutions have developed good long-range planning systems, planning in church-related higher education seems to be generally not well-developed" (p. 60). One of the conclusions of Shand's (1987) study, based on Seventh-day Adventist institutions of higher learning, was that only a minority of these institutions had developed written assumptions that provided a frame of reference for planning.

Eagen (1980) exposed the inefficiencies of existing plans in a study on planning practices of institutions accredited by the American Association of Bible Colleges, comparing their planning practices with those recommended in literature. Eagen found that many of the institutions' facilities and financial planning bore little relationship to the planning literature. Eagen found from the respondents that: 30.5% had no written facilities plan; 30.5% had a plan projecting for a period of 2-5 years; 30.5% had a plan projecting for a period of 6-10 years; and only 8.5% had a plan projecting 11+ years (p. 248, Table 11). Eagen found that a significant higher percentage of these institutions with student enrollments of more

than 500 systematically and formally reviewed and evaluated their long-range campus master plan than did institutions with student enrollments of less than 500.

In a study of the planning process of private, fundamentalist, evangelical colleges, Godwin (1975) reported areas that the study highlighted as most important to these colleges' presidents in the planning process. The need for planning in the area of financial resources was perceived by the presidents to be of highest importance, with campus development (i.e., planning for the construction of the physical structure of the campus) the major planning concern. Godwin recommended that planning programs be expanded in these colleges.

Coats (1986) studied the impact of transition in small private church-related institutions as perceived by the institution's personnel. Coats found one implication for practice was that institutional master plans needed to be developed prior to initiating major change.

Research on Campus Master Planning

One reason for ineffective campus planning may be the inadequate resources for guiding the development of campus master plan documents. Studies reviewed for this research focused mainly on the *processes* of campus planning to the exclusion of the elements necessary. A search of doctoral studies failed to locate a study that focused on the campus master plan document itself for colleges and universities. Maryatt (1983), Andera (1980), Hodel (1977), Bohl (1974), Andrew (1972), and Morley (1972) studied processes of master planning, but these studies included only master plan document elements applicable to the school district level. Krefman (1989), Keating (1988), Shaker (1984), Eagen (1980), Godwin (1975), Ku (1972), and Hampel (1969) studied aspects of planning for colleges and universities, but referred to the planning document only in passing. However, on the master's level, Barbour (1973) wrote a thesis entitled, "A General Guideline to Develop Campus Masterplans for Small Existing Universities Through the Process of Long-Range Comprehensive Planning." Barbour's study provided a base on which to build this study.

Another reason for insufficient or ineffective campus master planning may have been the lack of research to guide colleges and universities in developing master plan documents. One of Andrew's (1972) conclusions (#1) in his study was, "A model Master Plan can be developed provided that criteria are predetermined and the components of the Master Plan are identified and described" (p. 401).

Statement of the Problem

Upon review of studies in the field of educational master planning, none was found that attempted to identify the essential elements, principles, configuration, and format of campus master

plans for guiding small colleges and universities in developing a master plan document. The lack of such a study has left a void in the campus planning process in regard to developing a campus master plan, its purpose, and how it contributes to the overall strength of a small college or university with little campus planning experience.

Purpose of the Study

The purpose of this research was to study existing campus master plan documents and the campus planning literature to identify their elements, principles, configuration, and format, in order to develop guidelines to aid small colleges and universities in producing a master plan document. The results of this research aimed at providing these institutions with working guidelines outlining the configuration and format of a master plan document which incorporated campus planning elements and principles found in this research.

Significance of the Study

Several studies mentioned the need for research in the area of campus master planning in addition to Andrew's (1972) conclusion. Miller (1991) conducted a perceptions study of three middle school groups (teachers, principals, architects) in the field of educational facilities planning, and recommended reassessing the existing planning and design processes. He challenged facilities research specialists to pursue new areas of research in order to build a knowledge base.

Shaker (1984) noted from the early 1970s that problems occurring in higher education institutions (inflation, recessions, funding cuts, decline in growth and enrollment) had diminished research in campus planning. Shaker remarked, at the time of his study in 1984, that no major publications in campus planning had been issued since Dober's *Campus Planning*, in 1963. Later that year, however, P. V. Turner's work, *Campus: An American Tradition*, was published.

Riddle (1987), in the process of his study of school facility evaluation models to determine their worth, discovered a void in the available literature relative to school facility planning, evaluation, and organization. Riddle concluded that the literature had been neglected and needed serious attention. In recent years Graves (1993), Dober (1992), and Gaines (1991) have expanded the field with their works.

It was concluded that a study on developing campus master plan documents might, at least, provide a knowledge base for small colleges and universities to develop a document. It was recognized that even though every situation was different, a campus master plan document could contain elements that could be adapted to various circumstances. The guidelines created from this study would do more than provide elements, it would also provide a knowledge of how other master plan documents formatted

their information. The main focus, however, was to identify the elements that the literature and data master plans had consistently included.

Leu (1985) stated that a campus master plan document should contain the elements and reflect the principles that should guide the arrangement of academic spaces, placement of buildings, program development, and restructuring. It should be shaped by such categories as campus boundaries, enrollments, density of buildings, and student housing. Because of questions as to specific areas needed for inclusion in a campus master plan, a study to develop a master plan document guidelines would further contribute towards the planning process knowledge-base.

Delimitations

This research focused on the campus master plan documents of small colleges and universities, and recognized that significant differences existed between these institutions and the larger state or private research universities. However, in some cases the larger institutions were the better sources of the data. The data used for this study consisted of a selection from the available campus master plan documents collected from three general sources: (1) documents through interlibrary loans; (2) documents obtained through contact with institutions; and (3) documents in the collection maintained by the Department of Educational Administration in the School of Education at Andrews University. This research focused on the campus master plan document itself, and made no attempt to add to the existing literature or body of knowledge on the processes of campus master planning.

The results of this study, the formulation of campus master plan document guidelines, were not intended to be a comprehensive inclusive authority. As Bohl (1974) stated,

Persons responsible for planning educational facilities should not rely exclusively on procedural guides, except where the guides present statutory provisions or legal procedures that must be followed. . . Each school has unique problems related to that particular situation and no guide can be so encompassing as to cover all situations (p. 131).

Methodology

Due to the lack of a study in the area of master planning that focused on the campus master plan document itself, no suitable existing methodology was established in the field for this type of study. In preparation for the study, a review of methodologies from dissertations in this field was conducted in order to develop an appropriate methodology. This review led to the selection and combination of appropriate methodologies from related studies into a process that would ensure accurate results in a proper scholarly procedure.

Related studies were compiled from a search of doctoral studies on the topic of master planning. The majority of these studies focused on state master planning documents, coordinating and integrating the various levels of higher public education, especially stemming from the rise of community colleges in the early 1970s. Twenty dissertations that seemed appropriate in providing some guidance for creating master plans were reviewed in greater detail. Of these 20, four were not applicable to the subject of educational master planning. The remaining 16 (see Table 1) provided varying degrees of usefulness: 8 of the dissertations were studies on statewide master plans for higher education, some in conjunction with community colleges; 4 were planning process studies focusing on various models; 1 was a study on a master plan for finance; 1 was a study on overall planning for small colleges; and 2 focused on college and university campus planning.

Review of Dissertation Methodologies

The methodologies of the selected dissertations were analyzed and the results are tabulated in Table 2. From this the categories discussed below emerged, organized according to their appropriateness for this study. In consultation with the committee chair, a methodology was designed from these sources for this study.

Professional literature review

All the dissertations included reviews of literature. However, some studies had specific purposes in their reviews. Alcantra (1979) developed a questionnaire from the review. Bohl (1974) reviewed manuals and guides from 38 states to develop an instrument. Bohl also included bulletins, pamphlets, brochures, and other publications from agencies on school facility planning and construction. Brennan (1990) created a survey based on the synthesis of planning literature, national studies, and other state-planning documents to establish a set of criteria. From a review of the literature and similar studies, De Broekert (1977) proposed certain guides for statewide planning. Donnelly (1973) reviewed literature on topics and issues in planning in order to develop a typology of the characteristics of a community college. Morley (1972) developed a planning cycle from the literature.

Typology

The term 'typology' was used only by Donnelly (1973), yet the concept was used by several others. Three studies specified either an instrument, typology, or model all of which seemed to apply to this category. Bohl (1974) developed an instrument based on the review of other state-planning guides. Donnelly (1973) developed a typology of 19 characteristics of a community college from readings in

TABLE 1
DISSERTATIONS USED FOR REVIEW OF METHODOLOGIES

Author	Date	Title
Alcantra, P. D.	1979	<i>A Study of Public Expectations in Master Planning at a Rural Public California Community College.</i>
Bohl, G. T.	1974	<i>A Procedural Guide for Planning Educational Facilities.</i>
Brennan, E. B.	1990	<i>Proprietary Education in Alabama: A Process for Involvement in Statewide Planning for Higher Education.</i>
De Broekert, C. M.	1977	<i>Elements of Master Planning for Public Comprehensive Community Colleges for the State of Oregon.</i>
Donnelly, B. L.	1973	<i>Criteria for Community College Role and Scope Specifications for Statewide Master Plans of Higher Education.</i>
Godwin, R. S.	1975	<i>Guidelines for Planning with Particular Emphasis Upon Private, Fundamentalist, Evangelical Colleges.</i>
Harbert, D. L.	1968	<i>A Proposed Master Plan for Public Comprehensive Community Junior Colleges for the State of Vermont.</i>
Hausle, E. A.	1976	<i>The Coordination of Tertiary Education and the Development, Adoption and Implementation of a Master Plan in South Dakota.</i>
Jones, R. A.	1968	<i>Guidelines for a Ten-year Master Plan of Finance for Small Private Liberal Arts Colleges.</i>
Keating, J. P.	1988	<i>Models for Campus Master Planning and Facility Development: A Comparative Case Study Analysis of Four Private Research Universities.</i>
Keough, T. F.	1973	<i>Planning in Higher Education with Emphasis on Ohio and the 1966 Ohio Master Plan for Higher Education.</i>
Ku, P. C.	1972	<i>Master Plan for Community Colleges in the Republic of China.</i>
Leu, Chin-Wen	1985	<i>Ten Years' Experience With the Oregon Experiment: An Analysis and Critique of a Campus Planning Process.</i>
Maryatt, S. L.	1983	<i>The Master Planning Model, A Framework for Change.</i>
Morley, H. N.	1972	<i>A Comprehensive Systems Approach to Master Planning for Educational Facilities.</i>
Shaker, S. S.	1984	<i>Anatomy of University Campus Planning and Student Housing—With an Emphasis on Students' Concept of Ideal Dormitory (Dormitory Design Criteria, Room, Zoning Patterns, Problems, Land Use, Arrangements).</i>

TABLE 2
 TYPES OF METHODOLOGIES USED IN REVIEWED DISSERTATIONS

Dissertations	Types	Survey Questionnaire or Instrument	Synthesis of Literature	Synthesis of Master Plans	Interviews	State Documents or Files	Other
Alcantra (1979)	Desc	x	x		x		x ^{1,2}
Bohl (1974)	Doc		x		x	x	x ³
Brennan (1990)		x	x			x	x ⁴
De Broekert (1977)		x ⁵	x	x	x	x	x ⁶
Donnelly (1973)			x	x			x ⁷
Godwin (1975)		x			x		
Harbert (1968)	Hist		x ⁸			x	
Jones (1968)		x					x ⁹
Keating (1988)	x ¹⁰				x ¹¹		x ¹²
Leu (1985)		x			x	x	
Morley (1972)	Doc		x				x ¹³
Shaker (1984)		x	x				
Hausle (1976)	Hist		x			x	x ¹⁴
Keough (1973)	Hist		x			x	x ¹⁴
Ku (1972)	Hist		x			x	x ¹⁴
Maryatt (1983)	Hist		x			x	x ¹⁴

¹Used descriptive statistics for external evaluation and assessment, and for projection of needs. ²Pilot study conducted. ³Instrument developed and sent to panel for review. ⁴Critique of instrument by panel. ⁵Surveys in education from other states. ⁶Observations and discussions with administrators of community colleges in state, and other experts in the field. ⁷Developed a typology of characteristics of a community college from readings in professional related literature, and discussion with experts and practitioners in the field. ⁸Includes a review of current research of community colleges in related areas. ⁹Created a model college as basis for study. ¹⁰Exploratory and descriptive analysis of each case. ¹¹Interview guide developed. ¹²Comparative study analysis of four private research universities. ¹³Development of a planning cycle. ¹⁴Most of these dissertations do not spell out a methodology. They are generally Historical/Documentary. The study immediately enters into the review of literature and documents.

professional related literature and discussion with experts and practitioners in the field. Jones (1968) structured a model college that he used to show methods of planning, preparing, and adapting a program budget for a 10-year master plan of finance. This model was formed on the basis of data received from a survey instrument sent to selected colleges. His entire study was completed on this model.

Campus master plans selection as data

Donnelly (1973) provided the precedent for selecting master plans as a data source. He requested sample statewide master plans for higher education from all 50 states. Twenty-eight master plans were returned. Of these only 11 master plans were adequate to serve as data for the final analysis.

Feasibility study

The feasibility study checked whether the typology was on track, and made necessary adjustments before conducting the data collection. Two studies conducted some form of feasibility testing. Donnelly (1973) conducted a feasibility test using the typology on one master plan before completing the analysis of literature and testing the other master plans. Alcantra (1979) conducted a pilot study.

Master plans synthesis

Donnelly's (1973) study also provided precedent for a synthesis of master plans. He analyzed the role and scope statements of each master plan, and developed a chart to use as a tool in ordering the categories. This chart included a list of each of the characteristics from the typology.

Measurement methods used

Some simple statistics were used in several studies to quantify theoretical aspects of master planning. Four studies used either some form of statistics, or mentioned statistics in the methodology. Alcantra (1979) stated in his methodology that descriptive statistics were used. Donnelly (1973) took statements from master plans if they pertained to any one of the 19 role and scope statements that constituted his typology. He listed the 19, ranked according to the number of occurrences he found in each of the 11 selected state master plans. The 19 traits were placed in three general groups: functions; institutional traits; and contributions. He created a table showing the mean and median of each group according to their frequency of appearance in the 11 selected master plans. Donnelly also made a quantitative analysis, including frequency counts, of each community college characteristic and a count of the number of master plans in which the characteristic was discussed. He presented a table listing the 19 characteristics with the number of times each was mentioned, and the number of plans it was

mentioned in. He made another table listing the characteristics, ranked according to the number of times each was mentioned, from greatest to least. He then made a table showing the mean and median of frequencies for each of the three categories, including all of the 19 characteristics. By comparing the means and medians of each category, he sought to explain by what categories a community college was best known. This quantitative approach also helped illustrate which individual characteristics were most commonly accepted.

Godwin (1975) also included a table listing the means for each of the five subcategories into which he divided his financial area. Interestingly, though Godwin's study had a financial focus, the category that he found ranked highest in importance was new buildings, facilities, and equipment, with a mean of 4.80. The other subcategories and their means were: sources of new income, 4.12; budget preparation and management, 3.16; general operation costs, 2.92; accounting, reporting, and auditing, 1.64 (p. 70).

Eagen (1980) divided planning into four categories: (1) philosophy and organization, (2) education, (3) facilities, and (4) finance. Eagen established a null hypothesis for each part which essentially stated that there existed no significant difference between the planning practice of the respondent institutions, and the planning practices recommended in the related literature. Ultimately he rejected his null hypothesis for each category.

Campus master plan document

The basis for developing a document from the results of the study had substantial precedence in campus-planning literature. Two studies specifically produced documents (or models) from their results. Harbert (1968) did a four-step study that constituted a proposed master plan for public, comprehensive, community junior colleges in the state of Vermont.

Keating (1988) studied models for campus master planning and facility development in his analysis of four private research universities: Northwestern, MIT, Rochester, and Pennsylvania. The purpose of the study was to determine the key processes each university used in implementing the campus master plans for their future facility development. Keating made comparisons across cases in order to develop an overall model. An inquiry structure was designed that identified critical variables in the campus master planning process as a basis for case analysis. By comparing across cases, two models were developed to serve as guides for master plan implementation.

Study Methodology

From the results of the review of methodologies, a study based on the following steps was conducted. The steps were developed from the categories reviewed previously, each chosen for its relevance and applicability to this research. They were divided into three stages.

Development of typology

Following this initial review of dissertations, a second search of related campus planning dissertations was made of background data for the formulation of a *typology*. Nine dissertations were found that seemed appropriate to contribute to a typology for a study on campus master plan documents, and are listed in Table 3. These, combined with a review of literature on topics and issues pertaining to campus planning, led to criteria for the creation of a typology for a model master plan document. Current articles, journals, and books on the topic of master planning, relevant to the context of this study, were useful in incorporating the most up-to-date methods in practice.

From the literature a campus master plan document typology was compiled as a measurement/integration guide for the evaluation of selected master plans. The purpose of the typology was to measure whether elements identified in the literature were present in actual master plan documents, and to integrate new elements into the typology that did not appear in the literature, but existed in the actual documents.

The typology was reduced to a table of categories and elements (see Appendix A). Elements present both in the typology and in the master plans were identified, with availability for the addition of new items where necessary.

Appropriate campus master plans for the study were selected, based on results of the review of literature and availability. A list of master plan documents from campus-planning research universities was compiled, along with key master plans identified in the review of literature, such as the 1962 classics, Bath University and Harvard University. A total of 20 campus master plan documents were selected for the study. Ten were on hand in the department of Educational Administration in the School of Education at Andrews University. These documents were obtained either by visitation to the respective institutions or developed at the University. Ten were obtained according to availability through inter-library loan. The criteria for choosing a document was those which were appeared as complete documents.

On completion of the typology, a feasibility was conducted, using some of the master plan documents selected for the study. Necessary adjustments to the typology were made. Then the typology was subjected to an interrater reliability test with final modifications made prior to the synthesis of the data.

TABLE 3
DISSERTATIONS REQUESTED FOR COMPILATION OF THE TYPOLOGY

Author	Date	Title
Andera, F. J. C.	1980	<i>The Development and Evaluation of a Model to Guide the Educational Facility Planning Process.</i>
Andrew, C. P.	1972	<i>The Development of a Model Master Plan for a Local School District With Applicability to a Selected School District.</i>
Dance, K. E.	1988	<i>The Impact of Master Planning on Institutional Effectiveness.</i>
Eagen, L. J.	1980	<i>Institutional Planning Practices in Bible Colleges Accredited by the American Association of Bible Colleges.</i>
Hampel, C. P.	1969	<i>A Study of Campus Planning at Selected Universities.</i>
Hodel, R. A.	1977	<i>A Guide to Operational Facility Planning.</i>
Krefman, M.	1989	<i>The Green Tree Campus of Michigan State University: 1968-1988 (Campus Planning).</i>
Miller, G. K.	1991	<i>A Comparative Analysis of the Importance of Middle School Building Characteristics to Teachers, Principals, and Architects.</i>
Neylon, T. B.	1991	<i>The Role of Educators in Educational Facilities Planning: A Case Study of the Planning Process (Facilities Planning, Campus Design).</i>

Synthesis of master plan documents

The synthesis of master plan document elements, principles, configuration, and format was conducted through the typology. The synthesis of these plans constituted the basis for the results in the findings, and the development of the campus master plan document. The occurrence, place, and function of master plan document elements were incorporated into the data findings. A table was developed showing the main elements found. The elements were ranked according to occurrences from most to least. Elements were categorized into groups, with means and medians for each group figured, and tables presenting the classifications.

Development of a campus master plan document

Campus master plan document guidelines were developed from the typology adjusted by the findings from the synthesis of the master plan documents. The guidelines were additionally reviewed by a campus planning expert (R. Dober) for comments and observations prior to the completion of the study.

The final result are guidelines that could serve in a general sense for directing the configuration and format of a campus master plan document. The nature of the study was for these results to apply only in this capacity, as a guide or resource. Each institution and locale will have unique features that were not part of these guidelines, but which would need to be incorporated into each institution's particular planning document. However, one objective of this research was that these guidelines could be adaptable to different regions, cultures, and environments. Figure 1; *Study Methodology*, graphically illustrates both the purpose of the methodology and its logical flow.

Organization of the Study

Chapter 1 builds a rationale and establishes the base for the research. It also outlines the methodology used in the study. Included in this chapter is an explanation of the procedures followed in the development of the typology and the synthesis of master plans, along with an indication of significant differences between the typology and/or between the master plans themselves.

Chapter 2 provides a review of professional literature, emphasizing the literature from 1963 to 1995. This chapter also gives a brief overview of the historical evolution of campus master plan documents along with an overview of the process of campus planning, a prerequisite to the creation of the campus master plan document. The foundation is set for chapter 3, which builds a typology of a campus master plan document from the literature.

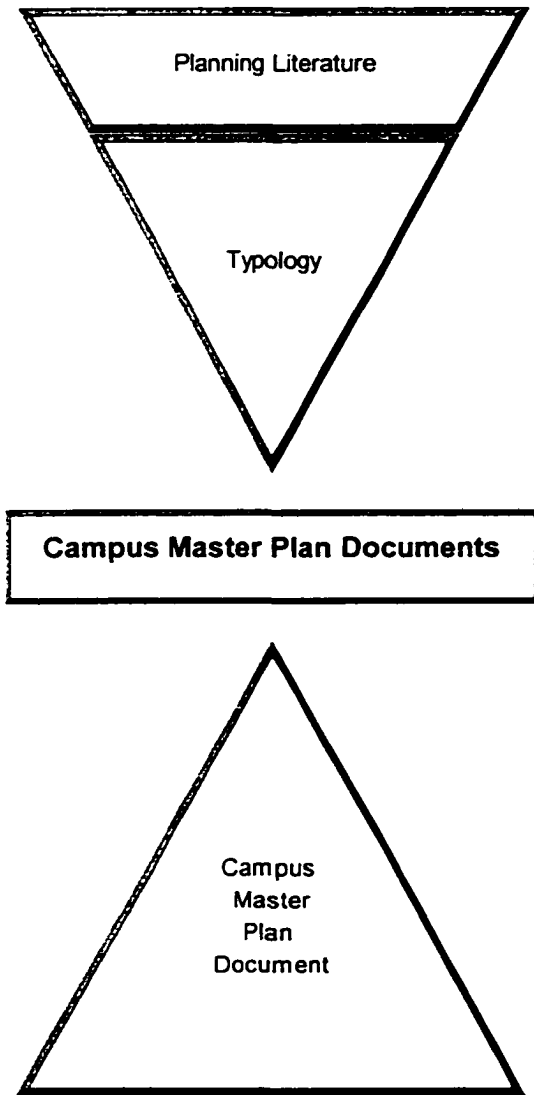


Figure 1. The methodology of the study.

Chapter 3 consists of the compilation of the literature typology to be used for the synthesis of the campus master plan documents.

Chapter 4 covers the collection of data, and discusses the findings resulting from the synthesis of the campus master plans.

Chapter 5 presents the findings in the form of a campus master plan document.

Chapter 6 closes the study with conclusions, recommendations, observations from R. Dober, and a statement of further areas of recommended research. Figure 2 provides a graphic view of the organization of this study.

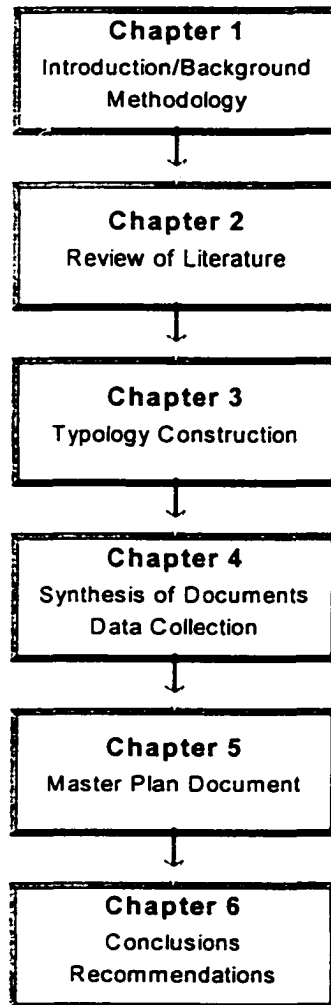


Figure 2. The organization of the study.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The term "master plan" is used in a wide context of environments. Even in the educational-planning context, the term "master plan" is still variedly used. Educational master plans include a wide range of documents, such as statewide higher education plans, campus master plans, community junior college plans, school district plans, academic plans, or even utilities master plans for a single institution.

The literature in this chapter was organized in order to achieve several points: First, to define the term 'campus master plan', second, to build the context in which a campus master plan is produced, and lastly, to lay a foundation for an exploration into the elements and format that comprised the campus master plan document. This consisted of several steps: (1) establishing the literature context; (2) presenting from the literature definitions of a campus master plan; (3) reviewing the historical progression of the campus master plan document; (4) outlining the process of campus master planning, which product is the master plan document; (5) identifying the people involved in producing the master plan document; and (6) the 'selling' of the final document.

Literature Context

The literature in the field of campus planning was not extensive (Riddle, 1987; Shaker, 1984; Keough, 1973). For this study literature was consulted from all available sources, including dissertations in campus planning, and ERIC papers. However, the 'bookends,' if this expression may be used, were Dober's 1963 landmark study, *Campus Planning*, and his most recent *Campus Design* (1992). In addition to the range of the study, works by Klauder and Wise (1929), Ackerman (1931), Larsen and Palmer (1933), and Evenden, Strayer, and Engelhardt (1938) were also consulted. The 'bookends' on the shelf of literature encompassed mainly the decades from the 1960s to 1990s.

Prior to developing the literature on the campus master plan document, the art and necessity of campus planning emerged from the literature as foundational pieces to the development of the campus plan.

The Art of Campus Planning

Dober (1992) observed campus design as the art of campus planning. It was the culmination of the processes and procedures that gave form, content, meaning, and delight to the physical environments of the campus. With the campus design being the art, the campus plan itself was the canvas, because it was the product of the campus planning process (Barbour, 1973; Morris, 1984). Dober (1992) believed that each campus, whether new or old, deserved to be "shaped by a plan that is responsive to its own realities, marked with its own distinctions, and guided by concepts that are as workable as they are attractive" (p. 3).

This belief, that a campus deserved to be shaped by a plan, had previously been noted by Larson and Palmer. Back in 1933 they observed that "the value of an adequate campus development plan cannot be overestimated" (p. 45). As an example, they pointed to the University of Colorado as one of a few institutions in the United States that had planned from the beginning the entire development of its educational plant and consistently kept its building program moving towards this goal. Their belief was, "In this age of long-range planning, no institution is in a position to jeopardize its future through a short-sighted program of campus development" (p. 69). Almost 60 years later, Gaines (1991) traveled across America visiting colleges and universities. In his book, *The Campus as a Work of Art*, he ranked the top 50 campuses he experienced according to four factors: (1) urban space; (2) architectural quality; (3) landscape; and (4) overall appearance. Stanford ranked first, Princeton second, Wellesley third, and the University of Colorado fourth, evidence that the plan at the University of Colorado provided stability and purpose through a period of unprecedented changes in higher education.

The Necessity of Campus Planning

Mayhew and Smith (1966) noted, "If communities never changed, there would be no need for the master plan since this is a document dedicated to the future and the changes it will bring. The need of such a planning document for a rapidly growing area is evident, but it is also important for the community experiencing little or no growth" (p. 15). *Occupations and Education* (1969) saw a great need for master planning at all levels of education. Graves (1993) perceived that too few schools were designed with future expansion in mind. Graves believed every school needed a master plan to accommodate changes in program and increases in enrollment. He also felt the opposite was often ignored. Skelly (1989) wrote, "Many schools can't anticipate when they are going to need something, in what order they are going to need it, or how much they can afford to spend on it. What you do in a master plan is develop something that helps structure these decisions" (p. 14). Kark (1986) put it succinctly, "For all the variable factors in campus planning, there is one absolute: needs will change" (p. 20).

Definitions in Literature of the Campus Master Plan

Prior to Dober's 1992 reference to campus design as the art of campus planning, Klauder and Wise (1929) termed campus planning itself an art, but also added that it was a science. *Planning Toward an Ideal* (1900-1989) defined the ultimate campus master plan as the concrete formula for a college to accomplish the physical part of its aim and ideal. But as literature revealed, this *formula* was somewhat of an inexact science.

In 1929, Klauder and Wise defined the campus master plan as "a general development plan" that was concerned with the placement of present buildings and designated sites for future ones. It coordinated everything into an integrated whole while permitting expansion of any separate unit. It was "conducive to beauty of the scene and architectural effect, to convenience of daily use and to economic and effective administration" (p. 23). They added that the details should be "left entirely open for future development," because they strongly believed that "a development plan should deal with things in the large, as a basis only, and no development scheme ever be adopted except 'in principle'" (p. 29).

By 1933, Larson and Palmer expanded the campus development plan to be "a summary of the growth of the institution to date and a comprehensive brief of future needs" (p. 46). An analysis of the institution was called for, outlining the educational objectives; the spiritual, social, and recreational needs of its students; and the future demands. Larson and Palmer saw the campus development plan as an embodiment of the ideal, but also a practical guide to the realization of that ideal, which could be a useful tool in eliminating waste and keeping cost factors under control. However, for the most part, prior to the post World War II baby boom, the campus master plan was viewed as a general document, "not so detailed that it will retard or discourage adaptations to future needs as they may develop" (Evenden, et al., 1938, p. 7).

By the late 1960s the campus master plan had evolved to an overall framework of guidelines and general planning factors with the purpose of facilitating continued "planning and development on a systematic and well coordinated basis" (*Occupations and Education*, 1969, p. 2). The campus master plan was seen not only as a guide, but as a blueprint for the total development of the campus, which could be used to direct resources for the continual development of the institution's facilities. More than just gathering data, the campus master plan evolved to a process that was never complete (Parker & Smith, 1968). From a general document the campus master plan developed into a "detailed blueprint for a school's growth or consolidation over a specified period of time" (Rosen, 1987, p. 52).

Why a Master Plan? (1960-1969) elaborated further this blueprint as "an action plan for growth and includes: (1) verbal statements of philosophy, goals, educational program, enrollment projections,

completion schedules and costs; and (2) graphic statements of the campus location, size, form, appearance and environment" (p. 4). Castaldi (1987), agreed in general terms, "the campus master plan should advance the achievement of educational goals of the college or university and promote its research and service programs" (p. 317). Ellison and Smith (1987) reiterated that the campus master plan could be viewed as an "explanation of the institution's educational and operating philosophy, an analysis of its current condition and a description of major changes that it will seek to implement during its intermediate to long-range future" (p. 6).

One aspect seemed obvious, a view to the future was a key element of the campus master plan. The Council of Educational Facility Planners International (1991) stated that campus master planning "is a way of identifying the best route to the future through a workable plan for handling priority-rated, predictable situations and anticipated changes. A master plan defines ultimate goals and the facilities required to help achieve the goals" (p. C10). Additionally, the campus master plan "provides a clear and orderly plan of action for future expansion of facilities within the limits of the financial resources of the institution" (Castaldi, 1987, p. 318). The campus master plan provided a carefully drawn document, which guided through a series of steps the future action of those responsible in linking the present with the future (Castaldi, 1987).

As literature demonstrated, the definition of the campus master plan changed over time. This may have been partly due to the changing role it played in historical institutional development. A historical review of the evolution of the campus master planning set the context of the campus master plan, and its definition.

Historical Background of Campus Planning and the Campus Master Plan Document

In the introduction of *Campus Planning: Redesign-Redevelopment-Rethinking* (1983) it was stated that the best legacy a college president could leave behind was a "well formulated master plan which provides a predictable blueprint for the future" (p. ii). As noted above, what constituted a well-formulated campus master plan had changed over time. Castaldi (1987) observed that to some college planners, "the master plan is simply a site plan of the campus showing the main malls and the location of existing and future buildings" (p. 317). He commented that this rather narrow approach covered only a small segment of the long-range planning, which by 1987 was normally associated with an institution of higher learning. Dober (1992) remarked:

Once upon a time, a noble air-view of the campus (as it might be) would give focus and inspiration to campus development through a dramatic rendering (informed by a few

and drawn by the anointed). Whatever their merits might have been, plans thus articulated in that fashion would be judged and dismissed as folly, fancy, or expedient schemes. (p. 253)

A brief historical overview of campus planning and the development of campus master planning revealed that the campus master plan had its beginnings as an aerial-view architectural drawing, showing location of existing and/or future buildings.

According to Turner (1984), campus planning in America has had a long and full history, and has existed from the earliest period. Historians of American higher education, according to Dober (1992), have organized this development into four general time frames. The first began during the colonial college period prior to the Revolutionary War. The second continued with the expansion of the college (post-Revolutionary War through the Civil War). The third period was the growth of the University after the Civil War, and the fourth was the broadening of the base of higher education. In addition to these American periods, the foundational period of medieval colleges was included as the germinal period from which campus planning evolved.

The Medieval Colleges

No campus existed in the medieval universities nor was one needed. Teaching masters rented lecture rooms and students lived in hostels or inns. With the rise of the chantry movement in England, several colleges were funded and endowed with the purpose of supporting scholars, who, in addition to the pursuit of their studies, took time each day to pray for the souls of the endowers. Most students, however, lived in academic halls, which were usually townhouses or inns converted for that use. Each hall had a specific academic specialization, but also provided room and board for the students (Penner, 1991).

One academic hall has survived to present, but most of the academic halls gave way to the endowed colleges. However, the early concept of the collegiate quadrangle (considered the point of departure for campus planning) seemed to have appeared both by accident and circumstance (Penner, 1991). Land being scarce, buildings were built around the edges of the property to conserve land and for protection, but also to have a better means of controlling the students (Turner, 1984). New College may be the first example of a planned college although no remaining plans have been found. Unlike other previous colleges, such as Merton, which added buildings as needed, New College (ca. 1400), having no existing structures, "was not only planned on a grand scale but it was completed in six years" (Penner, 1991, p. 6). New College became the "magnificent model for future college founders at Oxford and Cambridge, and inspired a host of later architects and college planners with a vision of a planned college" (Penner, 1991, p. 8).

The Colonial Period

Although the medieval colleges were the precursors to American higher education, almost from the beginning the American institutions set on a different course from their English roots.

Several things are significant about the colonial American rejection of the English quad. First, it was conscious. . . . Second, there were reasons for the rejections, reasons having to do with new ideas about what a college should be, about its relationship with the community around it, and about American values and ideals. And third, the rejections established the basic pattern of the American campus plan from then on—a plan that has typically consisted of separate buildings set in a landscape in an open and extroverted manner, in sharp contrast to the inward-turning closure of the English pattern. (Turner, 1987, p. 3)

From that point on, when colonial American colleges were mentioned by historians at all, they were considered to be largely unplanned or simply poor reflections of the British colleges at Oxford and Cambridge (Turner, 1984).

Turner (1984) outlined several principles that determined the evolution and growth of American colleges. First, was the decision to locate them on the frontier rather than in the cities. Second, first applied by Harvard, was the belief that higher education was only effective when students ate, slept, studied, worshiped, and played together in a tight community. Third, which set a pattern for American colleges, was the creation of separate buildings, rather than the linked structures of English colleges. Turner concluded that the early Harvard physical layout was the result of conscious and long-range planning, rather than simply a haphazard response to needs as they arose. In 1672 a wholesale reorientation and rebuilding program was begun, taking several decades to complete, which revealed a controlling design or master plan. "In the next several decades, all construction at Harvard was in fact directed toward the completion of this master plan" (p. 28). Turner interestingly pointed out,

In the colonial period, the president or trustees of a school usually determined the placement and overall form of new buildings and left the details of their design to a master builder. After the Revolution, the design of college campuses and buildings increasingly was given over to architects—either true professionals, such as Benjamin Henry Latrobe and Joseph-Jacques Ramée, or talented amateurs such as Thomas Jefferson. (p. 53)

Post-Revolution

It was at Yale, in 1792, that James Hillhouse, treasurer of the college, consulting with John Trumbull, devised a new plan for the school and raised the funds for its completion. Trumbull produced two sheets of plans that reinforced the concept of alignment of buildings, and in the process constituted probably the oldest surviving master plan for an American college (see Figures 3 and 4). Trumbull's site plan also revealed a strong interest in landscaping. It showed rows of trees around rectangular lawns, and a large area laid out with meandering paths and irregular beds of planting. This plan was probably



Figure 3. Master plan for Yale, drawn by John Trumbull, 1792.

(Note. From *Campus: an American tradition* (p. 42), by P. V. Turner, 1984, Cambridge MA: The Architectural History Foundation/MIT Press.

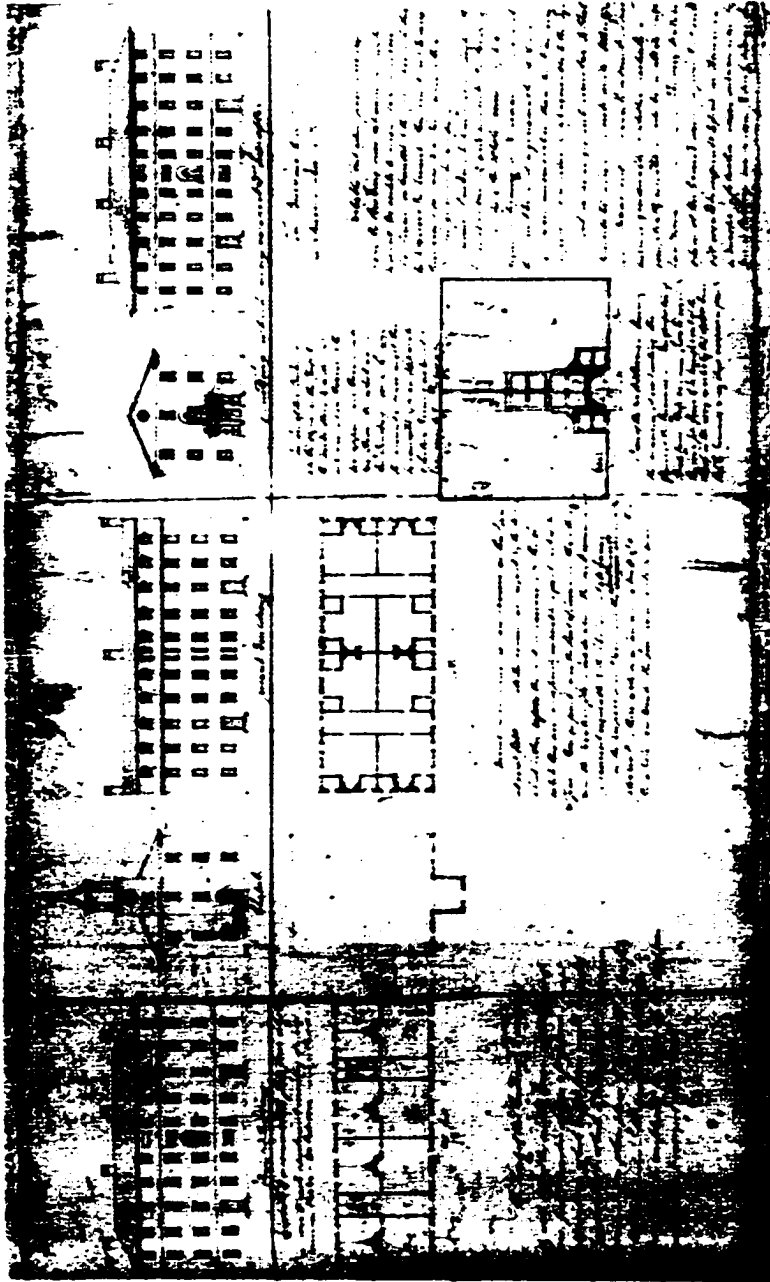


Figure 4. Trumbull's master plan for Yale.

(Note. From *Campus: an American tradition* (p. 43), by P. V. Turner, 1984, Cambridge MA: The Architectural History Foundation/MIT Press.

the first instance in American college planning where a master plan was devised to be visually satisfactory at every stage of its execution (Turner, 1984).

It was also during this time that the term *campus* was coined to describe the open space between Nassau Hall and the road at Princeton. The word since has evolved significantly in meaning.

When it was first used to describe the grounds of a college, probably at Princeton in the late eighteenth century, *campus* had simply its Latin meaning, a field, and described the green expansiveness already distinctive of American schools. But gradually the word assumed wider significance, until at most colleges it came to mean the entire property, including buildings. . . . *Campus* sums up the distinctive physical qualities of the American college, but also its integrity as a self-contained community and its architectural expression of educational and social ideals. (Turner, 1984, p. 4)

In 1812 campus planning began to involve architects more. Harvard hired Charles Bulfinch to design a building, determining aspects of "form and the site"—design features that college authorities had until this time handled (Turner, 1984, p. 60). The Harvard trustees specified to Bulfinch that his building design have reference to buildings that may be built in the future, in other words, to create a master plan. Bulfinch produced at least three plans (see Figures 5 and 6).

By 1813 Ramée produced the most ambitious college plan of that time. Dober (1963) called it the "first realized campus plan in the United States" (p. 19). Interestingly, a graduate of Union College found, browsing through an old print shop in Paris in 1890, the plan for the buildings and grounds of Union College prepared by Ramée (Klauder & Wise, 1929). Although partially executed, the plan still forms the core of Union College's (Schenectady, NY) campus. This school, along with Jefferson's University of Virginia, epitomizes the early American visionary collegiate dreams (Turner, 1984; see Figure 7).

American collegiate planning was considered to have begun around 1800 with Jefferson's plan for the University of Virginia (see Figure 8). In Dober's (1963) estimation "Thomas Jefferson was the most extraordinary master planner in American education" (p. 21). Jefferson, more than designing the plan of the University of Virginia, also selected the site, supervised the construction, wrote the specifications, devised the curriculum, served as Rector, and later on the Board, in what Jefferson endearingly referred to as the "child of his old age" (Frary, 1931, as cited in Dober, 1963, p. 21). Critics found Jefferson's campus plan commendable for the rational form it gave to the educational program, and its consideration of site and functional arrangements. It added variety within a singular form, and provided good answers to fire and contagious disease, which were a big problem in many Colonial colleges, all within Jefferson's ideal of a campus appropriate to an "academical village" (Jefferson, personal correspondence to L. W. Tazewell, January 5, 1805, and to Hugh L. White, May 6, 1810). Turner (1987) viewed this period's planning ideal as creating order and symmetry to the greatest degree possible. Union College in New York and Washington

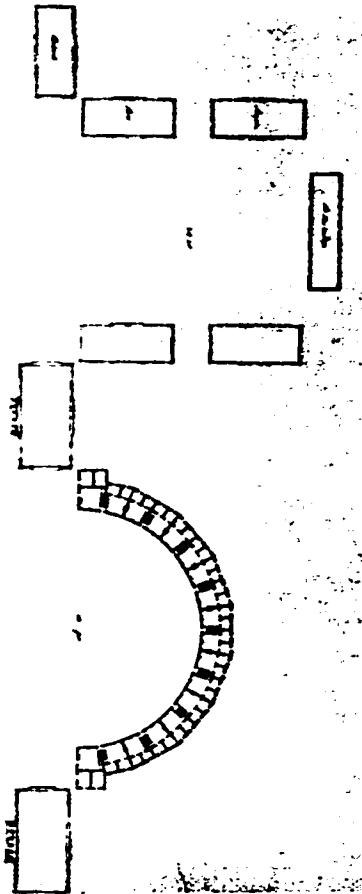


Figure 5. Master plan for new buildings at Harvard, probably by Charles Bulfinch, 1812.
(Note. From *Campus: an American tradition* (p. 61), by P. V. Turner, 1984, Cambridge MA: The Architectural History Foundation/MIT Press.

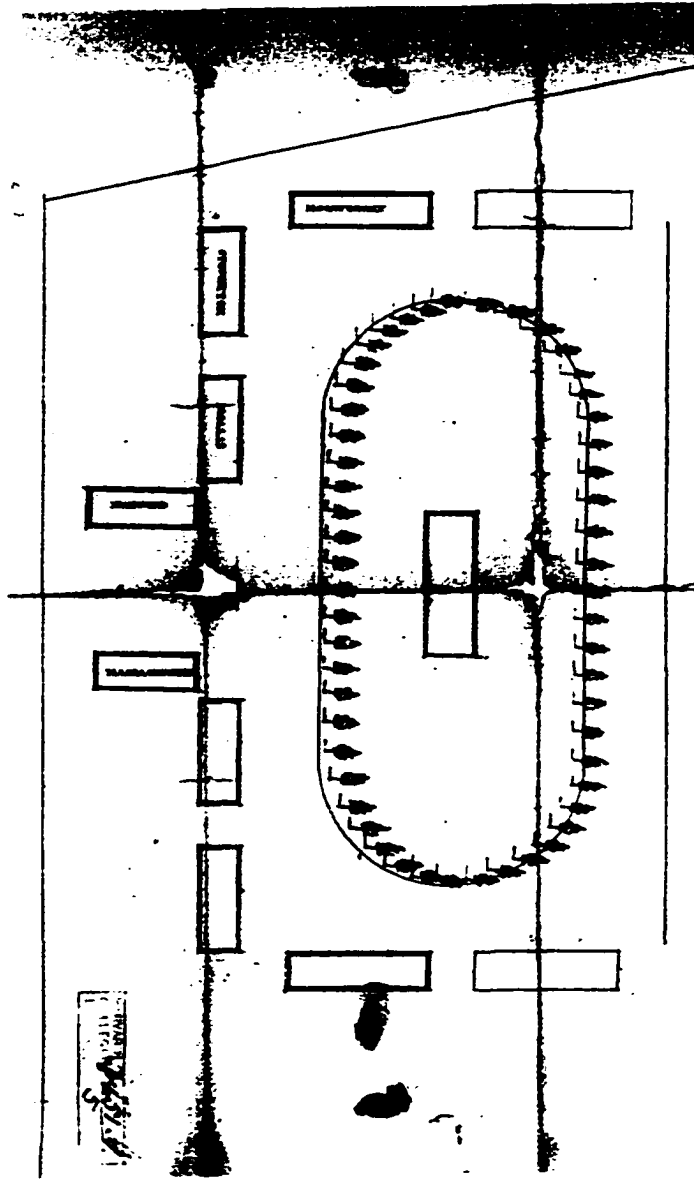


Figure 6. Master plan for new buildings at Harvard, by Charles Bulfinch, 1812.
 (Note. From *Campus: an American tradition* (p. 62), by P. V. Turner, 1984, Cambridge MA: The Architectural History Foundation/MIT Press.

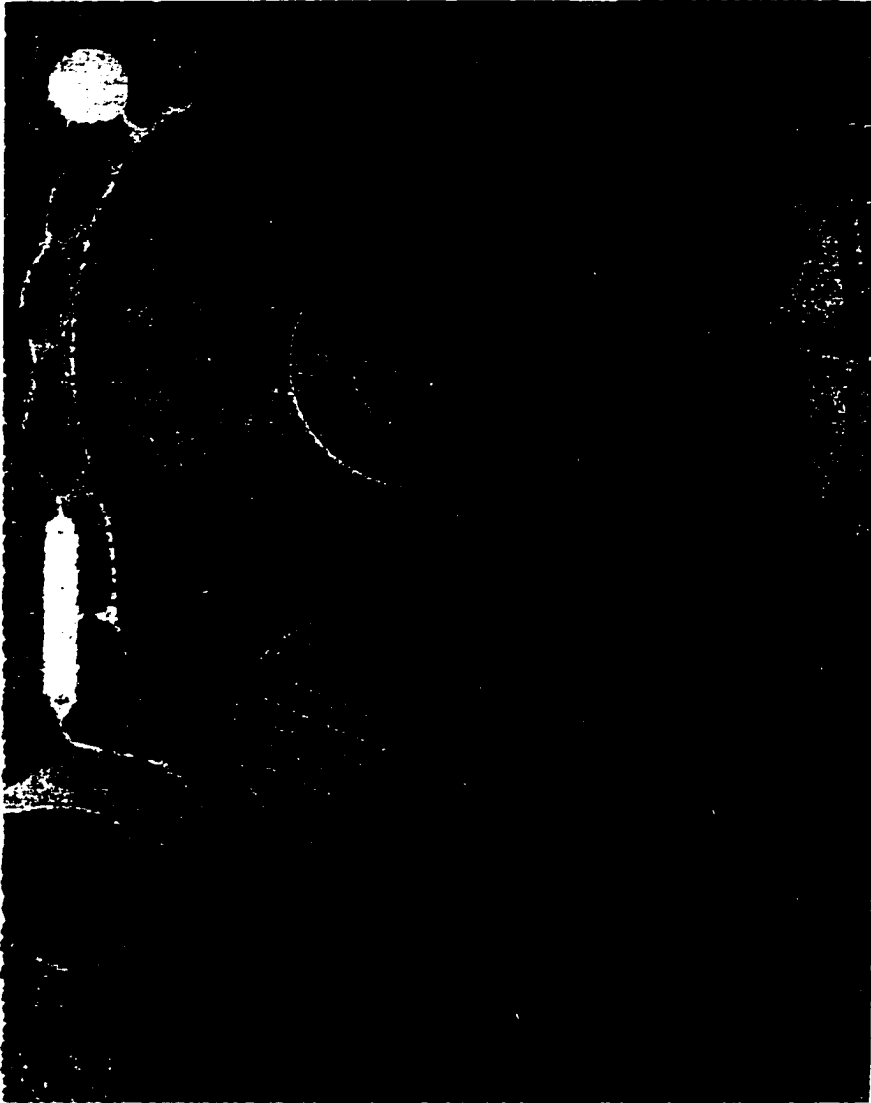


Figure 7. Ground plan of Union College, by Joseph-Jacques Ramée, 1813.
(Note. From Joseph Jacques Ramée and the buildings of north and south college, by C. Hislop and H. A. Larrabee, 1932, *Union Alumni Monthly* 24(4) reprint, n.d.

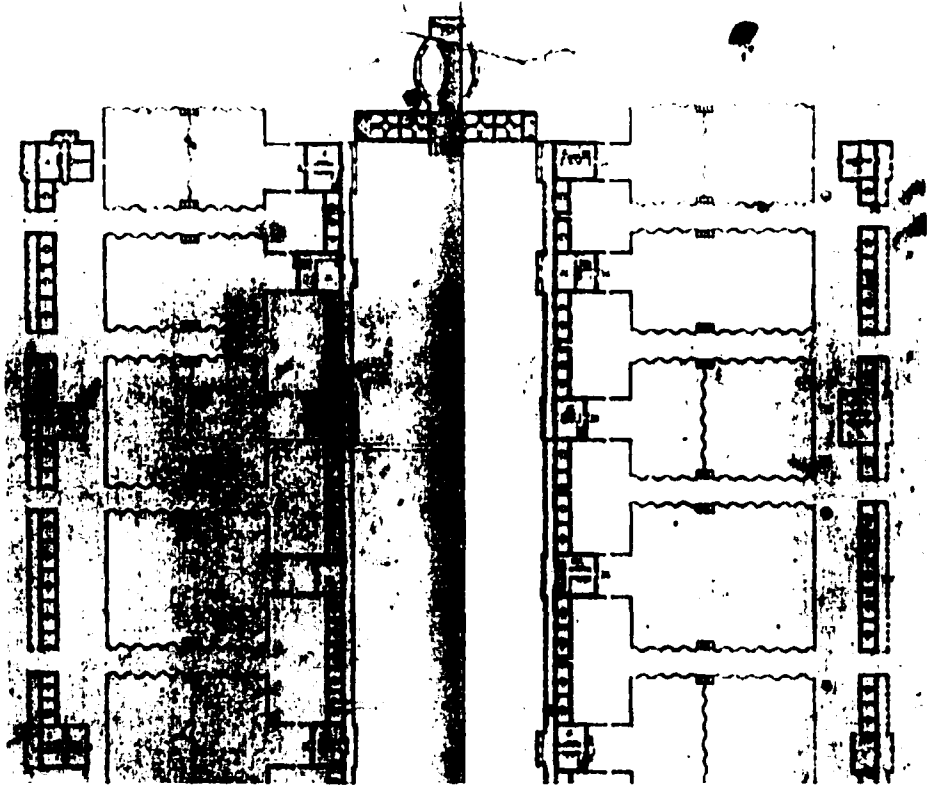


Figure 8. Jefferson's design, University of Virginia.

(Note. From *The lawn: a guide to Jefferson's university*, (p. 15), by P. Hogan, 1987, Charlottesville, VA: University Press of Virginia.

and Lee in Virginia were good examples of this planning. At existing schools at the time, "planners often attempted to reshape the campus plan to meet this ideal" (p. 25).

By the middle of the 19th century, the Grand Plan became common. Schools would hire architects to produce ambitious master plans. These plans had little chance of being fulfilled, and stood in contrast to the more realizable plans of Jefferson, Ramée, Trumbull, and Bulfinch (Turner, 1984).

In 1862 the Land Grant College Act was passed and the elitist quality of higher education became more democratic. Flexibility began to appear as an important quality in plans. Frederick Law Olmsted set a new planning ideal of colleges as people centered--irregular and picturesque arrangement of buildings in a rural village or park-like setting, a stark departure from the rigid quadrangles (Turner, 1984; see Figure 9).

Post Civil War

In the late 19th century the American university began to evolve. Following somewhat the German university model, an American system soon developed. In contrast to the 'rural village,' the new university was viewed as a city and adopted the Beaux-Arts system to create its physical form. The university was referred to as the 'City Beautiful.' The University of Chicago and Stanford University, two new universities, embodied in many aspects this new trend (see Figure 10). At this time a good master plan became especially important, because of the complexity of the university in contrast to the two or three buildings of earlier colleges. Now, libraries, laboratories, lecture halls, gymnasias, administration buildings, dining halls, and clubhouses needed to be tied together from disparate elements together in a general unifying effect with visual harmony and order. Campus master plans, called to unify the campus artistically, were created under the assumptions that an architect drew the plan, and the school followed it faithfully. It was soon evident that schools tended to depart from the plan no sooner than it was finished. Nonetheless, even though having a plan did not guarantee its completion, it provided an intelligent point of departure, and its mere existence did more to ensure its realization than a lack of one (Turner, 1984).

The Stanfords commissioned Shepley, Rutan, and Coolidge, in 1886, to develop a comprehensive plan for their name-sake university, which is believed to be the first produced for any American institution since Jefferson's plan for the University of Virginia (Klauder & Wise, 1929).

The problem of existing campuses was one of chaos in the placement of buildings. Some schools had gone through the transformation from formal to informal to formal, with the changing trends resulting in buildings that were placed haphazardly without order. This called for a comprehensive or development plan,

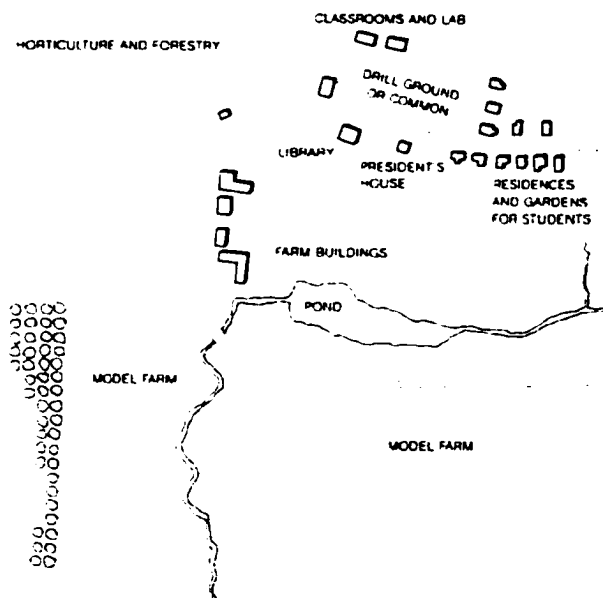
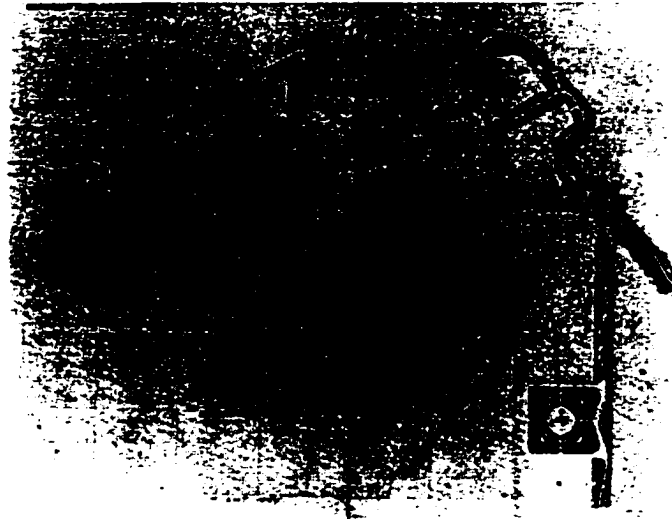


Figure 9. Plan for the UC-Berkeley & UMass, by Olmsted, 1866.

(Note. From *Campus: an American tradition* (p. 143), by P. V. Turner, 1984, Cambridge MA: The Architectural History Foundation/MIT Press.

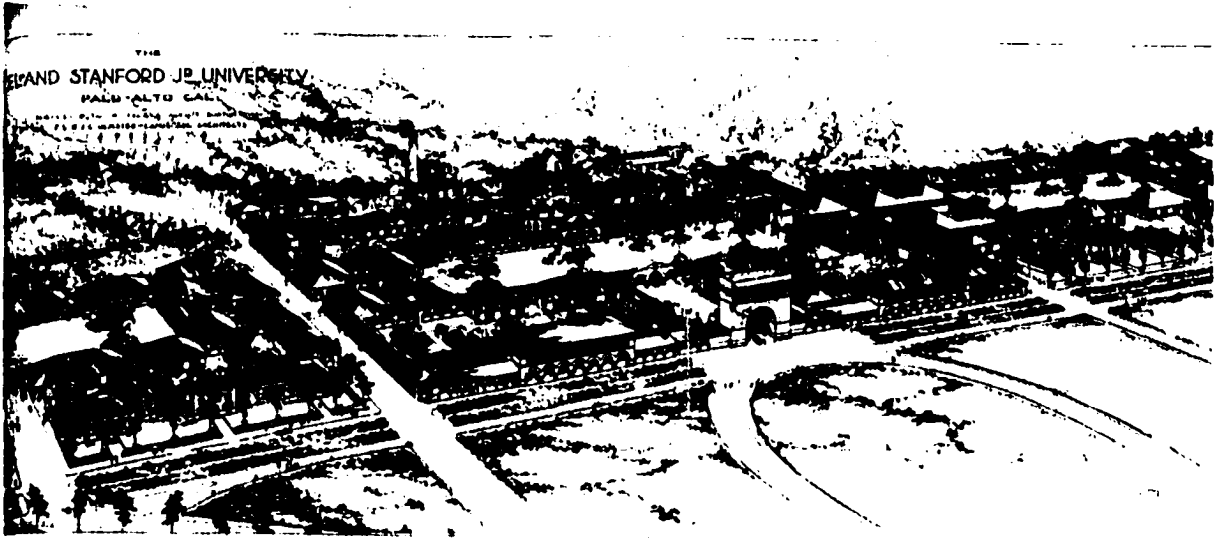


Figure 10. Master plan of Stanford University, Olmstead & Coolidge, 1888.
(Note. From *Campus: an American tradition* (p. 173), by P. V. Turner, 1984, Cambridge MA: The Architectural History Foundation/MIT Press.

development plan, a basic component of college planning in the 20th century, to see the orderly demolishing of 'obsolete' or 'impractical' buildings, and the erection of new ones (Turner, 1984).

In the early 20th century there was a reaction to the large university. Collegiate values of seclusion and separation came in vogue again, and with that came the appearance of the English quadrangle. Until this time the quadrangle had not greatly influenced American campus planning. Princeton, under the influence of its president, Woodrow Wilson, and architect, Ralph Adams Cram, undertook a major physical replanning effort coordinated with the collegiate ideal of enclosed quadrangles.

By 1929 Charles Klauder, one the architects who designed for Princeton and later became a well-known college planner, published his book *College Architecture in America*, one of the first in the field, which showed the increasing acceptance and usefulness of master plans, development plans, and college planning in general (Turner, 1984).

Post World War II

What influenced college planning the most after World War II was the extraordinary increase in enrollments from the years 1945 to 1975, unparalleled in recorded history (Dober, 1992). Planning for growth and change became more important than traditional concepts of campus form. Projections of future enrollments became a major preoccupation for planners. The *Society for College and University Planning* was founded in 1965, making college planning a distinct profession (Dober, 1992; Turner, 1984). With the growing emphasis on functionality and flexibility of planning, the idea of a master plan that predetermined the position and form of buildings was challenged. "The master plan (fixed and static) gave way to the campus plan (flexible and dynamic). Process and plan became interdependent" (Dober, 1992, p. 5). New plans were called for which would reflect the progressive principles of education, preservation of the natural beauty of the landscape, and be informal rather than institutional or monumental. A problem that arose in the modern institutions was how to fit into the traditional campus format the bulky, irregular buildings modern education required. The new thinking, displayed by Frank Lloyd Wright, was to make separate buildings more important than an overall system of order (Turner, 1984).

At this stage, planners abandoned the ambitious master plan in favor of establishing principles for future growth. The process of planning became more important than the final form. This resulted not only from the unpredictability of future growth, but also because formal master plans were seen too often as unrealistic and almost impossible to fulfill (Turner, 1984).

Efforts and Problems from the Mid-70s On

By 1976 a more comprehensive approach to university and college planning had evolved, recognizing "that because physical planning is so closely related to academic planning, the two cannot be separated" (Brewster, 1976, p. 10). As Weber and Fincham (1974) noted,

The old fashioned master plan was seldom more than a physical plan, a landscape architect's dream of how to site buildings and shape terrain to create impressive aesthetic effects. Contemporarily, however, the master plan is a complicated compendium of the school's educational philosophy, academic programs, administrative structure, kind and number of students served, rate of growth, and only lastly, the facilities that it will need to accomplish these goals. (p. 376)

In the 1980s the problems in campus planning were very different from those of the 50s and 60s, an era of fantastic growth. The key elements had become building infill and addition, providing for handicapped accessibility and deferred maintenance. Older buildings were remodeled to be more efficient as well as meet new fire, life safety, and energy code requirements (Johns & Schuster, 1983). Schmidtlein and Milton (1988-89) noted that planning since the late 60s had generally been advocated as essential for maintaining institutional health and vitality during what had been norm in this era: changing demographic and fiscal conditions.

In retrospect, Biehle (1991) observed that a campus master plan seemed to be demanded most often when a college or university was going through expansion, a change in academic emphasis, a shift in student clientele served, or a leap forward in quality—or, as was necessary, in planning a new college or a new location for an older college. The question he posed is also one of interest to this study, "Why, when a college or university spends money to create a master plan for its future, does it so seldom follow its guidelines?" (p. 22). In part, he answered the question himself with various reasons ranging from "a change of president or failure to involve faculty, students, and staff in the sculpting of the plan to weak permissive leadership or a poorly crafted plan" (p. 22). Biehle's reasons fell in two general categories: people and process. The Council of Educational Facilities Planning, International (CEFPI, 1991), reinforced this reasoning. "A successful campus planning program requires two basic components, namely, people and a well-defined planning process" (p. P6). Further review of these two components was the next logical step. However, the process was reviewed first.

The Process of Campus Master Planning

The Council of Educational Facilities Planning, International Manual (CEFPI, 1991), stated: "Educational facility planning for higher education is normally termed campus planning" (p. P2). It added that campus planning dealt with a series of elements (buildings, landscaping, zoning requirements,

access, parking, utility systems, security, auto/pedestrian/two-wheel vehicular traffic, pressures of declining enrollments and shrinking financial resources, energy conservation and life-cycle costing) which interrelated to create an entity known as the campus. The objective of campus planning was to produce a smooth interrelationship among these elements to create a functional, efficient unit that was environmentally and aesthetically appealing. Canon (1988) defined what he termed "campus master planning" as the total process of planning for a university, involving the interaction and coordination of strategic, educational, financial, and facility planning. *Why a Master Plan?* (1960-1969) confirmed that successful master planning was the result of careful analysis of the problems to be solved in context with existing conditions of site and buildings.

However, the planning process in and of itself was not a complete exercise. McKinley (1975) stated "Planning in one's own institution should be principally concerned with establishing a systematic process from which one may harvest plans" (p. 4). Stumer (1974) agreed:

Planning includes the development of interim 'products' or 'plans.' These plans are one of the most visible and tangible results of the planning process, and become the reference points for assessing the effectiveness of the over-all effort to inculcate the anticipatory perspective of planning throughout the institution. (p. 14)

Morris (1984) further added: "Campus planning generally refers to the overall, integrative process of creating a 'campus master plan,' which deals with the relationships between individual buildings and the campus as a whole" (p. 28). Barbour (1973) summed it this way: "The masterplan is a result of masterplanning (the process of preparing the masterplan)" (p. 104). The campus master plan as a product reflects the planning process. Stumer (1974) observed that any plan in the campus-planning process is in a

constant state of update or renewal in correspondence to (a) the range and intensity of turmoil in the general environment, (b) the internal change inputs regarding goals and objectives, and (c) the outcomes of the last cycle of coordination and evaluation. Specific plans are the products of these complex processes and thus are constantly recontoured by them. (p. 8)

While most literature in campus planning focused on the process, Morris (1984) observed that "planning seldom begins under textbook conditions. It almost never proceeds with perfect precision" (p. 3). He further added, "No matter how good your planning procedures are, they will be changed, and probably with good reason. Neither plans nor planning processes are carved in stone" (p. 5).

Yet, having a well-organized structured planning process was important in harvesting good plans. Halstead (1974) observed that phased planning accomplished decision making in a logical sequence, permitting review, agreement, and commitment before proceeding. "If campus planning is unstructured, there is a tendency for those involved to wander haphazardly, skip elements, argue

needlessly, and retrace steps" (p. 472). Brewster (1976) agreed with Halstead from the perspective of the product. "A comprehensive development plan or master plan carefully prepared, properly approved, and correctly used can mean the difference between a disorganized campus and a pleasing, functional grouping of buildings and spaces" (p. 34). Overall, Rossmeier (1979) summarized that "probably most important, keep the planning process simple. Sophisticated methodologies often do nothing more than keep participants so immersed with irrelevant tasks, a master plan is either never completed or completed haphazardly" (p. 10).

The following campus planning process was synthesized from Chapman (1990), Council of Educational Facility Planners International (1991), Dober (1992), Kansas Board of Regents (1972), and McKinley (1975), among others. The process of campus planning involves many steps, however an attempt of simplification was made to organize all the steps in five general categories—enough elements to count on one hand. These categories are: planning outline; planning agenda; planning analysis; plan development; and plan implementation. Figure 11 illustrates these categories in their proper sequence in the planning process, and graphically illustrates the place of the campus master plan document in the process.

Planning Outline

The first step an institution takes in the planning process is establishing the most appropriate planning sequence to produce plans. Dober (1963) commented, "To state that planning should be planned may seem redundant, yet process and procedure to a large extent control ultimate results" (p. 173). More importantly, Dober (1992) later added, "The process and sequence must be endorsed by those who ultimately decide what can or may be built, as well as the planning participants themselves" (p. 255). From this endorsement, "typically, an acceptable plan will emerge when there is general agreement as to the facts and findings and a consensus about their meaning and consequences" (p. 256).

Planning Agenda

Once the planning process had been established, Dober (1992) found "the most difficult task is determining what should be represented in the campus plan" (p. 256). Dober provided a general formula to be followed: "What we need minus what we have equals what we must obtain" (p. 265). Evans (1984) suggested a schedule be first developed to consider the elements that need to be incorporated in the campus plan (Table 4 provides a compiled listing of elements based on Evans, 1984). Planning elements varied in presence and importance from one campus to another, so each element needed to be

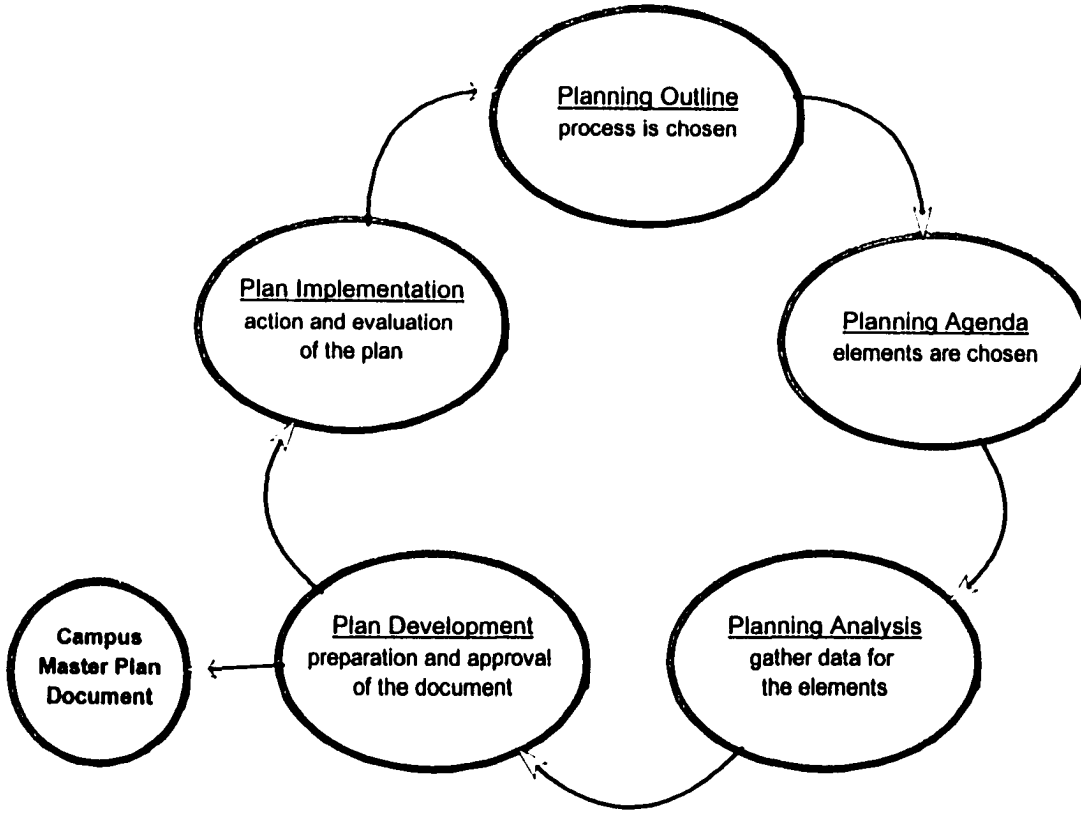


Figure 11. The campus planning process.

TABLE 4

COMPILED MASTER PLAN DATABASE ELEMENTS BASED ON EVANS (1984)

Environmental Features

Site and environmental data, such as:

- topography;
- soil types;
- ground water, hydrology, bodies of water to be incorporated in the campus design;
- land forms—location of ledge steep slopes, natural hazards (flood plain zones, earthquake zones, other);
- vegetation—identify trees;
- review of climate (winds, temperature changes, insolation, humidity, precipitation);
- noise (CEFPI, 1991; Dober, 1963; Dober, 1992; McKinley, 1975).

Existing Facilities

This is a summary of a building-by-building inventory of existing facilities conditions survey:

- the number, functionality, and condition of existing facilities, buildings, structures, facilities location, functional outdoor spaces;
- summarized by building, rooms, room utilization, net and gross square feet, and function;
- identify size, conditions, use, type, age, utilization, tenancy, location, and historic features of all space owned and operated by the institution;
- structural and mechanical adequacy;
- identify violations of safety and other codes;
- identify buildings for alterations, modernizations, or rehabilitation;
- determine short-term and long-term usefulness;
- determine replacement cost per building;
- how do the physical facilities themselves, because of the physical characteristics and state of repair, influence the patterns of movement on the campus?;
- how are buildings used and how does this impact the flow of pedestrians and vehicles?;
- whether approximate or exact, the building inventory figures are needed to establish a base line for judging space sufficiency, size, and condition (Barbour, 1973; CEFPI, 1991; Chapman, 1990; Dober, 1963; Dober, 1992; Evans, 1984; Kansas Board of Regents, 1972; McKinley, 1975; Treible, 1983).

Space Utilization

Space utilization studies and functional area study:

- general spatial structure and density of campus areas;
- locate facilities not fully used;
- locate facilities at or close to capacity;
- utilization of teaching facilities, study and evaluation of existing utilization of classrooms and laboratories;
- utilization of non-teaching facilities, study of present use and requirements for offices, research laboratories, public service facilities, and other general academic requirements;
- amount of square footage occupied by each student in each subject area;
- show functional arrangement of existing campus land uses by area (academic, housing, administration, services, etc.) (Barbour, 1973; Chapman, 1990; Dober, 1963; Kansas Board of Regents, 1972; Treible, 1983).

Circulation Systems

Pedestrian flow:

- pedestrian circulation (including handicap accessibility);
- how students and faculty members move about the campus from their residence halls, offices, and parking lots

Vehicular flow:

- identify existing channels of flow, streets and circulation paths, parking, circulation patterns (handicaps);
- circulation systems;
- number of people and vehicles which enter and leave;
- terminal areas of circulation (entrances and exits of buildings, service docks and loading platforms, parking areas);
- how automobiles approach and enter the campus and where they park relative to the activities which brought them to the campus;
- evaluate adequate access and capacity at these points;
- examine transition areas between channels of flow for safety and proper location;
- identify impediments to traffic (dead-end paths, lack of sidewalks, roads used by pedestrians and cars, mixture of traffic types, road and path capabilities insufficient for intended use, intersection problems, inadequate signalization);
- identify areas whose planting, signals, signs, lighting, or bridges would improve function, safety, or appearance of traffic flow.

Parking surveys:

- type of parking space (curb, lot, garage);
- number of spaces necessary;
- legal versus illegal parkers;
- type of parker (visitor, staff, student);
- type of vehicle (auto, truck, bicycle);
- turnover use of space;
- analytical survey of peak hours and days;
- parking regulations
- should parking be limited to the campus perimeter?
- what parking should be available for evening students? (Biehle, 1991; CEFPI, 1991; Chapman, 1990; Dober, 1963; Dober, 1992; Evans, 1984; Kansas Board of Regents, 1972; McKinley, 1975; Treible, 1983).

Land Use

Campus land use patterns (CEFPI, 1991; Chapman, 1990; Dober, 1992; Evans, 1984; McKinley, 1975).

Open Space

- reported in terms of its general use—academic, for research or instruction, recreational, aesthetic or environmental, etc.—and potential use—its suitability for development;
- campus open space patterns (Dober, 1992; Kansas Board of Regents, 1972; McKinley, 1975).

Landscaping

- how do the existing landscaping and civil engineering accoutrements influence campus use? (Dober, 1992;

Table 4— *Continued.*

<p>Evans, 1984; Kansas Board of Regents, 1972; Treible, 1983).</p> <p><u>Utilities Systems</u> <u>Utilities:</u></p> <ul style="list-style-type: none"> • map existing utilities, location of utilities; • identify by use, size, and general condition, potential capacities, new utilities required <p><u>Lighting:</u></p> <ul style="list-style-type: none"> • does the campus lighting plan, either intentionally or unintentionally, influence the use of the campus in the evening and night hours? <p><u>Signage:</u> (Dober, 1963; CEFPI, 1991; Evans, 1984; Kansas Board of Regents, 1972; McKinley, 1975; Treible, 1983).</p> <p><u>Special Design and Visual Features</u> <u>Visual design survey:</u></p> <ul style="list-style-type: none"> • observe places where people naturally congregate; • identify all existing vistas and views, special physical features and issues, and potential for exposing fresh ones (Dober, 1963; Dober, 1992; Evans, 1984). <p><u>Historical Buildings and Sites Survey</u></p> <ul style="list-style-type: none"> • historical districts or buildings • historical and cultural significance (broad historical value, identification with historic personage or event, architectural or landscape value as work of art); • suitability (representing reasonable amount of original material, adaptable to functional uses, reasonable cost of renovation, reconstruction, or restoration, reasonable continuing maintenance) (CEFPI, 1991; Dober, 1963). <p><u>Surrounding Community Studies</u> Town and Gown studies: (keep track of use, value, and changing patterns of activity on the land in its environs—<i>if just for self-interest</i>)</p> <ul style="list-style-type: none"> • community and regional land use, circulation, and transportation plans; • community development plans, including renewal and capital improvements; • matters relating to campus environs (land holdings and uses, assessed valuations, conditions of structures, market value of land and structures, legal codes on land); • identification of areas where people associated with the institution work, shop, and live—"spheres of influence" (Dober, 1963). <p><u>Physical and Legal Development Constraints</u> Purpose of list is to establish in a broad sense physical limits used within which the plan should be developed.</p> <ul style="list-style-type: none"> • can the University expand beyond its present boundaries, if so in what direction? • can certain streets be closed, if so which can be considered? • legal development restrictions for the entire campus and surrounding area • regulatory factors, including regional and local master plans (CEFPI, 1991; Kansas Board of Regents, 1972; McKinley, 1975). 	<p><u>Funding</u></p> <ul style="list-style-type: none"> • where will the funds come from for design, construction, and renovations, deferred maintenance? • what will be the time frame and amount? (Biehle, 1991; Dober, 1992). <p><u>Housing</u></p> <ul style="list-style-type: none"> • residential housing study — development of data on present and future demand for residential housing by students, faculty, and staff • student housing on residential campuses comprises one-third to one-half of the total building area (Barbour, 1973; Biehle, 1991; Evans, 1984). <p><u>Extracurricular Life</u></p> <ul style="list-style-type: none"> • more important at American Universities than in universities elsewhere in the world, non-academic facilities comprise 65-80% of the building area on residential college campuses. • what does the college intend for its students' extracurricular life? (Biehle, 1991; Evans, 1984). <p><u>Enrollment Plans</u></p> <ul style="list-style-type: none"> • the number, type, and diversity of students they expect to serve. • will the college stay the same size, or will it grow to a different size? • what enrollment is expected, or desired, 10 to 15 year from now? • are the expectations realistic? • what type of student will the institution enroll in the next decade or two? • how diverse will the university be? (Biehle, 1991; Kansas Board of Regents, 1972). <p><u>Space Needs</u> <u>Space adjustments:</u></p> <ul style="list-style-type: none"> • these might occur in the space inventory because of comparison between departments or groups, comparisons to peer institutions' or because of accreditation, or those space changes mandated or justified by internal and external space criteria, standards, laws, codes, and so on <p><u>Estimation of space needs:</u></p> <ul style="list-style-type: none"> • development of techniques for estimating future space needs (Barbour, 1973; Dober, 1992) <p><u>Athletics/Recreation</u></p> <ul style="list-style-type: none"> • adequacy of existing facilities • amount and type of space allocated • readaptive uses of existing facilities • future expansion (Evans, 1984) <p><u>Land Ownership</u></p> <ul style="list-style-type: none"> • institutional land ownership (Dober, 1992; McKinley, 1975). <p><u>Infrastructure Patterns</u></p> <ul style="list-style-type: none"> • infrastructure patterns • major infrastructures (Chapman, 1990; Dober, 1992). <p><u>Programmatic Change Factors</u></p> <ul style="list-style-type: none"> • growth or decline in the campus population, new missions, administrative reorganization, and so on (Dober, 1992).
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investigated and evaluated with existing conditions and policies, and mid- and long-range plans and policies formulated for use and for inclusion in the final planning document. Also, two subsets of the planning agenda needed to be defined: institutional profile and goal-setting.

Institutional profile

In addition to determining elements for the master plan, Dober (1992) noted a sub-step at this stage was "defining the institution's niche in higher education via an institutional profile" (p. 265). Dober suggested a profile could be drawn from institutional self-studies such as academic plans, on-going institutional research, or studies prepared especially for the campus plan study. The purpose was to identify the institution's peers, to better position the institution as to function, scale, and type of facilities required. Colorado Commission (1974) added: "It is necessary for an institution to undergo a complete analysis of its present and future mission, programs, and goals prior to making any attempt to master plan its physical facilities" (pp. B1-7).

Institutional goal-setting

Another sub-step was to begin identifying institutional goals. CEFPI (1991) noted that if institutional goals were to be statements around which campus planning could be built, they must be specific and measurable. These should be academic goals (programs, enrollment projections, faculty teaching responsibilities and conditions of service, and support programs), and nonacademic-needs goals, developed in the context of supporting the institution's prime responsibility of teaching and learning. Ross (1981) suggested the question to be asked was "What should this college become in the next ten years?" Then, the planner determined what was required for the college to fulfill its mission and purpose, and goals and objectives were established to accomplish that long-range vision.

Goals-setting also varied between long-range goals and short-range goals. Bounds (1978) observed that the long-range goals made up the core of the master plan. They answered the question of where the college wanted to be in 5 to 10 years.

Planning Analysis

At this stage the data were collected for the elements that comprise the campus master plan. Dober (1992) stated that "the objective here is to disaggregate, decipher, and evaluate the physical characteristics of the site and environs to reveal and appreciate those aspects of the site under study which may inform the proposed plans" (p. 258).

The process of plan development refined selected concepts and formulated precise recommendations. Base information needed to be supplied in order to prepare a master plan document. This included factual data to support the physical space demands, and documentation of parking needs along with figures and maps of the process. Historical information was very important for understanding why the institution existed, and it served as a guide to its future. Also, the budget limitations needed to be faced up front.

It is better to strap the reality onto the beginning of the process than to abandon the effort later because the budget will not support the recommendations. It is that abandonment that you must seek to avoid, for if it happens even once, the credibility of planning has been tarnished and all future planning efforts may be subject to the same demise. (Shuman, 1983, pp. 276-277)

Halstead (1974) agreed, "An initial reconnaissance and data-gathering effort, includes the making of initial recommendations to produce the necessary basic information required to develop a physical plant plan . . . to review all assumptions and input factors before developing proposals" (p. 474). Rossmeier (1979) summarized that "a master plan is only as good as the data base from which the future is projected. High quality, factual information must be accessible" (p. 10).

Along with developing a master plan database, a market forecasting and trend analysis also were sources of valuable data for a successful plan.

Master plan data base

McKinley (1975) noted that the physical development plan required a considerable amount of support data. Colorado Commission (1974) also specified that, in order to plan, it was necessary to generate and present a substantial amount of data about the existing physical plant. Barbour (1973), Biehle (1991), CEFPI, (1991), Chapman (1990), Colorado Commission (1974), Dober (1963, 1992), McKinley (1975), and Treible (1983) all listed a number of detailed studies necessary to develop desired information upon which to base an effective facilities plan. These studies included careful inventory and analysis of existing conditions on the campus as the starting point for future development. Table 4 compiled the variables and elements the authors above listed for an inventory of an existing physical plant. This information needed to be considered and examined in order to grasp the current circumstances of the campus prior to the start of the master plan. Table 5 lists master plan database study information other authors recommended.

The collected data became not only useful to the planning process, but additionally a large part was incorporated into the campus master plan document. Along with the collecting of data, certain tools were developed from the data to ease the visualization of planning concepts and problems.

TABLE 5
FURTHER DATABASE STUDIES AND INFORMATION

Author	Date	Criteria
Larson & Palmer	1933	<ol style="list-style-type: none"> 1. Educational objectives 2. Spiritual, social, recreational needs of the students 3. Demands made upon the institution in future years
Ross	1981	<p><i>Data of college environments on:</i></p> <ol style="list-style-type: none"> 1. Demographics 2. Geographics 3. Economics 4. Potential sources of students and job opportunities <p><i>Background data on college characteristics:</i></p> <ol style="list-style-type: none"> 1. Faculty/Staff 2. Physical features 3. Budgets 4. Academic programs 5. Students 6. Graduates
Ohio State University	1987	<p><i>Had as available resources:</i></p> <ol style="list-style-type: none"> 1. History of campus buildings 2. University photography collection 3. Campus map collection 4. University archives 5. Monographs focusing on specific content of the campus

Base map. The base map was a tool that not only helped visualization of planning concepts in early stages but also served as a basis for the master plan document. The facts and findings needed to be displayed so that all the participants had a reasonable understanding of the campus and environs as a physical place with measurable dimensions and attributes. A proper base map helped prevent the distortion of information, and the interpretations and judgments based on this information tainted and compromised. The advent of computer-assisted graphics and simulations provided new tools for this older process. Yet Dober (1992) observed that graphic products had not yet proven to be as portable or as accessible for group discussions as the conventional wall-sized drawings and slides, and in certain cases, recommended a topographic model. Base maps and their place in the planning process and the master plan document is more fully discussed in chapter 3.

Tables. Tables, in addition to base maps, served as tools for clearly displaying campus planning data. Colorado Commission (1974) specified that "much of the institutional data are to be compiled and presented in a series of tables. . . .Data contained in each table must be coordinated with data in all other tables so the entire long-range plan will 'track' from beginning to end" (pp. B1-7).

Market forecasting and trend analysis

Shuman (1983) observed that "many physical plans had been generated without the benefit of trends and demand analysis. Without the proper analysis, chances of failure for a plan are high" (p. 274). Ross (1981) reported of a college that collected data for the master plan of several characteristics of the college environment: demographics, geographics, economics, and the potential sources of students and job opportunities. It also collected background information on the college's characteristics such as faculty and staff, physical facilities, budgets, academic programs, students, and graduates. The data were used in time series to identify trends and to identify relationships between characteristics and trends, trying to answer the overall question, "What does it all mean?"

In addition to trend analysis, Shuman (1983) also noted that proper market forecasting was especially relevant to the physical plan because of the time necessary for implementation, such as acquiring land, designing, and building, and also because the expense of implementing the plan was high and would continue to increase.

Plan Development

Chapman (1990) observed that at this point the plan concept was fleshed out and details developed for short- and long-term implementation. At this phase, documentation began to take place.

"The form and content become extremely critical in conveying the plan message to trustees, legislators, donors, and future generations who will be asked to implement and carry forward the plan framework" (p. 17). Earlier Chapman noted that "this stage produces a statement about where the campus is headed as a physical environment" (p. 16). He added, "The stakes are high, because everyone's conception of the future of the campus is on the table to be tested" (p. 16).

Planning concepts development

Overall campus concepts were developed at this point to outline, as Kansas Board of Regents (1972) found, a framework for future land use and circulation—these two elements being the foundation of a long range campus plan. The procedure for the first could entail either articulating a concept of concentric hierarchy, where the university land uses grew in radiating concentric zones from a core containing the most intensely used facilities, or, it could articulate a concept of linear hierarchy, where the university land uses developed in linear zones away from an area containing most intensely used facilities. The procedure for the second involved developing a concept for overall circulation, such as the concept of accessibility, which provides for a sense of arrival on campus, has provisions for necessary vehicular access to certain facilities, with preservation of pedestrian sovereignty. Consideration could also be given to continuity of a university circulation development within a framework of a possible urban circulation system. A third procedure was to develop support concepts for the first two elements. This involved articulating a concept of connection: a visual awareness, uninterrupted pedestrian circulation, continuity of landscape; or of identification—developing activity nodes and open space in conjunction with circulation corridors (Kansas Board of Regents, 1972).

Gaming

In some cases, in order to test the developmental concepts, gaming was used. This process simultaneously considered all the previously mentioned concepts, and tested for the directions established to this point in the planning process. The objective was to optimize the relationships that have been previously established. This process could show that certain concepts were not valid and others, established earlier, could need modification. The outcome determined the major directions to be followed within the plan development phase (Kansas Board of Regents, 1972).

Synthesis of items to be represented in the campus master plan document

The planning process then synthesized the work to date and articulated the campus master plan. The information had been sifted, confirmed, and evaluated from the previous steps to reach the list of items to be represented in the campus master plan. The graphic representation varied in accordance with the complexity of the plan. At the least, the campus plan drawings needed to express: (1) goals and objectives, (2) the physical character of the existing site and environs, (3) the location of all physical changes and improvements, (4) the sense of place and image being established or enhanced, (5) the price to be paid and the value to be received, and (6) the implementation sequence (Dober, 1992).

Progress report

Dober (1992) found that a beneficial tactical maneuver, at this point in the study, was to make a major progress report to the campus constituencies. Dober (1992) outlines the following organization:

- a. the mandate for planning
- b. the beginning goals and objectives
- c. facility and site requirements, to date
- d. summary of site and environs analysis
- e. recap of major findings, to date
- f. a list of alternatives being considered
- g. a statement that the purpose of the meeting is to obtain reactions about the work to date, and to elicit views and ideas about other alternatives that should be considered as the study proceeds
- h. the identification of the person to be contacted should there be additional comments and ideas to be communicated after the meeting is adjourned
- i. a recap of the remaining work and schedule. (p. 259)

Testing alternatives

Once the constituents received the progress report, alternatives to the preliminary findings needed to be discussed. "It is important to move quickly and boldly in the alternatives step in order to evoke the revelations that come with seeing something on paper. This phase has to end with a consensus as to the general form of the campus plan" (Chapman, 1990, p. 17). Dober (1992) agreed:

Constructive contention is a hallmark of vital institutions. The articulation and discussion of alternatives is productive for several reasons. . . . The main features of the best solution will be revealed, as well as the criteria for making that determination. The discussions evoked by comparing alternatives can be channeled to create the consensus necessary for an institutionally acceptable plan. (p. 260)

Reviews and revisions

The draft plan of the synthesis needed to be distributed to a wide constituency, with the goal of making those revisions that common sense, consensus, or institutional leadership would direct (Dober,

1992). This step needed to allow rigorous objections to be heard before the plan was printed in final form (Evans, 1984). "It is important to incorporate several points of mid-course correction with campus participants. The decisions are more explicit, down to the wording of the campus plan documents" (Chapman, 1990, p. 17).

Numerous campus groups needed to review the master plan during the process of formulation. Distribution included faculty, staff, students, and members of the community outside the campus affected by such a plan. If the campus had an urban setting, people from the surrounding neighborhoods, elected officials, representative of local businesses, and safety and security forces also needed to have the opportunity to review the plan and offer suggestions. The long-range campus planning committee needed to review the master plan with technical review assistance from the physical plant department. The final official document needed to reflect consideration of all these interests. In addition, most systems required approval by one governing board committee and/or the total board (Evans, 1984; Weber & Fincham, 1974).

The final document

Rocchio and Lee (1974) noted that before the document was produced, the planner needed to know whom the plan was to reach and involve. Dober (1992) felt that a summary document, within the resources and time available, was helpful to narrate the undertaking and to disseminate the findings and conclusions to the largest audience possible. Rocchio and Lee (1974) continued that to be useful to the broadest range of people, the plan should be short, concise, and to the point. Lengthy documents could lose the reader before the total picture was seen. UNESCO (1975) summarized:

The work completed throughout this stage should be condensed into a succinct and readable report which can be given wide distribution. This document will be read by future faculty members, potential donors and government officials. It should therefore be written in terms that the layman can understand and attractively illustrated to present the proposed plan clearly. The publication 'The Proposed University of Bath: A Technological University,' . . . is an outstanding example of such a report [The campus master plan document from Bath was one of the chosen data of this study]. (p. 49)

CEFPI (1991) also added that the campus master plan document should include lucid descriptions; drawings when necessary, to explain and illustrate; and a narrative giving the rationale underlying major decisions.

Approval and publication of the campus master plan document.

The campus planner presented the campus master plan document, along with the planning team's recommendations to the approving entity. Approval came from the top level administrative officers,

the president, and the governing boards, and changes in the master plans would be made only with the consent of these same committees. "Master plans should not be changed at the whim of every new administrator who may assume the responsibility in an institution" (Brown, 1980, p. 224). Any necessary revisions were then made, prior to adoption by the Board (Weber & Fincham, 1974). Finally, copies of the document were sent to all the appropriate people on and off campus (Lane Community College, 1977).

For state institutions, Colorado Commission (1974) stipulated that the final published document have the approvals of: (1) the institution; (2) the governing board; (3) the commission on higher education; and (4) the governor of the state prior to becoming official.

Once the campus master plan was approved, it should be published by the institution and made available to campus planning groups, the media, government agencies, and the general public (Weber & Fincham, 1974).

Concerning the format of the master plan document, Graves (1993) observed:

The facility planner today has more information available than at any other time in history and thus should be able to make informed decisions on facility construction. Armed with this information, it is the wise planner who puts any long-range plan in a loose-leaf binder. The future is always subject to change. (p. 18)

After the final document was produced, Dober (1992) suggested that the study materials and summaries be deposited in the institution's library or campus planning office as an archival record and for those who wanted to use the documentation later.

Shelf-life of the master plan document

Dober (1992) stated, "Intrinsically, a campus plan is a snapshot of a changing picture. The focus and coverage and shelf-life of the plan are directly related to the effort put into the process outlined" (p. 256). Keating (1988) found that the clear measure of success of any plan was the degree to which it was put to use. "Planners fear that the plan will be put on the shelf. Implementation strategies and processes therefore are crucial to achieve the plan's objective" (p. 32).

Dober noted that, for most institutions, the development of a campus master plan was an episodic event, and that on-going and continuous planning was the desirable goal. However, some institutions were encumbered by lack of a professional staff and an institutional willingness to participate in this activity. Yet, the campus plan could still be kept alive by periodic review of its assumptions and outcomes, adjusted to recent events, and summarizing progress and impediments in an annual report to the trustees by the chief executive. Obviously, Dober concluded, "A well-informed program lengthens the shelf-life of the campus plan and will yield information essential for viable [campus planning] concepts" (1992, p. 256).

Two sets of campus master plan documents

Often having two different sets of campus master plan documents was desirable. Klauder and Wise, by 1929, had observed that in the east of the U.S. where land was not easily obtainable, in some cases development plans were long kept secret for fear that their publication would increase the price of needed land. Brewster (1976) also noted that in planning for the future growth of the institution on ground it did not own, "it may be necessary to have two plans—one for general display and everyday use, and the other kept under cover until the land is acquired" (p. 42).

Rocchio and Lee (1974) saw another value in producing two documents: one plan to outline the general themes, used for soliciting support and interest, the other, a more detailed account, complete with supportive material, lists, committees, etc., for individuals needing the details.

Brewster (1976) also suggested use for two sets of master plan drawings in the campus-planning office: one plan, at the same scale as the master plan, to show the campus as it was at the time the master plan was prepared, and next to this, the actual master plan hanging.

Plan Implementation

"The best campus plans are those that lead to early action—an immediate reward for those who have labored and a proof of the plan's viability and acceptance" (Dober, 1992, p. 265). As Klauder and Wise (1929) stated earlier, temptations to depart from the plan were strong, sometimes threatening the entire goal that had been set. Moreover, sometimes defeat was sounded by those who were yesterday's sponsors of the plan. Halstead (1974) felt that for campus master plans to be carried out effectively, they had to be enforced on a day-to-day basis. Biehle (1991) reasoned that "probably the most frequent cause of weak master plan implementation is the failure by the college's leaders to have a clear sense of where the institution is going or where they want it to go" (p. 21).

Realistically, however, Dober (1992) granted that few campus plans were implemented exactly as they were published. He cautioned that "a plan drawn too tightly will snap" (p. 265). What a well-formulated plan had as desirable features, he observed, were approximations and flexibility, and a capacity to incorporate adjustments and amendments. Additionally, it needed to provide a realistic process for development. First, it should outline phased development. Second, the plan should attempt to achieve a finished look to the campus at all phases of development. Third, it should contain provisions for the displacement of people and programs during renovation projects and as the consequence of construction (CEFPI, 1991).

Evaluation

Eventually planners needed to determine whether the campus master plan guidelines were being met, and whether the process was meeting the goals and objectives of the planning program. New information could be built into the on-going process for better development of plans in the future. According to CEFPI (1991) this process involved considerable interaction with administrators, faculty, students, the community, and alumni. Their responses served to modify or refine the process, becoming part of a basis for future planning and development. Some questions for consideration in the evaluation of campus master plan documents are: (1) Can the plan be realized economically, with the resources at its disposal? (2) Can the plan be modified to incorporate unforeseen developments in the future? Is a framework in place for the inevitable change and growth on an institution? (3) Is the plan locked into a particular educational theory? (It may prove to be inflexible to future changes.) (4) Does the plan encourage a maximum number of impromptu encounters with other students, faculty members, visitors, books, activities out of the regular schedule? (5) Does the plan seek to create distinctness and a sense of specialness to the campus, yet at the same time remain accessible and involved with the outside community? and (6) Does the plan develop a sense of beauty that influences the experience of students, faculty, and visitors, deeply adding to the educational experience? (Darnes, 1968).

Flexibility

In 1968 Darnes wrote, "Flexibility is still the key word to master planning" (p. 26). *Why a Master Plan?* (1960-1969) found flexibility to be "essential" (p. 18), Blank and Smith (1976) felt it was a key point that could not be overemphasized, and Rossmeier (1979) surmised that "planning should be viewed as flexible and dynamic" (p. 10). He saw planning curtailing vision because planning emphasized order while vision was not necessarily order.

As early as 1931, Ackerman foresaw the need for flexibility. Even at that date, he said that structures should be designed with a "view to flexibility of operation" (p. 692). Yet Dober (1992) still observed, "Arguably, the damning criticism applied to traditional campus master plans is their inelasticity" (p. 13).

Shuman (1983) called for the campus master plan to be flexible to sustain both minor and major adjustments. Blank (Blank & Smith, 1976) agreed, adding it should be sufficiently flexible to adapt to changing circumstances and situations. The Colorado Commission on Higher Education (1974) prescribed that it must be a flexible framework for campus growth to incorporate the dynamics of education and the fluctuations of enrollments and academic programs.

Castaldi (1987) also agreed that "no growing college or university, large or small, can afford to develop without a flexible master plan" (p. 316). However, he pointed out that some college and university planners object to the use of the term 'master plan' in campus development because they felt like a slave to the plan once it was formulated. He suggested that the postulates and assumptions underlying the campus master plan be reviewed before any appreciable capital funds be spent, ensuring the campus master plan was still valid and adequate. If these had not changed, he argued, there should be no reason why the plan could not be implemented. However, if the assumptions underlying the original campus master plan were no longer accurate, then it would be better to postpone major capital expenditures until the campus master plan had been revised to reflect changes in the financial program or in the educational goals of the institution. Rosen (1987) concluded that the campus master plan was not a set of goals placed in stone, but a flexible working tool that could help administrators do their job.

Review and change

American Association of School Administrators (1967) noted that in order for the campus master plan document to be of value, it needed to be flexible, and subjected to continual review and alteration. This concept of review and revision as a vital, on-going exercise dealing with the realities of change was widely promoted (American Association for School Administrators, 1967; Colorado Commission on Higher Education, 1974; Graves, 1993; Halstead, 1974; Miller, 1980; Morisseau, 1963; Rosen, 1987; Weber & Fincham, 1974). Although plans were devised at considerable cost, many were half-followed, ignored, or forgotten in the rapidly changing educational environment. Change being the only constant in campus planning, regularly scheduled reviews and revisions were necessary (American Association for School Administrators, 1967; Weber & Fincham, 1974). Halstead (1974) added, "As the planning process is a continuous activity, so the master plan, regardless of its depth and comprehensiveness, is but a temporary guide, not a final solution" (p. 21).

Instead, Halstead argued that the master plan needed to exist as a "living document, subject to changes in . . . needs" (p. 21). Rosen (1987) also viewed the master plan as a living document, meant to be reviewed at regular intervals and revised in accordance with changing circumstances. And Smith (Blank & Smith, 1976) noted that when a variety of constituencies, including state and federal government, impinge on an institution's mission, the best defense was an offense, and that offense was a well-prepared, living plan.

Additionally, the reviews needed to be conducted at appropriate intervals (Colorado Commission on Higher Education, 1974). In a survey by the Board of Education of the State of Michigan (1968) of its

community colleges, the respondent institutions agreed that the campus master plans should be regularly reviewed and updated, but differed on the appropriate interval of review from quarterly to semiannually, annually, frequently, and as necessary. Many campus planners from each institution believed annual appraisals and revision of graphics and statistics were desirable with new publications of the campus master plans at approximately 5-year intervals. The results of the survey showed the following rates of master plan reviews by institutions: 2, quarterly; 1, semiannually; 8, annually; 1, frequently; and 1, as necessary (State of Michigan, 1968, p. 2). *Occupations & Education* (1969) called for a plan to update the campus master plan, based upon experience and changing circumstances. Table 6 tabulates the remaining literature support for the periodical review.

Relationship between process and individuals

Regardless of the campus planning process, eventually, as Miller (1980) stated, "a plan is only as good as the commitment of the people who develop and implement it" (p. 29). The process itself became only as good as the balance between 'top-down' and 'bottom-up' planning involving the broader base of the constituents. Morris (1984) suggested that the key in bringing process and individuals together was to "identify those components of planning that need not be participatory and can be centrally directed, while subtly but firmly providing top-down direction and articulation to those areas where participation and consensus are critical" (p. 10). Humphries (1983) summed it up well that no serious master planning activity pleased everyone, but it left the vast majority of individuals pleased if they had been consulted at some point in the process and convinced that the plan was rooted in a solid base.

Individuals Involved in Campus Master Planning

"In a good physical planning process, many participants are involved, and influence and authority for the results are diffuse" (Brase, 1990, p. 2). CEFPI (1991) simply put it, "Successful planning for higher education requires the involvement of people" (p. P7). Chapman (1990) agreed that gathering data and understanding conditions and objectives were fundamental to the planning effort, but the planning process itself, was an "exceptional opportunity to develop the level of engagement among the parties involved in the campus plan" (p. 15).

Brase (1987-88), practically saw the planning process revolve around the individuals involved. He stated that "physical planning has to do with the essence of individuals' experiences of their physical surroundings in relation to their beliefs about the institution's values" (p. 42). Fink and Walker (1984) seemed to view it similarly from the context of process. One of their concerns in campus land use studies was engaging the "entire campus community, including faculty, students, and administrators, as well as

TABLE 6
INTERVALS IN LITERATURE FOR CAMPUS MASTER PLAN REVIEWS

Author	Annual	Biennial	Other
Graves (1993)	x		
Skelly (1989)	x		
Rosen (1987)	x		
Miller (1980)	x		
Lane Community College (1977)		x	
Weber & Fincham (1974)		x	
Kansas Board of Regents (1972)	x		
State of Michigan (1968)	x		Published every 5 years
TOTALS	6	2	-

the outside community, to build a commitment to a comprehensive, integrated plan' (p. 2). McKinley (1975) agreed that "procedures should be sufficiently inclusive to ensure participation in planning by all constituents of the institutions who have experience in and expectations of participation," but also noted that not all participants were equally qualified, and therefore, the process be "sufficiently exclusive to ensure that input from significant sources need not be limited or given inadequate attention" (p. 3). This balance, the choice of participants, according to Morris (1984), needed to be represented by certain constituencies between persons who could be counted on to foster planning-oriented behavior and persons of constructive, action-oriented demeanor, with the latter being more preferable. So, it seemed, that the "first requirement for a successful master plan is that the university's leaders engage in strategic thinking about the future, that they do a considerable amount of homework about what their campus is all about, where they would like it to go, and how they intend to get there" (Biehle, 1991, p. 22).

The following review of individuals involved in campus planning was divided into two sections. The first concentrated on individuals by position, and the second on committees. Figure 12 provides a graphical illustration of the individuals by position and committee this section covers.

Personnel

To compile a master plan, an institution had two options: hire an outside firm or do much of the work with in-house personnel (Weber & Fincham, 1974). For the in-house option, Stender (1969) did a study that indicated that the major contributors to campus planning were the president, individual members of the board of trustees (as opposed to the board as a whole or committees of the board), and the chief fiscal officer. The study also indicated that apparently the students, faculty, and academic dean were not involved in campus planning to the same degree as outside consultants. For the outside consultants option, Stender's (1969) study found that they generally fell into four different categories: educational, fund-raising, public relations survey consultants, and architects.

A little earlier the State of Michigan (1968) also conducted a similar study of its community colleges. Their results from surveying each campus showed that while the boards were responsible for complete understanding and approval of the total campus master plan and all its components, the presidents were the primary force in the campus master plan process, and that deans filled in for the chief financial officer. The results of Michigan's survey somewhat followed Stender's findings. Of the in-house personnel contributing, 13 were presidents, 2 were vice presidents, and 8 were deans or equivalent staff.

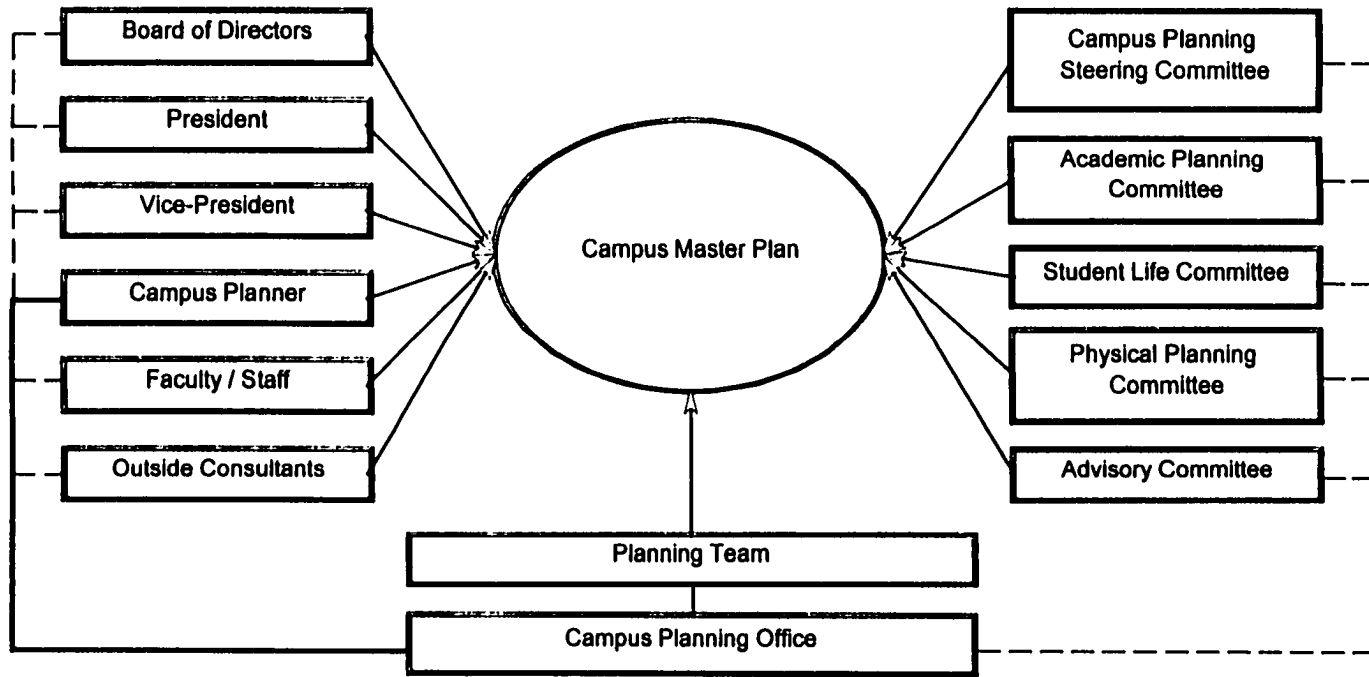


Figure 12. Individuals involved in the campus planning process.
Black lines show a direct line relationship, dotted lines show an advisory relationship.

For the campus planners, more fell in the technical category. In some cases these might have been on-staff personnel, but mostly they were outside consultants. The survey found that 20 were architects, 11 were engineers, 4 were urban planners, 6 were landscape architects, and 6 had other credentials.

The results of these studies pointed to a possible problem in campus master planning. Biehle (1991) warned that "plans that are developed by a few administrators and their architect and then handed down from the mountain top have little chance of long-range success" (p. 24). Biehle suggested that user groups, within each administrative unit and academic department, work with the architect-master planner on the details of the operation. This, Biehle argued, could make a huge difference in the successful use of the master plan, and face what he called the second cause of master plan neglect, the lack of user involvement in its design.

Several studies also have been conducted, focusing on personnel involved in planning for small private church-related institutions. Eagen (1980) found among the participants in facilities planning of institutions, accredited by the American Association of Bible Colleges, that presidents were involved 100% of the time, other administrators 89.1%, and trustees 83.6%. Then there was a big drop-off to faculty, involved 25.5%, staff 18.2%, alumni 10.9%, and students, only 5.5% (p. 250, Table 12).

Shand (1987) found this also among Seventh-day Adventist (SDA) institutions, that presidents, vice-presidents, and academic deans were the most involved in formulating institutional goals and objectives. Shand also concluded that in most instances administrators and department chairmen held similar views towards planning in SDA colleges and universities. Shand recommended that SDA college and university administrators share important planning information with general faculty, and provide more opportunities for faculty, staff, students, and members of the constituency to contribute meaningfully to the process.

The following review of individuals by position mentioned both in the studies above and literature was done to clarify the roles played by individuals during the campus master planning process.

The board of directors

The board of directors, or board of control, depending on the institution and circumstances, had basically two campus planning functions to perform. The first was to provide leadership to the campus master planning process. Miller (1980) called the leadership of the board of trustees and the president the "most critical element to successful planning" (p. 27). Council of Educational Facility Planners International (1991) defined this leadership as the Board having the responsibility of seeking the master

plan, then presenting it to the constituents and acting on its recommendations. The State of Michigan study (1968) found that governing boards needed to have not only a complete understanding, but also give approval of the total campus master plan and its components.

The second function of the board was giving final approval of the document, and approval of all subsequent revisions. Miller (1980) noted: "Boards of Trustees are almost always responsible for final approval of a planning document" (p. 27). Shuman (1983) added that the blame for the failure of the master plan document often fell on the board for not accepting the plan and the administration for not following it. "The only thing which should govern the abandonment of the plan is a new trend and demand analysis, or strong outside forces which govern changes beyond the control of the institution" (p. 277).

In addition to this, major changes to the campus plan, after having been prepared and accepted by the board of control of a college, should not be made without consultation with specialists, and until all the effects of the change had been studied and again approved by this board (Evenden et al., 1938). Colorado Commission on Higher Education (1974) added that minor changes between major revisions be accommodated by amendment, and each receive approval of the governing bodies (institution, board, etc.).

President

Several aspects of the president's role in campus master planning were evident, but probably key among them is a commitment to the campus-planning process. According to Miller (1980), "the president is the catalyst for developing the necessary and effective relationships among all those involved in the planning process" (p. 27). Miller also added that while the commitment of the president could not guarantee the complete success of a planning process, lack of support would certainly ensure its failure. Rossmeier (1979) not only iterated presidential and top administrative involvement for success, but emphasized that this depth of executive commitment must be unequivocally impressed on all administrative staff and faculty. To demonstrate this commitment, the president needed to show active involvement in the planning process. Schmidlein and Milton (1988-89) noted that "frequently, the extent of campus planning activities mirrored the president's personal interest in formal planning" (p. 8). They urged central leadership to "identify and address changing external trends, opportunities, and campus-wide problems and issues" (p. 15). Without this leadership, realistic master plans will not develop, nor will the best of plans be implemented (*Occupations and Education*, 1969).

In addition to being a catalyst, the president was also the one who initiated the campus master plan. The final product was the president's responsibility, as well as intimate involvement in the various phases of production and implementation (Mayhew & Smith, 1966).

Vice-presidents

In some larger universities, the president's role in the master planning process was delegated to a vice-president. Keating's (1988) campus planning study, at four research universities, found that at each institution responsibility for developing the campus master plan was assigned to a vice-presidential executive officer. Responsibility for the plan carried with it a sense of ownership or sponsorship. The actual responsibilities for developing the plan were delegated to central staff. The central staff were the ones who promoted and supported the plan. A campus master plan's acceptance and potential influence improved by the supportive role and involvement of staff responsible for the actual programming and design of individual facility projects.

Institutional campus planner

Godwin (1975) realized that one of the main problems in planning for and maintaining a campus master plan was getting key personnel involved and owning the process. He recommended that every developing college designate one administrator whose primary responsibility was the development of a comprehensive campus master plan based on a consistent self-correcting system of planning. For the most part, this was the responsibility of the educational facility planner. CEFPI (1991) stated that this individual is "often an educational administrator with special technical skills that provide for an understanding of the complexities of contemporary educational facilities and enable communication with, and coordination of, a variety of specially trained professionals" (p. C2). This chief planning officer was usually an energizer, who "guides a planning task force through planning activities successfully to the point of a written document" (Rossmeier, 1979, p. 9). The planning officer worked with the other members of the staff, architects, consultants, and suppliers to coordinate all the details involved, and with institutional staff to develop both a planning process and a plan (Mayhew & Smith, 1966). "The planning officer restricts consultants to specific tasks when added manpower is required, but ensures that staff are in control of effort at all times" (Rossmeier, 1979, p. 10).

The planning officer also oversaw the production of the master plan document. He ensured that all the elements of the campus planning process were integrated into it. In consultation with the planning team, the campus planner determined the format of the document, did the final editing and placing of materials into the document, according to the format decision, and had the document reproduced (Lane Community College, 1977). Included in this task was the responsibility of first establishing a basic concept of development (Brewster, 1976), and then creating a plan that embodies this desired conceptual pattern within the framework of existing facilities (Castaldi, 1987).

While the literature greatly supported the concept of a campus-planning officer overseeing and directing the planning process, it did not deal so kindly with consultants performing these tasks. Brewster (1976) indicted consultant campus planners hired to prepare campus master plans.

Many master plans developed by professionally recognized consultants have been followed only partially or perhaps not at all. One important reason for their failure was a lack of general acceptance; but mostly they failed because no one bothered to keep them updated. The person who prepared the *plan* collected his money and left to prepare another plan for some other school. To prevent this waste, someone in a strong position on the school staff must (1) see that the plan is seriously considered when decisions are being made affecting the physical development of the campus and (2) see that the plan is redrawn and kept updated. Otherwise, the master plan will soon be just another item in the school archives. It is better to revise an existing master plan periodically than to try developing an orderly campus with a succession of different plans. (p. 41)

Campus planning office and staff

Headed by the campus planner, the central planning office assisted administration and consultants throughout the planning process. In daily contact with an institution's people, problems, and requirements, the campus planning office needed to be in a position to give valuable professional assistance (Brewster, 1976; CEFPI, 1991). Its main responsibility was the coordination and production of the planning document. CEFPI (1991) listed its duties as:

1. *intelligence function*--measuring and evaluating existing activities and physical plants, predicting the effects of physical changes on curricula, institutional goals, and enrollments
2. *community relations function*--those studies, communications, meetings, and measures necessary to coordinate institutional and community growth objectives
3. *programming function*--identifying development problems, posing alternative solutions, preparing documents to ensure that project designs will reflect long-range development policy
4. *physical plant development*--preparing capital improvement budgets and preliminary and final project plans, supervising construction; and
5. *secretarial function*--keeping all records, documents, and other materials necessary to carry out planning, programming, and physical plant development (CEFPI, 1991, p. P7).

The campus planning office's role was assisting the campus-planning steering committee. Its functions included:

1. acting as a communications link between users and other groups like the administration, the CPC, professional consultants, other concerned people or agencies outside the campus, arranging meetings for various groups, and providing information
2. preparing information about spatial requirements, standards, costs, patterns, etc.

3. providing staff for assistance with each subcommittee of the CPC committee
4. reviewing planning activities of users' design works to help the groups work productively; and
5. conducting administrative functions such as compiling biennial capital construction reports, and supervising routine construction works.

Brewster (1976) listed other duties, such as:

1. maintaining the master plan up-to-date
2. preparing plans and specifications for countless remodeling and alteration projects
3. creating grading plans, site-development plans, sprinkling and planting plans; and
4. keeping record of all utilities, including being the 'keeper' of all plans and specifications of all projects done on the campus.

Castaldi (1987) declared, "Every institution of higher learning needs a planning bureau" (p. 311). The idea of a central planning office was not new, according to Brewster (1976). Most schools had had one in some form or another for years, he added, but the misconception was that only large and affluent universities and colleges could afford offices staffed with sufficient personnel to handle their planning problems.

Faculty and staff

Neylon's (1991) study found that for the campus master plan to be effective, the initial and ongoing support of key personnel, with the participation and involvement of as many educators as possible, was required. "While the plan emanates from the president's staff, the ideas in it come from the faculty members" (Ross, 1981, p. 1). A failure of faculty/staff involvement could be a lack of trust by the planners. Schmidlein and Milton (1988-89) saw that trust and confidence among parties involved an important factor in the success of efforts to determine campus directions and programs. When faculty were periodically placed in positions where they had to deal with campus-wide issues, they seemed to contribute to a higher level of trust.

To Stender (1969) it appeared that more people needed to be involved in campus planning, particularly deans, faculty, and students who had much to offer campus planning, particularly in small institutions. He surmised that possibly low participation was due to lack of formalized planning skills. Miller (1980) observed that a common mistake institutions made in preparation for planning was the failure to provide adequate training for the faculty and staff. College personnel, who had not previously worked with formalized long-range planning, frequently needed in-service education to acquire knowledge of the concepts and implications of planning. As a counterbalance, however, to high non-skilled

involvement. Castaldi (1987) recommended that an educator, competent in school plant planning, be part of the planning team and have final word on all building matters affecting the educational functions.

Outside consultants and agencies

"Consultants are a major source of assistance in developing and implementing a campus plan" (CEFPI, 1991, p. P8), especially, a planner who, as Biehle (1991) explained, "understands how colleges and universities work and appreciates what a special and unusual 'academical village' a college or university campus is" (p. 25). They contributed to the campus planning process by distilling the various discussions to the significant recurrent themes—the consistently repeated issues, the areas of common concern, and the areas reflecting the greatest disparity of opinion (Chapman, 1990). In order to be acquainted with all the areas of discussions, the consultant served as the liaison between the various areas within the university and the group or individual preparing the plan. He met with and discussed the needs of the various departments within the university to formulate the requests into a relationship that could be developed within the scope of the master plan (Hampel, 1969). Therefore, Hampel (1969) recommended, that

1. the consultant be a member, if not chairman, of the faculty master planning committee, included in all planning of any import on the physical facilities of the campus; and
2. the consultant be able to present several viable alternative procedures to achieve various configurations of campus expansion.

Rossmeier (1979) reiterated Brewster (1976), "In the past, too often consultants have been hired to develop a master plan through a one-shot effort. While such a plan would be relevant for a short period of time, there is no mechanism for updating this plan on a regular basis" (p. 6). More important, Rossmeier added, was to have institutional people involved in the process to increase the effectiveness of planning and to increase commitment to institutional goals and objectives. With an open, observable and accountable planning process in place, the master plan could be evaluated, revised, and changed on a systematic basis to meet changing conditions and needs (Rossmeier, 1979).

Another major impetus creating a need, but not necessarily providing solutions to planning, was external agencies. The biggest problem seemed to be planning geared towards meeting agency demands. Institutional individuals, working independently to develop planning documents to meet these demands, typically appeared largely ignored in decision making (Schmidlein & Milton, 1988-89).

Planning team

In some cases the president assembled a team of experts in educational programming, architectural design, and financial planning to produce a plan that expressed the philosophy and policies laid down by the board of trustees (*Why a Master Plan?* 1960-1969). The team could include an architect or an educational consultant, or begin the process before such persons are solicited (Mayhew & Smith, 1966).

The team's role was to gather information for the planning process. Some information was gained through correspondence and telephone calls, or by reading other college master plans and bulletins. However, Mayhew and Smith (1966) suggested that members of the planning team make personal visits to other college campuses where problems similar to those encountered at the home institution had been successfully solved. The cost of sending planners on such trips could appear high, but a single idea gleaned from a visit could save the institution thousands of dollars. Mayhew and Smith concluded, "Austerity in the planning phases can be costly in the long run" (p. 36).

Campus Planning Committees

The usefulness of different campus master planning committees was helpful in determining needs and priorities. While the plan analysis stage could produce a list of essential items, not all may be accomplished in the early phases of implementation. The varying committees helped spread the responsibilities, increase participation, and mediate differences among competing interests (Dober, 1992).

Early in the campus planning process, relevant committees were organized and master plan responsibilities delineated. The purpose was to identify and discuss the basic physical elements of the master plan. The results were policies and development strategies that were incorporated into the campus master plan (Evans, 1984).

However, Rossmeier (1979) warned that planning could not be run by a committee or even one individual but eventually needed to be diffused throughout the organization as a regular part of a participatory institutional activity (Rossmeier, 1979).

Several of the following committees provided expertise and various viewpoints needed for a successful planning effort.

Campus planning steering committee

The campus planning steering committee was the main body organizing the planning process. Composed of institutional executives, other administrative representatives, deans, faculty, and students,

the committee's purpose was to work with campus planning consultants on the development of the long-range physical master plan required by the board (Leu, 1985). Among its specific activities, were:

1. studying existing conditions, assessing and verifying needs, and establishing priorities for the quantity and quality of facilities and related service (CEFPI, 1991)
2. establishing and meeting appropriate timetables, ensuring interaction between committees, and overseeing that all the aspects of the planning process proceed expeditiously (Evans, 1984)
3. ascertaining that the proper data for beginning the planning effort were prepared (Shuman, 1983, p. 276)
4. reviewing plans and specifications for major alterations, additions, landscape projects, and other major jobs by institutional or outside professionals (Brewster, 1976)
5. ensuring that the campus master plan was kept current and its basic integrity maintained (Brewster, 1976)
6. advising the administration of its priorities and creating links of communication with the larger campus community (CEFPI, 1991).

The campus planning steering committee required a permanent meeting room, preferably adjacent to the campus planning office area. In this location the campus planning staff could be available for consultation, and to provide records, maps, drawings, and other basic reference materials. Brewster (1976) noted that one-foot spaces should be marked off both horizontally and vertically on the walls to help visualize dimensions.

The recommended size of this committee was between 10 and 12 members; however, as Chapman (1990) stated, "ultimately the measures of effectiveness come from the group's leadership, dynamics, and commitment" (p. 15).

The Clackamas Community College Master Planning Program Final Report (1973) described several aspects of the master plan steering committee including:

1. receiving official recognition as a permanent committee
2. restructuring the committee in such a way that new members were added one at a time so these new members could be trained in the planning process and become acquainted with past reports and documents as well as discussions with experienced members
3. scheduling regular meeting times at a specified location with the information posted throughout campus to encourage drop-ins; and
4. providing periodic training by committee members of other faculty, staff, and administrators of the institution.

According to Leu (1985), the campus planning steering committee was further divided into four subcommittees:

1. subcommittee on design—responsible to review and evaluate individual project proposals along with the simultaneous evaluation and refinement of existing patterns and the formulation of new patterns
2. subcommittee on historical continuity—responsible for policies relating to buildings and space of special significance to the university
3. subcommittee on transportation—responsible for developing policies for transportation facilities on and around campus; and
4. subcommittee on implementation—responsible for selecting consultants and preparing list of priority for capital construction needs (pp. 51, 52).

Academic planning committee

The role of this committee was to prepare a market study indicating growth potential and non-growth areas for specific academic disciplines. Studies also needed to be conducted to determine special institutional strengths or thrusts, library development, special policy matters and other special issues, and determine realistic enrollment projections for each academic discipline (Evans, 1984).

Committee on student life

The role of this committee was to be responsible for inventorying, examining, assessing student facilities in the context of student study, social, recreational, athletic, and health-related needs (Evans, 1984).

Campus physical planning committee

The role of this committee was to make an inventory of existing facilities relative to current and future needs, purposes, the policy framework, and design guidelines for future campus improvements (Evans, 1984). The committee could be either permanent or ad hoc, with the primary duty of the ad hoc committee being to prepare a list of requirements for a specific building to be occupied. Most persons served on an ad hoc committee only once, and usually needed to be supplied with basic information on how to prepare a program or requirements. Essential, also, was the professional and technical assistance from the department of physical plant (Brewster, 1976).

Advisory committee

This committee, usually composed of faculty members, was organized, sometimes by departments, in order to supply ideas and suggestions to the planning team and make continuous evaluation of plans as they were being developed. In turn, the planning team met with the entire college faculty periodically, and more often with each department, to ensure that all the educational details of a particular facility were known to those who would be users (Castaldi, 1987).

Personnel Summary

While a review was made of the various duties by position and committee during the campus-planning process, Hampel (1969) very accurately pointed out, "A very important consideration in the development of a useful plan is that there can be no termination of effort by those involved" (p. 29).

'Selling' the Campus Master Plan

An important final part of the campus planning process was 'selling' the plan. This 'selling' took on several different forms. 'Selling' could be an internal effort to get members of the institution 'on board' with the plan. It could also be an external effort to promote the results of the planning process. The 'selling' was more fully elaborated in the following aspects.

Public Relations and Fund-raising

Public relations affected the CMPD both within and without the institution. Shuman (1983) saw the internal selling of the plan as another important aspect in building support. He suggested keeping people apprised of the progress, establishing deadlines for products and adhering to them, and dropping away from the straight line of planning as a way of building organizational support for the plan.

Externally, the document should be viewed as "a proposed guideline and as an instrument for public relations" (CEFPI, 1991, p. P7). "Development and distribution of a capsule report of the plan is an important public information technique" (p. C12).

Fund-raising was another important function that tied in with public relations and the selling of the plan. As Skelly (1989) noted, "Developing a master plan is one thing, carrying it to a finished project is another. Fundraising is an important aspect of the finished product. No matter how comprehensive a master plan, it is worthless without the money to carry it out" (p. 14). Skelly further added that fund-raising influenced what got built first, second, third, and so on.

Donors and the Campus Master Plan

Donors seemed to prefer the formulation of a definite plan. *Planning Toward an Ideal* (1900-1989) stated that a plan already worked out ensured the best use of the gift from an economic, academic, and architectural point of view. "It is also apparent that the formulation and possession of a definite plan properly may itself stimulate gifts, may even act as an inspiration for the would-be benefactor and a goal for all those concerned with the institution's existence and good will" (pp. 14, 15).

Marketing and the Campus Master Plan

In marketing, especially to prospective students, the campus master plan played an indirect but important role. Gaines (1991) reported that "sixty percent of college-bound students told the Carnegie Foundation that the visual environment was the most important factor in choosing a college. Education is an endeavor that is most sensitive to ambience; students respond all their lives to memories of the place that nourished their intellectual growth" (p. 11). Timberlake (1990) noted earlier, "In the college marketing strategy, the physical attributes of a college or university sell that particular institution" (p. 24b).

Timberlake argued that from a holistic view of campus design

the architecture cannot be separated from the landscape, from the educational mission of the school or from the personality that the people, faculty, students and administration bring to it. In order to market colleges and universities in the next few years, attention must be brought to these aspects. (p. 24d)

Carmichael (1991-92) argued that along with academics, campus appearance played a major role in students' choice of a college. Carmichael believed a campus' appearance made a statement about what the institution stood for, what it cared about, which in turn affected the performance of students. "The physical appearance and resources signal to prospective students and faculty what kind of institution they are walking through" (p. 23). Mary Washington College (1986) concluded, "Effective campus planning should not only provide for orderly building growth, but also should create a campus image conducive to style and learning" (p. 163).

Summary

This chapter traced the origins and development of the campus master plan; outlined the planning process in which the campus master plan was produced; defined the roles of the individuals involved in the campus master plan's production; and looked at a few of its other uses in addition to it being an articulation of future institutional proposals. One of the questions constantly posed in campus planning is: Is the campus master planning effort worth the time, energy, and resources involved? To this question Blank and Smith (1976) summarized, "The master planning was worth the effort. It is our

responsibility to shape our master plan so that it, rather than random occurrences and mediocrity, will shape our institution." Chapter 3 looks more closely at the campus master plan document itself and types of campus master plans—some institutions have simply planned to grow unplanned.

CHAPTER III

A CAMPUS MASTER PLAN DOCUMENT TYPOLOGY

Background

Now, a development plan is a thing of long and mature study by many minds. It is publicly exhibited and all persons interested in the institution have opportunity month after month and year after year to criticize it. It has stood the test of time and should be considered in its main features inviolable. It has evoked enthusiasm. It has called forth gifts and these gifts should be made to further and not thwart it. Courage on the part of the governing officers is necessary. Fortunate indeed is the institution the development of whose physical plant is long in the hands of a wise and wide-visioned autocrat who brooks no detours in reaching the goal of a fine architectural plan. (Klauder & Wise, 1929, p. 43)

In spite of this eloquent description, establishing a typology of a campus master plan document from literature was not as obvious as first envisioned. As Stender (1969) stated, "One cannot generalize about the worth of master planning unless it is taken within the context of each institution. . . . The range of sophistication in the approach to the effort remains quite wide" (p. 55). This chapter attempts through the reviews of different types of and studies on campus master plan documents, prior to compiling a typology, to establish a framework for identifying elements from literature of a campus master plan.

Types of Campus Master Plan Documents

Parker and Smith (1968) observed that a campus master plan document to some has meant a single drawing pinned to a wall, while to others a voluminous printed document. This statement reflected the contrasts found in literature on the different points of importance and issues discussed on master plan documents. Of certainty is the following:

An investigation of some of the institutions which are proceeding toward their goal by means of a definite development plan discloses the fact that almost every type of college is found among them—small, large, co-educational or otherwise, private and state or municipal institutions. Numerous are those which have formulated development plans and have started well on the way to realization of their ideal. (*Planning Toward an Ideal*, 1900-1989, p. 15)

Campus Layouts

A list of campus layouts appeared in literature from *Why a Master Plan?* (1960-1969) and Timberlake (1990) diagrammed six types of campus layouts:

1. *traditional*—followed Jefferson's Academical Village concept
2. *woods and ravines* or *pastoral rural*—followed Olmstead's irregular, park-like, natural landscape concept
3. *suburban*—the campus had a lack of continuity and an unclear relationship to the landscape
4. *quadrangles*—followed the Oxford ideal of seclusion and separation
5. *urban gridiron*—followed a modern urban-city concept, buildings formed block-by-block continuum with pedestrian movement on the inside and vehicular traffic on the perimeter; and
6. *megastructure* or *megablock*—buildings interconnected under one roof.

Burkhalter (1983) divided these types into two generally identifiable categories for existing campuses:

1. *dispersed*, where extensive amounts of open space separated haphazard siting of buildings complexes, and
2. *concentrated*, with a necessity of centralized core and densely extends outward.

As Timberlake (1990) observed, each of these types had special characteristics that attracted different kinds of students.

Types of Documents

Keating (1988) did a study of four research universities' campus planning procedures: Northwestern University, M.I.T., University of Rochester, and the University of Pennsylvania. Dober (1992) identified four types of plans, which ranged from working with a clean slate to integrating new and old. These provided the basis for the types of campus master plan documents reviewed in this section.

New campus plan

Dober (1992) identified one type of plan as the new campus plan. This plan obviously begins with a new slate. However, Dober noted that the prospects for new campuses in North America seemed limited as enrollments for 4-year institutions were likely to remain stable in the foreseeable future.

Informal document

At Northwestern, Keating (1988) found the plan to be an informal document, which permitted flexibility in siting and program content of potential facilities. This loose-leaf plan did not prescribe specific building siting requirements, but instead outlined general land use patterns in zones of similar or related facilities that together provided an overall development scheme for the area of campus. However, recent departures from the plan called into question concepts of the plan. The staff members

responsible for planning agreed that their document was not well documented nor easily used as a reference tool. As a result, if this plan continued, the intention was to develop a more descriptive set of documents of the long-term plan along with the loose-leaf informal plan currently used.

Boles (1965), in his plant-needs survey, recommended a loose-leaf document with each section beginning on a new page. This would allow for easy revision without having to redo the entire document. *Bricks and Mortarboards* (1966) observed that most planners had concluded that the informal campus plans had survived better than the monumental, rigidly formal designs. It reported that most planners leaned toward the informal campus layout; however, they tended to favor rigid zoning as a means to separate the academic, 'activity,' and residential areas of the campus.

Sectional plan

At MIT, Keating (1988) found its campus master plan developed in regard to areas, sections, or specific sites. Their plan was not a comprehensive one for future development, but rather a detailed sectional plan because MIT did not own large amounts of undeveloped land. Future facility planning was driven by opportunities to acquire surrounding land in proximity to the existing campus. Because of this, MIT viewed its options in 50 year frames, with facility planning progressing in particular sections or areas of campus in 10- to 15-year frames as surrounding land became available.

Dober (1992) also identified the sector plan. He described its purpose as guiding new large-scale construction, which though designed as for a new campus, was situated on or being integrated into an existing campus.

The compact plan

Castaldi (1987) presented the compact plan, which psychologically, as he argued, lent itself more readily to an intellectually stimulating atmosphere than other plans. This was based on the related educational buildings clustered in the same central core area, architecturally exciting and harmoniously designed, surrounded by a circular peripheral driveway. The short distances for students to walk from building to building encouraged greater contact with faculty members and promoted the interchange of ideas among the community of scholars. The compact campus also offered greater architectural cohesion than the decentralized campus plan. Castaldi admitted there was no ideal or recommended layout for a college campus, and that in the absence of a well-conceived campus plan, the compact concept could not always be applied. In many instances, the location of buildings was determined more by the availability of land on the campus than by functional or conceptual considerations.

Land-locked plan

Freeman, D'Elia, and Woodward (1992) identified three 'waves' in campus master planning of special interest to land-locked institutions. The first, the traditional campus master plan, provided a rational, ordered, and handsome plan for long-term additions to the capital plant on available college-owned property. The second wave, developed in the last several decades, was institutions using a corner or strip of its property to develop income-producing structures, like shopping malls and hotels, with the purpose of using the income for academic structures on the core campus. The third wave was creating strategies where the institution built new facilities on city-owned property in cooperation with the city and private developers. These consisted of structures in which private developers could realize profits or enter into partnerships, such as housing, continuing education centers, performing arts facilities, administrative offices and student services or research/technology parks, hotel/conference centers, and other commercial facilities (Conroy & Schwarz, 1990). These new approaches obviously involved less control, and greater need for political, financial, and negotiating skills on the part of the institution. It meant giving up a degree of independence and separateness from the surrounding community, but provided solutions when land was scarce or unavailable (Freeman et al., 1992).

Insert, add-on plan

The insert and add-on plan was identified by Dober (1992). Its purpose was to strengthen the institution's niche by inserting a new building in an existing campus, adding-on to an existing building, or doing major renovations to the campus. The location, scale, and sequences of these changes were best coordinated through an overall plan.

Regeneration plan

Dober (1992) also identified the regeneration plan. This plan endeavored, through a comprehensive approach, to make the entire campus attractive and functional, not just selected aspects. This included the systematic reduction of deferred maintenance and the acceleration of building and site renewal. Viewed as the least glamorous, Dober argued it was the plan most needed by most American and many overseas campuses.

No master plan document

Several studies reviewed in some form this 'type' of plan. Keating (1988) found campus facility planning at the University of Rochester had been ad hoc without the guidance or vision of a comprehensive plan. The results were construction of several facilities, independent of an overall plan.

whose siting, design characteristics, and circulation patterns ignored the rest of the campus. A process was being implemented for a campus development program. This was not considered a master plan but a foundation for one.

Also, Keating (1988) found at the University of Pennsylvania that an existing review process was ineffective in significantly influencing the character of the new buildings. For this and other reasons, including an interest in comprehensive planning by the Board of Trustees, the University decided to develop a campus master plan.

Leu (1985) in his study found that the University of Oregon had tried campus planning without a formal master plan document through a process called the Oregon Experience (OE). The most specific characteristic of the process was that it used criteria statements called 'patterns' to develop a building design. Building criteria were determined in a participation process of discussions between users and professional consultants, using traditional media, such as bubble-diagrams, floor plans, sketches, sections, or models of previous projects. The process was built on several OE principles:

1. piecemeal growth by very small building increments, seen as important in determining campus character and user participation; and
2. diagnosis, a technique for evaluating and improving the campus environment through a planning process without a campus master plan.

This principle, which substituted the role of a traditional campus master plan, called for a yearly diagnosis of the campus and a set of plans for improvements proposed. The institution relied on this plan to guide campus development. Although the University of Oregon experimented with OE, Leu reported that the state board had a policy that every institution under its control develop and adopt a master plan. Leu admitted that not all the aspects of the OE process developed as planned. This was partly due to the structure of the state board, which favored a traditional campus master plan document, and structured the planning process accordingly.

Audrain (1986) reported that the University of Chicago debated over creating an explicit plan versus a generalized document emphasizing the planning process, and between hiring a prominent architect versus an experienced planning firm. The explicit plan was chosen along with the experienced firm, which eventually also strengthened the planning process.

Arcidi (1992) noted Princeton University as a campus that had grown without a master plan. Apparently this growth by accretion, without a comprehensive vision, had produced a "campus which is well suited to these pluralistic times" (p. 127). Earlier Arcidi (1990) had written, "Campuses are amalgamations of successive building campaigns. Often, they are not governed by a master plan, but

were seamed together over time—not by architects, but by the students who inhabit the campus” (p. 100).

Brewster (1976) also noted:

Not all campus planners accept master plans in the favorable light. . . . Some feel strongly that master planning is the wrong approach, that it is better to let the campus develop in accord with what is expedient at any given time. They can cite many examples of money being spent on a succession of master plans and nothing really worthwhile being accomplished. (p. 41)

Campus Master Plans and Short-Range Plans

Sometimes campus master plans or long-range plans were confused with project plans.

Shaker (1984) defined the difference. The long-range plan was a single, official, impermanent document adopted by a college or university as a general yardstick to guide future campus development over a long time span. The project plan, on the other hand, was a document that covered a definite segment of the university campus and could be as small as one building, floor, or room. Either as a preliminary or final plan, it was highly detailed technically and architecturally but had a limited scope and a short time span.

Future of Campus Plans

Whatever the different types of campus master plans being developed, Dober (1992) pointed out, the plan's legitimacy and longevity were directly related to achieving:

1. campus-wide understanding of the physical characteristics of the area under study
2. general agreement as to what improvements should be represented in the plan; and
3. confirmation of their location and the sequence of development (p. 284).

Dober (1992) projected that in the next decade the regeneration of the physical environment, not wholesale expansion, would be the primary objective of colleges and universities, with improvements occurring only in small increments stretched over time.

Schmidlein and Milton (1988-89) reported that comprehensive campus planning documents most commonly ended up 'on the shelf.' They observed that such documents possibly provided some general context for making campus decisions, but seemed to provide limited operational guidance.

Ringle and Savickes (1983) also observed the frequency of planning documents, completed and apparently accepted by key campus constituencies, becoming 'shelf' documents that were used mainly for presentations to external agencies rather than as guides for campus decisions and actions.

Schmidlein and Milton theorized that producing lengthy planning documents often may not be useful or appropriate due to the great amount of time and resources their preparation required. They reported that observations from persons involved in planning seemed to indicate the main value of preparing the plans

resulted in the insights participants gained during the process, not from the documents produced. Schmidlein and Milton suggested careful weighing of the benefits of documentation against its costs.

Blank and Smith (1976) concluded differently. They summarized that in the campus master planning process, of which the document was the product, one must have faith in what he does. To them the effort was worth what it took to shape a campus master plan, so that it, and not random occurrences and mediocrity, shaped the institution.

Purposes of a Campus Master Plan Document

In light of the arguments above, it was valuable at this point to review some of the statements defining the purposes from literature of a campus master plan.

Reed (1967) stated outright, that the purpose of the campus master plan was to make the best use of the site and to plan for the most efficient and functional placement of the various facilities necessary to fulfill the college's ultimate needs in carrying out its programs. If the campus could not be built all at one time, then the master plan document served as a pattern to plan the various phases of construction and coordinate that the phases would fit harmoniously into the ultimate development. Kark (1986) noted this in context with the Virginia Technical campus master plan: "Throughout the master plan, an attempt is made to convert liabilities to assets" (p. 25).

Shuman (1983) held that the campus master plan was prepared at a point in time to be used as a guide for future decisions. The preparation of the plan overlaid the day-to-day tasks, and supported the university's basic function, of keeping small the amount of administrative time devoted to campus planning concerns relative to other issues. Without an effective plan the administration could spend undue amounts of time being devoted to mundane issues of the physical plant. Evans (1984) added that more than a slick, printed document, the purpose of the plan was to produce a commitment from the campus leadership to the physical development principles contained in the plan. Then, as Brewster (1976) observed, it would not be just a pretty picture, but also be a working tool, meaningful only as it had "positive impact on the direction of an institution" (Miller, 1980, p. 28).

Another purpose for the campus master plan was getting maximum efficiency out of existing facilities, anticipating and preparing for future space needs (Rosen, 1987). The campus master plan could maximize the always-limited resources of an institution, providing savings for the present as well as the future, by having a plan for responding to the needs and resources as they become available (Skelly, 1989).

Skelly (1989) also noted that the campus master plan could energize and inspire the raising of funds needed to carry out the plan. "This is why it is so important to pick out what is special about the school and character of the campus, enhancing it with the plan" (Skelly, 1989, p. 15).

Dober (1992) additionally observed that a well-formulated campus master plan could define the institution's place within the larger community, justify land ownership, adjudicate site location decisions, mediate conflicts in land uses and circulation systems, and rationalize the construction and extension of infrastructure. Basically, as Skelly (1989) pointed out, the campus master plan reinforced the ideas and assets that really made an institution special, what set it apart, its resources, particularly physical, and tried to make the most of them.

As Dober (1963) concluded, "If in our time taste and style continue in cycles, as they will and must, it is *plan* that offers hope for continuity within change, and a viable campus design" (p. 34).

Studies and Preliminary Review of Campus Master Plan Elements

Studies on a smaller scale identifying campus master plan elements had been conducted. These were used as a starting point for this research. A preliminary review of the literature was performed, based on the number of occurrences from sources, to establish a general listing of elements. This listing was used as a guide in the more exhaustive compilation of element statements. These statements formed the base of the typology. The following is a fuller discussion of these studies.

Studies of Campus Master Plan Elements

The State of Michigan Board of Education (1968) conducted a study of its 28 community colleges on 32 campuses to better understand the status of campus master planning in its colleges. A questionnaire was sent to each campus and the responses highlighted 10 elements of a campus master plan. The results are listed in Table 7.

There was no implication in the questionnaires that these 10 elements were the only ones essential to a campus master plan, or even that all 10 were essential. In almost all cases, the 10 elements were stated as being included in the campus master plans.

Of the 25 campus master plans submitted with the questionnaire, and available literature, the elements (present and proposed in each case) were derived (see Table 8). These eight components varied from the earlier 10 components, and the community colleges were not informed as to what constituted a campus master plan. The 25 campus master plans submitted were compared with these

TABLE 7
STATE OF MICHIGAN (1968) STUDY QUESTIONNAIRE RESPONSES

Rank	Element	# of Responses
1.	Utilities plan	22
2.	Traffic, parking, and circulation plan	27
3.	Facilities plan	27
4.	Role and scope of the community college	26
5.	Enrollment projections	27
6.	Phased development	25
7.	Statistical summary	21
8.	Admission policies	23
9.	Community service program	21
10.	Organization of the community college based on its educational programs and goals (i.e., academic plan)	21

TABLE 8
STATE OF MICHIGAN (1968) STUDY-DERIVED ELEMENTS

Rank	Element
1.	Academic plan
2.	Student enrollments
3.	Building spaces and costs
4.	Housing philosophy
5.	Athletics and recreation
6.	Circulation and parking plan
7.	Community and zoning plan
8.	General site plan

components, and it was found the plans did not include all of the ten elements indicated by the questionnaire responses, or the later eight.

Organization and Preliminary Review of Campus Master Plan Elements

In subsequent sections of this chapter, the sources of campus master plan elements have been grouped by decades for the purpose of observing possible differences over time both in the literature and data. The result of this organization was five groups by decade: (1) 1930s; (2) 1960s; (3) 1970s; (4) 1980s; and (5) 1990s. The work of Klauder and Wise (1929), although dated earlier, was included in the 1930s group for several reasons: (1) it was one of the first published books on the topic of campus planning, and therefore an important point of departure; and (2) there consisted little literature prior to Klauder and Wise's work.

The compilation of the typology followed a two-step procedure. The first step consisted of a preliminary review of literature to create a matrix for recording occurrences of elements found, along with the citing sources. As each source was reviewed, a check was made in the column of the mentioned element, or a new column was added if the citing occurrence was not already written on the paper. Table 9 provides a listing of the sources consulted for this preliminary review along with the group organization.

One problem with this procedure was that several sources used similar language for titles or references to elements, which, when put in context of the reading, revealed a lack of direct similarity. Another, probably larger, problem was that sources would use different language in describing similar elements, thus eventually creating a listing of elements that was longer than what really existed in literature. Table 10 displays the top 60 elements found, ranked according to their occurrences in literature. Elements occurring only once were not listed.

The second step, a natural outgrowth from the problems of the first, was to organize the verbal statements according to their context in literature, grouped in a general order of the elements found in the preliminary review. The results of this step are more thoroughly discussed and developed in the next section.

The problem that arose with this compilation was one that revealed a principle of campus master planning: the interrelatedness of campus planning elements. Each author presented elements in groups or nutshells, combining sub-elements or aspects of campus master planning that another author would group differently. It was necessary at times to 'crack the nut,' so to speak, and separate the sub-elements mentioned in a particular reference, in order to organize the verbal statements according to the

TABLE 9
PRELIMINARY REVIEW OF CAMPUS MASTER PLAN ELEMENT SOURCES BY GROUP

1930s	1960s	1970s	1980s	1990s
1933, Larson & Palmer	1969, Babcock	1977, Lane Community College	1989, Skelly	1992, Dober
1931, Ackerman	1969, <i>Occupations & Education</i>	1976, Brewster	1987-88, Brase	1991, Blehle
1929, Klauder & Wise	1969, Stender	1974, Colorado Commission on H. E.	1987, Castaldi	1991, CEFPI
	1960-1969, <i>Why a Master Plan?</i>	1974, Halstead	1986, Babson College	1990, Brase
	1968, State of Michigan	1974, Weber & Fincham	1986, Mary Washington	
	1967, Reed	1973, Evans & Neagley	1985, Leu	
	1966, <i>Bricks & Mortarboards</i>	1972, Kansas Board of Regents	1984, Evans	
	1966, Mayhew & Smith	1972, Morley	1984, Shaker	
	1963, Dober		1983, Johns & Schuster	
			1982, Pawsey	
			1980, Brown	

TABLE 10
RANKING OF CAMPUS MASTER PLAN PRELIMINARY REVIEW ELEMENTS FROM LITERATURE

ELEMENTS	OCCURRENCES IN LITERATURE - Totals, with Distribution by Decade											
	Total (n = 36)		1930s (n = 3)		1960s (n = 10)		1970s (n = 8)		1980s (n = 11)		1990s (n = 4)	
	#	%	#	%	#	%	#	%	#	%	#	%
1. Land Uses	13	36	-	-	3	30	4	50	3	27	3	75
2. Utility Systems	12	33	-	-	3	30	4	50	3	27	2	50
3. Costs and Financial Implications	12	33	-	-	5	50	3	38	2	18	2	50
4. Enrollment and Campus Populations	11	31	1	33	4	40	2	25	3	27	1	25
5. Circulation	11	31	1	33	2	20	3	38	2	18	3	75
6. Landscaping	11	31	-	-	1	10	3	38	3	27	4	100
7. Educational Program	10	28	-	-	6	60	-	-	3	27	1	25
8. Building Sites	10	28	-	-	2	20	4	50	1	9	3	75
9. Parking	9	25	-	-	2	20	2	25	3	27	2	50
10. Goals/Objectives/Priorities	8	22	-	-	5	50	1	13	2	18	-	-
11. Evaluating Existing Facilities	8	22	-	-	3	30	2	25	2	18	1	25
12. Traffic Pattern	7	19	1	33	2	20	4	50	-	-	-	-
13. Projection of Future Needs	6	17	1	33	2	20	2	25	1	9	-	-
14. Land Acquisition	6	17	2	67	1	10	-	-	-	-	3	75
15. Scheduling	6	17	-	-	2	20	1	13	2	18	1	25
16. Campus Boundaries	5	14	-	-	2	20	1	13	1	9	1	25
17. Student Housing	5	14	1	33	-	-	1	13	3	27	-	-
18. Attractiveness--Appearance of Campus	5	14	-	-	2	20	1	13	1	9	1	25
19. Needs of Total Man--Sense of Home, Symbols	5	14	-	-	4	40	1	13	-	-	-	-
20. Environmental Design Guidelines	5	14	-	-	3	30	2	25	-	-	-	-
21. Athletics and Recreation	5	14	-	-	2	20	1	13	1	9	1	25
22. Visual/Spatial Aspects	5	14	-	-	-	-	1	13	2	18	2	50
23. Community Growth Factors	4	11	-	-	1	10	2	25	-	-	1	25
24. Personnel Housing	4	11	1	33	-	-	1	13	2	18	-	-
25. Zoning	4	11	-	-	2	20	2	25	-	-	-	-
26. Space Relationships	4	11	1	33	1	10	1	13	-	-	1	25
27. Site Plan	4	11	-	-	3	30	-	-	1	9	-	-
28. Campus Core	4	11	-	-	3	30	1	13	-	-	-	-
29. Renovation and Reuse of Structures	4	11	-	-	1	10	-	-	2	18	-	-
30. Phases of Development	4	11	-	-	3	30	1	13	-	-	-	-
31. Space Planning Standards	4	11	-	-	2	20	-	-	1	9	1	25

Table 10 - Continued.

ELEMENTS	OCCURRENCES IN LITERATURE - Totals, with Distribution by Decade											
	Total (n = 36)		1930s (n = 3)		1960s (n = 10)		1970s (n = 8)		1980s (n = 11)		1990s (n = 4)	
	#	%	#	%	#	%	#	%	#	%	#	%
32. History of the Community	3	8	-	-	1	10	2	25	-	-	-	-
33. Summary of Institutional Growth	3	8	1	33	-	-	1	13	-	-	1	25
34. Density of Buildings	3	8	-	-	-	-	2	25	1	9	-	-
35. Financial Resources	3	8	-	-	1	10	1	13	1	9	-	-
36. Topography (Grading)	3	8	-	-	1	10	2	25	-	-	-	-
37. Space Needs	3	8	-	-	2	20	-	-	1	9	-	-
38. Infrastructure	3	8	-	-	1	10	-	-	1	9	1	25
39. Orderly Building Growth	3	8	-	-	2	20	-	-	1	9	-	-
40. Academic Plan	3	8	-	-	2	20	1	33	-	-	-	-
41. Security and Safety	3	8	-	-	-	-	-	-	2	18	1	25
42. Physical Planning Objectives/Principles	3	8	-	-	1	10	1	13	-	-	1	25
43. Philosophy (Role and Scope)	3	8	-	-	2	20	-	-	1	9	-	-
44. Building Codes	2	6	-	-	-	-	1	13	-	-	1	25
45. Zoning Regulations	2	6	-	-	-	-	1	13	-	-	1	25
46. Architectural Policies	2	6	-	-	-	-	-	-	2	18	-	-
47. Architectural Form	2	6	-	-	-	-	1	13	-	-	1	25
48. Relationships Between Elements	2	6	-	-	-	-	1	13	1	9	-	-
49. Meshing with Existing Facilities	2	6	-	-	1	10	-	-	-	-	1	25
50. Statistical Summary	2	6	-	-	1	10	1	13	-	-	-	-
51. Facilities Plan	2	6	-	-	1	10	1	13	-	-	-	-
52. Housing Philosophy	2	6	-	-	1	10	-	-	1	9	-	-
53. Access	2	6	-	-	-	-	-	-	-	-	2	50
54. Energy Conservation	2	6	-	-	-	-	-	-	1	9	1	25
55. Deferred Maintenance	2	6	-	-	-	-	-	-	1	9	1	25
56. Transportation (Public)	2	6	-	-	1	10	1	13	-	-	-	-
57. Open Space	2	6	-	-	-	-	1	13	-	-	1	25
58. Community Use	2	6	-	-	1	10	-	-	-	-	1	25
59. Action Plan	2	6	-	-	2	20	-	-	-	-	-	-
60. Develop Master Plan Drawings	2	6	-	-	2	20	-	-	-	-	-	-

preliminary review groups (i.e., the element *topography*, which might have been variously grouped with the Academic Plan, Circulation, or Land Use Aspects.).

Holistic View of Campus Master Planning

Before reviewing the compiled statements of the campus master plan elements found in literature, a framework needed to be established for the placement of elements. The temptation might occur to take a listing of elements, and check each item off for inclusion into a document. The literature, however, did not treat each different element in isolation. Klauder and Wise (1929) recognized that the keynote of a campus master plan was order. As a document, it needed to have a homogeneous, clearly apprehended scheme that provided a studied and happy balance of things: buildings located with regard to their functions, importance and architectural effect, natural views conserved; and topographical advantages skillfully exploited. Larson and Palmer (1933) also underscored harmonization between new and existing buildings of established colleges both in group arrangement and in plan. The clear theme was the interconnectedness of elements in an overarching scheme rather than a compilation of studies of the various aspects of an existing and future campus.

The campus master planning process was the meshing of interconnected elements in a document whose totality is greater than the sum of its parts. Timberlake (1990), as noted in chapter 2, termed it "a holistic view of the campus," including the campus design (p. 24d). This view went from academics to operations, to physical plant, to the architecture not separated from the landscape, to the educational mission not being separate from the personality that the people, faculty, students, and administration provide. Morris (1984) called it an "overall, integrative process of creating a 'campus master plan,' which deals with the relationships between individual buildings and the campus as a whole" (p. 28). Shaker (1984) added, "It is not a joined incrementalism plan, but a holistic plan broken into components or stages accomplished through a sequence of processes" (p. 32). Muller (1985), in his planning process, noted that from the outset there was a conscious attempt not to view any element in isolation nor to permit a single element to take absolute priority over the others. "Proposals were viewed against a matrix of relations and interactions between the components of the campus" (p. 11) Both CEFPI (1991) and Halstead (1974) also mentioned the importance of smooth interrelationships between elements.

Compiled Campus Master Plan Element Statements From Literature

Prior to listing the verbal statements of elements found in the sources, as noted above several authors pointed out the importance of not following a checklist simply because it exists. Brown (1980)

wrote, "Master plans for one school cannot be applied *in toto* to another school. Needs will be different, locations of buildings will vary, being affected by such things as terrain, the availability of power lines, the location of the water, etc." (p. 225). Kansas Board of Regents (1972) also observed that variations would occur between institutions because of differences in the amount of information, the degree of plan refinement, campus location, and other determinants. Dober (1992) agreed, "The actual number and type of components in a campus plan will, of course, vary with the institution's niche in higher education, mission, size, and related factors" (p. 229). Evans (1984), prior to his listing of elements comprising a campus master plan, cautioned, "The physical planning elements vary from campus to campus. The relative importance of one element over another varies from one institution to another. Each element should be investigated" (p. 718). It is through this paradigm that the following compilation of elements was viewed.

The following compilation of verbal statements of elements were based on the preliminary review, and ranked according to the number of sources making reference to each element. Following the list of these elements, a more detailed treatment of element ranking is provided in the section of the results of the compilation of element statements.

Circulation

Circulation included movement patterns of vehicles, pedestrians, bicycles, and service equipment—all elements of movement and placement of people and vehicles on campus. It was a system of roads and pedestrian ways from residential areas to the academic center, and the secondary relationship of vehicular access. The pedestrian walks occupied the important locations and provided the simplest and most direct means of inter-communication (Ackerman, 1931; Biehle, 1991; CEFPI, 1991; Chapman, 1990; Dober, 1963; Shaker, 1984; Skelly, 1989). Kansas Board of Regents (1972) organized circulation into five areas.

1. *Pedestrian circulation*—location of all major malls and secondary walks to be developed on campus
2. *Vehicular circulation*—location of all major malls and secondary walks to be developed on campus
3. *Service circulation*—location of all service centers on campus by building and designated routes for service vehicle
4. *Parking*—location of all planned parking areas including the lot capacity and designated use by faculty, students, and visitors, recommendations for future parking related to growth, new buildings, and consideration for parking bicycles, motorbikes, motorcycles, etc.

5. *Utility plan*—several locations of all major utility systems on campus including the location of all central plants.

Information on each of the above needed to be documented in both graphic and narrative form (Halstead, 1974; Kansas Board of Regents, 1972).

Pedestrian circulation

The pedestrian circulation system was a principal exterior design element unifying the campus. This system normally included:

1. major malls, plazas, or squares (gathering points and transition areas between buildings and other elements of the walkway system)
2. major pathways (carrying the heaviest volume) of pedestrians
3. major intersection of pathways
4. minor pathways
5. pedestrian circulation through the facilities
6. pedestrian safety, signage, and major pedestrian ways (CEFPI, 1991; Colorado Commission, 1974; Evans, 1984; Kansas Board of Regents, 1972; Rosen, 1987).

Vehicular circulation

In the vehicular circulation system the flow of streets, roads, and service intermixed with intersections, a system for visitor orientation, direction, and traffic control, and the signs, signals, and relationship with surrounding site objects (Halstead, 1974). Weber and Fincham (1974) predicted that even where mass transit was available, the automobile would continue to be a prime factor in getting student and faculty to and from campus. In planning vehicular circulation, the ideal situation typically was to create:

1. a ring loop in which traffic will move about the periphery of the campus
2. a series of penetrators to allow traffic to move from the ring road to destinations on campus
3. a series of minor campus streets to allow for servicing and maintenance of facilities (CEFPI, 1991, p. P3).

Access

Consideration given major access points had become an increasingly important element in the planning of the campus (CEFPI, 1991; Halstead, 1974). This included traditional, older schools becoming more oriented to the movement of people to and from the campus, as well as newer

campuses oriented to access by automobiles as well as providing for handicapped accessibility (CEFPI, 1991; Johns & Schuster, 1983).

Parking

Parking issues included determining spaces in surface parking, parking structures, and parking areas; parking limitations; availability for evening students; short-term and long-term; handicap parking; and loading areas (Biehle, 1991; CEFPI, 1991; Evans, 1984; Halstead, 1974; Weber & Fincham, 1974).

Dober (1992) remarked that parking was one of the issues that got much attention in committees, but ended up with little evidence. It should be treated as a utility, with supply-and-demand studies to justify need and offer alternatives. Campus buildings that drew large audiences needed to be located on the periphery of central campus with adequate parking nearby.

Visitors

Visitors on campus added a strain to the campus utility systems. Colorado Commission (1974) advised that provisions be made for routine day-to-day visitors who may be expected at many of the facilities on campus. This included automobile parking facilities, information centers, and waiting areas for special events involving visitors as participants or spectators, such as athletic events, performing arts, etc. Colorado Commission suggested policy decisions be reached prior to making any attempt to determine the scope of on-campus vehicle circulation and storage facilities.

Utility access

Access for service equipment needed to be provided for campus service and emergency access to every building or group of buildings on campus. This could be done by using the normal roadway circulation system, special access drives, or a portion of the walkway system (CEFPI, 1991; Evans, 1984).

Safety and security

Brown (1980) and CEFPI (1991) mentioned safety and security as master plan document issues. This included safety and convenience in the location of drives, pedestrian-auto conflicts, location of playfields, kitchens, stages, storage rooms, and other points of delivery (Evans & Neagley, 1973).

Buildings and Facilities

Stender (1969) found that most facilities arose from the program being offered. Programming facility needs created a plan within a conceptual framework of existing facilities to outline the difference between what existed and what was needed to achieve the educational program (Castaldi, 1987; Kansas Board of Regents, 1972; Stender, 1969). The plan, whether new facilities were specified or not, attempted to ensure the highest possible utilization and performance of existing facilities with due consideration to operating costs (CEFPI, 1991; Colorado Commission, 1974; Rosen, 1987). Dober (1963) looked at the campus master plan in terms of planning modules or elements. Two of these elements were instructional and research facilities. A compiled taxonomy of existing facility aspects included:

1. the amount, type, and condition of space allocated to each academic discipline
2. the amount, type, and condition of space allocated for library and museum purposes
3. important functional relationships between academic and other building areas
4. spatial and functional relationships that deserve special attention between existing building areas, plazas or outside open areas, recreational areas, study areas, extracurricular student life centers, parking areas, and service areas
5. problems in existing facilities, such as cramped or underutilized space, structural conditions, malfunctioning utilities, awkward room layout, lack of amenities, excessive noise, poor circulation and outdated equipment
6. buildings that could or should be adapted for different uses
7. building accessibility to the handicapped
8. recommended use or removal of existing facilities
9. recommended construction of new facilities; and
10. construction of new facilities to satisfy the difference between space available in existing facilities and total space needed (Colorado Commission, 1974; Evans, 1984; Rosen, 1987).

Projected physical needs

Projections of physical development needs were based upon the approved campus academic plan and other extra-academic campus programs and activities. These were translated into facilities that include descriptions of physical facilities by general type and approximate size and capacity, including cost needed to carry out academic and research missions, policies on housing, recreation, and parking, etc. (Castaldi, 1987; Weber & Fincham, 1974). The total building needs had to be projected at the several phases of campus growth (Colorado Commission, 1974; Kansas Board of Regents, 1972).

Buildings

The campus plan for a college needed to provide for buildings (Evenden et al., 1938). CEFPI (1991) added that campus planning dealt with a series of buildings. A compiled taxonomy indicated how this has developed:

1. building orientation
2. the layout of existing buildings
3. location of all buildings (including existing buildings and what will be done with them)
4. new building needs, location, and type of architecture
5. the necessity of meshing with existing structures
6. building infill and addition; and
7. preferred orientations for light, sound, and climate controls (Babcock, 1969; Biehle, 1991; Brown, 1980; CEFPI, 1991; Colorado Commission, 1974; Johns & Schuster, 1983; Rosen, 1987).

Libraries and museums

Ackerman (1931) listed the library as a specific element to be accounted in the master plan document. Dober (1963) listed libraries and museums together as a campus master plan module. Interestingly, Ackerman suggested the library should have ample allowances of room for future expansion, because he foresaw there always being a demand for library expansion. By Dober's writing, the library had become a central part of the campus and the educational process. Dober placed the library's location on the central route of heaviest pedestrian use. Ackerman located it between the academic group and the residential group, not far from the buildings of general social use.

Renovation and reuse of structures

The renovation of buildings and deferring maintenance appeared in literature as growing aspects of campus planning (Biehle, 1991; Dober, 1992; Johns & Schuster, 1983). Babson College (1986) recommended renovation and reuse of existing structures to preserve the present character of the campus. Renovation and remodeling enabled older buildings to be more efficient as well as meet new fire, life safety, and energy code requirements (Johns & Schuster, 1983).

Payne (1967) suggested the listing of major deferred maintenance needs ranked in order of priority.

Codes and requirements

The institution was to function within the framework of a variety of governmental regulations and limitations affecting the physical development of campus (CEFPI, 1991). This included accessibility to the handicapped and other special requirements.

Land Use Aspects

The campus master plan was termed primarily the long-range projection of the land use plan on the campus, and land use within the immediate vicinity (both current and projected) (Biehle, 1991; Chapman, 1990; Colorado Commission, 1974; Kansas Board of Regents, 1972; Shaker, 1984). CEFPI (1991) stated that land and its capacity for development represented the first and most important determinant of the campus master plan. Brase (1990) noted the importance of land use, because these types of decisions tended to be irreversible. Inefficient or inappropriate decisions represented an enormous opportunity cost, which escalated as a campus was developed and land committed to use. Institutions usually had to live with their design mistakes for a long time, and practically no private donor or public sources would commit funds to remedy a built planning error or design flaw after the fact.

A taxonomy of the principal land uses encountered in a typical campus plan included:

1. building sites
2. teaching and research
3. recreation fields and courts
4. intercollegiate athletics
5. parking ramps and lots
6. agricultural production
7. streets and roads
8. airport
9. campus areas
10. investment property (CEFPI, 1991).

The quality of land available affected many aspects of the campus master plan, including building density, parking system used, circulation pattern, the availability of resources to support areas such as housing, research, and other non-teaching functions of the university, kind of programs offered, and enrollment. Land use was the foundation on which the primary development guidelines of all the other elements of the campus plan were built (CEFPI, 1991). Kansas Board of Regents (1972) stated that the land use section explained the recommendation of the plan primarily in relation to:

1. overall campus zoning
2. planned density within each zone
3. proposed building or expansion locations
4. proposed location of all open space (both instructional and non-instructional)
5. land acquisition—map indicating proposed area to be acquired with priority for acquisition
6. utility zones; and
7. recommended community zoning and use in area surrounding the campus.

Kansas also noted that the information about each of the items listed should be documented in both graphic and narrative form, as seen on item 5 above. Several authors included other elements with land use.

Campus boundaries

Campus boundaries included: general geographic boundaries of the master plan, such as a region, a state, or an administrative area within a state (*Occupations & Education*, 1966), local land perimeter and campus boundaries (Colorado Commission, 1974; Leu, 1985), and building set-backs from property lines (Brown, 1980). Additionally, graphic statements of the campus size and location were developed (*Why a Master Plan? 1960-1969*).

Land use and zoning

Weber and Fincham (1974) combined land use and zoning patterns. Their view was that surrounding land and its use should be assessed for its possible effect on the campus and vice versa. Expected growth patterns adjacent to and involving residential, commercial, and industrial facilities needed to be anticipated and evaluated concurrently with campus projections. Shaker (1984) and CEFPI (1991) noted the need of listing zoning requirements and regulations.

Density

Land coverage decisions involved the general spatial structure and density of campus areas, the infrastructure patterns of buildings on grounds (height and land coverage) within building zones, of utilities, roads, circulation, parking facilities, and everything involved at an institution (Chapman, 1990; Colorado Commission, 1974; Leu, 1985; Skelly, 1989). Halstead (1974) recommended a study of density, land coverage, and scale in order to establish the best possible combination of these factors to produce the desired environment.

Expansion locations

Why a Master Plan? (1960-1969) noted that prior to deciding on locations, areas of the site needed to be established and reserved for their particular use. Skelly (1989) suggested asking what were the most critical pieces of ground to avoid wasting. Evans (1984) added that areas of special interest or importance should be preserved or protected.

Land acquisition

As noted previously in Table 10, land acquisition was mostly present in the 1930s and 1990s literature. Early on Larson and Palmer (1933) found it important that a college, in order to give direction to its growth, not follow a policy of acquiring small properties as immediate needs arose, but follow a well-developed plan, thought out in advance of any projected construction, to guide the trustees in acquiring desirable new properties when they were in the market rather than injudiciously acquiring land not essential. They also suggested acquiring land in the vicinity of the campus, through gifts or purchases, but never selling except in the case of dire necessity.

This was the most extensive commentary found in the literature on land acquisition. Kansas Board of Regents (1972) simply listed land ownership as an item to be studied, Evans (1984) added areas not presently a part of the campus that should be considered for purchase or sale, and Biehle (1991) mentioned property acquisition or development of excess property as issues to be considered. Bohl (1974) added that an advantage to long range planning was the possibility of purchasing land before its value inflated, saving money, years before construction occurred.

Academic Plan

While the academic plan was not always perceived as part of the campus master plan, it was a major element shaping the campus master plan. *Why a Master Plan?* (1960-1969) succinctly explained the academic relationship to the master plan. "The educational program—or specification—is a translation of the objectives of the institution, in light of the community's needs. The development of a bold educational program is a prerequisite to a bold master plan" (p. 28).

Brase (1987-88) observed that only institutions with undemanding or nonexistent academic visions could ignore the way that academic ideals, values, and character found or failed to find their expression in the physical development of a campus. Bounds (1978) called for the creation of an educational master plan. Such a plan would contain educational specifications for future facilities and actual space requirements.

A campus master plan was seen as an explanation of the institution's educational and operating philosophy, fulfilling the college's ultimate needs in carrying out its programs (Ellison & Smith, 1987; Reed, 1967). As early as 1929, Klauder and Wise found the college plant consisted of three areas: teaching, housing, and recreational, the first being the academic. The campus master plan served to fulfill the academic services of the college or university (Biehle, 1991; Castaldi, 1987). Dober (1963) stated the academic plan was the first requisite for programming instructional facilities.

Verbal statements of an educational program were a major component of the academic plan for the campus master plan (Larson & Palmer, 1933; *Why a Master Plan?* 1960-1969). The parts of the academic plan consisted of:

1. Role of the institution in its organizational system of higher education (Weber & Fincham, 1974)
2. Aspects of the educational program in context with the institution's role and scope, philosophy and purpose, educational programs to be offered and degrees awarded, what kinds of programs to go where, anticipated enrollment and faculty-student ratios, relationship with the community; listing of buildings to be constructed with target dates; philosophy on housing, traffic flow, parking, communications (Brown, 1980; Halstead, 1974; Payne, 1967; Shaker, 1984; Skelly, 1989)
3. Policies: admissions; academic program (general content, degrees, organizational structure—colleges, divisions, schools, departments, etc.); class sizes; calendar structure (quarters, semesters, etc.); community programs; ancillary programs; other (Biehle, 1991; Colorado Commission, 1974)
4. Future programs in teaching, research, and service; staffing, financing, and housing; justification; detailed description of courses, contents, integration with present courses; type and number of personnel needed, anticipation of operational costs (Biehle, 1991; Castaldi, 1987).

In essence there were two general areas to the academic program: the primary educational program and the support programs for the educational program (Kansas Board of Regents, 1972).

A summary of conclusions could be communicated by words, descriptions, timetables, and/or graphic devices such as drawings depicting required relationships between various facilities and activity areas (Halstead, 1974).

Costs and Financial Aspects

The gathering of financial background of a campus' capital costs, including land acquisition, construction of facilities, furnishings, purchase of major equipment, landscaping, roads, parking, boundary improvements, utilities, professional services, and contingencies—taking in account inflation and

cost of money—consisted of verbal statements of costs and actual budgets for the envisioned campus. Then, cost estimates were made relative to expected budgetary limitations (Halstead, 1974; Kansas Board of Regents, 1972; Morley, 1972; Payne, 1967; Rosen, 1987; Shaker, 1984; *Why a Master Plan?* 1960-1969).

In addition to determining costs, the source and availability of funds for design, construction, and renovations, and the financial capability needed to be considered (Biehle, 1991; Brown, 1980; CEFPI, 1991; Morley, 1972; Payne, 1967).

An issue of increasing importance in relation with costs of construction, operation, and maintenance, was saving money over the years without impairing safety, usefulness, or the aesthetic values of a campus (Evans & Neagley, 1973).

Studies of facilities construction economics with overall estimates of cost factors and financing strategies and proposed alternatives were suggested, using the current year as the basis for estimating costs, and covering all project expenditures to determine the overall campus development life-cycle costing (Castaldi, 1987; CEFPI, 1991; Colorado Commission, 1974; Dober, 1992; Kansas Board of Regents, 1972; Morley, 1972; Payne, 1967). From this point, definitions could be made of what part of the curriculum and physical needs may be satisfied, outlining a development schedule (Brown, 1980). Brown suggested:

1. outlining the availability of funds during the next few years
2. defining what part of the curriculum and physical needs could be satisfied; and
3. outlining a development schedule.

Brown further added that no major expenses should be made in the development of the property, or nothing built until the master plan was approved.

Darnes (1972) developed a proposed model for Illinois public junior colleges to use in reassessing their master plans. The model called for 5-year and 10-year plans forecasting financing. Darnes suggested projecting assuming constant dollars, then making the same projection assuming a specific increment increase in dollars available to support programs, and, finally, to make projections for the same period assuming a decrease in the funding.

Phases of Development and Scheduling

The master schedule established a sequential order for campus planning and construction, indicating the processes to be carried on concurrently and those to follow sequentially. Time limitations, indicating the priority of land and building space needs, and sequences delineated the major stages and

operations involved in both short- and long-term development, as directed by expected future needs and available resources (Brown, 1980; Colorado Commission, 1974; Ellison & Smith, 1987; Kansas Board of Regents, 1972; Mayhew & Smith, 1966). Included were verbal statements of the completion schedule (*Why a Master Plan? 1960-1969*).

As Dober (1992) noted, not everything could be accomplished in the early phases of implementation. Reed (1967) suggested organizing the ultimate development of the campus in phases of construction that fit harmoniously into the plan.

Action plan

Sometimes, sequencing and scheduling were used to create a multi-year or mid-range plan to identify, describe, and budget for a 5- to 10-year implementation program. In sequence, fiscal planning was based on physical planning, and physical planning is based on academic planning (Evans, 1984). This developed into an action plan, with guidelines, general planning factors, priorities, and time lines relating to program and facility development, organization and organizational relationships, staffing, and funding (*Occupations & Education, 1969; Why a Master Plan? 1960-1969*). The action plan provided for orderly building growth, and a clear idea in which direction to grow to best achieve programs, but permitted orderly growth with functionality and aesthetic quality. It also minimized disruption of campus activities (Halstead, 1974; Mary Washington College, 1986; Skelly, 1989). It was a clear and orderly plan of action for future expansion of facilities within the limits of the financial resources of the institution (Castaldi, 1987).

An action plan was also a tabulation of individual building costs, overall campus costs, staging of construction in keeping with demand, staging of construction in keeping with anticipated political and financial climates, tabulation of sources of funds, legislation governing funding procedures, tabulation of current annual capital costs, tabulation of design and construction starting dates (*Why a Master Plan? 1960-1969*). A prioritized program was then structured for implementing the needed expansion or consolidation of facilities in gradual stages (Colorado Commission, 1974; Rosen, 1987).

Dimensions

In other instances, scheduling referred to the calculation of dimensions, such as net and gross calculations, at a scale suitable for the campus plan (Dober, 1992).

Site Plan

In relation to the site plan, Castaldi (1987) stated, "To some college planners, the master plan was simply a site plan of the campus showing the main malls and the location of existing and future buildings" (p. 317). Babcock (1969) and Reed (1967) referred to it simply as taking advantage of, or making the best use of, the site.

Dober (1992) and Halstead (1974) specified a site analysis for the campus master plan. The objective of the analysis differed. Halstead sought to determine the influence of regional, community, and campus environments vis-a-vis campus development and vice versa. Dober was interested in disaggregating, deciphering, and evaluating the physical characteristics of the site and environs. A listing of the areas to be analyzed were:

1. environs
2. institutional land ownership
3. campus land use patterns
4. predominant building use (functions)
5. pedestrian circulation (including handicap accessibility)
6. vehicular circulation (handicaps)
7. parking
8. topography
9. campus open space patterns
10. campus landscape
11. major infrastructures; and
12. special physical features and issues (Dober, 1992).

Other site references included outdoor site facilities projections for physical education, recreation, intercollegiate athletics, physical plant, automobile parking, and other facilities (Colorado Commission, 1974).

In addition, *Why a Master Plan?* (1960-1969) looked at the selection of a suitable campus site. This involved consideration of such factors as relationship to community, transportation, size of college, future growth, other institutions, neighbors, zoning, services and protection, microclimate, cost, potential for environmental development, and availability.

Topography

The topography was one advantage that needed to be skillfully exploited (Klauder & Wise, 1929). A vital part in any development plan, the site determined the general layout of the campus. A symmetrical

and formal layout was generally conceded to be the most appropriate for a level site, and rugged and irregular sites generally required irregular grouping of buildings, if for no other reason than to fit them to the ground (Klauder & Wise, 1929).

Colorado Commission (1974), CEFPI (1991), and Halstead (1974) mentioned topography only singularly, as an element to study.

Building sites

Designating building sites appeared as an important aspect in the pleasing functional arrangement of buildings, each with its specific needs of service, approach, grades, mass, and form (Chapman, 1990; Weber & Fincham, 1974). CEFPI (1991) and Klauder and Wise (1929) saw the campus master plan document as a site development scheme of present buildings and designated sites for future ones, conceived to coordinate and render them in an integrated whole, located according to their functions, importance, and architectural effect.

Halstead (1974) recommended making a schematic working plan to guide locating specific campus buildings. It should show all campus buildings, fields, areas, size and shape, circulation patterns, major and minor roads, walkways, landscape elements, water sites, plants, shrubbery, trees, major grade changes, large paved areas, construction projects, proposed land acquisition, and order of development. Colorado Commission (1974) also suggested a diagrammatic map showing the boundaries of the institution's service area and the location of the institution's main campus and other land holdings, identifying whether the land holdings are owned, leased, rented, etc.

Campus core

Mayhew and Smith (1966) observed that the campus core was an area where attention should be first given, with the planning of room for expansion in many directions. About the same time *Bricks and Mortarboards* (1966) reported that the trend seemed to be toward the development of a rather tight academic core, with housing, 'activities,' and other functions growing out from it. At the heart or focal point of the core they saw a new tendency to place lecture hall facilities. Earlier, Ackerman (1931) listed as one element the time factor. This influenced the overall layout of the campus in relation of residential areas to recreational facilities and to the academic center of the campus.

Utility and Energy Systems

CEFPI (1991) stated utility systems were an essential yet often neglected element in the planning of any campus. However, the literature frequently mentioned plans for utility systems, including

all services, access, and community use (Biehle, 1991; Brown, 1980; Colorado Commission, 1974; Shaker, 1984; Skelly, 1989). Dober (1963) observed that "coordinated construction of utilities, roads, and buildings affords considerable savings in campus development" (p. 167). A compiled taxonomy of the major utility systems includes:

1. heating and air conditioning
2. electricity, power and electrical lines
3. gas and natural gas lines
4. size, condition, and reserve capacity of water service (including fire hydrants)
5. sanitary sewers and treatment facilities
6. storm water or drainage
7. phone and telecommunications system
8. trash removal and disposal
9. steam distribution system
10. fuel and fuel storage (liquid and/or coal)
11. alternative fuel and power options
12. water
13. clock
14. temperature control
15. fire alarm
16. fire and police protection
17. waste disposal; and
18. energy management and innovations (Biehle, 1991; CEFPI, 1991; Evans, 1984; Halstead, 1974; Weber & Fincham, 1974; *Why a Master Plan?* 1960-1969).

Weber and Fincham (1974) noted that these aspects affected campus placement and growth. Brewster (1976) observed that the entire utility distribution system became extremely complicated and expensive.

Drawings were recommended indicating the exact location, size, direction of flow, type, (existing and proposed) conditions, and all other information pertaining to its utilities, including sources (Brewster, 1976; Halstead, 1974).

Energy

Not merely consideration but planning needed to be given to energy—the resources, consumption, and water conservation (CEFPI, 1991; Johns & Schuster, 1983). Sieben (1982) called for

the creation of an energy master plan to save on consumption. Sieben's goal was to maximize hourly use while minimizing overall energy consumption. Some aspects related to energy are:

1. aspect of land coverage and building heights related to solar access
2. reaffirmation of an architectural style conducive to conservation of energy
3. concept of a loop road system with peripheral parking resulting in a pedestrian campus, thus reducing auto travel; and
4. landscape concepts natural to the region protecting buildings and reducing watering demands (Johns & Schuster, 1983).

Institutional Aspects

The literature statements on institutional background included: statements on community factors; statements on institutional history and background data; statements on institutional mission and purpose; and statements on the goals and objectives to be achieved.

Community factors

Community factors included aspects from several different perspectives. Darnes (1972) included this element as part of his *Foundations*. This was a description of the local community, major employers, minority groups living in the area, and other population descriptions, upon which characteristics and needs of the institution's own unique mission as a college were defined.

Weber and Fincham (1974) identified a need to determine immediate and future goals of the community. They saw such things as park and recreation needs, and cultural-social objectives as a vital part of the planning process.

Mayhew and Smith (1966), a guide for community college planning, specified a thorough and detailed analysis of the economic and sociological patterns of the community and projections of population growth, both in number and direction, to guide college population, general education needs, and adult education requirements. The analysis resulted in future projections estimating the educational needs that the college was to meet. These long-range and short-term needs could be met through planning programs and essential resources, including the occupational resources of the community (*Occupations & Education*, 1966).

Halstead (1974) also listed a community analysis, but for the purpose of discussing and evaluating the effects on campus plans of factors such as urban circulation, adjacent land use, major utility facilities, location of cultural and recreational facilities, interaction of institution with community, existing zoning, future community land use, etc.

Morley (1972) included a history of the community (past, present, future) as a vital portion of a successful master plan. This involved creating a clear picture of possible and current land utilization, consisting of: current land use development; development and population growth trends; and community maturation land use development. Other factors to be carefully considered were: the power structure, both formal and informal; all enactments, legislative and otherwise, which may affect educational facility construction; and general community growth patterns.

Institutional history and background data

This part consisted of a brief summary of the history of the physical growth and development of the campus to date, in addition to its general role, history, and relationships (community or service area), to provide a context for proposals for future expansion (Colorado Commission, 1974; Larson & Palmer, 1933; Ohio State University, 1987; Weber & Fincham, 1974).

The institutional data outlined the general role of the institution, its history, its relationships with the community, and its service area. The service area included:

1. geographic (boundaries, characteristics)
2. history
3. population—present and projected (size, racial characteristics, socio-economic characteristics)
4. economic basis
5. climate (temperature ranges, precipitation, etc.)
6. transportation systems; and
7. education (need, systems existing) (Colorado Commission, 1974).

Mission and purpose

Lane Community College (1977) put as the first step in the development of the master plan document the preparation of the statements of mission and purpose. The mission was a philosophical statement of the role and values of the institution, and the purpose broadened the mission by separating it into individual statements. These were ongoing conditions that must continue to exist if the institution's mission was to be maintained (Lane Community College, 1977; Kansas Board of Regents, 1972; *Why a Master Plan? 1960-1969*).

Around the mission and purpose, statements on an institutional profile defined the institution's niche in higher education (academic plan, ongoing institutional research, identifying the institutions

peers). This information helped position the institution as to function, scale, and type of facilities required (Dober, 1992). It also specified the nature of the institution, answering questions as to why the school existed, what it was best equipped to do, how it wanted to be perceived, what was its special mission or market niche, and what it was trying to do for young people. The answers to these questions were what was translated into physical facilities and land use that would have the desired impact on those using them (Biehle, 1991).

Goals and objectives

Goals were verbal statements (*Why a Master Plan?* 1960-1969), identifying end conditions or products to be achieved and/or maintained, and were the most specific of the statements of value (Lane Community College, 1977). They defined philosophical objectives—part of the academic-social-cultural-community relationship (*Why a Master Plan?* 1960-1969). They defined physical objectives and principles—design control guides that constituted the framework of the overall campus form and shape, and expressed the aesthetic spirit of the campus plan (Weber & Fincham, 1974). They defined educational objectives—a specific curriculum, and a system of instructional programming, which along with the community analysis established present and future site requirements and facility needs (Mayhew & Smith, 1966). Goals determined the long-range objectives of the institution and how existing and new programs could be designed to meet these needs (Dames, 1972).

Goals were given a value and ranked in order of priority. From this ranking objectives were established to be achieved within the first 4 years of the master plan document's identified goals. Programs were then designed to achieve the objectives (Lane Community College, 1977; *Occupations & Education*, 1966). The goals and objectives were established on two levels:

1. *Institutional level*—major goals of the institution
2. *Primary and Support Program and Subprogram levels*—explicit objectives for programs and subprograms (Kansas Board of Regents, 1972).

Enrollments and Campus Populations

According to Biehle (1991) a campus master plan needed to be based on the student populations it hoped to serve. Castaldi (1987) added that expansion should not occur simply to expand. There needed to be well-documented rationale. Graves (1993) noted every school needed a master plan to accommodate changes in program and increases in enrollment, or declining enrollment, as CEFPI (1991) observed.

The enrollment plan calculates:

1. the number, type, and diversity of students
2. constant college size, or growth
3. enrollment expected, or desired, in 10 to 15 years
4. realistic expectations
5. type of student enrolled in the institution in the next decade or two; and
6. diversity of the university (Biehle, 1991).

Bricks and Mortarboards (1966) cautioned that determination of ultimate enrollments always be made with true humility.

Enrollment projections included verbal statements of projections, as well as enrollment size and distribution data (current, phased growth, maximum): basic enrollment; enrollment distribution by organizational unit; enrollment distribution by local residence (Colorado Commission, 1974; Leu, 1985; *Why a Master Plan? 1960-1969*).

The enrollment factor played an important role in planning because of its affect on other elements (Morley, 1972). First, institutions with large enrollments had more difficulty grouping structures to keep them within the time-distance diameter of hourly class periods (Ackerman, 1931). Second, enrollment affected program planning. Student population forecasts, labor force projections, emerging manpower requirements, and the impact of technology on occupational education needs shaped the program offered (*Occupations & Education*, 1969). Third, the enrollment affected the total campus population reciprocally in the needed number and type of faculty and staff (Shaker, 1984). The base population of a campus was the sum of the number of students, faculty, staff. As the campus population grew, so did the day-to-day visitors and the demand on parking facilities, information centers, waiting areas, etc., and special events. This in turn tied in with circulation as policy decisions regarding visitors needed to be made prior to attempting to determine the scope of on-campus vehicle circulation and storage facilities, as well as other facilities (Colorado Commission, 1974).

Payne (1967) suggested formal studies of enrollment projections for:

1. the institution; by fields and academic level; assumptions underlying the projections; FTE's and PTE's; and
2. the faculty and staff required for the educational program within the enrollment.

These data helped determine space requirements, which in turn helped determine location and number of parking spaces, road locations and load capacities, pedestrian circulation, and service requirements. Colorado Commission (1974) suggested compiling data on faculty and staff size with

distribution by function area and organizational unit, in addition to curriculum and student load projections by organizational unit, and contact-hour projections by organizational unit and course.

Environmental Aspects

This element Evans and Neagley (1973) termed as meeting the "needs of the total man." It was the attempt of striking the balance between all the aspects of the educational experience, including creating symbols that would serve emotional as well as physical functions (Evans & Neagley, 1973). Larson and Palmer (1933) wrote of preserving the spiritual, social, and recreational needs of students.

Statements of environmental aspects included elements of aesthetics, ecology, atmosphere, and creating campus symbols. These aspects of the campus environment were contained in graphic and narrative statements of environmentally and aesthetically appealing design guidelines (CEFPI, 1991; Kansas Board of Regents, 1972; *Why a Master Plan?* 1960-1969). These guidelines were expressed through:

1. descriptions of the architectural character that were desired in future campus buildings, which might include material, size, facades, windows, door openings, etc.
2. descriptions of the ground landscape character that were desired in development of outdoor space (This might include conceptual planting and landscape plans for certain areas of campus, views and vistas to be maintained and outdoor furniture.)
3. descriptions of graphics to be used on campus with recommended location
4. description of lighting for campus, where and how the campus should be lit (Kansas Board of Regents, 1972).

Aesthetics/attractiveness of the campus

Several times the element of attractiveness was mentioned as needing to be a part of the master plan document. Evans and Neagley (1973) saw it as the appearance of the entire college campus. Babcock (1969) felt one purpose of the plan was to build a home of remembered beauty. Babcock wrote of creating a 'campus,' an interior, with a special and indigenous feel.

Within this section, the master plan document needed to include graphic statements of appearance (*Why a Master Plan?* 1960-1969).

CEFPI (1991) felt that a major concern in campus planning was the maintenance of an environment that had aesthetic appeal throughout, having a college campus that was "intellectually inspiring and aesthetically exciting" as Castaldi (1987, p. 315) wrote. Payne (1967) called for the aesthetic and ecological environments to be defined. CEFPI listed some aspects relating to aesthetics:

1. basis of campus organization: quadrangles, major axes, or other geometric forms affecting planning decisions
2. limits buildings could rise or spread without adversely affecting the form and function of the campus
3. how the campus joined surrounding areas
4. implications for the aesthetic quality of existing or proposed pedestrian and vehicular corridors
5. continuity across campus of furniture and equipment in buildings
6. inclusion of sculpture, fountains, and other art inclusions to create special aesthetic appeals; and
7. plant and other landscaping materials used to promote unity and the aesthetic quality of the campus (CEFPI, 1991).

Halstead (1974) focused on the outdoor design features. These were specific descriptions and drawings of outdoor features: building appearance and massing; outdoor night lighting; surface materials, patterns, and colors; nature and character of pools and fountains, sculpture, flags, banners; plants and plant massing (Halstead, 1974).

Ecology

Ecology involved both the "investigation and application of sound principles to the interrelationship between built systems and natural systems to ensure a campus in harmony with nature, yet able to meet the needs of human users" (CEFPI, 1991, p. P5). Areas related to ecology were:

1. landscape quality
2. links between development and vegetation removal
3. run-off and waste disposal
4. noise containment; and
5. provision of useful spaces for people (CEFPI, 1991).

Atmosphere of the campus

Babcock (1969) noted that making a great campus meant remembering that in the confines of such a place something special was going on, the two or four year pursuit of something elusive, out of the pathways and pressures of ordinary economic life. Babcock stated, "The setting in which this occurs is as important as the library, to both the student and the teacher. One ought to feel this change of atmosphere when he walks through the gate" (p. 15). *Why a Master Plan?* (1960-1969) concurred,

observing the ideal educational buildings which gave a sense of stability and permanence, a sense of the depth of time, of one's place in the continuity of man's knowledge. A place of learning, not a fairground, but a place of repose and calm where the student can think, digest, and examine. Castaldi (1987) also agreed, "The college campus. . . is in reality a total environment that stimulates teaching, learning, introspection, and creative thinking. The college campus should be intellectually inspiring and aesthetically exciting" (p. 315).

Creating meaningful symbols

Mayhew and Smith (1966) observed that a campus' total design and architecture should express an integrity of function on several levels. They added that this integration could be greatly enhanced by the use of a carefully selected symbol or motif. This was possible with a dominant structure like a campanile, a single outstanding building, a pervasive architectural theme from a repeated geometrical shape, or the consistent use of exposed aggregate or redwood timbers. *Bricks and Mortarboards* (1966) noted, "Everywhere there is the conviction that every great campus has a symbol (p. 149).

Landscaping

Brewster (1976) wrote that "daily experiences of movement about the campus often have a more profound effect upon the student than do his classroom contacts" (p. 233). Brase (1987-88;1990) added that an institution's landscape design and building design should express (or at least reinforce) its academic values. "A campus' physical character--its forms, spaces, styles, and visual messages--provides the most tangible, direct, visceral, and insuppressible expression of what an institution is all about" (1990, p. 1). Brown (1980) called for integrated building and landscape plans.

As early as 1938, Evenden et al., stated the campus plan for a college needed to provide for a planting program. Pawsey (1982) noted that the University of Melbourne realized "even in the longest term of the Master Plan, rebuilding of the campus would never proceed to the extent that harmony and continuity could be achieved by the use of building elements" (p. 26) However, it was felt that the objective could be achieved by using landscaping elements and campus furniture. Brewster (1976) held it was highly desirable to have a master campus landscape plan. Spotty hit-and-miss plantings and ill-advised treatment of outdoor areas could ruin the appearance of a potentially beautiful campus, in addition to existing physical resources not being well incorporated into the campus master and campus landscape plan.

Landscaping alone, as an element, was listed by Biehle (1991), CEFPI (1991), and Halstead (1974). A compiled landscape taxonomy included:

1. Periphery
2. Boundaries
3. Gateways
4. Ceremonial open spaces
5. Active recreation open spaces
6. Passive recreation open spaces, including plaza areas, ponds, significant views or vistas
7. Gardens and arboretums
8. Building settings
9. Vehicular circulation routes
10. Pedestrian circulation routes, walkways
11. Campus crossroads
12. Sculpture, fountains, memorials
13. Outdoor furniture
14. Lighting
15. Direction Signs
16. Plantings: flower beds, the type and quantity of trees and shrubs
17. Accents
18. Special Effects
19. Paving
20. Seating
21. Rubbish containers
22. Information kiosks (Dober, 1992; Evans, 1984; Pawsey, 1982).

Program Space Needs and Standards

Early on, Larson and Palmer (1933) reported that a plan needed to include a comprehensive brief of future needs. These were projections of the demands to be made upon the institution in future years.

Spatial needs

Barbour (1973) recommended development of techniques for estimating future space needs. Projection of total space needs, in accordance with the educational program and current assignable space, needed to be translated into specific projects and priority of need, and the number of spaces required to provide for the curriculum needs as outlined. Also, a plan needed to be developed for facilities

to satisfy the needs of support services in administration, food service, student housing, and auxiliary enterprises (Babcock, 1969; Brown, 1980; Payne, 1967). Space needs also included land requirements for items like additional car parking areas, outdoor space needed for recreation, physical education, etc. (Kansas Board of Regents, 1972).

Once the space needs were established, comparisons could be made between departments of groups, peer institutions, or accreditation standards. These comparisons might cause adjustments because of changes mandated or justified by internal and external space criteria, standards, laws, or codes (Dober, 1992).

Space planning standards

Evans (1984) suggested creating space planning standards for the type of space and programs of the various academic, support, and non-instructional functions. This would consist of the amount of space required for graduate study as opposed to undergraduate study, small-enrollment courses versus large-enrollment courses, large evening enrollments, and also establish space standards for offices and, with more difficulty, for teaching and non-teaching (research) laboratories. Standards could also be established for individual program needs in terms of library space, archive and storage space, study space, student recreational space, and other space. A taxonomy for establishing space requirements included:

1. subject areas
2. classrooms
3. administrative and support areas
4. laboratories
5. research areas
6. extensions and public service
7. shops
8. libraries
9. seminar and study rooms
10. offices
11. lockers
12. individual study spaces
13. recreational and social areas
14. dining and coffee shops

15. athletic and physical fitness spaces
16. parking
17. site usage
18. physical plant service
19. auxiliary enterprises
20. non-institutional agencies (Colorado Commission, 1974; Evans, 1984; *Why a Master Plan?* 1960-1969).

Once the requirements were established, the size of spaces needs to be determined. This included:

1. net space areas for each type of function
2. future growth consideration
3. storage elements
4. circulation and service requirements
5. gross college area (*Why a Master Plan?* 1960-1969).

Then, space assigned to each academic program or discipline could be compared to the amount of space the program would generate if reasonable space allocation standards were applied (Colorado Commission, 1974).

Housing

Housing was one of the elements Klauder and Wise (1929) noted as important. For the most part the information that appeared in the master plan document was the result of the housing study, which, depending on current and future institutional policies on housing, analyzed the placement of facilities for student (married or single) and faculty/staff for their influence on the campus and community (Leu, 1985; Weber & Fincham, 1974). Biehle (1991) stated that student housing on residential campuses composed one-third to one-half of the total building area. This could be argued, but at least it indicated the importance of a residential housing study to develop data on present and future demand for residential housing by students, faculty, and staff (Barbour, 1973). Dober (1963) noted that the role of higher education in housing students was being debated. However, as he observed, institutions continued providing housing for a portion of students and faculty. Shaker (1984) suggested a comparative market analysis of campus and neighborhood housing supply and demand. A housing study needed to document:

1. type, size, and quantity of units
2. condition of units
3. future expansion
4. buildings to be razed or adapted to new uses (Ackerman, 1931; Evans, 1984).

Architectural and Outdoor Spatial Aspects

Evans (1984) provided a listing of visual and spatial aspects:

1. color and type of campus building materials
2. architectural style
3. screening and eliminating undesirable visual elements
4. campus graphics and public information
5. campus art work (Evans, 1984).

The literature, however, organized in broad terms the visual aspects around the architectural form of the campus, and the spatial, around the open space.

Architectural form

The architectural design, form, and effect of the campus merited serious consideration in any master plan (Brown, 1980; Castaldi, 1987; Halstead, 1974; Klauder & Wise, 1929). Early on, Larson and Palmer (1933) counseled that in established colleges "care should be taken that new buildings harmonize with and add to the charm of the old, both in group arrangement and in plan" (p. 30).

Castaldi (1987) suggested that broad policies regarding the type of architecture, height of buildings, and materials of construction be established prior to the development of the campus master plan, similar to what Evans (1984) listed above. *Why a Master Plan?* (1960-1969) called for an explanation of design philosophy, graphic statements of form which specified quality of building and spaces designed, suggested materials, and texture, aesthetic requirements of each building within the plan.

Open space

More than conserving the natural views, as Klauder and Wise (1929) pointed out, the open space between buildings was the area where principles of design were probably the most abused and least understood (Brown, 1980; Weber & Fincham, 1974). They stated that if these spaces—large or small, green or paved, enclosed or open—were properly disposed they could bring excitement, cohesiveness, pleasure, and an obvious dignity to the visual aspect of a campus (Weber & Fincham, 1974).

For the master plan document, existing and proposed organization of the outdoor space, size of space and linkages between, and the character of the elements defining open spaces needed to be shown, as did spatial quality—the general size, shape, and location of outdoor areas as defined by the ratio of ground area to building area; building height to distance between buildings; and percentages of space devoted to roads and parking, planting, and grading (Halstead, 1974).

Space and Functional Relationships

Functional relationships determined how the campus was organized, by buildings, open space, and with the community and region (Halstead, 1974). These important spatial relationships also included the functional relationships between campus building areas, plaza areas, parking service areas, centers for students, and recreational areas (Evans, 1984).

Castaldi (1987) noted "good campus planning requires that all related buildings be clustered in the same general area" (p. 319). Reed (1967) recommended a plan for the most efficient and functional placement of the various facilities. Brown (1980) suggested that before working out the details of the physical master plan, the space relationships should be determined. *Why a Master Plan?* (1960-1969) recommended establishing functional relationships consisting of:

1. shared spaces
2. interrelated interests
3. faculty needs
4. maximum travel distance
5. convenience factors
6. future growth
7. administrative feasibility
8. flexibility
9. community accessibility.

Evans and Neagley (1973) added establishing facility groupings and affinities. This consisted of creating zones of activity on the campus and grouping buildings of related functions in optimal relationship with each other.

Payne (1967) recommended a plot plan to graphically illustrate planned location of projects and their functional relationship to other buildings and campus activities.

Extracurricular, Recreation, and Athletics

Both Klauder and Wise (1929) and Larson and Palmer (1933) mentioned recreational needs as a part of the campus plan. More important at American universities than in universities elsewhere in the world, Biehle (1991) reported non-academic facilities comprised 65% to 80% of the building area on residential college campuses. The college needed a plan for students' extracurricular life. Vaughn (1983) observed,

Perusal of a variety of college and university campuses in the United States and abroad contributed greatly to our understanding of what makes a successful campus. Actively supporting the social fabric of campus life emerged as a principle area of recreational facilities inadequacy. (p. 143)

Dober (1963) listed one of his campus-planning modules as centers for extracurricular life. This included student unions, clubs, theaters/auditoriums, and churches/chapels, etc. Dober noted these centers tended to be built only once or twice a century. Breslin and Breslin (1990) noted the value of a well-planned physical education and athletic center to attract students. They observed that these facilities were one of the first buildings prospective students wished to tour. Fink and Body (1983) reported an increase in active recreational sport interest, which came along with the increase in enrollments in the 1960s and 1970s. They recommended developing a sports and recreational master plan to create useful facilities.

However, by 1989 Fink still observed that most institutions did not have a comprehensive overview of where they had been or where they were going with recreational programs and sports facilities to meet the needs of various user groups. Dober (1963) observed that five functions needed to be provided for: physical education and hygiene; intramural sports; intercollegiate athletics; informal recreation and sports; and instructional courses in preparing physical education teachers. Weber and Fincham (1974) suggested an overall community view be taken at this point to guarantee successful placing, size, and use of these facilities. Evans (1984) listed some aspects to consider:

1. adequacy of existing facilities
2. amount and type of space allocated
3. readaptive uses of existing facilities
4. future expansion.

Planning Concepts

According to Kansas Board of Regents (1972), planning concepts implemented objectives and gave direction to the later phases of physical planning. They were qualitative and programmatic in nature, were abstract, and were expressed in terms of organizational structure, relationships, and other functional

requirements—concepts ultimately linked with projections of resource needs (land, building space, money, etc.) to define courses of action at the programmatic level. McKinley (1975) organized planning concepts in three models:

1. *Preservation model*—applied to a campus with stable or declining enrollments, extremely tight capital budgets, and minimum program modification
2. *Conservation model*—applied to a campus projecting stable and/or modest enrollment growth
3. *Redevelopment model*—applied to a campus with projected growth. There are many categories of concepts and they tend to have universal applicability to planning projects.

Physical concept

The physical concept was mentioned by several sources (Kansas Board of Regents, 1972; Muller, 1985). This concept explained the physical concepts which had been developed and the reasons why they were selected for plan development. Kansas Board of Regents (1972) listed a typical concept statement consisting of the following headings:

1. statement of physical constraints
2. summary of existing physical problems on campus
3. alternative physical concepts
4. evaluation of each concept
5. explanation of concept to be developed.

Information about each of the above subheadings needed to be documented in both graphic and narrative form (Kansas Board of Regents, 1972). The following identified concepts were similarly organized.

Centralization (decentralization)

This concept dealt with centralization of activities, services, or personnel. Its goal was to influence the campus master plan in terms of organizational structures, functional relationships, and space affinities (Kansas Board of Regents, 1972).

Integration (segregation)

This concept grouped closely related functions in cohesive integration. A need for privacy would necessitate segregation (Kansas Board of Regents, 1972).

Movement and flow

This concept coordinated the continuous movement and flow of people, vehicles, goods, services, and information in terms of priority, sequence, and degree or mix or separation between buildings and across the campus (Kansas Board of Regents, 1972; Muller, 1985). The dominant movement patterns were those routes most used by students during the academic day, and which became entrenched as major components of the pedestrian circulation system (Muller, 1985).

Priority

This concept had to do with establishing priorities of functions and needs (Kansas Board of Regents, 1972).

People

This concept derived from the physical, social, and psychological characteristics of people classes, in small groups and in large groups (Kansas Board of Regents, 1972).

Change

This concept dealt with growth (decline), altered functions, cycles of activities, etc. Statements were frequently expressed with the terms of flexibility (versatility, expansibility, convertability) and phasing (Kansas Board of Regents, 1972).

Open space

This concept explored the role of open space in the relationship of human, built, and natural elements, as well as its significance as a generator of environmental quality and student contact (Muller, 1985).

Aesthetic design

The design aesthetic of the campus consisted of two physical aspects: natural, such as paths, vistas, nodes, corners, and other natural or accidental aspects; and those contrived by man in a conscious effort to improve the environment (McKinley, 1975). They influenced the design concepts for new construction, as well as the landscape-horticultural concept (Biehle, 1991; Rosen, 1987).

Architectural aspects

Broad policies regarding the type or architecture, height of buildings, and materials of construction were determined prior to the development of a site plan for the campus (Castaldi, 1987).

Policies also included the totality of the institution, and accordingly established a physical identity and image consistent with its unitary character, a consciously effort to relate the new to the old (Muller, 1985).

Ideal functional organization

The functional organization concepts established ideal interrelationships of building use with circulation, open space, and other space (McKinley, 1975). The concepts included diagrams of the following areas:

1. nature and relationships of land-use zones
2. functional relationships within land-use zones
3. utilizing the topography
4. utilizing the subsurface soils conditions
5. visual scale
6. weather protection
7. utilizing the landscape
8. flexibility for growth.

The concepts also include land coverage decisions such as:

1. building density (height and land coverage) within building zones
2. parking facilities, surface, and structures (Colorado Commission, 1974).

Document Organization

The literature actually made mention of two elements normally associated with the organization and structure of the document: preface and summary.

Preface

Only Morley (1972) specified a document preface, as most of the literature did not describe in such detail a typical master plan document. Morley noted that the preface "should state in clear terms the reason for the study, personnel involved, outcome, and any other information that would benefit the reader" (p. 60).

Summary

Only the Colorado Commission (1974) listed a summary, and then in only one word.

Results of the Compilation of Element Statements

The compilation of element statements varied from the preliminary review of element statements. As expected, the ranking of elements changed because the preliminary review took references of elements out of context. However, other differences also occurred.

The first was the number of sources used increased from 39 to 54 as more sources were consulted. In order to make comparisons between the preliminary review and the compilation, sources cited in only one element were not included in the totals used to determine ranking, reducing the total $n = 38$. Each individual decade group also varied in number. The 1930s group gained one source. The 1960s group lost one source. The 1970s group gained two sources. The 1980s group lost one source, and the 1990s groups gained one source. Table 11 lists the sources used for the compilation of statements. Sources listed below the line in each group were the only ones cited in one element.

Table 12 provides a complete listing of the compiled statements ranked according to the number and percentages of occurrences overall and by group. The elements listed contain one or more of the elements listed in Table 10. While Table 10 does not list elements occurring only once in the preliminary review, Table 12 offers a complete listing of all the identified elements in the compilation of statements.

Table 13 shows a general comparison between the initial results of the State of Michigan's study, the preliminary review, and the compilation of statements. It also identifies occurrences of elements between lists. Of special interest are those elements that appear on each list, or on two of the three. Later in chapter 4, another comparison is made between Michigan's study and the final results from the data collected. A comparison across lists is also conducted identifying differences between occurrences of elements between Table 13 and the results of chapter 4.

Another area of interest is the ranking of top elements by decade group. This may indicate changes in priority of campus planning elements over time. Table 14 shows the top elements for each decade group between the preliminary review and the compilation of statements. The elements for each decade were taken from Tables 10 and 12, and ranked according to percentages of occurrences in each group-dated literature. All elements occurring 30% or more (with one exception) were listed. The preliminary review 1980s group found no elements occurring over 30%. So, of the top elements found, all of 27% were listed instead.

Below the listings of the preliminary review groups and the compilation of statements groups, in Table 14, are ranked listings of elements common to both. The ranking of these shared elements was determined by adding together the numeric rank value of each element in the previous two lists (i.e., the 1990s preliminary review group lists 'landscape' first, or 1; the 1990s compilations group lists 'landscape'

TABLE 11
SOURCES OF CAMPUS MASTER PLAN ELEMENT STATEMENTS BY GROUP

1930s	1960s	1970s	1980s	1990s
1938, Evenden, Strayer, Englehardt	1969, Babcock	1976, Brewster	1989, Skelly	1992, Dober
1933, Larson & Palmer	1969, <i>Occupations & Education</i>	1974, Colorado Commission on H. E.	1987-88, Brase	1991, Biehle
1931, Ackerman	1960-1969, <i>Why a Master Plan?</i>	1974, Halstead	1987, Castaldi	1991, CEFPi
1929, Klauder & Wise	1967, Payne	1974, Weber & Fincham	1987, Ellison & Smith	1990, Brase
	1967, Reed	1973, Barbour	1987, Rosen	1990, Chapman
	1966, <i>Bricks & Mortarboards</i>	1973, Evans & Neagley	1985, Leu	
	1966, Mayhew & Smith	1972, Darnes	1984, Evans	
	1963, Dober	1972, Kansas Board of Regents	1984, Shaker	
		1972, Morley	1983, John's & Schuster	
			1980, Brown	
	1969, Stender	1978, Bounds	1989, Fink	1993, Graves
		1977, Lane Community College	1987, Ohio State University	1990, Breslin & Breslin
		1975, McKinley	1986, Babson College	
		1974, Bohl	1988, Mary Washington	
			1985, Muller	
			1983, Fink & Body	
			1983, Vaugh	
			1983, Sieben	
			1982, Pawsey	

TABLE 12
RANKING OF COMPILED CAMPUS MASTER PLAN ELEMENT STATEMENTS FROM LITERATURE

ELEMENTS	OCCURRENCES IN LITERATURE - Totals, with Distribution by Decade											
	Total (n = 38)		1930s (n = 4)		1960s (n = 9)		1970s (n = 10)		1980s (n = 10)		1990s (n = 5)	
	#	%	#	%	#	%	#	%	#	%	#	%
1. Circulation	18 ¹	47	1	25	1	11	6	60	6	60	4	80
2. Buildings and Facilities	17 ²	44	2	50	3 ¹	33	3	30	6 ¹	60	3	60
3. Land Use Aspects	17 ¹	44	1	25	2	22	5 ¹	50	5	50	4	80
4. Academic Plan	16 ¹	42	2	50	3	33	4 ¹	40	6	60	1	20
5. Costs and Financial Aspects	15	39	-	-	2	22	6	60	4	40	3	60
6. Phases of Development and Scheduling	14 ¹	36	-	-	4	44	3	30	6 ¹	60	1	20
7. Site Plan	14	36	2	50	5	55	3	30	1	10	3	60
8. Utility and Energy Systems	13 ¹	34	-	-	2	22	4	40	5 ¹	50	2	40
9. Institutional Aspects	12 ²	31	1	25	3	33	6 ¹	60	-	-	2	40
10. Enrollments and Campus Populations	12 ¹	31	1	25	4	44	2	20	3	30	2 ¹	40
11. Environmental Aspects	12	31	1	25	5	55	4	40	1	10	1	20
12. Landscaping	10 ¹	26	1	25	-	-	2	20	3 ¹	30	4	80
13. Program Space Needs and Standards	10	26	1	25	3	30	3	30	2	20	1	20
14. Housing	9	23	2	50	1	11	2	20	3	30	1	20
15. Architectural and Outdoor Spatial Aspects	8	21	2	50	1	11	2	20	3	30	-	-
16. Space and Functional Relationships	8	21	-	-	3	30	2	20	3	30	-	-
17. Extracurricular, Recreation, and Athletics	6 ¹	15	2	50	1	11	1	10	1 ³	10	1 ¹	20
18. Planning Concepts	6 ²	15	-	-	-	-	3 ¹	30	2 ¹	20	1	20
19. Document Organization	2	5	-	-	-	-	2	20	-	-	-	-

¹ source(s) not included in the count.

TABLE 14
TOP CAMPUS MASTER PLAN ELEMENTS BY GROUP

Preliminary Review									
1930s	%	1960s	%	1970s	%	1980s	%	1990s	%
1 Land Acquisition	67	1 Educational Program	60	1 Land Uses	50	1 Land Uses	27	1 Landscaping	100
2 Enrollment/Campus Population	33	2 Costs & Financial Aspects	50	1 Utility Systems	50	1 Utility Systems	27	2 Land Uses	75
2 Circulation	33	2 Goals, Objectives, Priorities	50	1 Building Sites	50	1 Enrollment/Campus Pop	27	2 Circulation	75
2 Traffic Patterns	33	4 Enrollment & Campus Population	40	1 Traffic Patterns	50	1 Landscaping	27	2 Building Sites	75
2 Projection of Future Needs	33	4 Needs of the Total Man	40	5 Costs & Financial Aspects	36	1 Educational Program	27	2 Land Acquisition	75
2 Student Housing	33	6 Land Uses	30	5 Circulation	36	1 Parking	27	6 Utility Systems	50
2 Personnel Housing	33	6 Utility Systems	30	5 Landscaping	36	1 Student Housing	27	6 Costs & Financial Aspects	50
2 Space Relationships	33	6 Evaluation of Existing Facilities	30	5 Academic Plan	33			6 Parking	50
2 Summary of Institutional Growth	33	6 Environmental Design Guidelines	30					6 Visual/Spatial Aspects	50
		6 Site Plan	30					6 Access	50
		6 Campus Core	30						
		6 Phases of Development	30						
Compilation of Statements									
1 Buildings and Facilities	50	1 Site Plan	56	1 Circulation	60	1 Circulation	60	1 Circulation	60
1 Academic Plan	50	1 Environmental Aspects	56	1 Costs & Financial Aspects	60	1 Buildings & Facilities	60	1 Land Use Aspects	60
1 Site Plan	50	3 Phases of Development/Scheduling	44	1 Institutional Aspects	60	1 Academic Plan	60	1 Landscaping	60
1 Housing	50	3 Enrollment/Campus Population	44	4 Land Use Aspects	50	1 Phases of Dev & Scheduling	60	4 Buildings & Facilities	60
1 Arch. & Outdoor Spatial Aspects	50	5 Buildings and Facilities	33	5 Academic Plan	40	5 Land Use Aspects	50	4 Costs/Financial Aspects	60
1 Extracurricular, Rec. & Athletics	50	5 Academic Plan	33	5 Utility Systems & Energy	40	5 Utility Systems & Energy	50	4 Site Plan	60
		5 Institutional Aspects	33	5 Environmental Aspects	40	7 Costs & Financial Aspects	40	7 Utility Systems	40
		5 Program Space Needs & Standards	33	8 Buildings & Facilities	30	8 Enrollment & Campus Pop	30	7 Institutional Aspects	40
		5 Space & Functional Relationships	33	8 Phases of Dev & Scheduling	30	8 Landscaping	30	7 Enrollment & Campus Pop	40
				8 Site Plan	30	8 Housing	30		
				8 Program Space Needs/Stand	30	8 Arch. & Outdoor Spatial Asp	30		
				8 Planning Concepts	30	8 Space/Functional Relation	30		
Shared Elements Between Preliminary Review and Compilation of Statements Within Groups									
1 Housing (Student/Personnel)	50	1 Academic (Educational) Plan	30	1 Circulation (Traffic Patterns)	20	1 Circulation (Parking)	10	1 Landscaping	10
		2 Enrollment/Campus Population	35	2 Land Use Aspects	25	2 Academic (Educational) Plan	10	2 Land Use Aspects (Land Acq.)	15
		3 Institutional Aspects	35	3 Costs & Financial Aspects	30	3 Land Use Aspects	30	3 Circulation (Parking/Access)	15
		4 Site Plan	35	4 Utility Systems	30	4 Utility Systems & Energy	30	4 Site Plan (Building Sites)	30
		5 Environmental Aspects	35	5 Site Plan (Building Sites)	45	5 Enrollment & Campus Pop	45	5 Costs & Financial Aspects	30
		6 Phases of Development/Scheduling	45	6 Academic Plan	50	6 Landscaping	45	6 Utility Systems	65
		7 Buildings & Facilities	55			7 Housing	45		
Shared Elements Across Decades Groups									
3 occurrences: Land Use (2 5), Circulation (2 66), Academic Plan (4 66), Utility Systems (4 63), Site Plan (5 66)									
2 occurrences: Landscaping (4 25), Costs & Financial Aspects (4 75), Enrollment and Campus Population (4 75), Housing (6 75)									

TABLE 13
TOP CAMPUS MASTER PLAN ELEMENTS BY STUDY

Michigan	%	Preliminary Review	%	Compilation of Statements	%
1. Traffic, Parking, & Circulation Plan	84	1. Land Use	36	1. Circulation	47
1. Facilities Plan	84	2. Utility Systems	33	2. Buildings & Facilities	44
1. Enrollment Projections	84	2. Costs & Financial Aspects	33	2. Land Use Aspects	44
4. Role & Scope of Community College	81	4. Enrollment & Campus Projections	31	4. Academic Plan	42
5. Phased Development	78	4. Circulation	31	5. Costs & Financial Aspects	39
6. Admission Policies	72	4. Landscaping	31	6. Phases of Development and Scheduling	36
7. Utilities	69	7. Educational Program	28	6. Site Plan	36
8. Statistical Summary	66	7. Building Sites	28	8. Utility Systems and Energy	34
8. Community Service Program	66	9. Parking	25	9. Institutional Aspects	31
8. Organization Based on Academic Plan	66	10. Goals, Objectives, Priorities	22	9. Enrollment & Campus Population	31
		10. Evaluating Existing Facilities	22	9. Environmental Aspects	31

COMPARISON OF ELEMENTS ACROSS LISTS

Circulation (3), Buildings and Facilities (3), Academic Plan (3), Utility Systems and Energy (3), Institutional Aspects (3), Enrollment Projections/Population (3)
Land Use Aspects (2), Costs & Financial Aspects (2), Phases of Development and Scheduling (2), Site Plan (2)

third, or 3: $1 + 3 = 4 / 2 = 2.0$). The shared elements were then ranked in reverse order—the lowest valued elements first and so on.

Below the shared element between the preliminary review and the compilation of statements is a listing of shared elements across decades groups. These elements were listed by the average of their previous ranking (i.e., Land Use Aspects is listed by three decades with the rankings of 2.5 (1970s), 3.0 (1980s), and 2.0 (1990s): $2.5 + 3.0 + 2.0 = 8 / 3 = 2.5$).

Time Frame of a Campus Master Plan Document

The campus master plan document was a single, official, impermanent document, of a definite life, adopted by the university as a general yardstick to guide future campus development with the possibility of amendments if inefficiency was noted (Shaker, 1984). It preferably looked into the future as far as the eye could see, establishing a set of assumptions regarding what might occur in that time frame (*Occupations & Education*, 1966). Biehle (1991) stated it was a detailed document that laid out the direction, physical needs, and overall appearance of a college or university for the foreseeable future.

Early on, Evenden et al. (1938) wrote, "The campus plan for a college should provide for a buildings and planting program which will care for the expected development of the college for a period of at least fifty years in advance of the time the plan is developed" (p. 7). Even in the 1960s, *Bricks and Mortarboards* (1966) agreed, "The colleges today [1966] have one thing in common: they are in transition and they must look deeply into the future" (p. 165). By the 1990s, Chapman (1990) countered, "The campus plan . . . is an event that focuses people's attention on the larger issues every five to ten years at best" (p. 16). In either case, a comprehensive, long-term view afforded by a master plan document prevented waste and discontinuity often associated with piecemeal development, and coordinated intelligent growth, with a minimum of interference in scholastic activities (Rosen, 1987).

Table 15 shows the differing time frames called for in the literature. Based on these sources, it was difficult to find a consensus, but four of nine references were located around the 10-year length.

Graphical Illustrative Content of the Master Plan Document

"Planners and consultants then undertake an intensive analysis (usually in map form) of the existing plant, grounds, circulation elements, utilities, and the neighborhood surrounding the campus to determine their adequacy for the new program" (*Bricks and Mortarboards*, 1966, p. 147). It was noted already that the campus master plan was an illustrated document (CEFPI, 1991). Furthermore, at any stage in its evolution, it should have diagrammatic clarity, revolving around a small number of strong,

TABLE 15
CAMPUS MASTER PLAN TIME FRAMES IN LITERATURE

References	5-10 years	10 years	18 years	15-20 years	20-30 years	50 years	Other
Biehle (1991)				x			process takes 4 months to 1 year
Chapman (1990)	x						
Fink & Walker (1984)	x						
Shaker (1984)					x		
Brown (1980)					x		not exceeding 30 years
Bounds (1978)		x					
Stender (1969)		x					
Occupations & Education (1966)			x				preferably as far as the eye can see; but in general terms 18 years
Evenden, Strayer, & Englehardt (1938)						x	
TOTALS	2	2	1	1	2	1	

unifying ideas or themes that can be distilled to a clear and compelling diagram (Chapman, 1990). More pragmatically, Barbour (1973) suggested that in making clear to university administration, project architects, and other parties who could effect the plan's realization, the planner might supply accompanying models, drawings, and sketches illustrating all major elements, as Halstead (1974) added, over the time of the planning period. *Why a Master Plan?* (1960-1969) also suggested the development of master plan drawings.

This section studied various graphical devices found in literature for illustration of concepts presented in the master plan document. It concluded with a review of other graphical recommendations found in the elements of the compilation of statements.

Campus Mapping

Kansas Board of Regents (1972) recommended that physical information about the campus should be clearly documented in order to have a good, factual basis for decision making. This consisted of base mapping. Kansas suggested a well-organized format of mapping for each of its institutions, establishing four specific types of base mapping:

1. campus base map
2. sectional base maps
3. individual buildings plans
4. campus community map.

Additionally, it suggested that each institution maintain current aerial photos of the campus and campus community. These four types of mapping, with some additions from other sources, were further developed.

Campus base map

The facts and findings should be displayed so that all the participants will have a reasonable understanding of the campus and environs as a physical place with measurable dimensions and attributes. Without a proper base map, the information will be distorted, and the interpretations and judgments based on those findings tainted and compromised. (Dober, 1992, p. 257)

Earlier Dober (1963) noted that the campus base map was a major tool at the survey stage. A compilation of aspects of the base map included:

1. location (in service area, in community)
2. the environs surrounding the campus (land uses, streets, zoning, access via transportation networks, visual)

3. boundaries of the institution's land holdings, property lines (if available), number of acres
4. roads, major walks on campus, points of entrance, terraces, and existing paving
5. campus buildings in block outline form
6. main entrances to buildings
7. building locations, buildings by name, function, number of floors, finished floor elevations, gross square footage, building materials, buildings condition, date of construction, dates of any renovations (for legibility and ease of comparison, this information could be part of the legend and keyed to each building)
8. functional outdoor spaces, such as playfields, parking areas, and others (legend labels listing of acreage, use, capacities, and related information)
9. topography (using 5 foot intervals), subsurface soils conditions
10. natural features, landscaping, major vegetation, outcrops of ledge, wet lands, tree masses, and other site conditions or natural plant growth
11. location of major existing utilities and lines
12. water features
13. sign systems
14. service areas
15. grid coordinates (Barbour, 1973; Colorado Commission, 1974; Dober, 1963; Halstead, 1974).

Dober (1963) observed that as a tool, the campus base map served as a working document for sketch plans and other planning. The maps needed to be drawn so that inexpensive copies could be made from them. Later Dober (1992) also noted that existing computer-assisted graphics and simulations provided new tools for this older process. However, he added that the new graphic products had not yet proven to be as portable or as accessible for group discussion as the conventional wall-sized drawings and slides. He also found that, in certain cases, a topographic model could be helpful.

Kansas Board of Regents (1972) stated the purpose of a campus base map was to document various overview information about the total campus. The map had a format that could be photographically reduced to fit on an 11" x 17" sheet for recording certain usage information. A suggested scale of 1":200' was given, and the information to be included specified: building location and name; sidewalks; and streets with name (option with scale). The graphics were to be simple single-line indications of required physical information and press-on lettering. Kansas Board of Regents suggested annual updating, based on information derived from sectional base maps.

Sectional base maps

Kansas Board of Regents (1972) stated the purpose of sectional base maps was to document and communicate various kinds of detailed information about the campus to people directly involved with maintenance and upkeep, and to architects and engineers involved in specific projects requiring site information. They were also to be used for preparing budgets for replacement and improvement of utilities, lighting, landscape, etc. The suggested format consisted of a recommended scale of 1":20'. Additional information to be included was: building location and name; sidewalks; streets with name; location of trees with type indicated; either grid or contour; topography with 2' contour intervals optional; campus lighting; location/type and size of all utilities and tunnels; location of major planting areas; and outdoor furniture. The graphics could be determined by each institution. Kansas suggested updating the section maps on a continual basis as changes were made on campus.

Individual building plans

Kansas Board of Regents (1972) stated the purpose of individual building plans was to document and communicate specific information about each campus building for space use decision making. The suggested format for these maps was in the form of building plan sets. The arrangement of the sets was: a title sheet; a table of contents containing alphabetical and numerical listings of buildings; a campus key map, an 11" x 17" map made from the reduction of the campus base map—indicating all building numbers; and building plan sheets (data sheets provided for each set of building plans), organized according to numbers indicated on the campus key map. All plan sets were to be bound in loose-leaf form.

The building plan sheets were also to provide given specifications for:

1. the outline of the building with outside and inside walls (showing all doorways and windows and indicating distinction between outside and inside wall sections)
2. net square feet within each space
3. room number (indicated at doorway of each space)
4. a building number (accompanying the chart sheet)
5. summary gross and net area (on each sheet)
6. one floor of building per sheet (except where more are appropriate)
7. north arrow and scale on each sheet
8. room types
9. the graphics scale.

Colorado Commission (1974) also listed building plan sheets specifications for:

1. diagrammatic floor plan
2. exterior photograph
3. physical description
4. space inventory by functional use classification, room type, and organizational unit.

Kansas Board of Regents specified that the graphics could be determined by each institution. It also suggested the building plan sheets be updated on a continual basis as changes occur within each building. The building plan sets were to be updated annually.

Campus community map

Kansas Board of Regents (1972) stated the purpose of the campus community map was for usage as a base map in which to document and communicate various kinds of information concerning the campus community environment necessary in overall physical development decision making. The format for this map was also to be reduced to 11" x 17", with the following information to be included: campus building location; major streets with name; campus boundary; north arrow; and a graphic scale. The Board suggested that the graphics be the same as the campus base map. Updating was suggested annually from city maps and "in-house" surveys.

Utilization Mapping

Morley (1972) observed that utilization maps could be used for projecting needs of a community, the areas of population, utility usage, and overall industry expansion. These maps helped in analyzing and projecting trends in housing (renting, owning), manufacturing, public buildings, parks, vacant property, etc. Kansas Board of Regents (1972) specified the utilization maps were based on two general groups: campus base maps and campus community maps. These served for decision making in the planning, facility programming, and facility design processes.

Campus base maps

Under this category Kansas Board of Regents (1972) listed four maps: land use map, campus areas map; pedestrian circulation routes and distance ratio map; and vehicular circulation map.

Land use map. Kansas Board of Regents suggested that this map list three general areas.

1. *Campus zones*: general zones (academic, support, PE--athletic/recreation, housing; academic facilities (instruction, research, public service); academic support facilities (library, audiovisual, radio and television, museums, data processing centers); institutional support facilities (general administration, non-academic); auxiliary enterprise facilities (general, housing, athletic facilities, parking, PE/recreation).

2. *Special area/non-building areas*: special; non-building.

3. *Open areas*.

Campus areas map. Kansas Board of Regents suggested this map diagram two general areas:

1. total campus area; and

2. land ownership, by category (state owned, foundation owned, rented, other).

Pedestrian circulation routes and distance ratio map. Kansas Board of Regents suggested this map diagram two general areas:

1. major pedestrian routes; and

2. minor pedestrian routes.

Vehicular circulation map. Kansas Board of Regents suggested this map diagram two general areas:

1. major roads and intersections; and

2. traffic counts.

Campus community maps

Halstead (1974) observed that the regional study should identify present and future forms of transportation, public facilities, institutions of learning (as feeders, competitors, and/or supporting resources) and all major development plans within the region that could affect the physical environment of the planned institution or its student population. The conclusions could be effectively communicated in a graphic summary.

Kansas Board of Regents (1972) listed two maps under this category: community land use map; and community vehicular and pedestrian circulation map. Barbour (1973) was the source of the site analysis maps.

Community land use map. Kansas Board of Regents suggested this map list four general areas:

1. zoning of the surrounding community within 6-8 blocks of the campus
2. existing development
3. location of off-campus housing for students
4. land values indicated by range (low, medium, high).

Community vehicular and pedestrian circulation map. Kansas Board of Regents suggested this map list five general areas:

1. major highway network
2. proposed changes in highway network
3. major pedestrian route and entrance—surrounding community
4. transit routes
5. off-campus street parking.

Site analysis maps. Barbour (1973) reported the site analysis maps resulted from analyzation of the region in which the campus was located and closely examined existing and proposed community land use and zoning.

Barbour specified this diagram contained all observations of site and environment that have an effect upon development, including:

1. drainage
2. topsoil: depth, condition
3. natural features: location and analysis of tree masses; rock outcrops; lakes, ponds, streams; soil analysis; critical subsurface rock and water conditions
4. vistas and views
5. possible points of vehicular access and egress
6. environmental nuisances
7. prevailing wind direction.

Barbour suggested the site analysis be graphically imposed over a topographic base map with extensive enough coverage to indicate the character of the immediate surroundings that are affected by or could affect the campus.

Barbour recommended a second site analysis map providing a graphic summary of all regional, community, and campus environs conclusions determined as having a major impact on the development of the campus. Items included were:

1. areas available for future expansion and designated land use for these areas
2. retention or deletion of certain physical features
3. designation of campus entry points
4. major vehicular and pedestrian circulation notations.

Planning Diagrams and Other Devices

Barbour (1973) listed two types of diagrams, the organization and the site-related functional, which formulated part of the conceptual plan. Kansas Board of Regents (1973) suggested geographic area designations to help in planning.

Organizational diagram

Barbour (1973) recommended an organizational diagram to indicate the required relationships of various facilities and activity areas, organized in an ideal form. It would also schematically show major functional and circulation elements, major access points, and significant relationships to adjacent areas.

Site-related functional diagram

Barbour (1973) also suggested a site related functional diagram as a graphic interpretation indicating conceptually the functional relationship of the various facilities, activity areas, and circulation systems and their modification by relationships to specific site conditions.

Conceptual plan

This plan(s) formulated on the graphic illustrations of the environmental concept from the site-related functional diagram was overlaid on a base map used for the functional diagrams. This plan should included:

1. A differentiation between existing and planned development
2. The general size, shape, and location of outdoor areas defined by structures, planting, and grading; the location and identification of parking areas as to type, number of acres, and cars per acre; identification of athletic open facilities and their acreage
3. Illustration of the major flow of pedestrian, bicycle, and vehicular circulation

4. Illustration of berms, bollards, pavement treatment and other principle devices used to achieve a system of public orientation, direction, and traffic control (Barbour, 1973, p. 78, 81).

Geographic area designation

Kansas Board of Regents (1972) suggested the possibility of dividing a campus into geographic areas, permanently constant, for planning puposes. The Board suggested this could be done along the following guidelines:

1. major changes between campus activities (e.g., between housing and academic facilities)
2. major highways which divide the campus
3. natural barriers (e.g. rivers, sharp drops in topography)
4. residential barriers.

Schematic Drawings, Charts, and Other Illustrations

Schematic plans and illustrations within the framework of the conceptual plan illustrated specific structures (or disciplines) located within each functional area. Sections, perspective sketches, or study models complemented the schematic plan(s). The schematic plan(s) needed to:

1. Show schematic configuration and size of buildings according to developed square footage requirements specified in an approved diagram
2. Locate specific athletic area activities required by the approved program
3. Indicate parking area size, shape, location, and number of spaces and levels
4. Identify types of roads, walks, and bicycle paths
5. Illustrate significant elements such as planting, treatment of major grade changes, and large paved areas
6. Show location, size, and direction of major utility elements such as substations, water treatment plans, sewage disposal, pumping stations, etc.
7. Indicate the direction and extent of growth and the amount of additional gross square footage of building areas, as well as the acres of athletic and parking facilities.

The schematic phase gave actual dimensions to the plan. Economic studies determined the feasibility of the scheme.

Charts

Charts served several functions. Biehle (1991) recommended using a chart to show present distribution of class sizes. Biehle also recommended a chart showing hoped-for changes in the distribution, especially increase in nontraditional or older students.

Photographs, monographs, sketches, perspectives, and archives

Halstead (1974) suggested aerial photos or model to show identifiable elements. Halstead also suggested using sketches, sectional sketches, perspectives, photographs, and working models to support and illustrate concepts developed.

Ohio State University (1987) also suggested having available as resources the history of campus buildings, the university photography collection, the campus map collection, and university archives, in addition to monographs focusing on specific components of the campus.

Final Document Graphic Inclusions

Weber and Fincham (1974) suggested the inclusion of the following graphic materials:

1. campus development plan drawings reflecting the stated objectives and principles, and illustrating the major physical planning proposals
2. a map of the existing campus showing the relationship of the campus to its immediated surroundings (in detail either as to existing or proposed land uses or as to existing or proposed patterns of buildings and development in areas "close in" to the campus)
3. an oblique aerial photograph of the campus
4. a map showing the campus in relation to its metropolitan region or subregion (10- to 15-mile radius)
5. a drawing illustrating general planning proposals, if any, of the surrounding areas (with approved information from general plans of the adjacent city or county showing land use and circulation proposals possibly affecting campus development).

Final design drawings

Halstead (1974) recommended that final design drawings be refined to the point that more detailed technical development would not require radical revision of the functional concepts. They needed to include a brief statement of the concept, development objectives, and planning principles that formed

the basis of the design. The analysis forming the basis of each element should be apparent, and should be prepared as an overlay that can be placed on the base map.

Halstead listed six supplementary drawings to indicate the steps by which various elements of the basic plan were realized. Each of these drawings were to contain a delineation of existing conditions, planned development, and phasing.

1. *Spatial form*—show existing and proposed organization of outdoor space, size of space and linkages between, and the character of the elements defining open spaces
2. *Architectural form*—Analyze existing and proposed buildings in terms of location, floor elevations, general condition, architectural quality, functional use, materials, height, and location of entrances and service areas
3. *Traffic and parking*—Identify (concurrently existing and proposed) community, campus, and pedestrian circulation patterns relative-use intensity of various routes and parking areas (Critical grade hazards and inefficient methods currently being used to control traffic needed to be noted.)
4. *Utilities*—Show (existing and proposed) conditions and location of utility system, including storm and sanitary sewers, natural gas conduit, power and electrical lines, heating, communications, clock, temperature control, fire alarm, etc. (System sources should be indicated.)
5. *Grading*—Indicate subsurface conditions and proposed new contours; spot elevations for parking areas, buildings, retaining walls, roads, walks, and steps
6. *Landscaping*—Evaluate existing plants, shrubbery, and trees for quality and conservation. The plan for the future should indicate location, type, and relative size of materials; also, the functional use of each, whether for windbreak, environmental enhancement, shading effect, etc. (Halstead, 1974, p. 479).

Illustrations by Elements

A review of the preceding elements from the compilation of statements was made to record all references to graphical illustrations used. Table 16 indicates particular illustrations cited for each element.

Organization of the Campus Master Plan Document

The organization of the master plan document was not obviously apparent in the literature. While it may be a given that every source would outline its unique organization, there also did not seem to appear any distinguishable patterns between them. The importance of the master plan document's organization was noted by McKinley (1975): "In organizing the physical development plan, it is essential

TABLE 16
 GRAPHICAL DEVICES FOR CAMPUS MASTER PLAN ELEMENTS
 FROM THE COMPILED STATEMENTS

Elements	Graphical Devices
Circulation	GD, VS
Buildings and Facilities	FSF, DPF, FF, SRD
Academic Plan	VS, Ds, GD, TT, Dw
Land Use Aspects	GD, VS
Costs and Financial Aspects	VS, CD, B, FCE, DS, FF
Phases of Development & Scheduling	MS, VS, Sq, B, TL, CD, St, SD, Tb
Site Plan	SP, DM
Utility and Energy Systems	Dw, Da
Institutional Aspects	VS, Ds, An, PF
Enrollments and Campus Populations	VS, ED, PF, BP, Da
Environmental Aspects	VS, GD, Ds
Landscaping	VS
Program Space Needs and Standards	FSF, SRD
Housing	An, Da
Architectural and Outdoor Spatial Aspects	GD, SRD
Space and Functional Relationships	SP, PP
Extracurricular, Recreation, and Athletics	SRD
Planning Concepts	VS, GD
Document Organization	VS

Key:

An	Analysis
B	Budgets
BP	Base Population
CD	Cost Determinants
Da	Data
DM	Diagrammatic Map
DPF	Description of Physical Facilities
DS	Development Schedule
Ds	Descriptions
Dw	Drawings
ED	Enrollment Data
FCE	Facility Construction Estimates
FF	Financial Forecasting
FSF	Future Space Forecasts
GD	Graphical Devices
MS	Master Schedule
PF	Population Forecasts
PP	Plot Plan
SD	Schedule of Dimensions
SP	Schematic Plan
Sq	Sequencing
SRD	Space Requirements Data
St	Staging
Tb	Tables
TL	Time Lines
TT	Time Tables
VS	Verbal Statements

that a distinction be made between functional campus organization and the campus design and architectural aesthetic" (p. 6).

Campus Master Plan Document Data Collection Checksheet

A data collection checksheet was developed to help collect more accurate data from the data master plan documents. The typology, at this point, became the information compiled from the statements. This compilation was then compared to the data, in an attempt to develop a model.

Developing a checksheet to provide better accuracy of collection had prior occurrence in literature. Canon (1988) developed a model to evaluate the campus planning effort in the form of a questionnaire. The objective of the questionnaire was to determine the effectiveness of the campus master planning approach, and to determine whether selected elements were present. Canon used, in determining the presence of an element, a value scale as follows: (3) Yes; (2) Somewhat evident; (1) Least evident; and (0) No. Canon also included space under each element to write in an evaluation. Proctor (1931) used a similar system in reviewing architects' working drawings prior to purchase by a school board. Proctor categorized elements of drawing in four groups: clearly shown; partly shown or shown elsewhere; not required or not provided; and not shown.

These two studies provided a measurement scale base for the data collection checksheet. This checksheet appears in Appendix A and is discussed further in chapter 4.

Summary

Chapter 3 developed a typology through the review of literature for the collection and comparison of data presented in chapter 4. This was accomplished by a compilation of related campus master plan element statements found in literature. One purpose of this typology was to determine whether there existed a close relationship between elements specified in literature and those found in the actual campus master plan documents.

Prior to the compilation a review was presented of different types of master plan documents. This review highlighted the varying kinds of documents existing, and underlined the difficulty of trying to establish standards.

After the compilation of statements, comparisons were made between previous studies in this area and a preliminary review of elements as mentioned in literature. Comparisons were also made by decades to determine (if possible) changes in literature priorities over time.

The typology, then, was the listing of the different areas found in the compilation of statements. This listing became the backbone for the data collection checksheet in Appendix A. This listing

comprises what literature has cited as "elements" of a campus master plan, the totality of which could be considered the "ultimate" campus master plan.

However, it was not expected or suggested that a campus master plan contain all these elements. On the contrary, the typology was used as a guide to study actual plans from which guidelines might emerge that contained the most commonly used and cited elements from literature and the data campus master plans. Chapter 4 details the results from the data master plan documents' study.

CHAPTER IV

SYNTHESIS OF DATA

The synthesis of the data involved three steps. These were: conducting a pilot study; conducting an interrater reliability test; collecting and analyzing the data. The analysis of the data was divided in two parts. The first was the front page sections of the data collection checksheet. The second focused on the master plan document elements. This chapter describes how the data were collected and the results of this collection.

Pilot Study

Prior to the study of the data master plan documents, the data collection checksheet (Appendix A) was tested. A pilot study was conducted with the checksheet on four (4) sample master plan documents (Table 17). The checksheet originally listed all the elements with sub-elements in a column on the left of the page. The graphical devices identified in Table 16 composed succeeding columns to the right. These graphical devices were identified from the compilation of statements (in chapter 3) and included as part of the study as a means of investigating how each element was developed in the master plan document and also as a baseline guide (as prescribed in literature) for more accurate evaluating the development of elements in the data master plans.

Results from the pilot study revealed that modifications to the checksheet were needed. Most of the graphical devices listed were too specific and difficult to identify. Of the original 27 devices listed in Table 16, seven were finally used in the checksheet. Table 18 provides an explanation of the evolution of these devices throughout the pilot study and interrater reliability testing phases.

Due to the pilot study three elements were added to the collection checksheet because of their recurrence in the pilot phase. These were: additional document organization; letter of commission; and ultimate development plan. The additional document organization element was added to track items originally not specified in the document organization element. It was determined at the time not to add new aspects to the established element (from chapter 3), but create a new element and harmonize any similarities in the document developed in chapter 5. Letter of commission was also added because of its

TABLE 17
 CAMPUS MASTER PLAN DOCUMENTS USED IN THE PILOT STUDY
 AND INTERRATER RELIABILITY TEST

Author	Date	Title
<u>Pilot Study</u>		
Todd/Pokomy, Architects and Planners	1969	<i>Lehman Master Plan.</i>
Streeter, E. A.	1979	<i>A Master Plan for the Adventist University of Central Africa.</i>
Daverman Associates, Inc.	1969	<i>Master Plan Report: Ferris State College.</i>
Ciampi, M.	1960	<i>Planning for Action: Progress Report No. 4 (University of Alaska).</i>
<u>Interrater Reliability Test</u>		
Daverman Associates, Inc.	1976	<i>Development Plan: North Central Michigan College.</i>

TABLE 18
 GRAPHICAL DEVICES' EVOLUTION THROUGHOUT THE STUDY

Devices listed in Table 16	Devices After Pilot Study/Interrater Test	Final Device Listings
An Analysis	- Included in narrative (N)	
B Budgets	B Included in Tables (Tb), Schedules/Projections (S/P) and others	
BP Base Population	- Included in Tb, S/P, and others	
CD Cost Determinants	- Included in S/P and Tb	
Da Data	Da Included in S/P, Tb and others	
DM Diagrammatic Map	M Maps: used extensively (Changed)	M Category all types of maps used.
DPF Description of Physical Facilities	- Included in N	
OS Development Schedule	S/P Schedules/Projections (Changed)	S/P Category of items of time lines, phases of development, or enrollment, academic, financial, or physical projections.
Ds Descriptions	N Narrative: used frequently (Changed)	N Category for any type of text or description accompanying an element.
Dw Drawings	I Illustrations: used (Changed)	I Category for sketches, drawings, photographs, renderings, and any other illustrative outlines.
ED Enrollment Data	- Included in S/P and others	
FCE Facility Construction Estimates	- Included in S/P and others	
FF Financial Forecasting	- Included in S/P and others	
FSF Future Space Forecasts	- Included in S/P and others	
-	F Figures (Added)	F Category for all types of charts, graphs, etc., which are not included in illustrations (I) and Tables (Tb).
GD Graphical Devices	- Used as the overall term	
MS Master Schedule	- Included in S/P	
PF Population Forecasts	- Included in S/P	
PP Plot Plan	- Included in Maps (M)	
SD Schedule of Dimensions	- Found in pilot study Included in S/P and Tb	
SP Schematic Plan	SR Space Relationship Diagram (Changed)	SR Category for bubble diagrams, cross-sections, and matrices showing relationships between elements of a whole.
Sq Sequencing	- Included in S/P	
SRD Space Requirements Data	- Included in S/P, Figures (F), or Tb	
St Staging	- Included in S/P	
Tb Tables	Tb Tables (expanded)	Tb Category for all types of tables (columns/rows) whether financial, budgets, sq. footage.
TL Time Lines	- Included in S/P	
TT Time Tables	- Included in S/P	
VS Verbal Statements	- Included in N	

presence in the pilot master plan documents, as was the ultimate development plan element. This last addition was included because no element seemed to include the aspects of the final development phase, or the portion that focused on the ultimate goal or final development aspect of the document. There was some crossover in this element with the phases of development element, but the data clearly revealed two distinct elements.

Interrater Reliability Test

An interrater reliability test was conducted on the checklist after the modifications from the pilot study were made. For this test two individuals, in addition to the researcher, were chosen to evaluate the checklist with an actual campus master plan document to establish reliability for the researcher. The first rater selected was an experienced administrator, an academic dean of a small private university with prior involvement in university-wide planning as well as other small campus planning. The second rater was an expert in the field of campus planning, having extensive experience in the campus planning process, consultation in campus planning, publication of campus master plan documents in addition to teaching courses in facility and campus planning.

Each rater was provided with the section on the compilation of statements from chapter 3, a modified checklist, and the same campus master plan document to rate (see Table 17). A reliability rating of .7 between the two raters and the researcher was established as acceptable.

An early problem, which emerged in the reliability testing, was the original listing format of the typology elements. There was a listing of three pages in length, which made it difficult for the interraters to easily match elements found in the test master plan document with those in the checklist. Duplication was also found between the typology elements of chapter 3. The compilation of statements (typology) of chapter 3 was reorganized to its present form, reducing the number of elements from 32 to 19. Upon the raters' recommendations, further modifications were made to the checklist to contain all the listings on one page. On the second page were listed the three elements added from the pilot study along with blank areas for additions to be included that were not listed in the typology. It was at this point that the graphical devices were further consolidated to the final seven items (Table 18). The checklist itself thus became a grid of nine columns by 19 rows, as it appears in Appendix A.

Upon completion, the three checklists compared very favorably. Qualitatively, in all cases of variation, two of three checklists agreed. Comparison of the three checklists by columns yielded the following variations:

1. Column B (Figures), no variations
2. Column C (Illustrations), one variation, row 11—only two checklists recorded entries

3. Column D (Maps), two variations, row 13—only one checksheet recorded an entry, row 16—the same
4. Column E (Narrative), one variation, row 12—only one checksheet recorded an entry (however, the row was scored the same as the other checksheets)
5. Column F (Schedules and Projections), one variation, row 8—only two checksheets recorded entries
6. Column G (Space Relationship Diagrams), no variations
7. Column H (Tables), no variations
8. Column I (Scores), two variations, row 16—one checksheet entered no score (0) and the other two entered a 1, row 18—the same checksheet entered a 3 and the other two entered a 2 (the scoring total and means were identical for all three checksheets) (scoring explanations found in Appendix A).

Quantitatively, the results of adding the total entries per column minus variations across all three checksheets (B = 1, C = 6, D = 10, E = 15, F = 1, G = 0, H = 2, I = 17) equaled 52, which divided by the total entries across checksheets including variations (B = 1, C = 7, D = 12, E = 17, F = 2, G = 0, H = 2, I = 19), which equaled 60, resulted in a reliability rating of .87. If considered overall at 19 possibilities per column (B through I), the results of the total possibilities per column (19) minus the total variations per column resulted in the following: B = 19, C = 18, D = 17, E = 17, F = 18, G = 19, H = 19, I = 17; which totalled = 144 / 8 (number of columns) = 18 (average per column) / 19 (possibilities per column) resulting in a reliability rating of .95. From either approach, the reliability rating exceeded the pre-established rating of acceptability of .7.

Analysis of the Front Page Checksheet Section's Data

The first part of the analysis of data covered the sections on the front page of the data collection checksheet. These were the biographical information, physical appearance, and document details of the data master plan documents. The front page checksheet listings were added mainly for collecting additional information from the data. The object of these sections was to study the possibility of a standard "look and feel" to the physical appearance, composition and organization of a campus master plan document. Table 19 shows the overall results from the front page checksheet sections, and Table 20 breaks down the different aspects by decades.

Biographical Information

The biographical information was pertinent both in identifying the documents used for this study and the possibility of future referencing or verification. Table 21 provides a listing (by institution and date)

TABLE 19
OVERALL DATA CAMPUS MASTER PLAN DOCUMENT ASPECTS SCORES

Document Aspects	Overall Results
Mean Year	1979
Cover Font	Serif, 55% Sans Serif, 40% Other, 5%
Binding	Spiral, 60% Perfect, 20% Other, 20%
Text Font	Sans Serif, 40% Serif, 30% Courier, 30%
Document Type	Formal - printed, bound book, 60% Informal - loose-leaf, 40%
Layout Size	Other, 30% 8.5" x 11" Tall, 25% A4 Tall, 20% 11" x 14" Wide, 10% 8.5" x 11" Wide, 5%
Number of Pages	Average: 69 Spread: 28 - 141
Dividers	0, 60% 3, 10% 4, 10% 6, 10% 5, 5% 7, 5%
Printing Color	B/W with color in Maps, 55% B/W, 45%
Length of Plan	5-10 yrs, 50% 11-15 yrs, 20% not specified, 20% 16 - 24 yrs, 10%
Type of Plan	Insert/Add-on, 55% New Campus, 35% Regeneration, 10%
Campus Layout	Suburban, 50% Rural/Pastoral, 30% Urban, 20%

TABLE 20
TOP DATA CAMPUS MASTER PLAN DOCUMENT ASPECTS SCORES BY DECADES

Document Aspects	60s	70s	80s	90s
Cover Font	Serif, 60% Sans Serif, 40%	Sans Serif, 60% Serif, 40%	Serif, 60%	Serif, 60%
Binding	Other, 40%	Spiral, 40% Perfect, 40%	Spiral, 80%	Spiral, 100%
Text Font	Serif, 60% Sans Serif, 40%	Sans Serif, 40% Courier, 40%	Courier, 80%	Sans Serif, 60%
Document Type	Formal -printed, bound, 100%	Formal, 80%	Informal loose-leaf, 60%	Informal Loose-leaf, 80%
Layout Size	A4 Tall, 40%	Other, 60%	8.5" x 11", 60%	—
Number of Pages	82	74	72	49
Dividers			0, 60%	0, 100%
Printing Color	B/W with color in Maps, 80%	B/W with color in Maps, 80%	B/W, 80%	B/W 60%
Length of Plan	11-15 yrs, 40% 16-24 yrs, 40%	5-10 yrs, 60%	5-10 yrs, 60%	5-10 yrs, 60%
Type of Plan	New Campus, 60% Insert, Add-on, 40%	New Campus, 60% Insert, Add-on, 40%	Insert/Add-on, 60% New Campus, 20% Regeneration, 20%	Insert/Add-on, 80% Regeneration, 20%
Campus Layout	Suburban, 60%	Rural/Pastoral, 60% Urban, 40%	Suburban, 60%	Suburban, 80% Rural/Pastoral, 20%

TABLE 21
LISTING OF DATA MASTER PLAN DOCUMENTS BY ORDER OF COLLECTION AND DECADE

Data Master Plan Document	Decade
1. La Moyne College	90s
2. Calgary University	60s
3. York University	60s
4. Southern Oregon State University	90s
5. Harvard University	70s
6. Seattle Pacific University	80s
7. Murdoch University	70s
8. Adelaide University	60s
9. University of Richmond	70s
10. Colgate University	90s
11. Union College	80s
12. Northwestern University	90s
13. Chicago State University	70s
14. Rhodes College	80s
15. Montclair State College	80s
16. Kentucky University	60s
17. Southwest Texas State	90s
18. University College of Eastern Africa	70s
19. Adventist University of Central Africa	80s
20. Bath University	60s

of the campus master plan documents used in this study. The mean date of the data documents was 1979.

Physical Appearance

Cover descriptions, cover fonts, text fonts, and layout size aspects focused on the format and type of configuration used in data master plan documents. Dividers were used as determiners of whether there were any general organization similarities among the data. As shown in Tables 19 and 20, most of the data documents had no dividers.

The binding, document types, number of pages, and printing color were perceived as being of greater importance to a master plan document. The data revealed (Tables 19 and 20) that while 60% of plans had a spiral binding, which generally indicated an informal type of document, actually 60% of the plans were of the formal, printed variety. The most recent literature reviewed for the study recommended an informal type of loose-leaf document in which pages could be added, altered, or deleted (chapter 3). The data revealed that use of spiral binding increased steadily across decades, as well as the prevalence of more informal documents (see Table 22). In combination with this trend, the average pages per document steadily dropped over the decades, with the greatest decline in the 90s. Additionally, the documents progressed towards more black and white illustrations from 80% black/white with color in the maps, for the 60s and 70s, to 80% just black/white documents for the 80s, and 60% just black/white for the 90s. All these factors seemed to indicate a greater informality and flexibility appearing in the campus master plan documents.

Document Details

Overall, 50% of the documents were of a length of 5 - 10 years. By decade, the 60s group was split 40% for 5 - 10 years and 16 - 24 years. The rest of the groups (70s - 90s) were all equal at 60% for 5 - 10 years.

The majority of plans were the insert/add-on type (55%), which had been developing over time. The majority of 60s and 70s plans (60%) were new campus types. By the 80s, the insert/add-on became 60% of the plans, and grew to 80% by the 90s.

The majority of the campus layouts were the suburban kind (50%). The 60s, 80s, and 90s all had at least 60% or more suburban kinds of campus layouts. The lone exception, the 70s, 60% of those plans were rural/pastoral.

TABLE 22
SELECTED PHYSICAL APPEARANCE DATA RESULTS

	1960	1970	1980	1990
Spiral Binding	20	40	80	100
Informal (Formal) Documents	0(100)	20(80)	60(40)	100(0)
Average Number of Page	82	74	72	49

Analysis of Campus Master Plan Document Elements Data

The master plan document elements found in the data are presented in the order they appear in the collection checksheet (Appendix A). Table 23 lists the elements with mean scores by decade in the order they are discussed. Table 24 provides an overall listing of elements ranked by mean scores, with percentages of graphical devices found for each element included. The ranges for the mean scores fall between a perfect 3.0 (fully elaborated in every plan) and 0.0 (not shown in any plan). The discussion that follows was based on these mean scores.

Circulation

Circulation ranked second with a mean score of 2.80. As shown in Table 23, across decades the mean held fairly steady. The following element-illustration content, along with the incident percentage of graphical device illustrations, as shown in Table 24, was found in the data.

Figures

Graph: Commutation modes

Graph: Commutation times

Graph: Vehicular traffic

Illustrations

Photos (general)

Architectural Model Photo: Campus circulation

Artist rendition: Entrances to campus

Artist rendition: Campus pedestrian walkways

Artist rendition: Summer Circulation - external area

Artist rendition: Winter Circulation - internal walkway

Circulation concept

Parking concept

Maps

Circulation: Existing circulation [date]; proposed circulation; vehicular flow and arrival points; ring road; road, footpaths, covered way; vehicular circulation concepts; internal road patterns; potential vehicle circulation network; existing communications: roads affecting the university; future roads - proposed

TABLE 23
ELEMENT MEAN SCORES BY DECADE

Element	60s	70s	80s	90s
Circulation	3.0	2.6	3.0	2.6
Buildings and Facilities	3.0	2.8	2.8	2.4
Land Use Aspects	2.8	2.8	2.8	2.4
Academic Plan	2.6	1.6	0.8	0.8
Costs and Financial Aspects	1.6	1.8	1.6	1.8
Phases of Development & Scheduling	2.2	1.8	2.4	1.6
Site Plan	3.0	3.0	2.6	2.2
Utility and Energy Systems	2.4	2.2	2.4	1.8
Institutional Aspects	3.0	3.0	1.8	2.0
Enrollments and Campus Populations	3.0	2.0	1.8	0.8
Environmental Aspects	1.6	1.2	1.6	2.0
Landscaping	2.6	2.0	2.2	2.0
Program Space Needs and Standards	2.4	2.2	3.0	2.2
Housing	2.8	2.0	2.0	0.6
Architectural and Outdoor Spatial Aspects	2.8	2.2	2.2	1.2
Space and Functional Relationships	2.8	1.6	0.8	0.6
Extracurricular, Recreation, and Athletics	1.8	0.8	1.8	0.0
Planning Concepts	1.8	1.8	2.2	1.4
Document Organization	2.4	1.2	0.0	0.6
Additional Document Organization	3.0	3.0	3.0	3.0
Letter of Commission	1.2	1.2	1.2	1.2
Master Plan	3.0	1.6	2.4	1.6
Cumulative Means	2.49	2.02	2.02	1.83

Note. Elements are listed in the order discussed (which is the order they appeared in the data collection checksheet).

TABLE 24
LISTING OF DATA ELEMENTS BY GRAPHICAL DEVICES AND MEAN SCORE

Rank	Elements	F	I	M	N	S/P	SR	Tb	Score
1	Additional Document Organization	–	25	5	100*	–	–	5	3.00
2	Circulation	10	25	80	100*	5	15	45	2.80
3	Buildings and Facilities		10	50	55	95*	10	15	60
2.75									
4	Land Use Aspects	10	5	80	90*	–	25	15	2.70
4	Site Plan	5	35	85	90*	5	15	10	2.70
6	Institutional Aspects	5	30	70	85*	–	10	10	2.45
6	Program Space Needs and Standards	25	5	15	75	5	5	80*	2.45
8	Utility and Energy Systems	20	15	55	80*	5	–	15	2.20
8	Landscaping	–	10	60	80*	5	5	5	2.20
10	Ultimate Development Plan	–	35	65	65*	–	5	20	2.15
11	Architectural and Outdoor Aspects	–	35	35	75*	10	15	–	2.10
12	Phases of Development and Scheduling	10	15	50	75*	15	–	30	2.00
13	Enrollments and Campus Population	45	5	15	75*	–	–	50	1.90
14	Housing	15	15	40	65*	–	5	30	1.85
15	Planning Concepts	–	15	10	70*	–	15	–	1.80
16	Costs and Financial Aspects	5	–	–	60*	10	–	60*	1.70
17	Environmental Aspects	–	15	20	70*	–	5	5	1.60
18	Academic Plan	10	5	20	55*	–	10	15	1.45
18	Space and Functional Relationships	5	5	10	50*	10	35	5	1.45
20	Letter of Commission	–	–	–	40*	–	–	–	1.20
21	Extracurricular, Recreation and Athletics	5	–	20	45*	–	–	5	1.10
22	Document Organization	5	20	10	40*	5	5	–	1.05

All figures (except for Score) are percentages of the total ($n = 20$).

* Denotes highest ranking for element.

Parking: Circulation (traffic) and parking; potential parking and service drives; street/alley vacancies (vacat(e)ions); surface parking requirements; circulation and parking

Pedestrian: Existing pedestrian ways; proposed pedestrian ways; pedestrian volume; major pedestrian–vehicular conflicts; pedestrian circulation concepts

Public transportation: Public transportation routes; main approaches to site; detailed circulation relationships between the city and the university; transportation

Service: Provision of service easement; service/emergency; safety, security, and emergency routes

Bicycles: Bike ways - bike parks; bicycle volume; parked bicycles; potential pedestrian/bike network

Narrative

All the topics were internally divided between two general categories: existing; and proposed improvements.

Parking (system, proposed concept): Parking needs; available parking areas; parking structures; parking charges and financing of structures (parking fees); parking spaces; street/alley vacancies

Pedestrian Concept or System: Sheltered pedestrian routes; housing and pedestrians; pedestrian volume; pedestrian mall; covered pedestrian system; footpaths; protected footpaths

Vehicular Concept: Exterior vehicular route (loop road system, peripheral drive); inner-campus drives; automobile use (private); circulation inside the site; peak hour traffic; traffic projections for area; road pattern

Access and Entrances: Access and traffic (roads); arterial streets (major streets); collector streets; possible future link roads; entrances; entrance roads

Public Transportation: Transit system (routes/stations, arrival points); Transportation management plan; shuttle bus

Utility Access (service/emergency): Safety and security; service roads; service ducts; emergency vehicles

Bicycles (general) - bike pathways/parks

Visitors

Philosophy (of circulation)

Space Relationship Diagrams

Cross section: Typical sections of street level: pedestrian, bike, auto, emergency vehicle

Bubble Diagram: Road and auto parking system

Cross section: Main service ducts

Cross section: Peripheral and internal main roads

Space relationship diagram: Central campus location

Space relationship diagram: Major circulation

Space relationship diagram: Time distance

Tables

Parking: Peak weekday parking demand; peak residential parking demand; peak evening parking demand; car parking requirement; university parking; parking demand projections (by facility); peak parking demands (student); parking analysis; available campus parking (by building)

Public Transportation: Comparable commuting costs (bus, transit, parking, etc.); commuter modes (current, for students) and timetables

Circulation: Level of service on intersections (existing/proposed); peak time demands

Buildings and Facilities

Buildings and facilities ranked third with a mean score of 2.75. As shown in Table 23, across decades the means showed a gradual decline. The following element illustration content along with the percentage of incidence graphical device illustrations as shown in Table 24 was found in the data.

Figures

Graph: Categories of teaching and research space

Illustrations

Artist rendition: Library

Artist rendition: Univ. (student) Center

Artist rendition: Social science

Photo: general

Artist rendition: Housing

Artist rendition: Chapel

Artist rendition: University Offices

Artist rendition: Education
 Artist rendition: Humanities
 Artist rendition: Central heating and cooling plant
 Artist rendition: Physical plant
 Artist rendition: Food Services
 Artist rendition: Physical Education
 Artist rendition: Fine arts
 Artist rendition: Engineering
 Artist rendition: Student health services
 Different categories of space
 Floor plans of existing/proposed buildings
 Layout drawings of buildings identified for each project
 Model (removal/replacement of buildings)
 Photo of model: Architect's model of campus

Maps

Existing buildings/development)
 Construction: Proposed construction [dates]; building construction or acquisition
 Building use
 Building administration
 Building analysis (date)
 Building method
 Communal facilities
 Condition of structures
 Location of departments by building
 Off-campus facilities (map of surrounding areas)
 Potential building renovation, demolition, and relocation
 Proposed redevelopment (removal/replacement of buildings)

Narrative (general)

Buildings: Buildings; renovation/reuse; codes and requirements; building age and condition; additions; expansions; clustering of buildings; building floor plans; maintenance; deferred maintenance; proposed redevelopment (removal/replacement of buildings)

Facilities: Off-campus facilities; communal facilities; academic buildings (see listing below)

Projected physical needs: Facility audit; structures; building analysis; major structures required

Building method

Narrative (on Facilities)

Libraries (Library)

University Offices (administration)

Housing - Dorm

Student center (commons)

Physical education (Health)

Social science (school)

Food services

Academic buildings

Central heating/cooling plant (utilities)

Fine arts

Natural sciences

Other school buildings

Physical plant

Science (hall)

Sports facilities - Gym

Auditorium

Education

Engineering

Greenhouse

Humanities

Museums

School of Nursing

School of Business

Student health services

TV/radio station

Space relationship diagrams

- Cross section: the library (from east)
- Space relationship diagram: initial priority (removal/replacement of buildings)
- Teaching and research areas schematic plan and cross sections
- Tentative siting of schools

Tables

- Building age and condition
- Existing building heights/sq. footage
- Library seating capacity (by planning area)
- Location of departments by building
- Performance specifications for three categories of teaching and research space
- Room-size characteristics
- Tables of summary of requirements (and totals Table)
- University buildings on central campus

Land Use Aspects

Land use aspects ranked fourth, together with site plan, with a mean score of 2.7. As shown in Table 23, across decades the means held steady from the 60s through the 80s, and in the 90s it fell slightly. The following element illustration content along with the percentage of incidence graphical device illustrations as shown in Table 24 were found in the data.

Figures

- Graph: Existing Land Use Density
- Pie chart: Land allocation

Illustrations

- First diagram of the university (showing routes, lines of expansion)

Maps

- Land Use: Peripheral land use; existing land use; land utilization (w/buildings); existing land use density; existing site and land utilization (by density); future land use; proposed land use
- Zoning: Land use zoning (future); campus zones; existing (campus) functions; zoning within the site

Land (general): Existing land tenure; university property and planning areas (by college); land holdings; future land needs; advance reservation of land

Land Purchase/Acquisition: Land purchases (acquisition); land acquisition and development constraints

Narrative

Zoning: Land use and zoning; density; development zones

Land (general): Campus boundaries; land requirements; land holdings; available land; acreage

Land Use: Expansion locations; land use potential; land use policies; existing land use; land utilization; future land use

Land Purchases/Acquisition: Land acquisition; site selection

Space relationship diagrams

Bubble diagram: Proposed land use

Bubble diagram: Existing land use

Site utilization plan

Space relationship diagram: Land use concept

Tables

Existing land use density

Land allocation

Potential site analysis

Academic Plan

Academic plan ranked 18th, along with space and functional relationships, with a mean score of 1.45. As Table 23 shows, across decades the means gradually declined. The 60s means was 3.0, then the 70s and 80s fell slightly to 2.8, and in the 90s it fell further to 2.4. The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 24, was found in the data.

Figures

Chart: term-by-term fluctuation in student population in university

Chart: Semester credit hours

Figure: Proposed schools of study
Flow chart: Administrative hierarchy

Illustrations

Model: Aerial view of campus (showing school)
Photos: general

Maps

Existing (academic) functions
Other universities in the region (showing locations)
Schematic layout (by schools)

Narrative

Academic trends
Decentralization
Departments, schools
Educational objectives
Flexibility
Functional elements
Incremental growth
Post-graduate and research work
Program objectives (academic, vocational, farm experience, agricultural program)
Sandwich courses
Strategic points
Structure of plan
Student quality (intellectually/educationally)

Space relationship diagrams

Space relationship diagram: University and academic patterns compared
Time line: typical course patterns

Tables

Academic offerings
Hours generated by program, totals (for last 5 fall semesters)

Programs table

Quarter hour requirements

Costs and Financial Aspects

Costs and financial aspects ranked 16th with a mean score of 1.70. As seen in Table 23, across decades the means held steady between 1.6 and 1.8. The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 24, was found in the data.

Narrative

Analysis of expenditures (included manpower per hour costs)

Capital and opening costs

Funding restraints

Tables

Allocation of construction budget by calendar year

Budget estimates

Capital program (by school, building)

Capital costs projects (for each stage, and totals by area)

External works costs

Financial plan (by phase - [2])

Future physical plant projects (data)

Operating costs projection (for next 5 years by area)

Project summary (by: project, NSF, G.S.F., cost)

Summary of net areas, gross areas and costs for (number) of students

Summary of gross floor areas and costs for (number of) phases of development

Supplemental facilities envisaged in development plan

Phases of Development and Scheduling

Phases of development and scheduling ranked 12th with a mean score of 2.00. Across decades the means showed quite a divergence. The 60s means was 2.2, then the 70s fell to 1.8. The 80s jumped to 2.4, and in the 90s it fell again to 1.6 (Table 23). The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 24, was found in the data.

Illustrations

Photos

Maps

Development plan (one map per phase): Growth of university by stage; phasing plan; future development (existing buildings, proposed buildings/renovations, future projects); phase maps (one per phase) [dates - dates]; staging plan; phase (#) plan

Campus plan projects (by: project, NSF, G.S.F., cost)

Narrative

Phases of Development: Philosophy of building phases and phasing methods; Building plan (by phase and sub-phase w/costs); Two specific stages, third and fourth long-term, vague

Action plan

Priorities

Schedules and projections

Project development schedule

Tables

Construction schedule (by phase)

Each phase of development

Future physical plan projections (date)

Project summary (by: project, NSF, G.S.F., cost)

Project prioritization

Notes:

Number of phases (4, 6, 2, 3, 2, 2, 2, 4, 2, 4 / 10 data = $31/10 = 3$ phases average)

Most common = 2

Site Plan

Site plan ranked fourth, together with land use aspects, with a mean score of 2.7. Across decades the means showed a gradual decline. The 60s and 70s means were 3.0, then the 80s mean fell to 2.6, and in the 90s it fell further to 2.2 (Table 23). The following element illustration content, along

with the percentage of incidence graphical device illustrations as shown in Table 24 was found in the data.

Figures

Chart: Temperatures by month (across the year, max., min., mean)

Chart: Precipitation (by month)

Illustrations

Photo: aerial view of site, or other photos of site

Photos: general

Possible patterns for the central parade

Rendering: campus core

Maps

Topographical (with elevations, land form): Site slope analysis

Building sites: Proposed plan (of site projects); potential sites for future development (master plan); building areas (by resident area, academic area);

University (institution) site: Existing site conditions (summary) (list of buildings, numbered); site plan; soil test borings

Campus core: The main court; site plan for initial academic buildings; campus core: 1/2 mile diameter

Map of county

Narrative

Building sites: Expansion; expansion lines (directions of growth)

Topography

Campus core: Central mall (area)

Site characteristics: Existing site (development, facilities); site description; water supply; central area: existing campus conditions

Climate: Average temperatures; winds; extreme temperatures; rainfall; overall conditions; storms

Space relationship diagrams

Cross section: Buildings in the central area (top-down)

Cross section: Through the central area (across)

Tables

Potential sites (existing use, potential capacity)

Potential sites assigned

Utility and Energy Systems

Utility and energy systems ranked eighth, along with landscaping, with a mean score of 2.2. Table 23 shows across decades that the means held somewhat steady, then declined. The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 24, was found in the data.

Illustrations

Photos - general

Figures

Graph: Gas requirements (maximum demand)

Graph: Primary power distribution (max. demand)

Graph: Telephone requirements (# of extension lines) (external? or existing?)

Graph: Typical 24-hr. fluctuation in electrical demand in mid-winter

Graph: Water supply (peak requirements)

Graph: Water supply (average requirements)

Graph: Yearly electrical peak (demand and consumption)

Maps

Storm sewers (existing, under construction, future)

Sanitary sewers (existing, under construction, future)

Water mains [lines] (existing, future, meters, hydrants)

Existing utilities

Electrical distribution system

Gas mains

Chilled water and steam distribution

Existing (service) functions

Fire fighting system (hydrant, box, station)

Layout of easements

Main service routes (utilities)

Service distribution tunnels (existing, under construction, future)

Servicing plan

Storm retention basins (by area) and fire lanes

Telecommunications

Utility corridor concept (showing: campus utility corridor, city utility corridor)

Narrative

Electrical distribution: Energy shortage

**Sewage and waste disposal: Sewage (storm and sanitary); solid waste; storm drainage, run-off
(drainage -general)(surface water drainage - sewage); laboratory services; refuse disposal**

Air conditioning: Cooling; chilled water distribution (chillers); ventilation

Heating: Steam distribution; thermal; boiler house

Water: Fire mains; pumping water to various parts of campus; firefighting and fire prevention

Gas distribution: Natural gas

**Utilities: Future energy and utility needs; proposed utilities; existing utility plans; objectives;
general principles**

**Telecommunications: Telephone; computer cables and special communication conduits;
computer network master plan**

Service: Distribution tunnels; easements for services

Space relationship diagrams

Cross section: Easement of services

Tables

Comparison of costs for various fuels and heating systems

Comparison of capital costs for various boiler house schemes

Drainage basins

Estimated growth in electrical demand

Summary of daily water needs

Water consumption (in related or peer institutions)

Institutional Aspects

Institutional aspects ranked sixth, along with program space needs and standards, with a mean score of 2.45. Table 23 shows that the means for the decades were high for two decades then declined sharply, and rebounded slightly for the 90s. The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 24, was found in the data.

Figures

Flow chart: Formal structure of the university (administration)

Illustrations

Photos (general)

Old painting/engraving: university contracted with community (rel.)

Photo of model: Architect's model of campus

Photo of site

Photo of agricultural program

Maps

Surrounding community

Regional map (including a map showing peer institutions in the region)

Site in context with city (community)

City neighborhoods and school districts

Agricultural plan

Construction (from date to date)

Existing urban region

Existing city ordinances

General campus map

General plan for the environs of the University

Historical traces of early occupation on land

Institutional property in the previous centuries

Map of country

Map of the continent

Planned expansion of the urban region

Narrative

Institutional Context: Philosophy (background on what a university is, and how it applies to the institution); mission; purposes; aims and principles; goals; objectives; role; views of the future; evolution of long-range planning; proximity with other universities; setting; background; profile of the college; organization, governance and academic structure

Community factors: University and industrial society; economic and social benefits to region

Planning issues: Planning assumptions (not concepts); planning considerations; statement of need (for the plan) (for study) (post-secondary educational needs); master plan purpose; planning objectives; plan introduction; strategic plan; problem; the planning process (people, methods); History of the development plan; existing campus plan (date); planning conclusion; resolution adopting the campus master plan document (last page of the document); implementation of plan

History: Institutional history and milestones; historic districts (all regulations and codes concerning districts are specified); archeological and historical background

University and community (city) (location)

Institutional background data

Executive summary

Agricultural/Industrial

Suggested industrial programs: Agricultural activities

Space relationship diagrams

Cross section: Across site looking towards the city (vertical and horizontal distances to scale)

Space relationship diagram: Growth of the university

Tables

City zoning regulations

Enrollments and Campus Populations

Enrollments and campus populations ranked 13th with a mean score of 1.90. The means across decades declined sharply (Table 23). The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 24, was found in the data.

Figures

Projected undergraduate enrollments (dates)

University population breakdown (date)

Bar chart: student enrollment

Bar graph: Projected annual increase in working population (at Bath)

Bar graph: Projected growth in working population

Campus demographic change (male/female)

Chart: Headcount by enrollment (from date to date) (fall semesters)

Enrollment by faculties (departments)

Enrollment projections (timeframe)(over 20 years)

Figure: Proposed schools of study

Line chart: projected growth in student population

Net annual increase in population (over 10 years by category)

Pie chart: estimated distribution of campus population (date)

Pie chart: Student population growth (by stage (2))

Projected number of teaching staff (over 10 years)

Projected number of non-academic staff (over 10 years)

Projected number of technicians (over 10 years)

Projected graduate populations (over 10 years)

University student population (by college) (date)

Maps

Daytime student classroom use

Daytime faculty and employee distribution

Employees/Campus sq. area

Faculty/staff locations (density of personnel by location on campus)

Pie charts on map: Estimated distribution of campus population (dates)

Places of student home residence

Narrative

University population (overall quality) (over 10 years)

Demographics

Projected future enrollments (totals)
 Enrollment profile
 Enrollment cap
 Estimate non-academic staff population
 Estimate academic staff population
 Faculty/staff locations (density of personnel by location on campus)
 Population (present and future)
 Undergraduate annual intake

Tables

Total projected university population (by year)
 Enrollments by programs
 Future staff requirements
 Opening university enrollment
 Population distribution (by phase)
 Projected student population of schools of study (number, figures)
 Projected growth in working population (number, figures)
 Projected undergraduate intake (by year)
 Students in residence
 Ultimate gross student enrollment

Environmental Aspects

Environmental aspects ranked 17th with a mean score of 1.60. Across decades the means held fairly steady and even rose (Table 23). The significance of this trend may be the reflection of literature, which suggested that the campus environment play an increasing role in the recruitment of students. The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 23, was found in the data.

Illustrations

Aerial Photo: campus core
 Plan of seating

Maps

Ecology: Existing land drainage scheme; existing land drainage and water table; proposed land drainage scheme; soil of site and vegetation; subsoil analysis

Areas of environmental value and tree massings

Campus design features

Campus signage locations

Existing lighting

Impervious surfaces (showing paved and built areas, porous areas)

Lighting plan (by roadway, parking, spot and pedestrian lights)

Lighting locations

Outdoor art and memorials

Programmed exterior lighting (by types of lamps)

Narrative

Site accoutrements: Benches (site furniture) (seating) (wood benches); fences, screens, barriers, and bollards; signing (signage); bike racks; trash receptacles; public telephones; bus shelters; curbing; pedestrian paving; painting, stucco

Aesthetics/Attractiveness

Exterior lighting

Ecology: Bedrock; chalk and limestone areas; ground water; land drainage; soils tests; subsoil and foundations (soils - soil survey); topography (for buildings); topsoil

Decibel levels (noise): Traffic noise

Atmosphere of the campus: Campus character

Meaningful symbols: Art and memorials

Environmental improvement projects

Environmental safety

Ground treatment

Plant maintenance

Space relationship diagrams

Cross section: concrete curb

Cross section: timber curb

Cross section: wood trash container

Landscaping

Landscaping ranked eighth, along with utility and energy systems, with a mean score of 2.20.

Across decades the means slid variably. The significance of this trend was hard to ascertain other than the fact that master plan documents put less emphasis on campus landscaping.

The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 23, was found in the data.

Illustration

Artist rendition: Benches

Artist rendition: Lighting

Artist rendition: Shrubs

Artist rendition: Street

Artist rendition: Walkways

Maps

Landscaping: Landscape plan (broadscale landscape design); proposed landscape; landscape elements of the plan

Existing landscape

Comparisons to other landscaping/parks

Existing vegetation

Planting plan

Soils and existing vegetation

Tree inventory (detail)

Tree cover

Tree distribution

Narrative

Trees and shrubs: Tree plantings; tree shadings; the type and quantity of trees and shrubs; tree cover; trees; shrubs; ground covers and vines

Planting and flowers: Plant material; plantings—flower beds

Existing vegetation and land form: Soils (topsoil); lakes

Landscape architecture: Fountains; amphitheaters; outdoor furniture; lighting; direction signs; seating; use of landscaping

Surfaces: Hard surfaces; lawn areas; large, paved plazas; path, walls, and roadway materials; pedestrian circulation routes, walkways; paving

Guidelines (for proposed buildings within the landscape scheme)

Tables

Tree inventory key

Program Space Needs and Standards

Program space needs and standards ranked sixth, along with institutional aspects, with a mean score of 2.45. Across decades the means varied. The 60s mean was 2.4. It fell slightly to 2.2 for the 70s. In the 80s it jumped to 3.0, and dropped again to 2.2 for the 90s. The significance of this trend may indicate a reaction in the 80s from the rapid expansion of the 70s towards a more quantitative approach at determining space needs, possibly due to increased budgetary restrictions. By the 90s, growth slowed to a pace where the necessity of quantitatively justifying additional space was not as crucial as in the 80s.

The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 23, was found in the data.

Figures

Bar chart: Student station use/average hourly room use (fall of current year)

Bar chart: Floor area requirements

Chart: Car parking requirements

Chart: Estimated demand for meals

Chart: Number of students in lodgings at (university)

Chart: Number of students to be housed directly by the university

Chart: Percentage of students living at home (and number)

Graph: Summary of net areas for communal space

Graph: Summary of net areas for academic/administrative space

Graph: Summary of areas for residential space

Pie chart: Existing floor area (percentages by function areas)

Illustrations

Method of displaying classroom/lab use per room

Photo: general (of campus)

Map

Floor plans (2 stories) (of one building that illustrates classroom and lab use per room)

Space bank location

Student contact hours

Utilization of instructional space (fall, date)

Narrative

Spatial needs: Space standards; space inventory; future development spatial needs; space analysis; utilization of space

Teaching space uses: Teaching load timetable; main and subsidiary subjects (curriculum); teaching group sizes for varying activities; calculations of teaching space required

Classroom utilization per building

Classroom utilization per room

Non-semester credit hour generating facilities

Planning guidelines

Schedules of accommodation

Semester credit hour production

Ten-minute exchange limit (on size)

Space relationship diagram

Main and subsidiary subjects (curriculum)

Tables

Gross space requirements

Anticipated vehicle ownership

Car parking requirements (date - date)

Categories of space by organizational units to total area

Costs and areas for various parking schemes

Department space needs

Estimated percentage of working population eating in university

Existing classroom/lab utilization

Instructional space requirements

Library organization

Library space requirements: allocation of space

Master plan space needs (date - date)

Number of classrooms and labs per building

Requirements for lecture and seminar rooms

Semester credit hour production by building

Space standards

Space summary (date)

Space projection by facility

Summary of laboratory and shop requirements

Summary of classroom requirements

Housing

Housing ranked 14th with a mean score of 1.85. Across decades the means declined (Table 23). The significance of this trend may indicate that housing was less and less a concern to institutional planners. An unconscious following of the European model may be in effect, as institutions leave it up to the students to find housing where they can.

The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 24 was found in the data.

Figures

Group centers and restaurant bases

Graph: University residential accommodation

Illustrations

Drawings

Maps

Existing (resident life) functions

Possible forms for resident areas

Proposed housing demolition

Regional residential population distribution (date)

Students in residence

Narrative

Faculty/staff housing

Family units

Graduate housing (village type)

Halls (colleges)

Housing replacement

Housing space standards

Married student housing

Overall demand

Residential and social patterns (pattern based on academic activity)

Single units

Student housing

Undergraduate housing

Space relationship diagrams

Diagram of communal "nucleus" proposed for each school

Space relationship diagram: The university patterns (as compared to peer institutions)

Tables

Housing space standards

Residential distribution (by selected city/town)

Residential structures (university-owned)

Undergraduate residential accommodation (by house)

Architectural and Outdoor Spatial Aspects

Architectural and outdoor spatial aspects ranked 11th with a mean score of 2.1. Across decades the means declined (Table 23). The significance of this trend seems to indicate less attention to the more technical details of previous plans as to overall guidelines for the exterior visual aspects of the campus. It is possible that more of these responsibilities were being left to the architects, to harmonize new with existing.

The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 23, was found in the data.

Illustrations

Artist rendition: Central mall - vista (or proposed)

Drawing

Model: general; aerial view - central campus

A colonnade

Artist rendition: Enclosed (restricted) space

Artist rendition: Space between buildings

Bird's eye view (from the north, etc.)

Maps

Architectural character and building orientation zones

Building height

Campus design sections

Campus views, open spaces, and sunlight diagrams.

Main court (layout)

Material use zones

Open spaces preservation map

Open space ratios

Outdoor space - vehicular impact

Outdoor space definition and alignment

Potential pedestrian precinct

Vertical space of buildings

Narrative

Architectural form: Acoustics; architectural character; architectural impressions; building orientations; building elements; building construction; building materials; building/structure height(s); buildings and climates; buildings form; central core; compactness/compact development; exterior materials; exterior treatment of buildings; general design (principles) (buildings); interconnectedness of buildings, across campus ; quality of building; quantity of building-density; scale of structures; use of external materials; ventilation

Open space: Enclosed space; space between buildings; visual effect: buildings and their spaces; hierarchy of spaces; major open spaces; movement systems and their spaces

Design aspects: Spacial design; urban design concept, purpose and guidelines; design criteria;
campus design sections

Space relationship diagrams

Cross section: buildings (from north/south, east/west)

Cross section: the ambulatories

Cross section: the library (from east, etc.)

Space relationship diagram: major spaces

Space relationship diagram: urban design concept

Space and Functional Relationships

Space and functional relationships ranked 18th with a mean score of 1.45. Across the decades it declined sharply (Table 23). The significance of this trend seemed to indicate less and less attention was being given to relationship of functions and spaces within campuses. There might be some similarity between the fact that the majority of plans in the 80s and 90s were of the insert/add-on type where few options may have existed for the ideal placement of functions and spaces in relation to related elements.

The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 23, was found in the data.

Figures

Diagram: developing "street market" ideas of environment

Graph: instruction from student's own and other schools

Graph: lecture group sizes

Graph: methods of instruction for three typical courses

Graph: student's instruction from own and other schools compared with school's instruction to own and other students.

Pie chart: Floor area allocation (percentages for each element)

Maps

Existing functional elements

Proposed functional elements

Illustrations

Illustrations of growth patterns and flexibility

Narrative

Library (heart of campus - 5-min. walk from farthest academic building)

Parking (on fringe of academic sector)

Administration centrally located

Buildings arranged in functional sequence

Functional elements

On-campus park(s)

Pattern of teaching and research

Student union accessible to visitors

Student center centrally located

Student center/dining (close to student housing)

Space relationship diagrams

Related building groups

Academic area (showing location of schools)

Functional analysis

Functional relationships

Internal relationships

Space relationships

Space relationship diagram: function concept

Space relationship diagram: student's relationship with own and other schools

Space relationship diagram: subject relationships (affinities between schools)

Space relationship diagram: teaching relationships (from one school to another--
undergraduates)

Extracurricular, Recreation, and Athletics

Extracurricular, recreation, and athletics ranked 21st with a mean score of 1.1. Across decades the means varied sharply (Table 23). The significance of this trend seems to indicate that even though literature called for planning of sport and recreational facilities, less than half of the data had any reference to it at all.

The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 23, was found in the data.

Figures

Line chart: Playing field areas in 16 British universities/colleges (by acres)

Maps

Existing (recreational) functions

Playing fields (location)

Narrative

Playing fields (location, dimensions) (codes)

Amount and type of space needed

Location

Playing fields (kinds, list)

Topography (for sport facilities)

Tables

Playing field areas for the development plan

Planning Concepts

Planning concepts ranked 15th with a mean score of 1.8. Across decades the means remained fairly steady (Table 23). The significance of this trend seemed to indicate that overall planning concepts had remained a part of campus master plan documents over time.

The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 23, was found in the data.

Illustrations

Aerial conception of campus (at completion - 3D)

Architectural model photo: Triad model

Growth patterns and flexibility

Maps

Alternatives (to go with planning concepts)

Schematic layout

Narrative

Physical

Ideal functional organization (functional relationships)

Centralization/decentralization

Movement/Flow

Social and psychological relationships

People

Aesthetic design

Integration

Pedestrian (campus core)

Building sites

Campus order and beauty

Change

Circulation/Access

Distance-between-units relationships

Ease of growth and flexibility

Economic influences

Framework principles = planning principles

Growth patterns

Identity to colleges (in British sense)

Land use concept (campus core)

Landscape advantages

Legal and political influences

Library

Links

Living/work facilities relationships

Open space

Pedestrian mall

Quality of space

Sensitivity to the neighborhood

Shared space concept plan

Timeframe

Vehicular

Zones: campus core, academic, athletic/recreational, housing, plant services

Space relationship diagrams

Circulation concept

Concentration of functions

Pedestrian concept

Physical unification

Shared facilities

General notes

Data 4 termed the concepts "Principles for campus planning" and included all the elements in the front page.

Document Organization

Document organization ranked 22nd with a mean score of 1.05. Across decades the means declined steadily. The document organization was a very specialized element that referred only to a preface and a summary, as indicated in literature. Obviously the trend showed their declining use.

The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 23, was found in the data.

Figures

Chart

Flow chart: Administrative hierarchy

Illustrations

Drawing: general

Narrative

Conclusions

Preface

Summary of the plan (patterns)

Analysis of the New Campus Master Plan Document Elements Added

The following elements were those that emerged from the pilot study, and that were more easily cataloged by adding them to the list as new elements. Almost every data master plan document included elements not listed among the typology, and this was expected, as each institution was unique with special problems and possibilities not found elsewhere. However, three additional elements were: additional document organization, which included most mundane aspects of document organization such as title pages, table of contents, bibliography, etc.; letter of commission; and ultimate development plan.

Additional Document Organization

Additional document organization ranked first with a mean score of 3.00. Across decades the mean obviously did not vary, as the highest means possible was 3.00 (Table 23).

While the previous document organization was a very specialized element, which referred only to a preface and a summary, this element served as the 'catch-all' for any other type of document organization that was not either a preface or summary. Therefore, it is not surprising to find in 100% of the documents some form of organization. The most common content was included from the data below.

Illustrations

Photo: Aerial view of plot (with initial development superimposed)

Drawing: main square

Photo: general

Photo: campus church

Maps

Map of the area (with keys)

Narrative

Table of contents

Title pages

Introduction

Planning committees
Acknowledgments
Foreword
Appendix(es)
Table of illustrations
Bibliography
Abbreviations
Abstract
Board
College officers
Explanatory notes
List of plates
List of figures
List of tables
Reference documents
Study commission
Table of appendices

Letter of Commission

Letter of commission ranked 20th with a mean score of 1.20. Across decades the means held steady. The significance of this trend seemed to indicate, with less than half of the documents having a letter of commission, that this element was not commonly used.

The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 23, was found in the data.

Usually written by

Letters of commission, included usually at the front of the table of contents or shortly after, were usually written by the President (presentation to board by president), or an Author - Architect.

Contents

A letter
Commission prologue
Letter of T.D.O.T. circulation study

Notes

These letters usually presented the document or gave reference or acknowledgments to key individuals/organizations involved in the planning process. They also stated the intention of the document and the goals of the study.

Ultimate Development Plan

The ultimate development plan, for lack of a better term, ranked seventh with a mean score of 2.15. Across decades the means zigzagged. The 60s mean was 3.0. It fell to 1.6 for the 70s. It rose again to 2.4 for the 80s, and dropped back to 1.6 for the 90s.

The significance of this trend was hard to determine. It appeared that the elaborate longer range plans of the 60s were less and less developed as plans reflected more immediate needs and sought to be more flexible, thus not developing ultimate scenarios.

The following element illustration content, along with the percentage of incidence graphical device illustrations as shown in Table 23, was found in the data.

This element included what the campus would appear like at the completion of the plan, or completion of the specified time line.

Illustrations

Architectural model photo: campus model - plan view

Architectural model photo: campus model - perspective view

Model, and model of physical plan

Maps

Campus master plan (at ultimate development)

Development plan (phases I, II, III, etc.)

Growth and expansion: Potential growth areas (which the campus could expand to in the foreseeable future); expansion locations

Accepted master plan

Alternatives: A, B, C, no action

Alternatives to planning concepts

Campus site plan - concept (or master plan)

College response to alternatives

Concept plan (at full development)

Final completion stage of plan
 Illustrative campus plan
 Pattern of growth
 Permanent buildings
 Plan for the campus and immediate environs
 Proposed development (existing/proposed buildings)
 Proposed actions

Narrative

Proposed development (plan): Future development and expansion; proposals and rationale (development concept); future construction (new)

Campus master plan: The physical plan; concept (plan)

Alternatives: Planning processes and alternatives concepts; Alternatives (A, B, C, No action)

Development process: Growth and development patterns; directions; growth and change

planning

Framework principles (framework description: recommendations of the master plan concepts)

General descriptions

Ideas for the future

Potential projects and programs

Solution and recommendations

Space relationship diagrams

Diagram: different direction of growth

Diagram: the linear core

Diagram: various patterns of growth (concrete, zonal, molecular, and linear [both])

Space relationship diagram: Development concept

Tables

Alternative comparison matrix

Potential long-range projects

Space analysis

Organization of the Data

The elements in the data master plan documents were organized in the documents along similar recurring themes. The most common was the "existing/proposed" theme, where all the elements were treated in regard to what currently existed on campus and what was being proposed in the plan. Table 25 lists the varying organizational themes of the data. As can be seen, variations of the theme existed, even among new campuses. Figure 13 illustrates the organization of data 9, a sample of the typical existing/proposed campus master plan document organizational configuration .

New campus campus master plan documents were organized in a more linear configuration. With no existing facilities present, the master plan documents focused on developing the proposed elements—usually one by one. Figure 14 illustrates the organization of data 7, a sample of linear configuration representing the new campus category.

Summary

Chapter 4 discussed the process and results of the analysis of data. This involved three basic steps. The first was a pilot study conducted to determine the viability of the data collection checksheet as a data collecting tool. The second consisted of an interrater reliability test to determine the accurateness of the researcher as a data collector. Finally the data were analyzed and tabulated. The analysis of the data was divided in two parts. The first dealt with the front page sections of the data collection checksheet. The second focused on the campus master plan document elements. Chapter 5 formulates a master plan document from the data collected in this chapter and the typology compiled in chapter 3.

TABLE 25
ORGANIZATIONAL THEMES PRESENT IN CAMPUS MASTER PLAN DOCUMENTS

Theme	Data CMPDs
Existing–Proposed	1, 4, 5, 6, 9 ¹ , 10 ¹ , 11, 12 ¹ , 14, 15 ² , 16 ¹ , 17
Existing, Proposed, Details of Development, Technical Details	2
New Campus (linking [tie-in] of all elements in each chapter)	8
New Campus (progression of elements)	3, 7, 13, 18, 19, 20

¹With an introduction and summary before, and implementation and conclusions after. ²Same as 1, but with space program between existing and proposed.

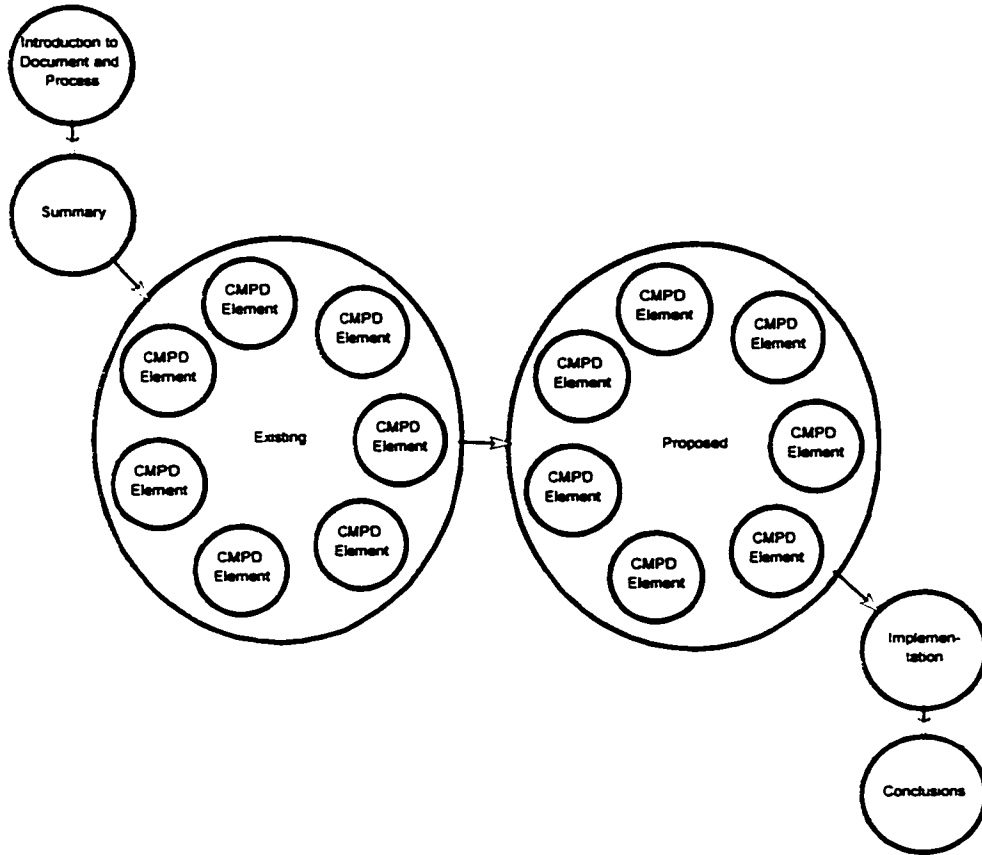


Figure 13. Data 9—sample of existing/proposed organizational configuration.

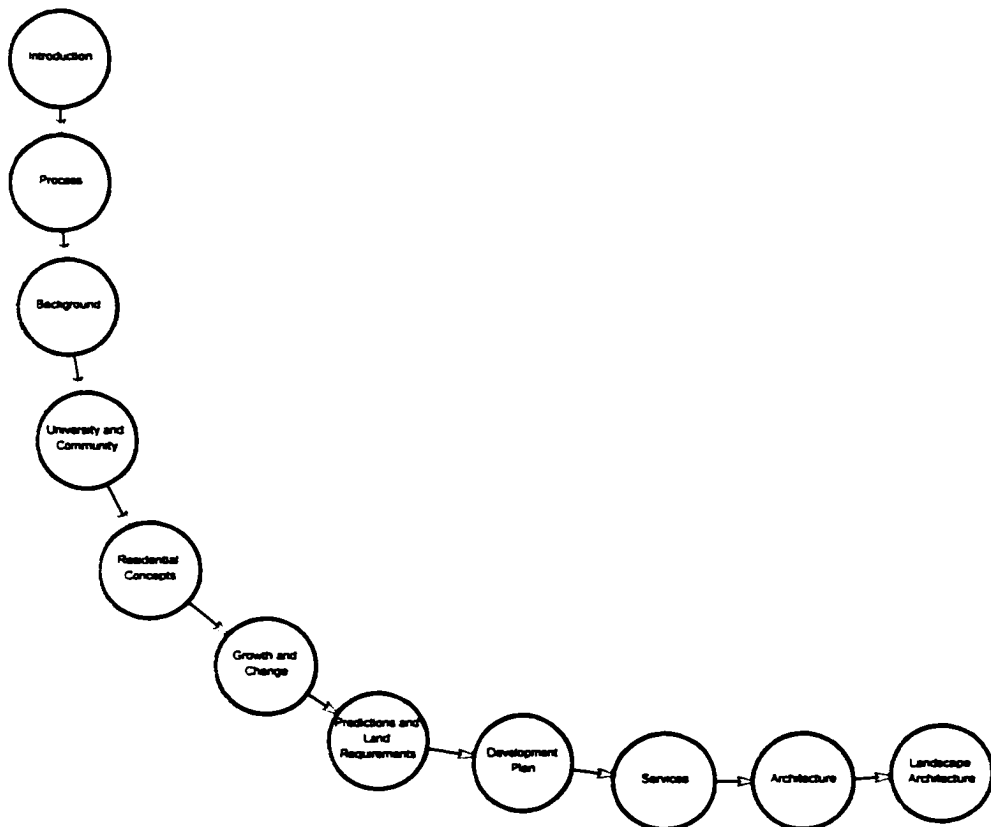


Figure 14. Data 7—sample of linear organizational configuration.

CHAPTER V

THE CAMPUS MASTER PLAN DOCUMENT

Introduction

This chapter develops a campus master plan document, built on the results of the study in chapters 3 and 4. These results included guidelines for both the contents as well as the format of a document. This was the goal of this study: to formulate guidelines in the form of a document that could be used by small colleges and universities as a resource in the field of campus master planning.

Context for the Campus Master Plan Document

Prior to developing this campus master plan document, a review of the literature was conducted with the purpose of formulating a type of master plan document as specified in literature (chapter 3). Nineteen elements were identified along with varying sub-elements for each and listed according to their occurrence in literature. These elements were grouped together and termed the *typology*, which was used as the basis to synthesize data from actual master plans in order to test the presence of these 19 elements, plus identify other elements not included in the typology (chapter 4). The synthesis of the data found all 19 elements present to some degree in addition to 1 other element, the ultimate development plan. Table 26 lists the typology elements along with the synthesis of data master plans' results ranked according to results of each chapter. This document was the summation from both the typology and the data master plans, which, as seen in the bibliography, were representative of a global perspective rather than just North American documents.

Organizational Format of the Document

The organizational composition of a master plan document will vary according to the type of the campus master plan desired. This document is for two basic campus-planning settings: an existing campus, where most of the emphasis is placed; and a new campus.

With new campuses not often being built, most master plan documents will be developed for existing campuses. This type of document will have a common theme of presenting most of the

TABLE 26
COMPARISON OF RANKING ELEMENTS BETWEEN THE TYPOLOGY AND DATA MASTER PLAN DOCUMENTS

Typology	Occurrences in Literature (n = 38) ¹		Data Master Plans	Score ²
	#	%		
1. Circulation	18	47	1. Document Organization	3.00
2. Buildings and Facilities	17	44	2. Circulation	2.80
2. Land Use Aspects	17	44	3. Buildings and Facilities	2.75
4. Academic Plan	16	42	4. Land Use Aspects	2.70
5. Costs and Financial Aspects	15	39	4. Site Plan	2.70
6. Phases of Development and Scheduling	14	36	6. Institutional Aspects	2.45
6. Site Plan	14	36	6. Program Space Needs and Standards	2.45
8. Utility and Energy Systems	13	34	8. Utility and Energy Systems	2.20
9. Institutional Aspects	12	31	8. Landscaping	2.20
9. Enrollments and Campus Populations	12	31	10. Ultimate Development Plan	2.15
9. Environmental Aspects	12	31	11. Architectural and Outdoor Aspects	2.10
12. Landscaping	10	26	12. Phases of Development and Scheduling	2.00
12. Program Space Needs and Standards	10	26	13. Enrollments and Campus Population	1.90
14. Housing	9	23	14. Housing	1.85
15. Architectural and Outdoor Spatial Aspects	8	21	15. Planning Concepts	1.80
15. Space and Functional Relationships	8	21	16. Costs and Financial Aspects	1.70
17. Extracurricular, Recreation, and Athletics	6	15	17. Environmental Aspects	1.60
17. Planning Concepts	6	15	18. Academic Plan	1.45
19. Document Organization	2	5	18. Space and Functional Relationships	1.45
			20. Extracurricular, Recreation and Athletics	1.10

¹ The body of literature used to construct a typology consisted mainly of sources that prescribed at least 2 or more elements to be included in a campus master plan.

² The scoring was based on a scale of: 3 = fully elaborated; 2 = partly elaborated; 1= referred to in passing; and 0 = not mentioned. The score listed here is the average for the entire study.

elements in the document twice: once as existing conditions in the plan section, and again as proposed changes in the development plan section.

With a new campus, the document changes somewhat. Although the two sections of the plan and the development plan still apply, the elements build upon each other in a linear fashion rather than dealing with pre-existing problems and conditions. Figure 15 graphically presents both lines of development for an existing and a new campus. The goal of this document is to be applicable for either type of campus.

The Campus Master Plan Document

The document, as illustrated in Figure 15, is organized in seven sections for both existing and new campuses. Within these sections, the elements are developed to produce a well-organized, coherent, and logical flow of the information being presented. The discussion below enlarges each of these sections within the framework of existing and new institutions.

Plan Introduction

Plan introduction is the section that presents not only the document but also the organizational structure for it. Whether for existing or new campuses, the organizational structure to the document is necessary, as well as an introductory part encapsulating the main themes of the plan and its overall purpose. Table 27 lists varying aspects of the organization and the introduction with different aspects of illustration.

Background to the Plan

The background of the plan as with the plan introduction varies little between existing and new institutions. It includes three elements that provide the basis and rationale upon which the plan is built. These are the institutional aspects, the academic plan, and the planning concepts (see Table 28).

Institutional aspects

The institutional aspects provide the context out of which the institution is contemplating development. A new institution obviously does not have the history or tradition linked to certain parts of campus, buildings, or places. Nor has it established links with community and industry based on research or quality of graduates. Therefore, it needs to consider more what role or need it will plan on addressing, and, as such, develop plans to meet these goals. Many new institutions are developed for this very reason, and their master plan documents reflect from the outset this purpose.

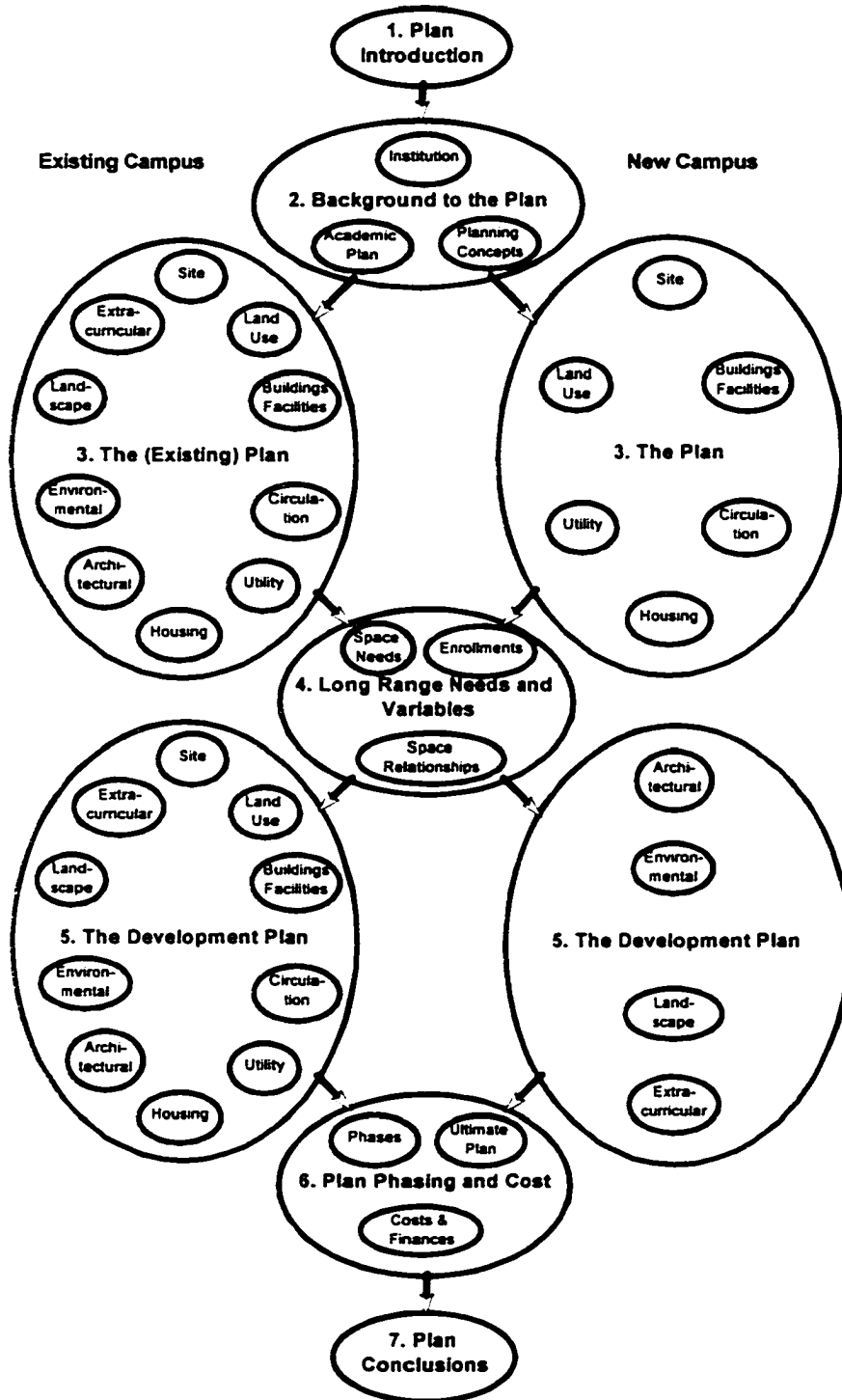


Figure 15. The campus master plan document.

TABLE 27
PLAN INTRODUCTION

Item	Description
<i>Organization</i>	
Listings:	Title pages
Tables:	Contents; Illustrations Plates Figures Tables Appendices
Framework:	Abbreviations Abstract Preface Foreword Summary of the plan or planning patterns
Individuals:	Planning committees The board Institutional officers Acknowledgments to other individuals
Commission:	Study commission A letter of commission (letter usually written by the president (when the plan is presented to the board by the president), or the author (which in some cases may be a consulting or resident architect). This section usually presents the document or states the intention of the document and the goals of the study.
<i>Introduction</i>	
Introductory:	Statement to the plan, and the purpose of the document.
<u>Illustrative Elements:</u>	
Illustrations:	Aerial view photographs Photographs of symbolic buildings or vistas Drawings of the campus or main square Charts Flow charts Maps of the area

TABLE 28
BACKGROUND TO THE PLAN

Item	Description
<i>Institutional Aspects</i>	
Institutional Context:	The philosophy (background on what a university is, and how it applies to the institution); mission; purposes; aims and principles; goals; objectives; role; views of the future; evolution of long-range planning; proximity with other universities; setting; profile of the college; organization, governance and academic structure
Community Factors:	The university and industrial society; economic and social benefits to region
Planning Issues:	Planning assumptions (not concepts); planning considerations; statement of need (for the plan, for the study, post-secondary educational needs); master plan purpose; planning objectives; strategic plan; the problem; the planning process (people, methods); the history of the development plan; and any existing campus plans (date).
Institutional History:	Milestones; historic districts (with all regulations and codes); and the archeological and historical background
University and Community:	City, location
Institutional Background Data:	Its maintenance and use
Agricultural/Industrial Programs:	Either in existence or suggested industrial programs and activities
<i>Illustrative Elements:</i>	
Maps of:	The surrounding community; the regional map (also showing peer institutions in the region); the site in context with city (community); city neighborhoods and school districts; agricultural/industrial plan; construction (from date to date); existing urban region; existing city ordinances; general campus map; general plan for the environs of the university; historical traces of early occupation on land; institutional property in the previous centuries; a map of country; a map of the continent; and planned expansion of the urban region.
Illustrations:	Photos of site, of agricultural/industrial program, or an architect's model of campus; old painting/engravings of university relationships with community.
Cross Sections:	Site and city (vertical and horizontal distances to scale) relationships, or growth of the university
Tables:	City zoning regulations
Figures:	Flow charts of the formal structure of the university (administration).
<i>Academic Plan</i>	
Topics:	Academic trends; educational objectives; student quality (intellectually/educationally); strategic points; structure of plan; program objectives (academic, vocational); departments, schools; post-graduate and research work; flexibility; decentralization; incremental growth.
<i>Illustrative Elements:</i>	
Maps of:	Existing (academic) functions; other universities in the region (showing locations); schematic layout (by schools)
Tables:	Academic offerings; hours generated by program, programs; quarter or semester hour requirements
Charts:	Term-by-term fluctuation in student population in university; semester or quarter credit hours; proposed schools of study; administrative hierarchy
Space Relationship Diagrams:	Comparing institutional and academic patterns
Timelines:	Typical course patterns
Photos:	General

Table 28—Continued.

Planning Concepts

Sample Topics: Physical aspects; ideal functional organization (functional relationships); centralization and decentralization; movement and flow; social and psychological relationships; people; aesthetic design; integration; pedestrian treatment of the campus core (pedestrian mall); building sites; campus order and beauty; change; circulation and access (vehicular); distance-between-units relationships; ease of growth and flexibility; economic influences; growth patterns; identity to colleges (in British sense); land use concept in the campus core; landscape advantages; legal and political influences; library; links; living-to-work facilities relationships; open space; quality of space; sensitivity to the neighborhood; shared space concept plan; timeframe; and land zoning.

Illustrative Elements:

Illustrations: Aerial conception of concept - 3D; architectural model photo (of concept)
Space Relationship Diagrams: Specific concepts or concentration of functions
Maps: Alternatives (to go with planning concepts); schematic layouts

For an existing institution, in addition to history, traditions, or established links, consideration needs to be given to how the institution will adapt to perceived needs. The background and history are important in this aspect because they show a record of where the institution has been.

Overall, institutional aspects build a basis showing the institution has thought through its position and role it has played, and then articulates its responsibility for the future.

Academic plan

The academic plan is important because it shows the direction the institution is taking—in respect to the community and its constituency—to meet the needs shown in the institutional aspects. Again, this section will not vary significantly between existing and new institutions except where the existing institution can show a track record (or lack thereof) of addressing the issues.

Addressing the academic plan is also crucial because this is the product that educational institutions produce. If there is no demand for the product, or if it fails to meet the needs identified in the institutional aspects, then this will shape the entire planning direction of the document.

Planning concepts

On the institutional aspects and the academic plan bases, the planning concepts provide the third layer of the background to the plan. The planning concepts are the assumptions, limitations, and frameworks that the planners bring to the planning process. Sometimes termed “principles for campus planning,” these concepts shape and define the entire process from the outset. They may limit certain options or expect certain outcomes, which the planners then insert and account for in their process. An example may be to reserve tracts of land that will not be open for development, or identify architectural styles that must be maintained with new buildings. When stated at the outset planners can most easily incorporate them into the process. Table 28 lists some sample topics that represent concepts found in actual master plans.

The Plan

The plan is the first step where the difference between existing and new is treated differently. In Figure 15 the difference is noted, as the left side of the diagram is for existing campuses, and the right side is for new campuses. Once the background has been established, the details of physical development have a better context in which to be expanded. Table 29 provides a listing of the elements that are covered in this section.

TABLE 29
THE (EXISTING) PLAN

Item	Description
<i>Site</i>	
Building sites:	Expansion sites; expansion lines (directions of growth)
Topography	
Campus Core:	Central mall (area);
Site Characteristics:	Existing site (development, facilities); site description; water supply; central area; existing campus conditions
Climate:	Average temperatures; winds; extreme temperatures; rainfall; overall conditions; storms
<i>Illustrative Elements</i>	
Maps of:	Topographical (with elevations, land form); site slope analysis; county
building sites:	Proposed plan (of site projects); potential sites for future development (master plan); building areas (by resident area, academic area);
institution site:	Existing site conditions (summary) (list of buildings, numbered); site plan; soil test borings
campus core:	The main court; site plan for initial academic buildings; campus core: 1/2 mile diameter
illustrations:	Photos (aerial view of site, or other photos of site); possible patterns for the central parade; rendering (campus core)
Cross Sections:	Buildings in the central area (top-down), through the central area (across)
Tables:	Potential sites: existing use, potential capacity, assigned
Charts:	Temperatures by month (across the year, max., min., mean); precipitation (by month)
<i>Land-Use Aspects</i>	
Zoning:	Land use and zoning; density; development zones
Land:	Campus boundaries; land requirements; land holdings; available land; acreage
Land Use:	Expansion locations; land-use potential; land-use policies; existing land use; land utilization; future land use
Land Acquisition:	Land acquisition; site selection
<i>Illustrative Elements</i>	
Maps of:	
land use:	Peripheral land use; existing land use; land utilization (w/buildings); existing land-use density; existing site and land utilization (by density); future land use; proposed land use
zoning:	Land-use zoning (future); campus zones; existing (campus) functions; zoning within the site
land:	Existing land tenure; university property and planning areas (by college); land holdings; future land needs; advance reservation of land
land purch/acq:	Land purchases/acquisition; land acquisition and development constraints
Space Relationship	
Diagrams:	Bubble (proposed land use; existing land use); site utilization plan; land-use concept
Tables:	Existing land-use density; land allocation; potential site analysis
Figures:	Graph (existing land-use density); pie chart (land allocation)
Illustrations:	First diagram of the university (showing routes, lines of expansion)
<i>Buildings and Facilities</i>	
Buildings:	Buildings; renovation/reuse; codes and requirements; building age and condition; additions; expansions; clustering of buildings; building floor plans; maintenance; deferred maintenance; proposed redevelopment (removal/replacement of buildings)
Facilities:	Off-campus facilities; communal facilities; academic buildings (see listing below)
Projected Physical Needs:	Facility audit; structures; building analysis; major structures required
Building Method	
Topics on Facilities:	Libraries (library); university offices (administration); housing - dorm; student center (commons); physical education (health); social science (school); food services; academic buildings; central heating/cooling plant (utilities); fine arts; natural sciences; other school

Table 29—Continued.

	buildings; physical plant; science (hall); sports facilities - gym; auditorium; education; engineering; greenhouse; humanities; museums; school of nursing; school of business; student health services; TV/radio station
<i>Illustrative Elements</i>	
Tables:	Building age and condition; exiting building heights/sq. footage; library seating capacity (by planning area); Location of departments by building; performance specifications for 3 categories of teaching and research space; room-size characteristics; tables of summary of requirements (and totals table); university buildings on central campus
Maps:	Existing buildings/development; construction (proposed construction (dates), building construction or acquisition); building (use, administration, analysis (date), method); communal facilities; condition of structures (age and condition); location of departments by building (see entry in table); off-campus facilities (map of surrounding areas); potential building renovation, demolition, and relocation; proposed redevelopment (removal/ replacement of buildings)
Illustrations:	Different categories of space; floor plans of exiting/proposed buildings; layout drawings of buildings identified for each project; model (removal/replacement of buildings)
artist renditions:	Library, university (student) center, social science, housing, chapel, university offices, education, humanities, central heating and cooling plant, physical plant, food services, physical education, fine arts, engineering, student health services
photos:	General; of architect's model of campus
Space Relationship Diagrams:	Cross section (the library (from east)); initial priority (removal/replacement of buildings); teaching and research areas schematic plan and cross sections; tentative siting of schools
Graph:	Categories of teaching and research space
<i>Circulation</i>	
Parking (system, proposed concept):	Parking needs; available parking areas; parking structures; parking charges and financing of structures (parking fees); parking spaces; street/alley vacancies
Pedestrian (system, proposed concept):	Sheltered pedestrian routes; housing and pedestrians; pedestrian volume; pedestrian mall; covered pedestrian system; footpaths; protected footpaths
Vehicular (system, proposed concept):	Exterior vehicular route (loop road system, peripheral drive); inner-campus drives; automobile use (private); circulation inside the site; peak hour traffic; traffic projections for area; road pattern
General Access and Entrances:	Access and traffic (roads); arterial streets (major streets); collector streets; possible future link roads; entrances; entrance roads
Public Transportation:	Transit system (routes/stations, arrival points); transportation management plan; shuttle bus
Utility Access (service /emergency):	Safety and security; service roads; service ducts; emergency vehicles
Bicycles:	Bike pathways/parks
Visitors	
Philosophy	(of circulation)
<i>Illustrative Elements:</i>	
Maps:	
circulation:	Existing circulation (date); proposed circulation; vehicular flow and arrival points; ring road; road, footpaths, covered way; vehicular circulation concepts; internal road patterns; potential vehicle circulation network; existing communications: roads affecting the university; future roads - proposed
parking:	Circulation (traffic) and parking; potential parking and service drives; street/alley vacancies (vacat(e)ions); surface parking requirements; circulation and parking;
pedestrian:	Existing pedestrian ways; proposed pedestrian ways; pedestrian volume; major pedestrian/vehicular conflicts; pedestrian circulation concepts;
public transport.:	Public transportation routes; main approaches to site; detailed circulation relationships between the city and the university; transportation;
service:	Provision of service easement; service/emergency; safety, security, and emergency routes;
bicycles:	Bike ways - bike parks; bicycle volume; parked bicycles; potential pedestrian/bike network;

Table 29--Continued.

Tables:	
parking:	Peak weekday parking demand; peak residential parking demand; peak evening parking demand; car parking requirement; university parking; parking demand projections (by facility); peak parking demands (student); parking analysis; available campus parking (by building)
public transport.:	Comparable commuting costs (bus, transit, parking, etc.); commuter modes (current, for students) and timetables;
circulation:	Level of service on intersections (existing/proposed); peak time demands
Illustrations:	Circulation concept; parking concept
artist renditions:	Entrances to campus; campus pedestrian walkways; summer circulation - external area; winter circulation - internal walkway
photos:	General; architectural model photo of campus circulation
Space Relationship	
Diagrams:	Central campus location; major circulation; time distance
cross section:	Typical sections of street level: pedestrian, bike, auto, emergency vehicle; main service ducts; peripheral and internal main roads
bubble diagram:	Road and auto parking system
Graphs:	Commutation modes; commutation times; vehicular traffic

Utility and Energy Systems

Electrical distribution:	Energy shortage
Sewage and waste disposal:	Sewage (storm and sanitary); solid waste; storm drainage, run-off (drainage - general)(surface water drainage - sewage); laboratory services; refuse disposal
Air conditioning:	Cooling; chilled water distribution (chillers); ventilation
Heating:	Steam distribution; thermal; boiler house
Water:	Fire mains; pumping water to various parts of campus; firefighting and fire prevention
Gas distribution:	Natural gas
Utilities:	Future energy and utility needs; proposed utilities; existing utility plans; objectives; general principles
Telecommunications:	Telephone; computer cables and special communication conduits; computer network master plan
Service:	Distribution tunnels; easements for services

Illustrative Elements

Maps:	Storm sewers (existing, under construction, future); sanitary sewers (existing, under construction, future); water mains (lines) (existing, future, meters, hydrants); existing utilities; electrical distribution system; gas mains; chilled water and steam distribution; existing (service) functions; fire fighting system (hydrant, box, station); layout of easements; main service routes (utilities); service distribution tunnels (existing, under construction, future); servicing plan; storm retention basins (by area) and fire lanes; telecommunications; utility corridor concept (showing campus utility corridor, city utility corridor)
Graphs:	Gas requirements (maximum demand); primary power distribution (max. demand); telephone requirements (# of extension lines); typical 24-hr. fluctuation in electrical demand in mid-winter; water supply (peak requirements); water supply (average requirements); yearly electrical peak (demand and consumption)
Tables:	Comparison of costs for various fuels and heating systems; comparison of capital costs for various boiler house schemes; drainage basins; estimated growth in electrical demand; summary of daily water needs; water consumption (in related or peer institutions);
Illustrations:	Photos - general
Cross section:	Easement of services

Housing

Topics:	Faculty/staff housing; family units; graduate housing (village type); halls (colleges); housing replacement; housing space standards; married student housing; overall demand; residential and social patterns (pattern based on academic activity); single units; student housing; undergraduate housing
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Table 29—Continued.

<i>Illustrative Elements:</i>	
Maps:	Existing (resident life) functions; possible forms for resident areas; proposed housing demolition; regional residential population distribution (date); students in residence
Tables:	Housing space standards; residential distribution (by selected city/town); residential structures (university-owned); undergraduate residential accommodation (by house)
Figures:	Group centers and restaurant bases
Graph:	University residential accommodation
Illustrations:	Drawings
Space Relationship Diagrams:	Diagram of communal "nucleus" proposed for each school; the university patterns (as compared to peer institutions)

Architectural and Outdoor Spatial Aspects

Architectural Form:	Acoustics; architectural character; architectural impressions; building orientations; building elements; building construction; building materials; building/structure height(s); buildings and climates; buildings form; central core; compactness/compact development; exterior materials; exterior treatment of buildings; general design (principles) (buildings); interconnectedness of buildings, across campus; quality of building; quantity of building-density; scale of structures; use of external materials; ventilation
Open Space:	Enclosed space; space between buildings; visual effect; buildings and their spaces; hierarchy of spaces; major open spaces; movement systems and their spaces
Design Aspects:	Spacial design; urban design concept, purpose and guidelines; design criteria; campus design sections

Illustrative Elements:

Illustrations:	Drawing: A colonnade; bird's-eye view of campus/building (from different perspectives)
artist renditions:	Central mall - vista (or proposed); enclosed (restricted) space; space between buildings
model:	General; aerial view - central campus
Maps of:	Architectural character and building orientation zones; building height; campus design sections; campus views, open spaces, and sunlight diagrams; main court (layout); material use zones; open spaces preservation map; open space ratios; outdoor space - vehicular impact; outdoor space definition and alignment (see spacial design in narrative); potential pedestrian precinct; vertical space of buildings
Space Relationship Diagrams:	Major spaces; urban design concept
Cross Sections:	Buildings (from north/south, east/west); the ambulatories; the library (from various perspectives)

Environmental Aspects

Site Accoutrements:	Benches (site furniture) (seating) (wood benches); fences, screens, barriers, and bollards; signing (signage); bike racks; trash receptacles; public telephones; bus shelters; curbing; pedestrian paving; painting, stucco
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Aesthetics/

Attractiveness

Exterior Lighting

Ecology:	Bedrock; chalk and limestone areas; ground water; land drainage; soils tests; subsoil and foundations (soils - soil survey); topography (for buildings); topsoil
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Decibel Levels:	Traffic noise, other noise
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Atmosphere of the Campus:	Campus character
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Meaningful Symbols:	Art and memorials
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Environmental

Improvement

Projects and Safety

Ground Treatment

Plant Maintenance

Illustrative Elements

Maps of:	Campus design features; campus signage locations; impervious surfaces (showing paved and built areas, porous areas); outdoor art and memorials
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Table 29--Continued.

ecology:	Existing land drainage scheme; existing land drainage and water table; proposed land drainage scheme; soil of site and vegetation; subsoil analysis; areas of environmental value and tree massings
lighting:	Existing; plan (by roadway, parking, spot and pedestrian lights); locations; programmed exterior lighting (by types of lamps)
Illustrations:	Aerial photo (campus core); plan of seating
Cross Sections:	Concrete curb; timber curb; trash container

Landscaping

Trees and Shrubs:	Tree plantings; tree shadings; the type and quantity of trees and shrubs; tree cover; trees; shrubs; ground covers and vines
Planting and Flowers:	Plant material; plantings-flower beds
Existing Vegetation and Land Form:	Soils (topsoil); lakes
Landscape Architecture:	Fountains; amphitheaters; outdoor furniture; lighting; direction signs; seating; use of landscaping
Surfaces:	Hard surfaces; lawn areas; large, paved plazas; path, walls, and roadway materials; pedestrian circulation routes, walkways; paving
Guidelines:	For proposed buildings within the landscape scheme

Illustrative Elements

Maps of:	Existing landscape; soils and existing vegetation; comparisons to other landscaping/parks; planting plan; landscape plan (broad-scale landscape design); proposed landscape
trees:	Inventory (detail); cover; distribution
Artist Renditions:	Benches; lighting; shrubs; street; walkways
Tables:	tree inventory key

Extracurricular, Recreation, and Athletics

Topics:	Playing fields (kinds, list, location, dimensions, codes); amount and type of space needed; topography (for sport facilities)
<i>Illustrative Elements</i>	
Maps:	Existing (recreational) functions; playing fields (location)
Line Chart:	Playing field areas in peer universities/colleges (by acres)
Tables:	Playing field areas for the development plan

Site

For an existing campus, a general description of the campus as it currently exists, including aspects as listed in Table 29, is the goal. For a new campus, a description of the plot of land being considered or purchased should be done, including contour, topography, climate, and any other characteristics special to the locale.

Land use aspects and other elements

The elements in this section consist more closely of Dober's (1992) 'placemaking' concept—that is creating zones and reserving places on campus for the development of the campus. An existing campus would consider current land use, zones, and other land acquisition if needed. A new campus begins with the proposed development of future land uses and zones.

The following elements—buildings and facilities; circulation; utilities; and housing—then build upon each other. In the case of an existing institution, this section would present the current status or condition of these elements, illustrated by tables, maps, graphs, and photographs—all with the purpose of clarifying to the reader (someone who is not familiar with the campus) the existing conditions. For a new institution, these elements would build upon each other. After identifying land use zones and their uses, locations can be identified for schools and administration, general concepts of circulation identified, utilities needs estimated, and housing formulated. These elements will also depend on the results of the long-range needs and variables section, which looks at enrollments and campus populations. Since these will have been pinpointed during the planning phase, prior to the publication of the document, the elements in this section can be developed using the long-range parameters. For an existing campus the long-range needs and variables are presented after the existing conditions have been inventoried.

Architectural and outdoor aspects and remaining elements

The elements in this section consist more of 'placemaking,' as Dober (1992) termed it, where the design and aesthetic style of the campus are developed. In the case of an existing campus, all the details regarding architectural aspects, environmental aspects, the landscape, and extracurricular activities are collected and outlined. These usually relate closely with the planning concepts, and are addressed in the proposed changes. For a new campus these elements are proposed and detailed for their implementation.

Long-Range Needs and Variables

The elements in this section, presented in Table 30, are those which tend to make planning and master plans necessary. Some of the toughest issues to address in the document are the meeting of new needs in space for new or existing programs, enrollment, and campus population increases/decreases, and the relationships between existing and new space with each other and their changing functions. An existing campus has an advantage over a new campus in that it has a previous trend from which to base its projections.

For existing campuses it is important for the long-range needs to be addressed after the existing conditions have been described in order to follow the basic formula for campus planning: what the ultimate goal is, minus what exists, equals what needs to be developed. Thus, at this point the program space needs and standards, the enrollments and campus population, and the space and functional relationships are presented in order to incorporate their part in the proposed changes in the development plan.

For a new campus it would probably be more advantageous to address the long-range needs earlier in the process, possibly right after the background to the plan has been detailed. This may be more logical because the impact of the space needs and standards, the projected enrollments and campus populations, as well as the space and functional relationships will have a direct bearing on all the elements covered in the plan and later re-covered in the development plan. A truism in campus planning, as noted in *Bricks and Mortarboards* (1966), is that all ultimate projections be made in true humility—especially in light of the total outlay of funds projected to build a new campus.

The Development Plan

In this section the proposed changes recommended in the plan are presented. For the existing campus the elements from Table 29 are re-examined with the proposed changes pertinent to each element illustrated. For a new campus this section is a continuation of building on the previous elements from the plan section. Such elements as architectural and outdoor aspects, the environmental aspects, landscaping, and extracurricular recreational activities are outlined here.

Since no master plan documents are exactly alike, elements that pertain only to a specific institution can be added in this section easily without disrupting the organizational flow and format of the entire document.

TABLE 30
LONG-RANGE NEEDS AND VARIABLES

Item	Description
<i>Program Space Needs and Standards</i>	
Topics:	Non-semester credit-hour generating facilities; planning guidelines; schedules of accommodation; semester credit-hour production; ten-minute exchange limit (on size)
spatial needs:	Space standards; space inventory; future development spatial needs; space analysis; utilization of space
teaching space uses:	Teaching load timetable; main and subsidiary subjects (curriculum); teaching group sizes for varying activities; calculations of teaching space required
classroom utilization:	Per building; per room
<i>Illustrative Elements</i>	
Tables:	Gross space requirements; anticipated vehicle ownership; car parking requirements (date - date); categories of space by organizational units to total area; costs and areas for various parking schemes; department space needs; estimated percentage of working population eating in university; existing classroom/lab utilization; instructional space requirements; master plan space needs (date-date); number of classroom and labs per building; requirements for lecture and seminar rooms; semester credit-hour production by building
library: space: summary:	Organization; space requirements: allocation of space Standards; summary (date); projection by facility Of laboratory and shop requirements; of classroom requirements
Bar charts:	Student station use/average hourly room use (fall of current year); floor area requirements
Charts:	Car parking requirements; estimated demand for meals; number of students in lodgings at (university); number of students to be housed directly by the university; percentage of students living at home (and number)
Pie charts:	Existing floor area (percentages by function areas)
Graphs:	Summary of net areas for communal space; summary of net areas for academic/administrative space; summary of areas for residential space
Maps:	Floor plans (per # of stories) (of one building which illustrates classroom and lab use per room); space bank location; student contact hours; utilization of instructional space (fall, date)
Illustrations:	Method of displaying classroom/lab use per room
Photos:	General (of campus)
Space relationship diagram:	Main and subsidiary subjects (curriculum)
<i>Enrollments and Campus Populations</i>	
Topics:	University population (overall quality, over 10 years); demographics; projected future enrollments (totals); enrollment profile; enrollment cap; estimate non-academic staff population; estimate academic staff population; faculty/staff locations (density of personnel by location on campus); population (present and future); undergraduate annual intake
<i>Illustrative Elements</i>	
Tables:	Total projected university population (by year); enrollments by programs; future staff requirements; opening university enrollment; population distribution (by phase); students in residence; ultimate gross student enrollment
projected:	Student population of schools of study (#, figures); growth in working population (#, figures); undergraduate intake (by year)
Figures:	Projected undergraduate enrollments (dates); university population breakdown (date); campus demographic change (male/female); proposed schools of study; net annual increase in population (over 10 years by category); projected graduate populations (over 10 years); university student population (by college) (date)
enrollment:	By faculties (departments); projections (time frame)(over 20 years)

Table 30--Continued.

projected number:	Of teaching staff (over 10 years); of non-academic staff (over 10 years); of technicians (over 10 years)
bar chart:	Student enrollment
chart:	Headcount by enrollment (from date to date) (fall semesters)
line chart:	Projected growth in student population
pie charts:	Estimated distribution of campus population (date); student population growth (by stage [2])
bar graphs:	Projected annual increase in working population; projected growth in working population
Maps:	Employees/campus sq. area; faculty/staff locations (density of personnel by location on campus); places of student home residence
pie charts on map:	Estimated distribution of campus population (dates)
daytime:	Student classroom use; faculty and employee distribution
Space and Functional Relationships	
Topics:	Library (heart of campus - 5-min. walk from farthest academic building); parking (on fringe of academic sector); administration centrally located; buildings arranged in functional sequence; functional elements; on-campus park(s); pattern of teaching and research
student:	Union accessible to visitors; center centrally located; center/dining (close to student housing)
Illustrative Elements	
Space Relationship	
Diagrams:	Related building groups; academic area (showing location of schools); functional analysis; functional relationships; internal relationships; space relationships; function concept; student's relationship with own and other schools; subject relationships (affinities between schools); teaching relationships (from one school to another - undergraduates)
Maps of :	Existing functional elements; proposed functional elements
Figures:	Diagram developing "street market" ideas of environment
graphs:	Instruction from student's own and other schools; lecture group sizes; methods of instruction for 3 typical courses; student's instruction from own and other schools compared with school's instruction to own and other students.
pie chart:	Floor area allocation (percentages for each element)
illustrations:	Of growth patterns and flexibility

Plan Phasing and Cost

The plan phasing and cost, as outlined in Table 31, is the section where all the elements that have been elaborated are scheduled for implementation. The line of action for the goals of the plan is established, and the necessary resources to fulfill its accomplishments are identified.

In both the case of an existing or new campus, there will need to be some form of phasing to accomplish the proposals of the plan. The most common is between two and three phases per plan, looking ahead 5 to 10 years into the future.

Following the phases of development, whether for an existing or new campus, the ultimate development plan should be presented, illustrating what the campus will appear like at the completion of the plan or completion of the specified time line. This is the ultimate development plan for the fulfillment of the goals set forth in the planning process.

Finally, whether for an existing or new campus, the costs and financial ramifications of the proposed goals and the master plan should be addressed showing how the funds will be procured.

Plan Conclusions

The plan conclusions, as shown in Table 32, are the summary of the issues presented and covered in the plan. Technical data necessary for specified elements can be included in appendices, in addition to a bibliography, if needed, along with other reference documents or explanatory notes. In some cases, when the plan is the report of a planning commission that reports to a governing board, a resolution to adopt the master plan document is included in this section.

Whether for an existing or new campus the plan conclusions are fairly similar. The only variations may be that a new campus is usually built on commission, therefore a resolution to adopt the document may not be necessary.

Physical Aspects of the Campus Master Plan Document

Based on the results of the previous study, the outward appearance of the master plan document could follow the specifications listed in Table 33. These suggestions are based on the data from the master plans studied in the previous chapters.

Summary

The document presented in this chapter is the summary of a typology distilled from literature and the collection of data from sample campus master plan documents. The document was developed based on two contexts: an existing campus and a new campus. The contents for the document were

TABLE 31
PLAN PHASING AND COST

Item	Description
<i>Phases of Development and Scheduling</i>	
Phases:	Usually between 2 and 3 phases per plan
Action Plan:	List priorities
Phases of Development:	Philosophy of building phases and phasing methods; building plan (by phase and sub-phase w/costs); two specific stages, 3rd and 4th long-term, vague
<i>Illustrative Elements:</i>	
Maps:	
development plan (1 map per phase)	Growth of university by stage; phasing plan; future development (existing buildings, proposed buildings/renovations, future projects); phase maps (one per phase) (dates - dates); staging plan; phase (#) plan
campus plan projects	By: project, NSF, G.S.F., cost
Tables:	Construction schedule (by phase); each phase of development; future physical plan projections (date); project: summary (by: project, NSF, G.S.F., cost); prioritization
Illustrations:	Photos
Schedules and Projections:	Project development schedule
<i>Ultimate Development Plan</i>	
Topics:	Framework principles (framework description: recommendations of the MP concepts); general descriptions; ideas for the future; potential projects and programs; solution and recommendations
proposed development plan:	Future development and expansion; proposals and rationale (development concept); future construction (new)
campus master plan:	The physical plan; concept (plan)
alternatives:	Planning processes and alternatives concepts; alternatives (A, B, C, no action)
development process:	Growth and development patterns; directions; growth and change planning
<i>Illustrative Elements:</i>	
Maps:	Campus master plan (at ultimate development); development plan (phases I, II, III, etc.); accepted master plan; campus site plan - concept (or master plan); college response to alternatives; concept plan (at full development); final completion stage of plan; illustrative campus plan; pattern of growth; permanent buildings; plan for the campus and immediate environs
growth and expansion:	Potential growth areas (which the campus could expand to in the foreseeable future); expansion locations
alternatives:	A, B, C, no action; alternatives to planning concepts
proposed:	Development (existing/proposed buildings); actions
Illustrations:	Architectural model photos: campus model - plan view; campus model - perspective view; of physical plan
Tables:	Alternative comparison matrix; potential long-range projects; space analysis
Space Relationship Diagrams:	Different direction of growth; the linear core; various patterns of growth (concrete, zonal, molecular, and linear [both]); development concept

Table 31—Continued.

<i>Costs and Financial Aspects</i>	
Topics:	Analysis of expenditures (included manpower per hour costs); capital and opening costs; funding restraints
Illustrative Elements:	
Tables:	Allocation of construction budget by calendar year; budget estimates; capital program (by school, building); capital costs projects (for each stage, and totals by area); external works costs; financial plan (by phase - [2]); future physical plant projects (data); operating costs projection (for next 5 years by area); project summary (by: project, NSF, G.S.F., cost); summary of net areas, gross areas and costs for (#) of students; summary of gross floor areas and costs for 4 phases of development; supplemental facilities envisaged in development plan

TABLE 32
PLAN CONCLUSIONS

Item	Description
<i>Plan Conclusions</i>	
Topics:	Planning conclusions; resolution adopting the CMPD Appendix(es) Bibliography Reference documents Explanatory notes
<i>Illustrative Elements:</i>	
Tables:	Of element details (in appendices)
Illustrations:	Of planning conclusions, resolutions; photos
Figures:	Charts or graphs of element details (in appendices)

TABLE 33
PHYSICAL ASPECTS OF THE CAMPUS MASTER PLAN DOCUMENT

Aspect	Suggestion
Cover Font	Serif
Binding	Spiral
Text Font	Sans Serif
Document Type	Informal - loose-leaf
Layout Size	Any choice
Number of Pages	Around 70
Dividers	7
Printing Color	B/W with color in maps
Length of Plan	5-10 years
Type of Plan (as viewed in the model)	Insert/Add-on New Campus

grouped in seven sections in order to have a logical flow and progression of development from beginning to end. Each section was discussed in terms of the two contexts with the goal that the document could be used with either type of campus.

CHAPTER VI

SUMMARY, DISCUSSION, CONCLUSIONS, RECOMMENDATIONS, AND AREAS FOR FURTHER STUDY

Summary

This study identified the elements, configuration, and format of a campus master plan document, producing a sample document, based on the study, designed to guide campus master planners' endeavors. With all the previous studies in the field of campus planning, this study emphasized the campus master plan document, and did not attempt to add further to the extensive literature on the processes of campus planning. The need for this type of study in the discipline was determined both from the absence of doctoral studies addressing the campus master plan document itself, and the lack of this kind of resource in previous master planning efforts at Andrews University.

With this study's germinal roots at Andrews University, a small, private, church-related university, the focus was placed on the elements, configuration, and format of a campus master plan document to fit the needs of this size and type of college or university. Previous studies and the literature had noted that planning practices in small, private, church-related institutions lagged behind the norm of larger leading schools, which studies (*Bricks and Mortarboards*, 1966; Morisseau, 1964) had shown that only 50% had a plan that exceeded 5 years. Other studies showed that the problem was compounded for the smaller institutions because the personnel involved in campus planning often "wore several hats" in their assigned duties. This study was designed to be an additional resource for planning personnel for these smaller institutions.

The study began with a review of previous doctoral studies to determine what methodologies had been established in the field of campus planning, and specifically pertaining to the campus master plan document. From the body of studies in the field, 1 masters study and over 30 doctoral studies were more closely consulted for a base on which to build this study. From the methodologies of 16 of these previous campus planning studies, a methodology was formulated, which was deemed appropriate to obtain accurate results in this type of study. An additional 9 were consulted as a base to construct a general type of campus master plan document as specified in literature and campus planning studies.

The methodology involved reviewing the general literature to establish a background and context for the study. The term *campus planning* was reviewed in terms of institutional need, including literature definitions of campus planning itself. This was followed by a historical overview of the evolution of campus planning with a special emphasis on the development and progression of the campus master plan document. The literature defined a master plan document as a result or product of the campus planning process, so a general review of the campus planning process, as outlined in literature, was also conducted, to establish the context of the document's preparation. Included in the review of the process was the place of individuals who usually participated and were responsible in both the process and the authoring of the master plan document, highlighting their roles in its development. A final part of the general review of the literature was noting other needs, uses, or benefits that the literature recommended beyond the document's primary function as a planning instrument.

Following this general review, a specific search of the literature was conducted with the purpose of identifying, amassing, and collecting the elements, type of configuration, and format of a campus master plan document as reported or prescribed. The varied excerpts found were first synthesized into topics, and then into a composite of what a campus master plan document should include, and how it should be configured and formatted. This composite was the *type* of document, as found in literature, and was termed the *typology*. It became the collection checklist used in studying the data: actual campus master plan documents.

In addition to elements, configuration, and format, different types of campus master plan documents were identified, highlighting the degrees of possibility and focus the campus master plan document could have. These ranged from a tightly prescribed, highly detailed document, to institutions with no document at all where growth (or retrenchment) evolved according to the needs of the moment with little account of a long view. This led to a discussion of the potential future of the campus master plan document and its purpose(s) or benefit(s) to an institution, with critics citing the expense of creating a master plan document not being justified by its usefulness or shelf life.

As a starting point to identifying campus master plan document elements, a study by the State of Michigan Board of Education (1968) was found that outlined 10 major elements. From the literature 60 other partial elements were identified from more than 36 sources. These were elements that were found in at least two sources. These partial elements were then grouped into 19 general elements. These elements were: circulation; buildings and facilities; land-use aspects; academic plan; costs and financial aspects; phases of development and scheduling; site plan; utility and energy systems; institutional aspects; enrollment and campus populations; environmental aspects; landscaping; program space

needs and standards; housing; architectural and outdoor spatial aspects; space and functional relationships; extracurricular, recreation, and athletics; planning concepts; and document organization. In addition to these elements, the graphical illustrative content of campus master plan documents was studied. Campus mapping, planning diagrams, schematic drawings, charts, and other illustrations were connected to elements as specified by the literature.

After the typology was developed, it was tested through a pilot study. The pilot study showed that three more elements needed to be added to the typology. These were: additional document organization; letter of commission; and ultimate development plan. The combination of these elements and the graphical illustrative content became the typology of a campus master plan document found in the campus planning literature. The typology was reduced to a checklist form (see Appendix A) for use in the collection of data.

Prior to the collection of the data, the researcher was tested, as well, with an interrater reliability test. A campus planning expert and an educator with prior experience in campus planning both reviewed the same master plan document as the researcher. A reliability rating of .7 was established as satisfactory to accept the results of the researcher. The results of the test showed there to be a reliability of .87 and higher between the above three individuals.

The collection of data proceeded by choosing sample campus master plans from available documents with the attempt to be representative of the decades from the 1960s through the 1990s, as well as representative of a small college or university. The decade representation was accomplished, and most documents represented institutions with enrollment of 10,000 students or less. The data sampling also included varying regions around the world, providing the study results with a more generalizable worldwide use.

In addition to the elements and graphical illustrative content, the data were examined for fonts, bindings, document type, layout size, number of pages, dividers, printing color, length of plan, type of plan, and campus layout. These added aspects were included as part of the study to determine if physical similarities existed among campus master plan documents, or as a way of studying changes across time.

The findings of the study reflected and combined elements from both the typology and the collection of the data. These were integrated into a campus master plan document which represented the results. This document was developed as a campus planning resource in an open-ended manner for use both in an existing campus with a history of previous documents and planning efforts, or for the creation of a new campus. The final step in the study involved review and criticism of the findings and the

resulting document. The document was sent to Richard P. Dober, a practicing campus planning professional, for the review and critique of its applicability and value. He found the results to be of value (see Appendix B), and suggested their publication.

Discussion

In discussing the campus master plan document and the results of the study, three perspectives had not been covered at this point: first, the evolution of the document across the decades of this study; second, addressing the differences between the typology and the data had not been done; third, presenting ideas of where campus master plan documents may be headed to in the future.

Evolution of the Campus Master Plan Document

The first, evidenced not only from a historical review of campus master plans in literature but also from the data as well, is that the documents have evolved over time, including in the time frames delineated for this study. The campus master plans of the 1960s, exemplified by the documents of Bath and York, were bound and published classical works with little or no chance for adaptation or modification. They also tended to cover the entire campus and were more authoritative and quantitative in nature, formal and bound with illustrations designed to enhance their appearance. By the 1990s campus master plans had become more pragmatic and strategic in nature, temporal in appearance and design. Most were spiral-bound or loose-leaf, of a less formal and rigid nature, and tended to focus on specific problems. They grew progressively shorter over time, and evolved more from full-color layout to black and white, designed almost with the understanding that they would be modified and adjusted as the dynamics and policies of the institution evolved. While the grandiose schemes of the 1960s were inspiring, the practicality of the 1990s reflected campus planners' increasingly more pragmatic view to campus master plan documents.

The document itself has been a reflection of the changing nature of higher education worldwide since World War II. The documents of the 1960s were the most complete and comprehensive because many new campuses were being built at that time. The liberalization of higher education and the resulting influx of enrollment propelled the need for more facilities to accommodate the sudden growth. Without, in many cases, a preexisting campus, campus master plan documents needed to address all the elements of a campus plan to coordinate overall development of the institution. After this period of growth, and into the retrenchment and declining enrollments of the late 1980s and early 1990s, the master plan documents began to appear more specialized and focused, and they attempted to correct emerging campus problems, previous omissions or departures from earlier documents, or lack of vision from prior

planning efforts. No longer working from a clean slate, as Bath or York, these later documents covered substantially existing conditions and problems of the campus. These documents began to include items such as inventories of the conditions of buildings, with projected dates for renovations, upgrades, demolition or new construction—elements not found in most plans from the 1960s and early 1970s.

Discrepancies Between Literature and Data

A second issue is the discrepancy between the literature and actual campus master plan documents. This, as literature attested, was expected, as the experts are usually those on the vanguard in calling for change. The ranking of elements, from the typology to the collection of data, highlights the differing opinions between the prescribed and the practiced. In the typology the elements were ranked according to the number of sources that they were mentioned in. Table 12 (page 115) shows the listing of master plan document elements ranked by occurrences in literature. Table 13 (page 116) shows the progression from the starting point of the study of the State of Michigan (1968) through the preliminary review of 60 partial elements to the 19 final compilation of elements that became the typology. In Table 13 only the top 10 elements from each category were listed. The first comparison, in this study, of elements across lists is found at the bottom of this table. Table 14 (page 118) broke down the preliminary review of partial elements and the final compilation of typology elements by decade showing all elements that appeared in at least 30% of the literature. All the common elements for each decade were listed, and then the shared elements between the decades were also listed at the bottom of this table.

These shared elements, up to now listed by differing views on the literature, were amalgamated into the typology—the overall results of the review of literature. This list is compared in Table 26 (page 183) with the listing of element ranking from the collection of data. If the element "document organization" is ignored (as all documents contain some form of organization) from both elements lists, the top three elements of both lists are the same: circulation, buildings and facilities, and land-use aspects. After this point the differences between what is prescribed in literature and what was actually found in the data take noticeably different routes. The elements "academic plan," "costs and financial aspects," and "phases of development and scheduling" all drop below the halfway mark, with "academic plan" only two from the bottom. The "site plan," "institutional aspects," "program space needs and standards," and "utility and energy systems" all move up to fill the gap. After this, the new element "ultimate development plan" is sandwiched in at the midpoint followed by "phases of development and scheduling," and "enrollments and campus populations" which both had dropped. Next came "housing," which showed no change in ranking from the literature order, followed by "planning concepts," which was more prevalent in the data than the literature. The next group, "costs and

financial aspects," "environmental aspects," and "academic plan" came in at a much less observed rate than in literature. Rounding out the bottom were "space and functional relationships," and "extracurricular, recreation and athletics," which were almost at the bottom of the literature list, and did not vary considerably in the data.

The results of some of the change can be attributed to the previous issue discussed concerning the evolution of campus master plan documents over time. Table 34 shows the means of the elements varied by decade group of documents. The scoring scale was: 3 equaled a fully elaborated element in a document; 2 equaled a partially elaborated element; 1 for an element referred to in passing; and 0 for no mention at all. It is more understandable how the elements from data varied in importance from that in literature. Academic plan was almost fully elaborated in all 1960s documents, whereas it did not quite average a referred-to-in-passing grade for the 1980s and 1990s. Enrollments and campus populations show a similar though not quite as sharp a decline. Housing, space and functional relationships, and extracurricular, recreation and athletics were hardly referred to in passing or not mentioned at all in the 1990s' documents, where in the 1960s' documents they were almost fully elaborated. This, in spite of the fact that the most recent literature was beginning to call for planning and documentation in extracurricular, recreation, and athletics as an area of growing need on campuses. More attention was given to this element in the 1960s and 1980s than the 1990s. This evidence further reinforced the observation that for the 1990s and beyond, documents would be more focused and not include all the aspects generally found in older master plan documents.

So, the question arises as to what a master plan document of the 1990s and beyond, which may be a streamlined version of the tradition plan, should contain. Table 35 provides an adapted perspective from literature and the data, by dividing the elements into four groupings based on their occurrences (in literature) and score (from the data). The first group would be the *must haves*. These are elements that were prescribed in at least 40% or more of the literature, and were almost fully elaborated in every data document. These are the core elements of a campus master plan document. The second group is the *should haves*. These elements were prescribed in the mid to upper 30% of the literature, and were partly or more elaborated on in the data documents. These elements do not have the same rate of frequency as the first group, but are nonetheless a very integral part of the document. The third group is the *good-to-haves*. This is the mid-range elements, listed in the low 20% to low 30% of the literature, and hovered around the partly elaborated or below category. These elements are important to a complete document, but not all documents had included them, or fully elaborated on them. The final group is the *extras* elements. These elements appeared in less than 20% of the literature and averaged about a referred-to-in-passing score in the data

TABLE 34
ELEMENT MEAN SCORES BY DECADE
(Adapted from Table 23)

Element	60s	70s	80s	90s
Circulation	3.0	2.6	3.0	2.6
Buildings and Facilities	3.0	2.8	2.8	2.4
Land Use Aspects	2.8	2.8	2.8	2.4
Costs and Financial Aspects	1.6	1.8	1.6	1.8
Phases of Development & Scheduling	2.2	1.8	2.4	1.6
Site Plan	3.0	3.0	2.6	2.2
Utility and Energy Systems	2.4	2.2	2.4	1.8
Institutional Aspects	3.0	3.0	1.8	2.0
Environmental Aspects	1.6	1.2	1.6	2.0
Landscaping	2.6	2.0	2.2	2.0
Program Space Needs and Standards	2.4	2.2	3.0	2.2
Architectural and Outdoor Spatial Aspects	2.8	2.2	2.2	1.2
Planning Concepts	1.8	1.8	2.2	1.4
Document Organization	2.4	1.2	0.0	0.6
Additional Document Organization	3.0	3.0	3.0	3.0
Letter of Commission	1.2	1.2	1.2	1.2
Ultimate Development Plan	3.0	1.6	2.4	1.6
Cumulative Means	2.49	2.02	2.02	1.83

Note. Elements are listed in the order discussed (which is the order they appeared in the data collection checksheet).

TABLE 35
 LISTING OF DATA ELEMENTS BY SOURCES AND MEAN SCORE
 (Adapted from Tables 12 and 24)

Elements from Literature	Sources (n = 38)		Elements from Data	Score
	#	%		
<u>Must Have</u>				
1. Circulation	18	47	Circulation	2.80
2. Buildings and Facilities	17	44	Buildings and Facilities	2.75
3. Land Use Aspects	17	44	Land Use Aspects	2.70
4. Academic Plan	16	42	Site Plan	2.70
<u>Should Have</u>				
5. Costs and Financial Aspects	15	39	Institutional Aspects	2.45
6. Phases of Development/Scheduling	14	36	Program Space Needs and Standards	2.45
7. Site Plan	14	36	Utility and Energy Systems	2.20
8. Utility and Energy Systems	13	34	Landscaping	2.20
<u>Good to Have</u>				
9. Institutional Aspects	12	31	Ultimate Development Plan	2.15
10. Enrollments and Campus Populations	12	31	Architectural and Outdoor Aspects	2.10
11. Environmental Aspects	12	31	Phases of Development and Scheduling	2.00
12. Landscaping	10	26	Enrollments and Campus Population	1.90
13. Program Space Needs and Standards	10	26	Housing	1.85
14. Housing	9	23	Planning Concepts	1.80
15. Architectural/Outdoor Spatial Aspects	8	21	Costs and Financial Aspects	1.70
16. Space and Functional Relationships	8	21	Environmental Aspects	1.60
<u>Extras</u>				
17. Extracurricular, Recreation, Athletics	6	15	Academic Plan	1.45
18. Planning Concepts	6	15	Space and Functional Relationships	1.45
19.			Letter of Commission	1.20
20.			Extracurricular, Recreation and Athletics	1.10

documents. While not very prevalent in the literature or the data, these elements in some situations could be very important, especially "extracurricular, recreation, and athletics," a growing area in the recent literature.

From these two lists, the typology of chapter 3 and the data results of chapter 4, a combined ranking of elements was developed in Table 36. This list was derived by adding the rank value of identical elements on both lists and dividing by 2 to have a combined ranking. The only exceptions to this method were the elements "ultimate development plan" and "letter of commission," which were additions to the data elements listing. The combined listing was organized by scores, 1.0 - 5.5, 6.0 - 9.5, 10.0 - 15.0, and 16.0 - 20.0, and the combination of the literature and data provide a balance that neither individually did. For example, while the academic plan ranked 4th in the literature and 17th in the data, a better placement is around the middle of the pack in the good-to-have group. While the argument could be made that the academic plan should be part of the must-have group, it is certainly more important to the planning picture than as an extra, as the data suggested.

Future Evolvement of Campus Master Plan Document Elements

Having the base of the combined ranking of elements in Table 36, the future evolvement of campus master plan document elements raises a few questions. The first touches on available land and technology. Land issues, due to land's increased scarcity, will push planners to find renewed creative alternatives in providing campus services. Landlocked institutions will become more prevalent as communities continue to grow up around the campus, available land becomes more scarce, and curriculum demands requiring additional structures. Housing and commercial services will be among the campus functions which will be increasingly contracted out to providers, as higher education will become more focused on academics and programs, and less able or willing to maintain student services.

Land scarcity and the explosion of the internet, with all the aspects of connectivity, will bring distance education to the forefront of higher education. Campus planners in the 1990s and beyond will not only need to focus on delivering education to students off-campus, but on-campus will need to build in the infrastructure for computer networking. This will involve the elements of buildings and facilities, as extensive rewiring will need to be accomplished to provide networking services. At the time of this study deferred maintenance was an issue in campus planning. With the constant growth and development of the computing industry, upgrading and the infrastructure will be necessary to stay on the crest of technology, placing a larger burden on buildings and facilities.

TABLE 36
COMBINED LISTING OF ELEMENTS

Elements	Score
<u>Must Have</u>	
Circulation	1.0
Buildings and Facilities	2.0
Land Use Aspects	3.0
Site Plan	5.5
<u>Should Have</u>	
Institutional Aspects	7.0
Utility and Energy Systems	7.5
Phases of Development and Scheduling	8.5
Ultimate Development Plan	9.0
Program Space Needs and Standards	9.5
<u>Good to Have</u>	
Costs and Financial Aspects	10.0
Landscaping	10.0
Academic Plan	10.5
Enrollments and Campus Populations	11.0
Architectural and Outdoor Aspects	12.5
Environmental Aspects	13.5
Housing	13.5
<u>Extras</u>	
Planning Concepts	16.0
Space and Functional Relationships	17.0
Extracurricular, Recreation, and Athletics	18.5
Letter of Commission	19.0

Buildings and facilities will also be affected as technology demands for multimedia capabilities (send and receive) will place further demands on existing and future structures. Full interactive classrooms and production rooms will become more required components in the presentation of curriculum, and therefore of buildings. Utilities and services will need to be expanded to handle increased bandwidth requirements for these future requirements. The expense of constant upgrading and rewiring will present serious obstacles, especially for some of the smaller schools this study was designed to focus on. The nature of distance education and computing capabilities will affect to a large degree the nature of higher education from enrollments and campus populations, to buildings and facilities, to the curriculum.

The second question, which only will continue to grow as a major concern for campus planners, will be issues of campus safety. Buildings and facilities, as well as site planning and housing, will need to include safety features and designs, and undergo remodifications for existing structures. Layout and planning will increasingly need to consider lighting, visibility, and other safety-related issues.

The third question that will continue to be an issue requiring attention is circulation. The automobile and the student have historically been a campus planning problem, and this will continue to grow as the commuter student population increases. Many campuses in the 1990s struggle to meet growing parking needs as scarcity of land in the campus core will continue to push parking to the outer edges of the campus. Available parking areas will be used for other purposes and the need for parking will grow.

Conclusions

In a study of this nature the main conclusions appeared as the findings of the study, and these were incorporated in the campus master plan document developed in chapter 5. This, after all, was the purpose of the study. However, several additional conclusions, of a more prescriptive nature for the creation of a master plan document, follow.

First, not only have campus master plan documents evolved over time, they will continue to do so. This will be partly due to the fact that a document needs to be reflective of the local institution, situation, and needs. Any planning resource or materials used in the creation of a document will need to be tempered by this purpose. Master plan documents in the 1990s have changed from previous decades. Resources, such as the results of the findings of this study, only provide a point of departure and historical continuity, which are a part of campus planning processes. Nothing should be followed *en toto*. As change is a constant, the document should reflect new processes and changes in the future, and as such will continue to evolve.

Second, most of the master plan documents created in the 1990s and beyond will be for existing campuses. As Dober (1992) noted for the U.S., few new campuses will be built in the foreseeable future, though this may not be true worldwide. Individuals involved in campus planning will be faced mostly with additions to existing conditions, correcting past mistakes, and attempting to have linear integration of different campus plans and efforts into a continuous process of past and present harmony with the constant possibility of future expansion.

Third, campus master plan documents for the 1990s and beyond will need to be more of a loose-leaf and informal design, able to be updated and revised on a yearly basis. The literature reflected this, calling for yearly review of the document. However, the overall themes of the plan need to remain consistent. The yearly updates reflect the changing dynamics of the institution, which impact its long-range development. However, the long-range view of the document should not be changed by yearly updates. It should have a valid time frame of 5 to 10 years into the future.

Fourth, also building on the first, campus master plan documents have become increasingly shorter over the decades. This may be partly because a higher percentage of the later data was from colleges and universities that contracted out master planning services to architects and consultants, usually with the charge of solving a particular problem. The resulting master plan documents, authored through these services, heavily reflected the problems needing solutions, without always keeping in view the larger picture. The data showed that the master plan documents of the 1960s scored higher and were more complete than the documents of the 1990s.

Fifth, the guidelines established in this study could have a more universal application to other types of planners, such as city or urban planners.

Finally, although this study focused on the campus master plan document itself, it is recognized that the planning process and the curriculum of the institution shape the document. The document is only, as was previously noted, a result or product of the process, and as such cannot be taken out of that context.

Recommendations

The following recommendations were made in light of the study.

1. Administrators interested in keeping their institutions up-to-date in their planning efforts should follow these four steps to keep the institution's master plan document current:
 - a. Take a weekend or a few days a year on a retreat, with top planning personnel in the institution, to review and develop new ideas and initiatives. Then have these ideas be part of the

evaluation of the master plan document to be incorporated if accepted by the governing body. This will serve to provide ownership for the document and maintain it as a viable and living document.

b. Ensure that changes affecting the master plan document are quickly and accurately incorporated into the document by the designated institutional author.

c. Use the master plan document for more than a shelf-resource document. Make it available to the public relations department, alumni, donors, and other interested groups for input and critique of the document.

d. Lead out in the master planning process to ensure that efforts are up-to-date, and resources are allocated to their highest rate of return.

2. Campus planners, and other individuals involved in authoring a campus master plan document for varying reasons, should:

a. Use the results of this study only as a general resource or guide. Adapt each area to the particular needs of the local institution.

b. Ensure that the overall principles and objectives are clearly stated and visible throughout the document.

c. Avoid getting caught in the minutiae of details.

d. Resist changing the overall principles on a whim. Maintain a 5 - 10 year view when making changes.

3. For general use: have the results and document produced in chapter 5 of this study be made available to interested small colleges and universities worldwide as a resource in the production of campus master plan documents.

Areas for Further Study

First, studies should be conducted to expand and develop the various elements of a campus master plan document identified from this study, similar to Shakers' (1984) study on campus housing.

Second, research should be conducted on campus planning methods and practices that would have a particular impact on small, private church-related colleges or universities.

Third, this study provides a starting point, for more research into the viability of the campus master plan document and its future effect on campus development. This discussion, noted in the literature, has been debated as institutions find different methods of growth and evolution.

APPENDIX

APPENDIX A

CAMPUS MASTER PLAN DOCUMENT DATA COLLECTION CHECKSHEET

CAMPUS MASTER PLAN DOCUMENT DATA COLLECTION CHECKSHEET

BIOGRAPHICAL INFORMATION

Name of Institution: _____

Place: _____

Title: _____

Author: _____

Publisher: _____

Date: _____ 1960s 1970s 1980s 1990s

PHYSICAL APPEARANCE

Cover Description: _____

Cover Font: Serif San Serif Courier Other _____Binding: Spiral Perfect Loose-Leaf Other _____Text Font: Serif San Serif Courier Other _____Document Type: Informal - loose-leaf Formal - printed, bound, bookLayout Size: 11" x 17" 8.5" x 14" 8.5" x 11" Port 8.5" x 11" Land 11" x 14" Land A4 Tall A4 Wide Other _____

Dividers: _____

Number of Pages: _____ Printing Color: _____

DOCUMENT DETAILS

Length of Plan: 5 - 10 yrs 11 - 15 yrs 16 - 24 yrs 25+ yrs not specifiedType of Plan: New Campus Sectional Compact Land-locked Insert/Add-on Regeneration No DocumentCampus Layout: Traditional Rural/Pastoral Suburban Quadrangles Urban Megastructure

SCORING AND DEFINITIONS

F Figures: Category for all types of charts, graphs, etc., which are not included in illustrations (I) and Tables (Tb).

I Illustrations: Category for sketches, drawings, photographs, renderings, and any other illustrative outlines.

M Maps: Category all types of maps used.

N Narrative: Category for any type of text or description accompanying an element.

S/P Schedules and Projections: Category of items of timelines, phases of development, or enrollment, academic, financial, or physical projections.

SR Space Relationship Diagrams: Category for bubble diagrams, cross-sections, and matrices showing relationships between elements of a whole.

Tb Tables: Category for all types of tables (columns/rows) whether financial, budgets, sq. footage.

The scoring is modified from Proctor's (1931) scaling with Canon's (1988) weighting: 3 = clearly elaborated; 2 = partly elaborated; 1 = referred to in passing; and 0 = not shown

CAMPUS MASTER PLAN DOCUMENT ELEMENTS	F	I	M	N	S/P	SR	Ts	Score
1 Circulation (Pedestrian, Vehicular, Access, Parking, Visitors, Utility Access, Safety and Security)								
2 Buildings and Facilities (Projected Physical Needs, Buildings, Libraries and Museums, Renovation and Reuse of Structures, Code and Requirements)								
3 Land Use Aspects (Campus Boundaries, Land Use and Zoning, Density, Expansion Locations, Land Acquisition)								
4 Academic Plan								
5 Costs and Financial Aspects								
6 Phases of Development & Scheduling (Action Plan, Dimensions)								
7 Site Plan (Topography, Building Sites, Campus Core)								
8 Utility and Energy Systems								
9 Institutional Aspects (Community Factors, Institutional History and Background Data, Mission and Purposes, Goals and Objectives)								
10 Enrollments and Campus Populations								
11 Environmental Aspects (Aesthetics/Attractiveness of the Campus, Ecology, Atmosphere of the Campus, Creating Meaningful Symbols)								
12 Landscaping								
13 Program Space Needs and Standards (Spatial Needs, Space Planning Standards)								
14 Housing								
15 Architectural and Outdoor Spatial Aspects (Architectural Form, Open Space)								
16 Space and Functional Relationships								
17 Extracurricular, Recreation, and Athletics								
18 Planning Concepts (Physical, Centralization/Decentralization, Integration/ Segregation, Movement and Flow, Priority, People, Change, Open Space, Aesthetic Design, Architectural Aspects, Ideal Functional Organization)								
19 Document Organization (Preface, Summary)								

F: Figures; I: Illustrations; M: Maps; N: Narrative; S/P: Schedules and Projections; SR: Space Relationship Diagrams; Ts: Tables
3 = clearly elaborated; 2 = partly elaborated; 1 = referred to in passing; 0 = not shown

CAMPUS MASTER PLAN DOCUMENT ELEMENTS	F	I	M	N	S/P	SR	Tb	SCORE
New Elements (with notes)								
20 Additional Document Organization (Title Pages, Table of Contents, Bibliography, Introduction, Acknowledgements, Foreword, Planning Committee)								
21 Letter of Commission								
22 Master Plan								
23								
24								
25								
26								
F: Figures; I: Illustrations; M: Maps; N: Narrative ; S/P: Schedules and Projections; SR: Space Relationship Diagrams; Tb: Tables 3 = clearly elaborated; 2 = partly elaborated; 1 = referred to in passing; 0 = not shown								

Notes

Num.	Cell	Description
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1

APPENDIX B

LETTER FROM RICHARD P. DOBER

DOBER, LIDSKY, CRAIG AND ASSOCIATES, INC.

Campus and Facility Planning Consultants
385 Concord Avenue
Belmont, Massachusetts 02178-3096

TEL 617-489-1162 FAX 617-484-1595

3 April 1996

Mr. Brad Jamison
School of Education
Andrews University
Berrien Springs, Michigan 49104

Dear Mr. Jamison

Thank you for sharing your research and conclusions with me - a fine piece of work, I think.

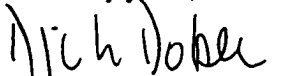
Here are a few things I believe are missing or not sufficiently stated in your conceptual summaries:

1. Process significantly determines the outcomes and the shelf-life of a campus plan.
2. Start-up principles (planning goals and objectives) should be articulated to inform and shape the process.

For example, see the enclosed pages from a study we did for the University of Minnesota Regents, outlining a model campus planning procedure.

I think a condensed version of your dissertation would make a good article for *Planning for Higher Education*. If you have time and inclination to do so, let the editor, George Keller, know that I thought your work was publishable.

Cordially yours,


Richard P. Dober, AICP

Z

APPENDIX C

SELECTED DATA: CAMPUS MASTER PLAN DOCUMENTS

SELECTED DATA: CAMPUS MASTER PLAN DOCUMENTS

- The Admundson Associates. (1990). *Southern 2000: campus master plan*. Ashland, OR: Southern Oregon State College.
- Architects Collaborative, Inc. (1986). *Rhodes college campus master plan*. Memphis, TN: Rhodes College.
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