

A SPATIAL ANALYSIS OF DUPLICATION
AMONG MAJOR PROGRAMS WITHIN
OKLAHOMA'S INSTITUTIONS
OF HIGHER EDUCATION

By

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CHAPTER I

INTRODUCTION

Quality in higher education has become one of the nation's more important issues. Responsibility for improving the quality of post-secondary education falls primarily in the hands of each individual state, and in some cases, individual institutions. Improvement in quality and system efficiency can be achieved through a combination of several variables depending on institutional (i.e. colleges or universities), state and regional needs.

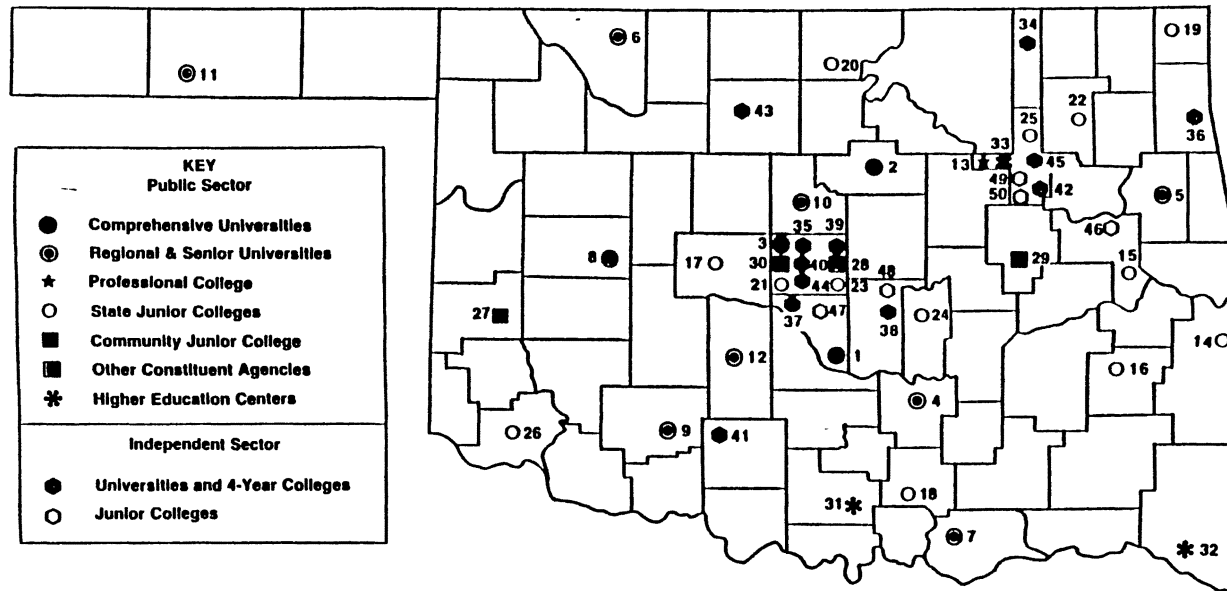
Not only is high quality in education important in its own right, but its significance for economic development should not be overlooked. The Oklahoma Higher Education Task Force in its 1987 report explained this connection: "Quality in higher education will form the catalyst necessary for emergence from the current depression and for further development of Oklahoma in a manner consistent with its citizens' needs and abilities" (OHETF, 1987, p. 2). Unfortunately, growth in quality at many Oklahoma institutions of higher education has been retarded in recent years due to the lack of well-defined missions and roles existing at each.

Historically, the major element of concern for public

higher education in the State of Oklahoma has been that of "universal access" (OHETF, 1987, p. 3), especially with the poorly developed transportation system that existed when most of the State institutions began operation. Oklahoma's system for higher education was originally designed with two major goals in mind. First, to provide some means of post-secondary education to those individuals desiring it, and second, for institutions to be ideally located among the State's uneven distribution of population. The system for higher education in Oklahoma is comprised of twenty-seven separate four-year and two-year public institutions, not including branch campuses, in addition to several private institutions (Figure 1). Oklahoma, compared to other states, has achieved this goal of universal access (OHETF, 1987).

Many of the State institutions justify their existence, location, and cost on the geographical area that they claim to serve. There is no doubt that each institution serves students from its local area, and in most cases, students from outside their region. But even if an institution does not serve its region well, for political reasons it is unlikely that any of the State controlled institutions will ever cease to exist.

The potential economic impact on a community would be disastrous if a local institution were to be closed. Thus, other changes in the system are needed to improve the quality and efficiency without creating other economic



State System Institutions, Agencies & Centers

Private Colleges and Universities

- | | | |
|---|--|---|
| 1 University of Oklahoma (Norman) | 17 El Reno Junior College (El Reno) | 34 Bartlesville Wesleyan College (Bartlesville) |
| 2 Oklahoma State University (Stillwater) | 18 Murray State College (Tishomingo) | 35 Southern Nazarene University (Bethany) |
| 3 Central State University (Edmond) | 19 Northeastern Oklahoma A&M College (Miami) | 36 Flaming Rainbow University (Stillwell) |
| 4 East Central University (Ada) | 20 Northern Oklahoma College (Tonkawa) | 37 Mid America Bible College (Oklahoma City) |
| 5 Northeastern State University (Tahlequah) | 21 Oklahoma City Community College (Oklahoma City) | 38 Oklahoma Baptist University (Shawnee) |
| 6 Northwestern Oklahoma State University (Alva) | 22 Rogers State College (Claremore) | 39 Oklahoma Christian College (Oklahoma City) |
| 7 Southeastern Oklahoma State University (Durant) | 23 Rose State College (Midwest City) | 40 Oklahoma City University (Oklahoma City) |
| 8 Southwestern Oklahoma State University (Weatherford) | 24 Seminole Junior College (Seminole) | 41 Oklahoma Missionary Baptist College, Institute and Seminary (Marlow) |
| 9 Cameron University (Lawton) | 25 Tulsa Junior College (Tulsa) | 42 Oral Roberts University (Tulsa) |
| 10 Langston University (Langston) | 26 Western Oklahoma State College (Altus) | 43 Phillips University (Lind) |
| 11 Oklahoma Panhandle State University (Goodwell) | 27 Sayre Junior College (Sayre) | 44 Southwestern College of Christian Ministries (Bethany) |
| 12 University of Science & Arts of Oklahoma (Chickasha) | 28 OSU Health Sciences Center (Oklahoma City) | 45 The University of Tulsa (Tulsa) |
| 13 Oklahoma College of Osteopathic Medicine & Surgery (Tulsa) | 29 OSU Technical Branch (Okmulgee) | 46 Bacone College (Muskogee) |
| 14 Carl Albert Junior College (Poteau) | 30 OSU Technical Branch (Oklahoma City) | 47 Hilldale Free Will Baptist College (Moore) |
| 15 Cummins State College (Warner) | 31 Ardmore Higher Education Center (Ardmore) | 48 St. Gregory's College (Shawnee) |
| 16 Eastern Oklahoma State College (Wilburton) | 32 McCurtain County Higher Education Center (Idabel) | 49 Spartan School of Aeronautics (Tulsa) |
| | 33 University Center at Tulsa (Tulsa) | 50 Oklahoma Junior College of Business and Technology (Tulsa) |

Source: Oklahoma State Regents for Higher Education

Figure 1. Institutions of Higher Education in Oklahoma

problems. One method of achieving this would be to reduce the redundancy existing among institutional academic programs within the State. There are undoubtedly some academic programs within each entity that do not serve their region well, attracting few if any students.

Justification and Purpose

Current economic conditions around the State of Oklahoma dictate a need for a more efficient system of higher education. An increase in efficiency would more than likely improve the quality of the system as well. The purpose of this investigation is to develop a method that would spatially analyze and help to identify areas of duplication among academic programs. Fortunately for Oklahoma, the data base required to make this kind of analysis is available. The use of a geographical perspective on this unique data set may provide results that help planners and administrators improve the statewide system and eliminate unnecessary program duplication among institutions.

Although a study completed at the request of the State of Oklahoma's Regents for Higher Education (OHETF, 1987) did not find widespread evidence of unnecessary duplication among programs, it did outline a few academic programs in some areas that may be redundant. Programs at the undergraduate level in teacher education, nursing, and home economics were just a few of the programs identified.

Continued operation of these low demand programs (i.e. nursing, home economics) draws heavily upon the funding available for higher education. Money allocated to weak and redundant programs, especially those not serving their regions well due to lack of demand, could be used to expand existing programs and develop new programs in areas of current demand that may help meet the needs of the future. The elimination of redundant programs would allow the State to use its resources much more efficiently. Hopefully, the results from this study will provide the Oklahoma State Regents for Higher Education valuable information and a new method for analyzing academic programs in terms of duplication at the present, as well as in the future.

Problem Statement and Hypothesis

The major objective of this investigation is to develop and test a method to analyze specific academic degree programs within the State of Oklahoma's System for Higher Education. The method would help reveal unnecessary program duplication that may be taking place. The academic program of Home Economics was chosen to be tested in the initial analysis of this investigation. This program was one of those noted in a study done for the State Regents for Higher Education (OHETF, 1987, p. III-34) that appears to have some problems with duplication, and is offered at nearly all of Oklahoma's institutions, both public and private. If the method produces favorable results, it may be applied to

other academic programs suspected of being unnecessarily duplicated within the State's system of higher education.

Therefore, the hypotheses that appear to warrant further investigation are:

- In terms of service provided to students within a region, academic programs currently exist in the State of Oklahoma's system of higher education which show a lack of need based on enrollments.
- Unnecessary program duplication exists among the academic programs of Home Economics at the State of Oklahoma's institutions of higher education.

The term unnecessary refers to those programs at various institutions not serving a reasonable number of students within their region. A low enrollment program at an institution not only indicates the lack of demand for it in that region, but may often indicate that the program is relatively weak or of low quality. Weak programs may be providing a disservice to the few students selecting that major. In other words, it is possible that these students may not be getting the quality of education that they are paying for. Students who leave their home service region (regions covering their home town and high school of graduation) to enroll in a similar program elsewhere, may also be indicative of program duplication and lack of demand for the program offered by the regional institution.

Area of Study

The area of study is limited to the political

boundaries of the State of Oklahoma. Data on all students currently enrolled at most of the State's institutions, along with their previous records, are continually compiled into a data base by the Oklahoma State Regents for Higher Education. This data base, the Unitized Data System (UDS), contains extensive information about each student, including the counties and high schools of origin. The 77 counties making up the State were used in defining the regional service areas for each institution, although it would be possible to subdivide counties by high school districts if necessary.

Limitations in the Scope of the Study

As with many studies, there must be certain limitations in order to make the investigation more manageable. Only data for State controlled institutions were used. Because some of the private institutions do not relinquish statistical information on their students, the data from these institutions are incomplete. In any case, the State has little control over what the private institutions can and cannot offer in terms of academic programs. For the State institutions, only students who are Oklahoma residents were used. These individuals make up the majority of the enrollment, and serving these students is the primary purpose of Oklahoma's system for higher education.

Since the goal of this study is to develop a method to identify redundant programs, only one individual degree

program--home economics at the undergraduate level--was used to compare the designated institutions. This program has over fourteen hundred majors and is offered at all of the State's public colleges and universities. Other degree programs, and the institutions as a whole, were not analyzed. Although there is some competition between 2-year and 4-year degree programs, the scope of this thesis is to look at the general picture in relation to redundancy among the programs. This along with graduate programs in home economics lends itself to a separate study altogether. The problem of program duplication seems to be more extensive at the undergraduate level.

Some home economics programs which show signs of unnecessary duplication may be providing important service courses to students from the region who major in other programs. The purpose of this study is not to investigate the actual student or state cost but to help identify program duplication that may add to the financial hardships facing the State's system for higher education. The state has identified the need to more effectively utilize the funding that is allocated to individual institutions (OHETF, 1987), and, at the same time, improve the quality. The methodology developed in this study may help to identify unnecessary program duplication that may warrant a more thorough investigation by the state planners and administrators, and thus serve as a basis for action.

CHAPTER II

REVIEW OF LITERATURE

Problems relating to academic programs in higher education have been sensitive issues for both policy makers and administrators. As problems have persisted or worsened over the years, various methods of approaching and solving them have been proposed. For the most part, those involved agree with the basic methods of addressing the issues. An example of one would involve redefining the institution's mission and the goal that each department will follow. Problems vary from state to state depending upon the size, number of institutions involved, and population being served. This is not to say that all systems of higher education are in poor condition, but most states are beginning to show some concern for these problems.

Because of this, numerous articles have been written on subjects dealing with a large variety of issues. Most deal with issues related to academic program review. Some documents contain material relating to program quality and duplication. Few, if any, approach the problem of program duplication in a geographical sense. This may be due to the fact that most state higher education systems lack a data base suitable for answering questions associated with

problems within the system.

Higher Education Problems: Past to Present

Most institutions around the nation have always seen a continual increase in their enrollments. But, within the last few decades, late 1960s to present, this influx has given way to a steady decrease in the actual number of students continuing their education. There are several theories behind this pattern; most revolve around the changing characteristics of populations. Nevertheless, this trend has set the stage for a new era of problems facing state higher education planners and policy makers at present and well into the future. Not only is the quality of programs offered at many institutions at stake, but so are their methods of financial backing.

The main theme in higher education of the 1960s, according to Mortimer and Tierney (1979), was geared toward quantitative growth. This led to the rapid development of new programs and the expansion of old. Many colleges felt that they must offer a broad range of programs to satisfy student interests, thus, creating a more attractive atmosphere. College faculty were hired at a rapid rate during the '50s and '60s (Dougherty, 1981a). Most of this took place in order to meet the demands for an education from the "Baby Boomers" who by this time were of college age. Vietnam War veterans also helped to increase the number of new enrollments at many of the nation's college

campuses.

Because of growth during the 1960s, many states, saw an unchecked proliferation and duplication of many academic programs (Cargol, 1983). It appeared that enrollments would always be sufficient to sustain all programs, and many campuses overextended themselves. It is the problem of duplication that remains the "bugaboo" of higher education today (Cargol, 1983, p. 2).

"Today, higher education is entering a new era full of conflicts and uncertainties" says Patterson (1979, p. 1), and the "...predicted declines in student enrollments have caused administrators to rethink tradeoffs resulting from cooperation and competition." With the declining student demand and a 20 percent decrease in the number of students graduating from high school, many institutions find themselves without sufficient numbers of students, and thus, income to survive. Lincoln and Tuttle (1983) point out that:

Falling enrollments, reduced legislature appropriations, available research funding and other economic and social factors have led to precipitously declining revenues in higher education. These in turn have spurred colleges and universities to identify and begin to implement survival strategies. Frequently such strategies have turned on program discontinuance as a key feature; eliminating the unprofitable product line appears to be a perfectly rational solution in our industrial oriented society (p. 3).

With the threat of losing support for higher education, "...many state administrators have grown increasingly aware of threats to the quality and flexibility in their

institutions" (Dougherty, 1981a, p. 69). With the decline in enrollments there will be fewer new programs, fewer new faculty positions, and less revenue from student fees, as well as from funding formulas tied to enrollment. Although there is a new trend with an influx of programs that are designed to bring back older students, this increase in enrollments will at best, only be enough to offset the decline and not reverse it (Dougherty, 1981a).

Awareness of this trend is indicated by the fact that, in the last decade (1970s), approximately three-fourths of all states had state-level higher education boards that engaged in the process of review and approval of academic programs (Barak, 1986). Although there have been three major areas of new responsibility developed--(1) budget development, (2) planning, and (3) program review/approval--it is the review process that has been most controversial (Barak, 1986).

Solutions to the Problems

Cargol, in his State-Level Agencies, the Curriculum, and Program Duplication, states that the decline in enrollments, as well as diminished political and financial support, has caused an increase in the level of competition for students by colleges. "No institution or educational system can serve or meet all demands for academic programs" (Cargol, 1983, p. 3). Consequently, the focus of academic program planning must be on what can be done best for the

greatest variety and number of students.

Cargol feels that there are many advantages for institutions to have clearly identified their mission and those specific programs that fill that mission. However, problems still exist in many cases due to intrastate regionalism, institutional resistance to change, the geographic dispersion of institutions, political pressure, and other factors. Although the access for many students would be reduced if some academic programs were restricted, chances improve for focusing limited funds on other stronger programs. Cargol refers to other literature stating that:

...if a program cannot be justified by real need, real demand, and complete information on resource commitment, the program can become an indirect financial manager of other programs by reducing the resources available for distribution and allocation to existing programs (1983, p. 4).

Davis and Dougherty, in their "Guidelines for Program Discontinuance" (1979), feel that the development of guidelines for implementing program discontinuance at a major institution may shed light on ways to maintain quality during times of financial stress. In developing their guidelines, these researchers found that economic and educational factors could not be separated when considering program discontinuance. As did others, they acknowledged the quality of the program on their list of high priorities.

Within their guidelines, several criteria useful for an objective review of a program were given. These include its national standing, quality of the applicant pool, performance of the program, students and alumni, and the

quality of the faculty (Davis and Dougherty, 1979). The authors are careful to point out that some programs being considered for closure due to high cost and low quality may actually have a high public service value and should not be closed. Thus,

...if this situation occurs, then it is especially important to consider alternatives to closure, such as merging with another unit or units within the college, transferring the program to another college within the university, developing a joint program with another institution, transferring the program to another institution, or making significant curricular changes to reduce the cost of the program without adversely affecting the program's quality (Davis and Dougherty, 1979, p. 75).

Dougherty, in his article "Evaluating and Discontinuing Programs," again emphasizes that institutions need to cut back on what they offer academically in order to maintain quality during periods of declining resources. In doing so, they can also increase the amount of flexibility they may have. It is the act of program discontinuance in his view that "...can help institutions deal with long-term financial difficulty" (1981a, p. 71). There are problems with this concept in that policy makers recognize a need for cuts but are reluctant to do so for various reasons. They tend to fear that discontinuance will damage the prestige and morale of an institution.

Ideally, "...the process should be ongoing, and program discontinuance should be viewed as an investment in the future rather than as a one-time penalty for an overdrawn account" (Dougherty, 1981a, p. 76). Thus, a comparison must

be made of the potential long-term benefits of increased quality and flexibility of the remaining programs verses cost. "Discontinuance can also be defined as the normal process of shifting academic resources over a more extended period of time" (Dougherty, 1981a, p. 75).

Dougherty restates many of his views and concepts in "Should You Starve All Programs or Eliminate a Few?" (1981b). In this article he suggests three dominant factors of program discontinuance in the context of governance and planning: (1) the academic quality of the program under consideration, (2) the changing environment in which education must operate, and (3) the changing priorities of the institution or state. Other factors, including economic and demographic, may lead institutions to consider program discontinuance.

Patterson (1979), as well as others, feels that few of today's educational organizations were created with cost effectiveness in mind. Institutions find themselves in competition with other institutions of their regions for students and financial resources. Most simply justify their existence and value on their contributions to education and society. Patterson advocates interinstitutional cooperation as a solution to the problem. He writes:

Interinstitutional cooperation can be used to avoid costly and unnecessary duplication. The ability to provide greater services to learners by pooling resources rather than by attempting to meet the needs as perceived by individual institutions offers a much more efficient use of resources. In the past, when financial resources were readily

available for higher education, the usual solution to meet an identified need was to create another organizational structure or institution. The cooperative approach offers an efficient and nonduplicative alternative as an answer to meeting future identified needs (Patterson 1979, p. 31).

Benefits from cooperation include avoidance of duplication, improved instructor quality, instructional diversity, increased access, additional funding sources, increased efficiency, and greater planning and control. According to The Three 'R's' of the Eighties; Reduction, Reallocation and Retrenchment, "...major opportunities for colleges and universities as they approach the eighties will require some reordering of programs and priorities. Institutions need to develop strategies that best fit their own purposes, missions and goals, because one single strategy is not best for all" (Mortimer and Tierney, 1979, p. 3). A number of methods for altering the budget base, or a budget control, were identified including program review and discontinuance.

The authors suggest that program discontinuance is inevitable during times of declining resources and budget gaps. Thus, Mortimer and Tierney proposed alternatives to program closure such as (1) merger, (2) transfer to another unit, or (3) establishing joint programs with another institution. They also point out the substantial technical, bureaucratic, and emotional barriers to consider when phasing out a program. These problems are compounded by the lack of a good data base and the existing political climate.

Lincoln and Tuttle, in contrast to many of the methods proposed by others involving program duplication and

discontinuance, believe there is too much emphasis placed on issues involving the demand for and quality of a program. The use of these issues by themselves is not sufficient to warrant closure of a program. More emphasis should be placed evaluating a program relative to the institution's core mission. However, Lincoln and Tuttle believe that:

...on a state-wide basis, program demand criteria may be brought to bear with some effectiveness to produce fiscal and programmatic efficiency. Program demand criteria, operating throughout a state, helps to avoid or eliminate costly duplications, especially for those programs which are in and of themselves costly (Lincoln and Tuttle, 1983, p. 5).

The authors found evidence that the effort to create a single institution program for various high-cost majors has caused schools of home economics to be found in only one institution in some states. This apparently holds true for schools of architecture and engineering which are sometimes found in only one or two institutions in many states.

Barak in his article, State Level Academic Program Review and Approval: 1984 Update, reports on the conclusions reached by a panel convened by the Education Commission of the States involving program review. The Commission concluded that:

Program review can help to keep postsecondary education vital by encouraging curtailment or closure of programs that no longer serve student needs and by helping the development of needed new programs. Effective program review must involve both the state higher education agencies and the institutions and combine institutional and state-wide perspectives. It should be clearly related to institutional missions (Barak, 1984, p. 2).

According to Barak, the commission also advised that the review of existing programs should incorporate both qualitative and quantitative dimensions of student need, program duplication, and program effectiveness.

In relation to the review and approval process of academic programs, Barak finds that criteria used from state to state are very similar, but with different weighted values given to each. The criteria included: (1) quality, (2) need/demand, (3) relation to institutional mission (i.e. centrality), (4) cost for new programs, and (5) cost and productivity for existing programs.

Barak and Miller (1986) established several criteria that are used on a statewide basis for undergraduate academic program review. The criteria are patterned after those given previously and are as follows: (1) costs, (2) area/state need, (3) demand for program, (4) program quality, (5) program duplication, (6) compatibility of the program with the institutional mission statement, and (7) other (Barak, 1984, p. 19). One problem seems to always exist between the planners and politicians. Planners tend to focus upon future needs and the politicians focus on more immediate demands.

As far as planning, or studying the possibilities of discontinuing particular programs, Melchiori (1982) states that discontinuance can be a realistic tool for retrenchment in changing curricula and also in reducing budgets. Definitions of discontinuance include merging related

programs, elimination of certain degrees or programs within departments, and even departmental closures. Certain causes for reviewing institutional programs, as brought forth by Melchiori, involve duplication or overlap within the region or state, and questionable program quality, as well as many others. He also considered the criteria used in evaluating programs such as the number of graduates from a program over a five-year period, number of students enrolled in the program, general student interest and demand for the program, appropriateness of the program to the institution's mission, and many other criteria.

Current Trends in Other States

Yunker (1983) reported on the problems facing Minnesota's area vocational-technical institutes (AVTIs). Although his study dealt with postsecondary vocational education, the concepts and problems are identical to those within higher education. With the growth rate double that of ten years ago, and with the decline in the state's financial resources, the project was designed to assess the management of the AVTI system. According to Yunker, the following issues were used as a base for the study: (1) student/teacher ratios, (2) program duplication, (3) completion rates, (4) placement rates, and (5) wages.

As was expected, the results indicated a significant amount of program duplication or overlap. Yunker reports that 60 percent of AVTI programs and 49 percent of community

college programs operate within at least 65 miles of another similar program. On average, each of these overlapped programs operated within 65 miles of three similar programs. In general, if two programs trained students for similar jobs within 65 miles of each other, they were said to be overlapped. "Unnecessary program duplication exists when there are too many suppliers of a program for existing student demand" (Yunker, 1983, p. 30).

Student/teacher ratios were used as a key indicator of duplication, and a number of programs with low student/teacher ratios were determined to be overlapped. With the State's policy of promoting accessibility throughout all regions, there have been some compromises between the goals of efficiency and accessibility. Metropolitan areas posed the biggest problems along these lines. Thus, the conclusions drawn show that there are "significant opportunities in the metropolitan area for improving efficiency and reducing duplication without greatly affecting the accessibility" (Yunker, 1983, p. xiii). Yunker advised that, "...reviewing those programs that are duplicated in the same geographic vicinity and have low student/teacher ratios is a sound approach toward achieving greater efficiency" (Yunker, 1983, p. 34).

Peat Marwick Main & Co. (Pappas, 1988) developed a draft proposal giving a methodological approach for identifying unnecessary academic program duplication within the State of Iowa's institutions of higher education.

Criteria for identifying potentially duplicated programs were outlined as follows: (1) the need for a program at multiple institutions, (2) differences in focus or emphasis in programs, (3) cost associated with each program, (4) demand for programs at each institution, and (5) potential elimination or change in the focus of a program.

With this established, the methodology was divided into three phases. The first phase would be used to establish an inventory of programs by type of degree and number of students completing a degree. During this phase, programs that were found to be unique under specified terms, such as those that provide a service or basic classes designed for all students (core programs), would no longer be considered as a problem with regard to duplication. Phase two introduced more screening factors to test the remaining programs. These involved the identification of core programs (necessary), linkages of a program (its relation to others), past and projected demand (enrollments and completions), and that of projected labor market demands. Those programs making it through phase two would be subject to the "tertiary screening factors" of phase three. These factors include the centrality of a program to the mission (i.e. institution), scope and focus, accessibility, quality, resources (funding), and the potential for savings if the program were to be eliminated. Although it is not known if this methodology was implemented, it covers many of the same aspects suggested by others in regard to program

duplication within higher education.

Volkwein (1984) found that the State University of New York (SUNY) at Albany terminated twenty-six degree programs and several academic units including two schools, three departments, and an experimental college over a fifteen month period. The Albany campus experienced a rapid growth in the number of programs being offered, enrollments, and resources in the same way as many other state systems and individual institutions. According to Volkwein, the question of institutional mission was overlooked, and programs were assured of continuing resources. New and expanded programs only had to compete for the continually increasing budget among themselves.

This growth period ended rapidly in 1979 with the onset of several years of fixed resources. With the fiscal condition of the State worsening, budget cuts were implemented for at least a two-year period, and student interests at the same time were shifting away from once popular fields of study. Committees were formed and decisions were made to terminate some programs. The resources saved through the termination of programs were reallocated to other departments and schools. This allocation was done on "the basis of their quality, enrollment demand, or ability to contribute significantly to the analysis of major public policy issues" (Volkwein, 1984, p. 394).

Crosson, reported that "...in Pennsylvania, problems

associated with enrollment, resource declines, an overbuilt system of postsecondary education, a multitude of independent institutions, and weak state-level structures are likely to have an immediate and substantial impact on the quality of higher education in the State" (1983, p. 534). There had been a projected 10 to 35 percent decrease in the number of enrollments to the year 1990. Furthermore, Pennsylvania had a higher tuition rate compared to other states, and was more dependent on these funds for its resource base.

Pennsylvania leaders chose to survey all educational leaders, both public and private, concerning the issue of declining enrollments. Four possible means of planning for enrollment decline were established and administered to the educational leaders surveyed. These were: (1) review and approve new academic programs, (2) discontinue duplicative programs, (3) identify specific public or private institutions for closure, and (4) establish maximum enrollment levels. In general, most of the educational leaders surveyed agreed with the measures, but, those interests that would have been affected by the implementation of such measures quickly opposed them (Crosson, 1983).

Smith reported that since 1975 "The University of Wisconsin System has been developing its internal planning and budget management systems with the idea that there will be a probable decline in enrollments in the decade from 1983

to 1993" (Smith, 1980, p. 2). The system assumed that the amount of state support in dollars would decline with enrollments. According to Smith (1980, p. 2), the instructional mission of most institutions seemed to be dependent on the "...enrollment funding formula." Because of this, a series of planning principles and management processes were designed to cope with the decline of enrollments and funding. The management instruments included: (1) mission statements, (2) constraining, altering, or reducing program arrays, and (3) enrollment and fiscal targeting.

The second instrument seemed most important in that it was designed to reverse the academic program growth that marked the '50s and '60s. This warranted the implementation of an evaluation and review process before allowing institutions to establish a new program. It also evaluated existing programs resulting in decisions on whether or not to continue, modify, consolidate, or discontinue a program. Smith states that "...in all of our planning documents, we have said that if the choice becomes clearly one of maintaining quality or reducing access, we will act to reduce access. We don't see how we can responsibly choose otherwise" (Smith, 1980, p. 4).

"The state of Kansas occupies a unique position in the literature of program discontinuance in that they have put together earlier comprehensive program review plans" (Hammond and others, 1987, p. 3). This plan was first set

up in 1972 and was based upon quantitative measures of degree production. Since 1983, a more qualitative process has been used, but apparently both methods are used effectively as program discontinuance tools.

During more of the quantitative era, 1972-1982, it was reported that a total of 89 programs had been discontinued, 81 in the first three years. There were also 30 "quantitatively weak programs" merged with programs viewed as being healthier. With the more comprehensive qualitative program review policy, beginning in 1983, there have been a total of 125 degree programs dropped or merged. The latter policy did involve aspects of duplication in its approach.

Davis (1984) notes that in 1964 The University of Tulsa established a college of education, which was designed to answer the then current demand and future expectations of students from Oklahoma. There was a rapid expansion in programs and enrollments, but this declined in the mid-'70s with as much as a 40 percent drop in enrollments. Despite declining enrollments the college maintained a broad range of programs.

Through a management consulting firm, retrenchment was suggested in order to limit resources in areas not central to the institutional mission. It was also suggested that some programs be phased out because of "limited demand and competition from state-supported institutions" (Davis, 1984, p. 10). Thus, other programs could be strengthened. It was decided to restructure the college and no new

programs would be implemented.

Wilson writes that "...in an attempt to undo some of the proliferation of degree programs that occurred in the 1960's, Louisiana's State Board of Regents eliminated 58 programs at 10 public universities" (Wilson, 1987, p. 14). This was the result after a review of 218 degree programs had taken place. The purpose of the review procedure was to eliminate programs of poor quality, strengthen those of strong quality, and most importantly, reduce duplication among institutions.

In the case of The University of Michigan, reviews were conducted on all existing programs because of financial constraints (Mortimer and Tierney, 1979). New programs would have to be developed by replacement rather than addition. Emphasis was placed on the quality of the program and its appropriateness to the mission of the institution.

Questions concerning the cost of the program in relation to other educational programs and needs were reviewed. If the program was deemed central and valuable to the needs of all students, then high costs did not warrant closing in spite of low enrollments. The main criteria used in reviewing the programs were: (1) is a comparable program offered at other institutions within the state? (2) can the program be made less costly or combined with others? and (3) does the program have a significant service value?

Oklahoma's Current Situation

The most recent analysis of the situation in Oklahoma appears in the 1987 report completed for the State of Oklahoma by the Oklahoma Higher Education Task Force (OHETF) titled Oklahoma's Secret Crisis. The basis for this report was the "...need to create a superior system of higher education from which the economic future of Oklahoma and the basic quality of life of its citizens are substantially dependent" (OHETF, 1984, p. 2). A task force was developed to assess the existing problems within the State's system for higher education. Five separate subcommittees made up the task force and involved the concepts of quality, governance, funding, duplication, and economic impact. A private consulting firm, Arthur D. Little, Inc., in association with the Barton-Gillet Company, were retained to do the actual research that would be used by the task force when making their final decisions and recommendations. Oklahoma, like the states discussed earlier, faces similar problems within its system of higher education. Oklahoma's historical obligation has been to "make higher education available to those who can benefit from it" (OHETF, 1987, p. III-28). Yet, due to intense competition and reduced state resources, OHETF stressed that curriculum programs must be offered at the highest possible level of quality, and at the same time, at the most efficient cost.

The OHETF report concluded that the people of Oklahoma have a justifiable concern that there is duplication among

the principal elements of the state's educational system. Coordination to eliminate duplication and overlapping service regions is important economically. Because of loosely defined missions, institutions of different levels, located within close proximity to each other, compete for the same student pool by offering similar curricula. State funds are therefore being allocated to duplicative programs that are in some cases of low quality, and not in demand at many of the institutions offering them. This is an area where efficiency in the system can be improved.

The purpose of this thesis is to develop a methodology that can be used to help identify programs showing signs of potential duplication and low demand. The OHETF report has already identified several academic programs that are under investigation. Because the Oklahoma State Regents for Higher Education have the data base necessary, as well as the need, it seems that this assessment tool will be of some use for policy makers and planners alike.

CHAPTER III

RESEARCH DESIGN

Unitized Data System

Statistics involving students are continually compiled into the Oklahoma State Regents For Higher Education's Unitized Data System (UDS). Operational since 1977, this data base may be unique in that Oklahoma seems to be the only State maintaining such a system. It has been primarily designed to serve as a functional, as well as an accurate policy planning tool (OSRHE, 1987). The content of the UDS is quite extensive. For each semester, there are at least seventy-five discrete variables gathered for each individual student within the State System of Higher Education (OSRHE, 1987). Data on all students is supplied by at least thirty separate institutions, both public and private. The statistics collected are recorded on a standard form by each individual institution.

Given the immense number of data elements within the UDS, a variety of research questions could be investigated. For this study, data indicating a student's resident county, hometown, and high school of graduation were retrieved from the UDS. Institutional codes, years of attendance by

semester, field of study (HEGIS -Standard U.S. Coding), instructional program, and student class (i.e. sophomore, junior, etc...) were also extracted from the UDS (Table I). Data which reveals each student's place of origin makes it possible to map and spatially analyze the regional service patterns of each institution.

The State Regents For Higher Education produces and publishes "Student Data Reports" on an annual basis. This document, created using the statistics compiled from the UDS, provides a variety of maps, tables, and charts presenting what the State Regents consider to be "primary measures of student involvement in higher education" (OSRHE, 1987, p. 5). Some examples of these include; programs through college, enrollments, student distribution, student transfer and progression, etc. The State Regents hope that it may "serve as an index to sources of comprehensive data that could be useful to State System administrators" (OSRHE, 1987, p. 6-7).

Geographic Service Areas

Previous Work

The geographic location of institutions of higher education is important. As mentioned before, logically locating institutions among the State's disproportionate distribution of population has always been an important issue within the State system for higher education. Equally

TABLE I
 EXAMPLES OF STUDENT DATA FOUND IN
 THE "UNITIZED DATA SYSTEM"

Resident County	1 HEGIS Code	2 Institution (By Semester)	Current Level	3 Program Code
14	1301	110	4	122
24	1301	110	3	122
55	1306	110	2	106
55	1302	111	3	114
67	1303	111	2	50
72	1305	111	2	94
55	1301	120	3	113
37	1303	120	2	146
44	1301	121	3	24
66	1301	122	4	45
76	1384	123	1	51
48	1301	124	4	23
50	1343	124	2	14
16	1301	130	3	390
26	1301	133	4	38
51	1301	140	2	18
39	1301	141	1	22
58	1301	143	1	26
36	1302	144	2	27
72	1301	146	2	11
33	1301	240	2	37
5	1384	243	2	1
60	1305	244	1	102
14	1301	245	2	23
55	1305	246	1	89

- 1 - Standard U.S. codes for Fields of Study.
 1301-1309 represents Home Economics.
 2 - Fall 1987, but any semester may be used.
 3 - Institutional instructional program codes.
 All fall under standard U.S. HEGIS code.

important is locating an adequate number of institutions in areas containing a large pool of potential students (metro-areas). All of this is done with the intent of providing the best and most efficient service possible.

The topic of institutional service areas has been discussed within another document published by the Oklahoma State Regents For Higher Education, "Historical Geographic Service Areas," prepared by Joe E. Hagy. The intention of this report was to "...provide not only a base for determining each institution's geographic service area, but to also provide a practical tool for use in making administrative and policy decisions" (Hagy, 1986, p. 1). The term "Historical" is used in reference to the fact that UDS data on students selecting a particular institution for the years 1981 through 1985 were used.

Hagy identified three types of geographic service areas: those that are designated by law, those defined or perceived by each institution, and those that are currently functioning based on factual data. Hagy's study focused on the third type of geographic service area, factual. Results reflect first-time entering students into either a public or private institution in the State.

The analysis of the data was divided into a variety of parts, the first of which described the service area from the perspective of each county in Oklahoma, with the percentage of its students attending the various State institutions. Also presented were the perspectives on how

each institution serves its region, including the number of students entering each institution from every county, represented as a percentage of the total students that it serves. Results were presented in both map and tabular form.

Service to students by race and gender was also analyzed. In addition, the origins of all students and enrollments on a national and international basis were reported. This type of information may provide the stimulus for future studies on service to students by Oklahoma's system of higher education.

Defining Service Regions

From the total number of institutions who actively report information to the UDS, only the twenty-five institutions currently offering a program in Home Economics in their curriculum were selected for analysis in this study (Table II and Figure 2). The Oklahoma Higher Education Task Force (1987) also used these institutions when conducting their investigation of duplication. All of these institutions are public, and therefore fall under the Oklahoma State Higher Education System.

Since each institution claims to serve its region, it was necessary to define zones for each institution that would represent its regional service area before the analysis could proceed. Once the service regions have been

TABLE II
OKLAHOMA PUBLIC INSTITUTIONS
OF HIGHER EDUCATION

Institution	Location
<u>Comprehensive:</u>	
- University of Oklahoma (OU)	Norman
- Oklahoma State University (OSU)	Stillwater
<u>Four Year:</u>	
- Central State University (CSU)	Edmond
- East Central University (ECU)	Ada
- Northeastern State University (NSU)	Tahlequah
- N.W. Oklahoma St. University (NWOSU)	Alva
- S.E. Oklahoma St. University (SEOSU)	Durant
- S.W. Oklahoma St. University (SWOSU)	Weatherford
- Cameron University (CU)	Lawton
- Langston University (LU)	Langston
- Univ. of Sc. and Arts of Ok. (USAO)	Chickasha
- Oklahoma Panhandle St. Univ. (OPSU)	Goodwell
<u>Two Year:</u>	
- Connors State College (CSC)	Warner
- Eastern Oklahoma St. College (EOSC)	Wilburton
- Murray State College (MSC)	Tishomingo
- N.E. Oklahoma A&M College (NEO)	Miami
- Northern Oklahoma College (NOC)	Tonkawa
- Rogers State College (ROGERS)	Claremore
- Tulsa Junior College (TJC)	Tulsa
- Western Oklahoma St. College (WOSC)	Altus
- El Reno Junior College (ERJC)	El Reno
- Carl Albert Junior College (CAJC)	Poteau
- Seminole Junior College (SJC)	Seminole
- Rose State College (ROSE)	Midwest City
- OKC Community College (OSCC)	OKC

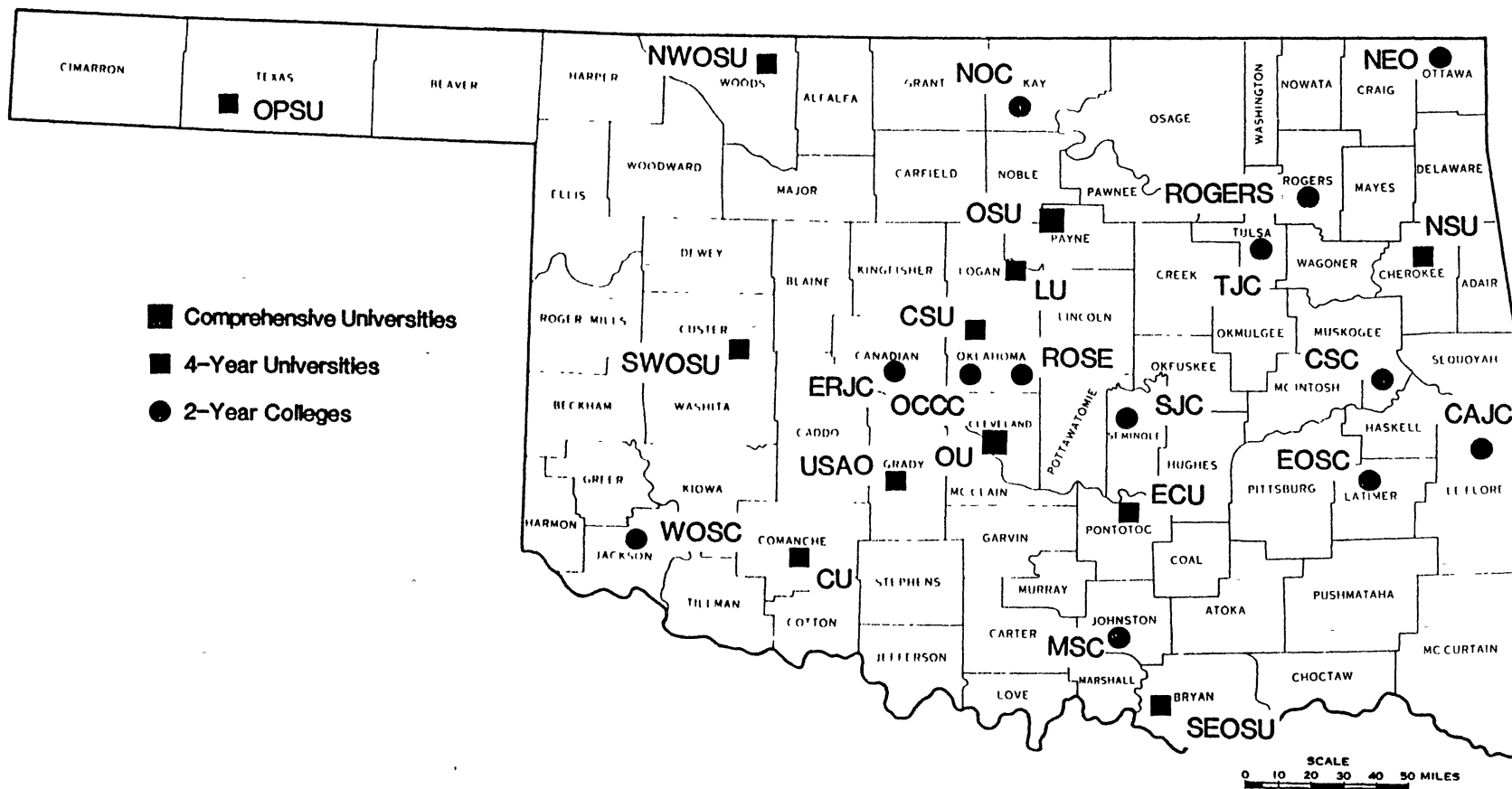


Figure 2. Oklahoma Public Institutions

defined, then the research question--does a specific program at an institution serve its region?--can be answered.

Although the primary reason for the location of each institution is to serve the surrounding population, the extent of the service area will vary depending on the size and type of institution. Those providing only two-year programs, community or junior colleges, are designed primarily to serve the local area. Those offering more than two-year programs should serve a much larger region.

Although the analysis in this study is limited to home economics programs, service regions were developed based on total student enrollments during previous years (1981-1985). This total service perspective provides a base with which individual programs can be compared.

Typically, given an increase in the distance from any institution, there would be a decrease in the number of students being served, in other words, a classic distance/decay situation. To approximate this distance decay relationship, both primary and secondary zones of service were established for each institution. The primary zone for a particular institution is comprised of any county which sends at least half of its college bound students to that institution, as reported in the Oklahoma State Regents "Historical Geographic Service Areas" report (1986). The county of location for each institution was automatically assigned to its primary zone.

The method for establishing the secondary zones is

based on radial limits defined by the Oklahoma Higher Education Task Force document (1987) in their investigation of possible duplication of programs in the State's higher education system. The task force used limits of a 100 mile radius for comprehensive universities (OU and OSU), a 50 mile radius for four year senior universities, and a 25 mile radius for community and junior colleges to reflect the drawing power of different types of institutions.

For each institution, any county falling within its radial limit was assigned to the secondary zone, unless it was already assigned to the primary zone. In instances when a county did not completely fall within the radius, it was included in the secondary region if either more than half of the county, or the majority of the county's population fell within the zone. County units were used because of their ease of analysis and presentation, as well as their being the basic units in previous studies of higher education in Oklahoma (See Appendix for maps of service regions).

Noncompetitive and Competitive approaches

Using these definitions of service regions, an individual county could fall in the primary and secondary zones of several institutions. With the exception of Oklahoma County, which encompasses most of the Oklahoma City metropolitan area, no other county fell within more than one primary zone. Well over half of the counties in Oklahoma

involve overlapping secondary zone assignments.

For counties falling in more than one service region, the expected attendance pattern of students was estimated based on two assumptions about the relative attraction of each competing institution. Total enrollment figures (1986-1987) for each institution involved (OSRHE, 1987) were used as a rough approximation of drawing power to estimate what fraction of the enrollments from a county could be reasonably expected to attend each of the institutions serving the region. Thus, an institution with 20,000 students should attract twice as many majors as one with only 10,000 students.

In some cases, the county in question fell within the primary zone for one or more of the competing institutions. If the county is primary for one institution, then its attraction to students should be greater than that of another institution for which the county is assigned to a secondary zone. It seems logical that such institutions would have an advantage in drawing power over more distant competitors. This idea was operationalized by doubling the drawing power of institution(s) within their primary county.

With the service regions defined for each institution, UDS data for the fall semester of 1987 was analyzed to see how well home economic programs at each institution actually served their regional students. A computer model was developed to perform the necessary calculations.

Two sets of results were obtained from this analysis.

First, how well is the institution actually servicing its regional students, and second, to what extent does the college depend on its region for students? Service is analyzed using both the noncompetitive (no division of counties between institutional service regions), and the competitive approaches. This method of analysis has been designed so that it may also be applied to other degree programs within Oklahoma's System For Higher Education. In the chapter which follows the results of the analysis are presented and summarized.

CHAPTER IV

RESULTS OF ANALYSIS

Results from the analysis will be broken down and discussed in two parts: (1) the service being provided by each institution to students from its designated region, and (2) the extent to which each individual institution depends on students from its region. Although this study uses home economics majors for the analysis, the method could be used for any major program. The results for both the service provided and institutional dependence during the Fall semester of 1987 will be discussed and dealt with in terms of the type, and location of each institution. Table III gives a general synopsis of the total number of home economics majors enrolled at each institution during the Fall semester of 1987. As would be expected, most of the larger institutions (i.e. comprehensive and other four-year) possessed more of the home economics majors than the smaller two-year institutions.

Service to Regional Majors

The services provided by institutions have been measured in two different ways. First, The amount of service being provided was calculated using a noncompetitive

TABLE III
 PERCENTAGE OF OKLAHOMA HOME ECONOMIC MAJORS
 AT EACH INSTITUTION: FALL 1987

College	Location	Number of Majors	Percent of Majors
<u>Comprehensive Universities:</u>			
OU	- Norman	262	18.0
OSU	- Stillwater	511	35.2
<u>Four-Year Regional Universities:</u>			
CSU	- Edmond	169	11.6
ECU	- Ada	65	4.5
NSU	- Tahlequah	72	5.0
NWOSU	- Alva	25	1.7
SEOSU	- Durant	53	3.7
SWOSU	- Weatherford	51	3.5
CU	- Lawton	38	2.6
LU	- Langston	10	0.7
USAO	- Chickasha	20	1.4
OPSU	- Goodwell	17	1.2
<u>Two-Year Regional Universities:</u>			
CSC	- Warner	6	0.4
EOSC	- Wilburton	7	0.5
MSC	- Tishomingo	5	0.3
NEO	- Miami	14	1.0
NOC	- Tonkawa	13	0.9
ROGERS	- Claremore	1	<0.1
TJC	- Tulsa	2	0.1
WOSC	- Altus	2	0.1
ERJC	- El Reno	0	0.0
CAJC	- Poteau	4	0.3
SJC	- Seminole	2	0.1
ROSE	- Midwest City	87	6.0
OCCC	- OKC	15	1.0
Total		- 1452	100%

premise which treats each institution as if it were isolated from the others. If isolated, and assuming all programs were of equal quality, all of the home economics majors within its region could be expected to attend that institution. This establishes a maximum value for potential service for each institution. But since most of the institutional service regions overlap with one or more of the others, this approach involves a considerable amount of double counting of students, as majors would be expected to attend each of the institutions that service their home region. The Oklahoma City metro area, for instance, falls within the service region of seven different institutions.

The second measurement introduces a competitive factor. As mentioned in Chapter IV, students from counties falling within more than one institutional service region would be proportionally divided among the competing institutions. The drawing power for the home economics majors would vary according to the zone (primary or secondary) and the total student enrollment for each institution as a whole. For example, the home economics majors from Oklahoma County were apportioned as followed: OU (14%), OSU (14%), CSU (20%), LU (2%), USAO (1%), ERJC (2%), ROSE (24%), and OCCC (23%).

The competitive approach, by reducing the estimated total number of home economics majors available to each institution, gives a more realistic picture on how well each is serving majors from its region. Tables IV and V summarize the number of home economics majors and compares

the actual with the potential number of majors by primary and secondary regions. Circle sizes in Figures 3 through 5 are proportional to the number of home economics students expected, and the shaded area represents the percentage of the expected that were served.

Comprehensive Institutions

When looking at the service provided by the State's two largest universities, using the non-competitive approach, The University of Oklahoma (OU) and Oklahoma State University (OSU) both served over 50% (Figure 3A and Table IV) of their primary zones. In terms of their secondary regions, OSU led the State with a 35% level of service, while OU dropped to 16%. Table IV shows that 81% of OU's and 63% of OSU's regional home economics majors either left the region, or attended another institution that shares the same region.

Figure 3B and Table V present the results based on the competitive approach. OSU actually served over 100% of the expected students from both its the primary and secondary zones (Table V) which is not surprizing considering its established reputation in the field of Home Economics. OU served over 100% of its primary zone but attracted only about half of its secondary zone potential (Table V). Overall, OSU's home economics program outperformed its competition and attracted more students than predicted, while OU did a reasonably good job of providing service to

TABLE IV

NON-COMPETITIVE SERVICE TO REGIONAL
HOME ECONOMICS MAJORS; FALL 1987

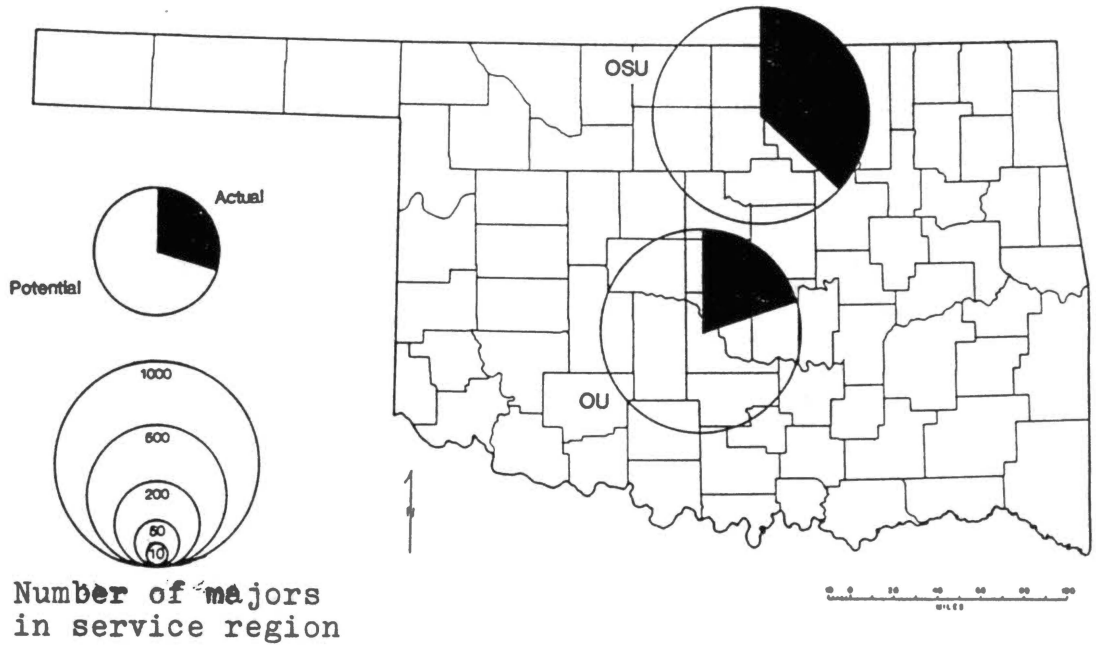
<u>College</u>	<u>Primary Region</u>			<u>Secondary Region</u>			<u>Unservd Potential Majors</u>	
	Number	Expected	%	Number	Expected	%	Number	%
<u>Comp:</u>								
OU	50	93	54	146	913	16	810	81
OSU	45	55	82	370	1057	35	697	63
<u>4-Year:</u>								
CSU	125	417	30	17	213	8	488	77
ECU	16	22	73	36	212	17	182	78
NSU	19	23	83	41	273	15	236	80
NWOSU	14	22	64	6	60	10	62	76
SEOSU	20	22	91	22	71	31	49	54
SWOSU	21	33	60	13	76	17	75	69
CU	28	40	70	7	78	9	83	70
LU	0	8	0	2	582	<1	588	>99
USAO	15	28	54	5	620	<1	628	97
OPSU	15	25	60	0	8	0	18	55
<u>2-Year:</u>								
CSC	2	25	8	1	11	9	33	92
EOSC	5	28	18	1	20	5	42	88
MSC	3	21	14	1	50	2	67	94
NEO	7	33	21	0	0	0	26	79
NOC	8	36	22	3	50	6	75	87
ROGERS	1	25	4	0	204	0	228	>99
TJC	1	174	1	1	56	2	228	99
WOSC	1	7	14	1	14	7	19	90
ERJC	0	29	0	0	436	0	465	100
CAJC	2	9	22	2	25	8	30	88
SJC	0	12	0	0	20	0	32	100
ROSE	69	406	17	14	117	12	440	84
OCCC	10	500	2	4	133	3	619	98

TABLE V
 COMPETITIVE SERVICE TO REGIONAL HOME
 ECONOMICS MAJORS; FALL 1987

College	Primary Region			Secondary Region			Unserviced Potential Majors	
	Number	Expected	%	Number	Expected	%	Number	%
<u>Comp:</u>								
OU	50	34	149	146	275	53	113	37
OSU	45	24	186	370	287	129	-104	**
<u>4-Year:</u>								
CSU	125	83	151	17	32	53	-27	**
ECU	16	4	404	36	17	218	-31	**
NSU	19	23	83	41	43	96	4	6
NWOSU	14	17	82	6	16	38	13	39
SEOSU	20	18	111	22	21	105	-3	**
SWOSU	21	12	176	13	15	89	-7	**
CU	28	17	162	7	21	34	3	8
LU	0	1	0	2	20	10	19	90
USAO	15	2	893	5	11	47	-8	**
OPSU	15	25	60	0	8	0	18	55
<u>2-Year:</u>								
CSC	2	4	50	1	2	62	3	50
EOSC	5	12	42	1	5	18	11	65
MSC	3	3	100	1	5	19	4	50
NEO	7	25	28	0	0	0	25	72
NOC	8	8	100	3	4	73	1	11
ROGERS	1	5	20	0	16	0	20	95
TJC	1	108	<1	1	25	4	131	99
WOSC	1	4	25	1	3	31	5	71
ERJC	0	2	0	0	10	0	12	100
CAJC	2	9	22	2	8	26	13	76
SJC	0	1	0	0	1	0	2	100
ROSE	69	100	69	14	18	77	35	30
OSCC	10	95	11	4	20	20	101	88

** Negative values represent institutions serving more than the expected number of home economics majors.

A. Without Competition



B. With Competition

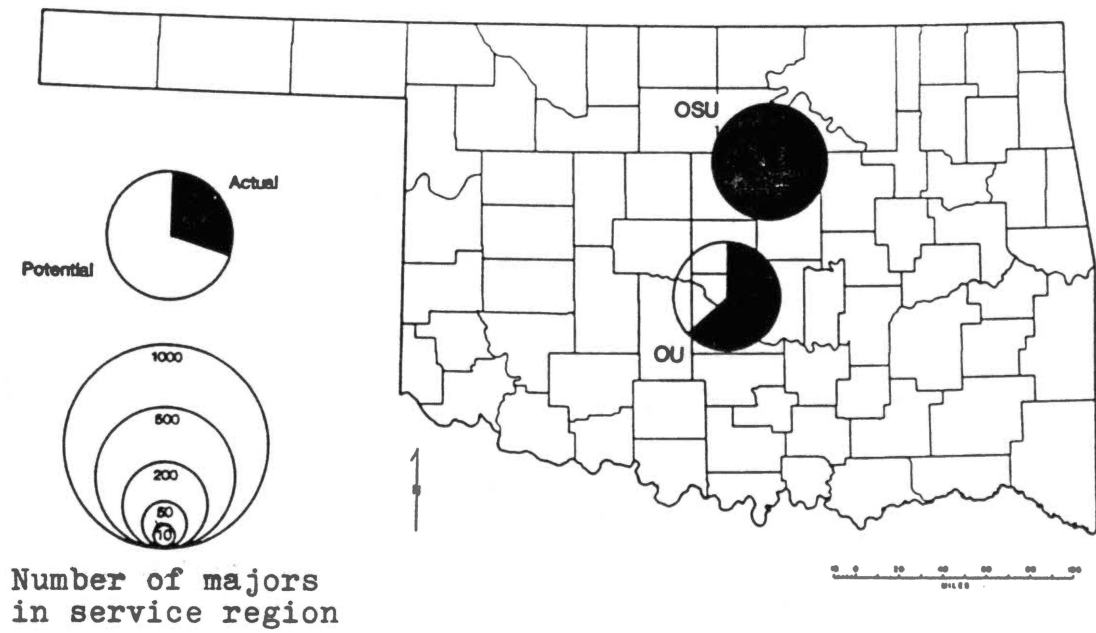
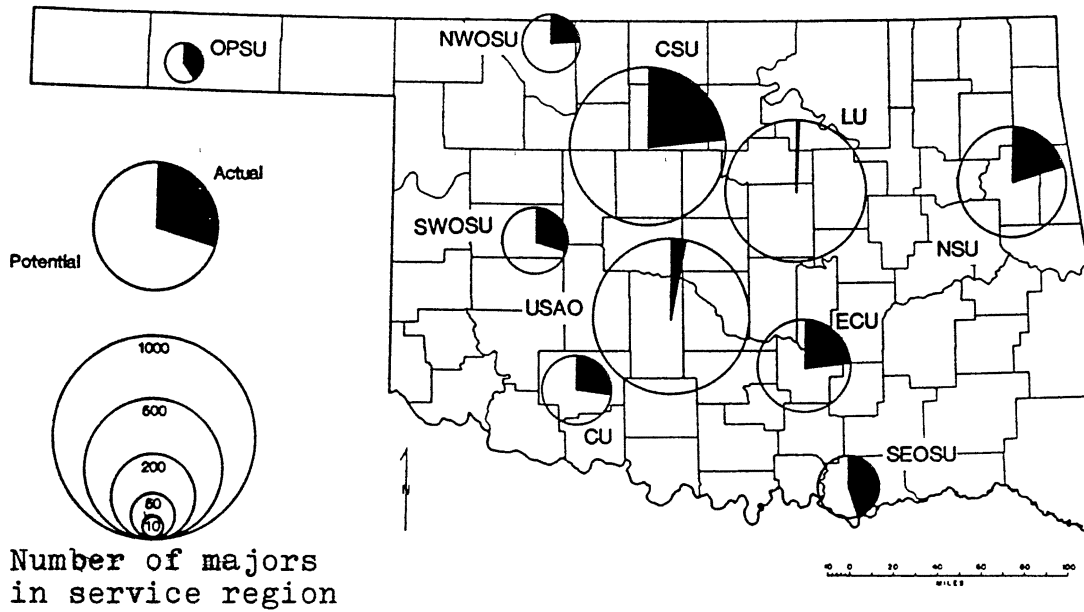


Figure 3. Home Economics Majors Served by Comprehensive Universities in Oklahoma

A. Without Competition



B. With Competition

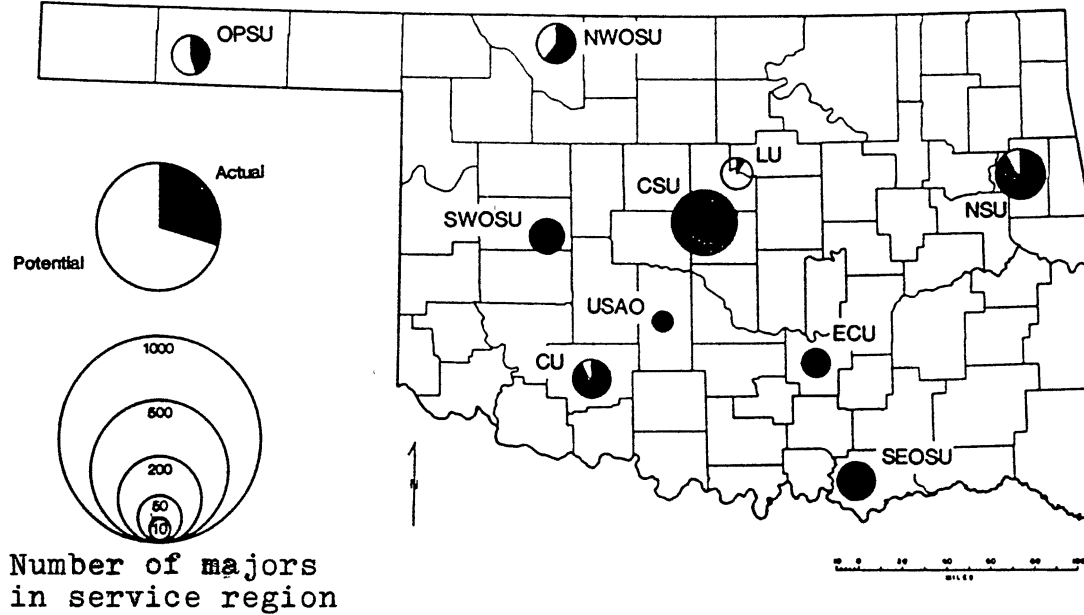
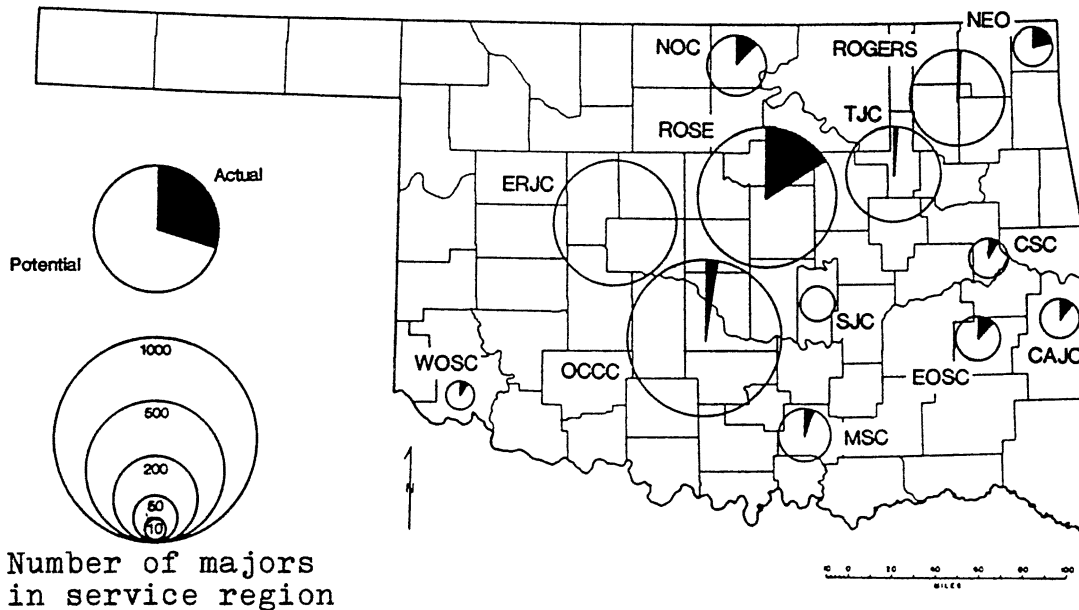


Figure 4. Home Economics Majors Served by Four-Year Regional Universities in Oklahoma

A. Without Competition



B. With Competition

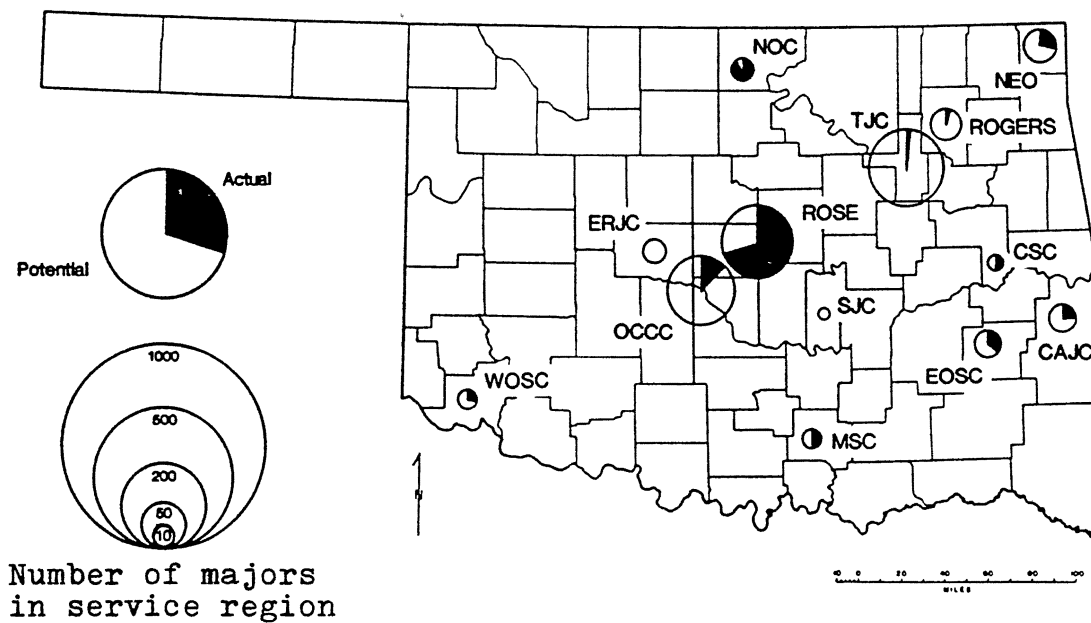


Figure 5. Home Economics Majors Served by Two-Year Institutions in Oklahoma

home economic majors within its region.

Four-Year Institutions

For the other four-year institutions, using the non-competitive assumption, the level of service at Southeastern (SEOSU) and Panhandle State (OPSU) is similar to that at OSU, while most of the others are approximately the same as at OU (Figure 4A). Only Chickasha (USAO) and Langston (LU) appear to serve an insignificant share of their regional students.

The competitive approach revealed that most of the institutions are serving about as many students as could be realistically expected to attend given the alternative opportunities (Figure 4B). Only Langston clearly fails to attract regional home economics majors, while the level of regional service at Northwestern (NWOSU) and Panhandle State lags behind the rest of the colleges.

Based on the method established for measuring institutional service, results for Langston (LU) may be somewhat distorted because of its special status as an institution with a traditional role of serving Oklahoma's black population. To expect Langston to attract home economics majors from all races may be an unfair assumption.

Two-Year Institutions

Using the noncompetitive approach, the level of service provided by Oklahoma's two-year institutions was very low,

the highest being Rose State (ROSE) which served around 17% of its potential majors (Table IV and Figure 5A).

The competitive approach increased Rose State's level of service to around 70% of its expected regional home economics majors, but other metro area schools showed little improvement (Table V and Figure 5B). Of the non-metro institutions, only Tonkawa (NOC) attracted about as many home economic students as would be expected given its regional competition. Most appear to serve fewer than one-third of their regional home economics majors. Except for Rose State, none of the other two-year institutions had more than 15 majors, making the percentage figures somewhat misleading.

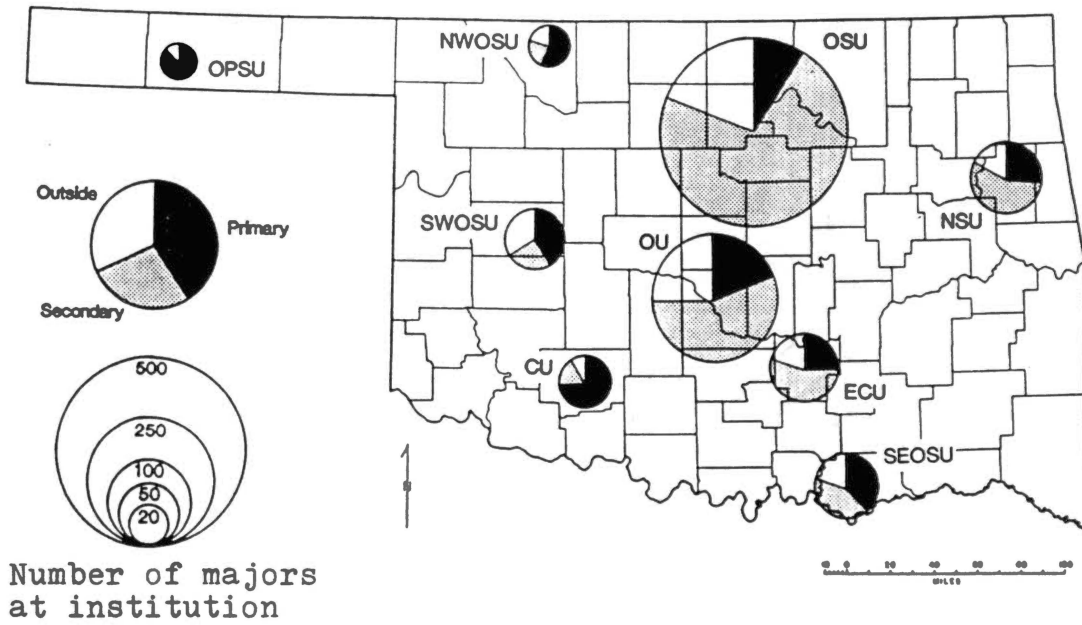
Dependence on Regional Majors

Comprehensive Institutions

Results for OU and OSU are similar in terms of dependence on their regions for their home economic majors (Table VI and Figure 6). As comprehensive universities, both are less dependent on their primary regions, and both draw fairly large numbers of their home economics majors from outside of their regions when compared with other schools. As comprehensive universities, it would be expected that each would attract majors from considerable distances.

TABLE VI
 DEPENDENCE ON REGIONAL HOME
 ECONOMICS MAJORS; FALL 1987

<u>College</u>	<u>Primary Region</u>		<u>Secondary Region</u>		<u>Outside Majors</u>	
	Number	%	Number	%	Number	%
<u>Comp:</u>						
OU	50	19	146	56	66	25
OSU	45	9	370	72	96	19
<u>4-Year:</u>						
CSU	125	74	17	10	27	16
ECU	16	25	36	55	13	20
NSU	19	26	41	57	12	17
NWOSU	14	56	6	24	5	20
SEOSU	20	38	22	42	11	21
SWOSU	21	41	13	25	17	33
CU	28	74	7	18	3	8
LU	0	0	2	20	8	80
USAO	15	75	5	25	0	0
OPUS	15	88	0	0	2	12
<u>2-Year:</u>						
CSC	2	33	1	17	3	50
EOSC	5	71	1	14	1	14
MSC	3	60	1	20	1	20
NEO	7	50	0	0	7	50
NOC	8	62	3	23	2	15
ROGERS	1	100	0	0	0	0
TJC	1	50	1	50	0	0
WOSC	1	50	1	50	0	0
ERJC	0	0	0	0	0	0
CAJC	2	50	2	50	0	0
SJC	0	0	0	0	2	100
ROSE	69	79	14	16	4	5
OCCC	10	67	4	27	1	7



Note:

For cartographic reasons, two maps are used to display all the schools. Some of the Oklahoma City area institutions are not centered in relation to their exact positions due to the various circle sizes.

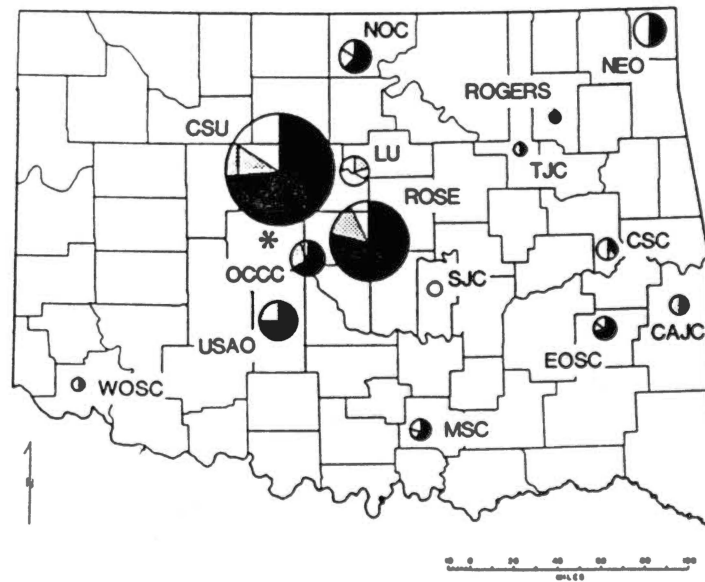


Figure 6. Dependence on the Service Region by Institutions for Home Economics Majors, in Oklahoma

Four-Year Institutions

Several types are evident among the State's four-year senior institutions. The home economics programs at East Central (ECU) and Northeastern State (NSU) are similar in terms of their dependence on majors from their respective regions. Each drew approximately 25% of its students from its primary zone and less than 20% from outside of the region (Figure 6 and Table VI). In contrast the home economic programs at Northwestern (NWOSU), Southeastern (SEOSU) and Southwestern (SWOSU) depend on their primary regions for about 40% to 60% of their majors (Figure 6). Southwestern attracted a higher percentage of home economics majors from outside of its region than did any other of the four-year institutions (Table VI).

The other four-year institutions were highly dependent on their regions for home economics majors. Both Cameron (CU) and Chickasha (USAO) draw 75% of their majors from the primary zone; neither draws many students from outside of its zone (Table VI).

Central State (CSU), located in the Oklahoma City metro-area, with the third largest number of home economics majors at 169, attracted 75% of its majors from its primary zone, 10% from its secondary zone (Table VI), and only 16% from outside of its service region (Table VI). Panhandle State (OPSU), with its extreme isolation in the Oklahoma Panhandle, is highly dependent on its primary region for

home economics students, and draws few students from outside.

The last of the four-year institutions, Langston (LU), had very few home economics majors, and most of those came from outside of its region.

Two-Year Institutions

Of the two-year State institutions, only Rose State (ROSE) attracted more than 15 home economics majors, and it depended on its region for 95% of its students, with nearly 80% coming from Oklahoma County. In general the other two-year programs were very dependent on students from their primary zones.

Thus with the exception of the State's two comprehensive universities, the University of Oklahoma and Oklahoma State University, the other institutions tended to be highly dependent on students from their region, with little attraction for outside students. Although some may serve as many as could be expected, the very size of many programs raises questions as to the quality of the service provided.

CHAPTER V

SUMMARY, CONCLUSIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Summary

The objective of this research was to develop and test a method that would spatially analyze and help to identify areas of potential duplication among academic degree programs. Identifying redundant programs that could eventually be phased out would allow the State to appropriate its financial resources much more efficiently. The academic program of home economics was chosen for analysis. It was hypothesized that unnecessary duplication exists among the State's home economics programs, and in terms of service, some of these programs show a lack of need based on enrollments.

Detailed data on State home economics majors were provided by the Oklahoma State Regents For Higher Education and used in testing the method developed. Primary and secondary service regions were defined for each institution. Service provided by each institution to students from its designated region, as well as the dependence each institution has on its region for students, was calculated.

Service was analyzed from both an absolute (non-

competitive) and relative (competitive) perspective. The absolute approach treated each institution in isolation as if it were expected to serve all of the students from its defined region. The competitive approach involved the proportional allocation of home economics majors from counties served by more than one institution. Low enrollments of home economics majors at an institution within a region not only indicates a lack of demand for the program, but may indicate a lack of quality as well, and certainly suggests a possible case of unnecessary program duplication in home economics among the various State institutions.

Conclusion

The two comprehensive universities, The University of Oklahoma (OU) and Oklahoma State University (OSU), served their regions well based on the competitive approach, with OSU actually serving more than its expected number of students. Both home economics programs appear to be sound in terms of what would be expected. With the exception of Langston University (LU), most of the other four-year institutions served a reasonable number of home economic majors given the competition. Northwestern (NWOSU) and Panhandle State (OPSU), which are more isolated in the northwestern part of the State, did not do as well as the others, serving only about half of the expected number of students.

The State's two-year institutional home economics programs did not serve their designated regions well. The noncompetitive approach showed that not a single program served over 20% of its regional students, and only two institutions, Rose State (ROSE) and Tonkawa (NOC), served a reasonable proportion of the expected majors given the competition. The other two-year institutions served no more than half of the expected home economics majors. Even Tulsa Junior College (TJC), located in a metropolitan area, served only a small fraction of its regional home economic majors.

With the exception of OU and OSU, home economics programs at most of the four-year institutions were highly dependent on their service regions for majors. As expected, those located in areas with large populations, such as Central State (CSU) and Cameron (CU), were much more dependent on their primary zones for students. Panhandle State (OPSU) drew majors from only its primary zone and Langston (LU) only from its secondary. The other four-year institutions drew about 20% of their home economics majors from outside of their respective regions.

Most of the two-year institutions were very dependent on their regions and attracted few majors from outside. Those located in the Oklahoma City metro-area showed a heavy dependence for majors from their primary zone.

With the exception of Langston University, all of the home economic programs at the state four-year institutions serve a reasonable number of the expected majors. The

program at Langston would appear to be redundant given its location and the surrounding competition for home economics majors.

Duplication of unnecessary programs among the State's two-year institutions appears to be much more severe, especially within the two large metro-areas. In Oklahoma City, neither El Reno (ERJC) or Oklahoma City Community College (OCCC) seem to be providing the service that would be expected. In Tulsa, surprisingly, neither Tulsa Junior College (TJC) or Rogers State College (ROGERS) served more than two home economics majors. Overall, it seems as if most of the State's two-year institutions have problems attracting viable numbers of home economics majors into their programs.

Suggestions

In a time of declining resources and soaring costs, it would seem unwise to justify funding duplicate academic programs with small enrollments. This is especially true for any institution with programs that serves its region poorly, since serving that region is the justification for the very existence of most institutions. There appears to be ample opportunity for Oklahoma's system of higher education to improve its efficiency, and reduce costs by phasing out some home economics programs without greatly affecting the accessibility to such programs for most college bound students. Other alternatives besides closure

include the intra-institutional absorbing of portions of programs, or possibly merging a program with that at another institution serving the same geographic area, especially metropolitan area institutions.

Although this research was limited to the academic program of home economics, its design can be applied to other programs offered by the State's various institutions. It would appear that in some cases, this methodology could be applied to other problems outside of higher education. For example, if data were available or could be collected, the service provided to designated neighborhoods by chain stores (i.e. convenience, auto parts) could be analyzed. This could be done on a local basis (city) where results may indicate which stores are actually providing the service that would be expected, and to what extent each depends on its local area for customers. Another example might include applying this methodology to the service being provided by rural hospitals (i.e. county, small town) to the areas they have been designed to serve. This is another issue, other than education, where the State could improve efficiency and reduce financial costs if some changes were to be made.

BIBLIOGRAPHY

- Alaska State Commission on Postsecondary Education. 1985. Review of the University of Alaska FY 1987 Operating and Capital Budgets. Juneau: December, 130p.
- Astin, Alexander W., Kenneth C. Green, and William S. Korn. 1987. The American Freshman: Twenty Year Trends 1966-1985. Los Angeles: American Council on Education at the Univ. of California.
- Barak, Robert J. 1975. A Survey of State-Level Academic Program Review Policies and Procedures for Higher Education. Iowa State Board of Regents, Des Moines: February, 77p.
- Barak, Robert J. 1984. State Level Academic Program Review and Approval: 1984 Update. State Higher Education Executive Officers Association, Denver: March, 26p.
- Barak, Robert J., and Richard I. Miller. 1986. Undergraduate Academic Program Review and Evaluation at the State Level. Association for Institutional Research Presentation, Orlando: June 22-25, 22p.
- Becher, Roy Antony. 1982. "Planning Study and Research Programmes in the Context of Budget Restrictions and Societal Changes." International Journal of Institutional Management in Higher Education, v6, n3, November: p231-37.
- Brush, John E. 1953. "The Hierarchy of Central Places in Southwestern Wisconsin." The Geographical Review. New York: American Geographical Society, 43, 3.
- Cargol, Owen F. 1983. State-Level Agencies, the Curriculum, and Program Duplication. Ed. ERIC Clearinghouse on Higher Education. Washington D.C.: AAHE March.
- Chronicle of Higher Education. 1980. "58 Degree Programs to Be Eliminated at Louisiana's Public Universities." Chronicle of Higher Education: 1p.
- Cohen, Authur M. 1987. "Contemporary Issues in Community

- Colleges: A Synopsis." Trends and Issues in Education. Ed. ERIC Clearing House for Junior Colleges. Los Angeles: January, 23p.
- Crosson, Patricia H. 1983. "The Pennsylvania Postsecondary Education System: Coping with Enrollment and Resource Declines." Journal of Higher Education, v54, n5, (Sep-Oct): p533-51.
- Davis, Michael W. 1984. "Restructuring a College education." AGB Reports, v26, n3, (May-June): p8-14.
- Davis, Carolyn K., and Edward A. Dougherty. 1979. "Guidelines for Program Discontinuance." Educational Record, v60, (Winter): p68-77.
- Dougherty, Edward A. 1981a. "Evaluating and Discontinuing Programs." Challenges of Retrenchment, Ed. James R. Mingle. San Fransisco-Washington-London: Jossey-Bass, p69-87.
- Dougherty, Edward A. 1981b. "Should You Starve all Programs or Eliminate a Few?" New Directions for Institutional Research, v8, n2: p9-23.
- Dollar, D. O. 1983. "A Study of the Relationships Between Marketing Orientations and Enrollments at Selected Community, Junior and Technical Colleges." Diss. Oklahoma State University.
- Dzierlenga, Donna Wells. 1981. "Employer Needs Assessment for Program Planning." Community / Junior College Research Quarterly, v5, n2, (Jan-Mar): p202-07.
- Fairweather, M. 1974. "The University of Oklahoma and Oklahoma State University: A Factorial-Spatial Analysis of Their Undergraduate Distributions." Diss. Oklahoma State University.
- Floyd, Carol Everly. 1982. State planning, Budgeting, and Accountability: Approaches for Higher Education. Ed. ERIC Clearing House on Higher Education. Washington D.C.: AAHE, n6.
- Getis, Arthur, and Barry Boots. 1978. Models in Spatial Processes: An Approach to the Study of Point, Line Area Patterns. London: Cambridge University Press.
- Hagy, Joe E. 1986. Historical Geographic Service Areas: A Report on Institution Selection by Students in Oklahoma Higher Education, 1981-1985, and Origin of Enrollments, Fall 1984. Planning and Policy Research Division, Oklahoma City: Oklahoma State Regents for Higher

Education, June.

- Hammond, Martine F., et al. 1987. Mandated Program Review and Program Discontinuance: Qualitative vs. Quantitative Standards. ASHE 1987 Annual Meeting Paper, San Diego: February 14-17, 37p.
- Hossler, Don. 1984. Enrollment Management: An Integrated Approach. New York: College Entrance Exam Board.
- Illinois Community College Board. 1987. Fiscal Year 1987 Program Review Summary Report. Springfield: December, 8p.
- Jencks, Christopher, and David Riesman. 1987. The Academic Revolution. Chicago and London: Univ. of Chicago Press.
- Jenny, Hans H. 1976. Higher Education and the Economy. Ed. ERIC Clearing House on Higher Education. Washington D.C.: AAHE, no. 2.
- Johnson, Lynn. 1986. "The Requirements for Effective College and University Involvement." The Higher Education-Economic Development Connection. Ed. American Association of State Colleges and Universities. Washington D.C.: AASCU, p43-56.
- Kaplan, Michael H. 1982. An Investigation of Selected Community School Terminations. Mid-Atlantic Center for Community Education, Charlottesville: Virginia Univ., September, 50p.
- Keohane, Kevin. 1984. "Case Study of a Merger in Higher Education." International Journal of Institutional Management in Higher Education, v8, n3: p211-17.
- Kintzer, Fredrick C., and James L. Wattenbarger. 1985. The Articulation / Transfer Phenomenon: Patterns and Directions. Washington D.C.: AACJC / NCHE.
- Lincoln, Yvonna S., and Jane Tuttle. 1983. Centrality as a Prior Criterion. Paper Presented to the Joint Meeting of the Association for the Study of Higher Education and the American Educational Research Association, San Francisco: October 19-21, 15p.
- Long, James P., et al. 1983. How to Phase Out a Program. National Center for Research in Vocational Education, Columbus: Ohio State Univ., 46p.
- Mason, Thomas R. 1984. The Search for Quality in the Face of Retrenchment: Planning for Program Consolidation

- within Resource Capacities. 19th Annual International Conference of the Society for College and University Planning, Cambridge: July 10, 27p.
- McConnell, H. 1965. "Spatial Variability of College Enrollment as a Function of Migration Potential." Professional Geographer v17, (November): 29-37.
- Melchiori, Gerlinda S. 1982. Planning for Program Discontinuance: From Default to Design. ERIC Clearing House on Higher Education. Washington D.C.: AAHE, no. 5.
- Mortimer, Kenneth P., and Michael L. Tierney. 1979. The Three 'R's' of the Eighties: Reduction, Reallocation and Retrenchment. ERIC Clearing House on Higher Education. Washington D.C.: AAHE: no. 4.
- Moryadas, Lowe. 1975. The Geography of Movement. Atlanta and Dallas: Houghton Mifflin.
- Nielsen, Richard P. 1981. "Evaluating Market Opportunities for Academic Programs with a Program-Employment Opportunities-Competing Institutions Index." College and University, v56, n2: p178-82.
- Oklahoma Higher Education Task Force. 1987. Oklahoma's Secret Crisis: Report to the Governor of the State of Oklahoma and Members of the Oklahoma Legislature. Oklahoma City: Wolf, January 1.
- Oklahoma State Regents for Higher Education. 1987. Student Data Report: Oklahoma Higher Education, 1986-87. Oklahoma City: Oklahoma State Regents for Higher Education.
- Ottinger, Cecilia A. 1984. 1984-85 Fact Book on Higher Education. American Council on Education. New York: Macmillan.
- Pappas, Alceste T., et al. 1988. Methodology for Identifying Unnecessary Program Duplication. Draft Presented to the Iowa State Board of Regents. Peat Marwick Main & Co. New York: August, 32p.
- Patterson, Lewis D. 1979. Survival Through Interdependence: Assessing the Cost and Benefits of Interinstitutional Cooperation. Ed. ERIC Clearinghouse on Higher Education. Washington D.C.: AAHE, no. 10.
- Pifer, Alan, et al. 1978. Systems of Higher Education: United States. New York: International Council for Higher Educational Development.

President's Report in Response to the Governor's Request on

Reducing the Scope of the University of Wisconsin System. 1975. Board of Regents, Madison: Wisconsin Univ., April 18, 103p.

Radner, Roy, et al. 1975. Demand and Supply in U.S. Higher Education. New York: McGraw.

Ruddock, Maryann Steele. 1982. Assessing the Impact of Discontinuing a Program. 22nd Annual Forum of the Association for Institutional Research, Denver: May 16-19, 19p.

Skinner, Patricia, and Jonathan Tafel. 1986. "Promoting Excellence in Undergraduate Education in Ohio." Journal of Higher Education, v57, n1, (Jan-Feb): p93-105.

Smith, Donald K. 1980. Preparing for a Decade of Enrollment Decline: The Experience of the University of Wisconsin System. Legislative Work Conference of the Southern Regional Education Board, Atlanta: 9p.

"Tight Budgets and Changing Educational Needs." 1984. OECD Observer n128, May: p24-29.

Tuckman, Howard P., and W. Scott Ford. 1972. The Demand For Higher Education: A Florida Case Study. Lexington: D. C. Heath and Co.

Volkwein, J. Fredericks. 1984. "Responding to Financial Retrenchment: Lessons From the Albany Experience." Journal of Higher Education, v55, n3, (May-June): p389-401.

Willingham, Warren W. 1972. The No. 2 Access Problem: Transfer to The Upper Division. Ed. ERIC Clearing House on Higher Education. Washington D.C.: AAHE, n4.

Wilson, Robin. 1987. "Critics Tell House Panel that Colleges Waste Money on Overpaid Professors and Duplicate Programs." Chronicle of Higher Education, v34, n4: pA1, 26-27.

Yunker, John. 1983. Post-Secondary Vocational Education at Minnesota's Area Vocational-Technical Institutes. Minnesota State Office of the Legislative Auditor, St. Paul. Program Evaluation Div.: 133p.

APPENDIX

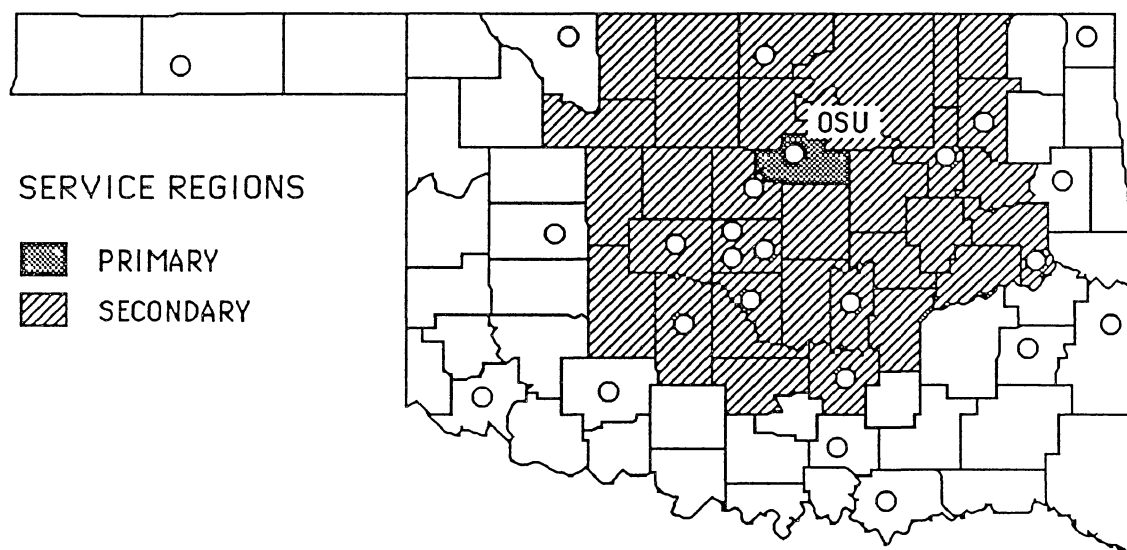
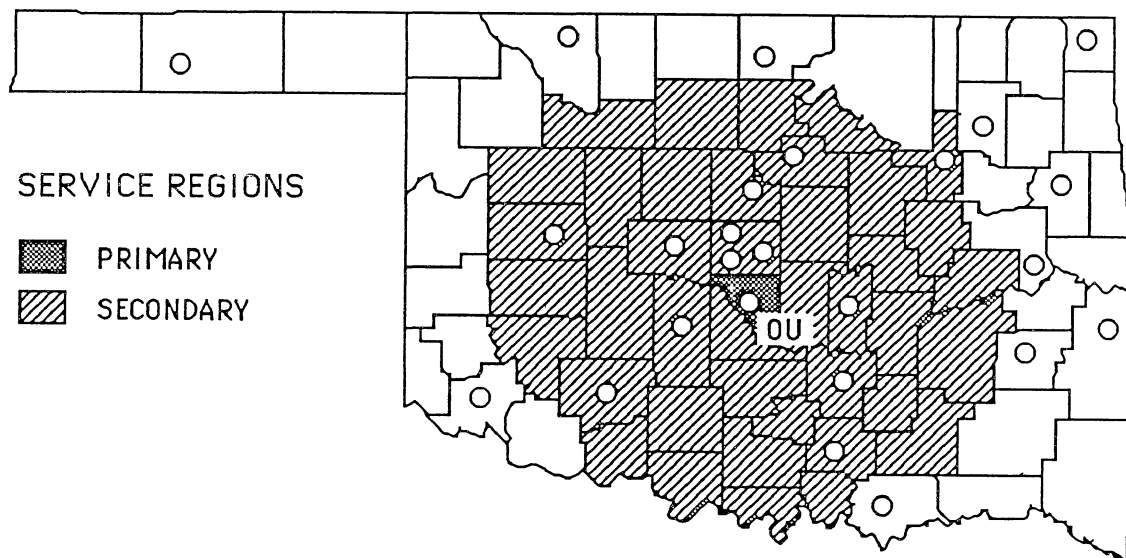
PRIMARY AND SECONDARY SERVICE REGIONS
BY INSTITUTION AND COUNTIES

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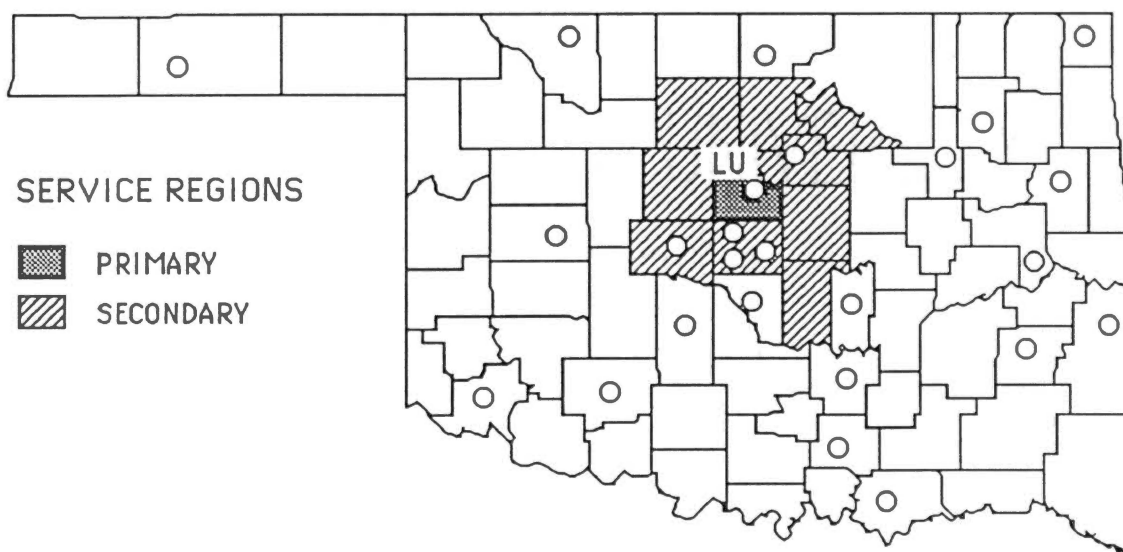
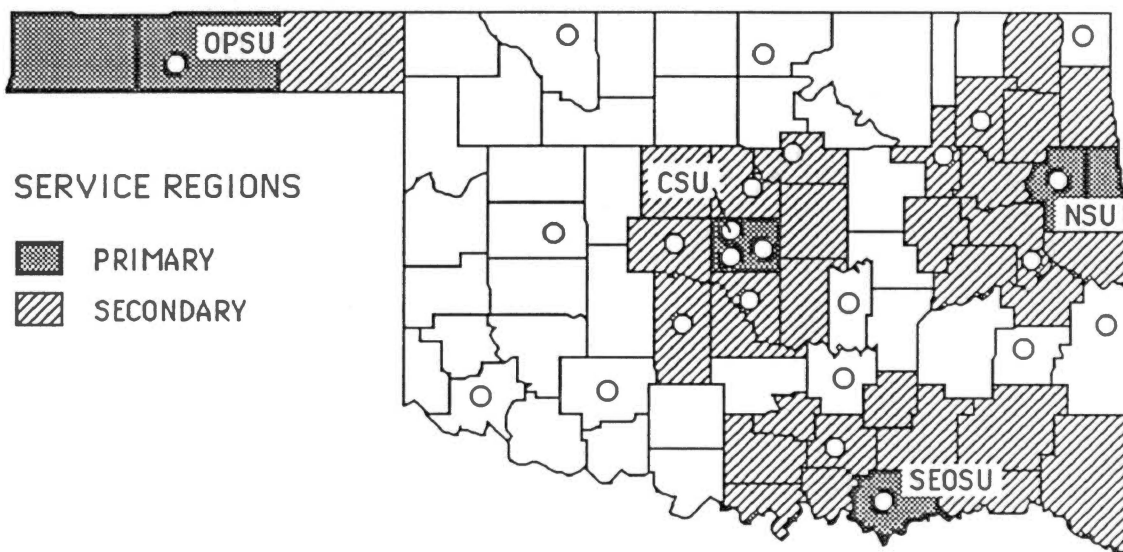
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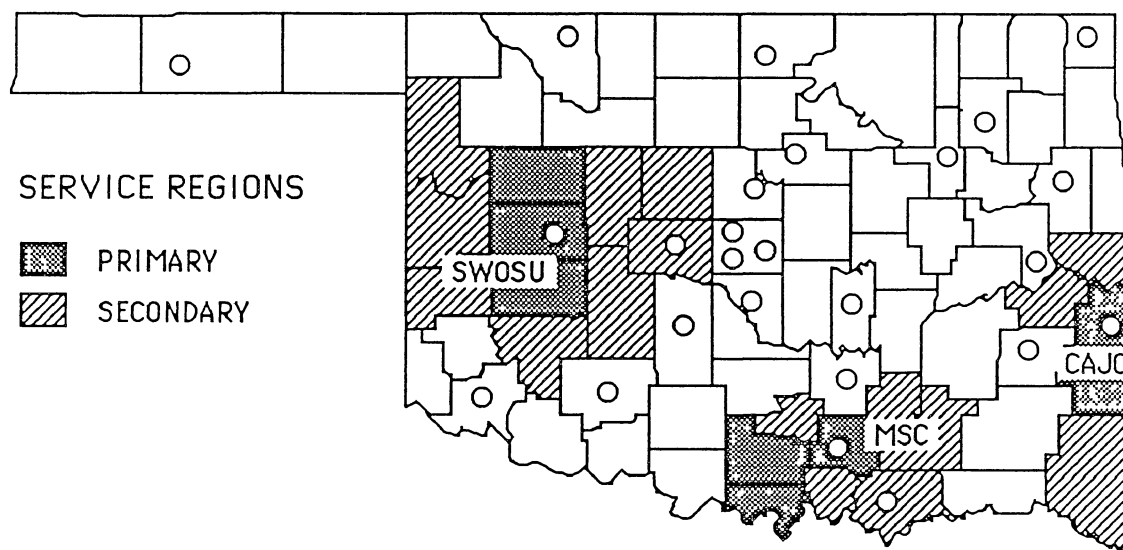
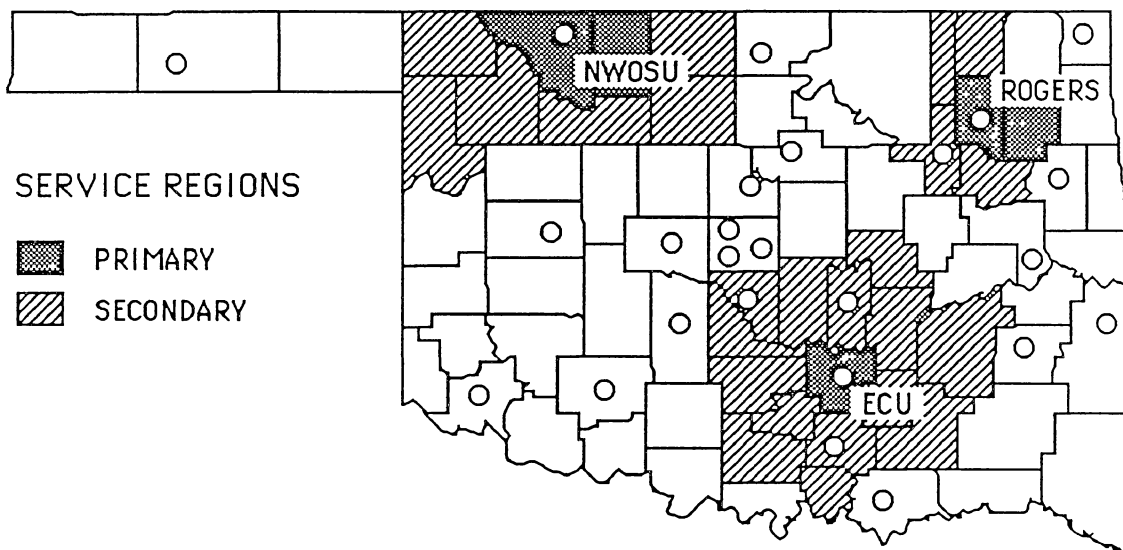
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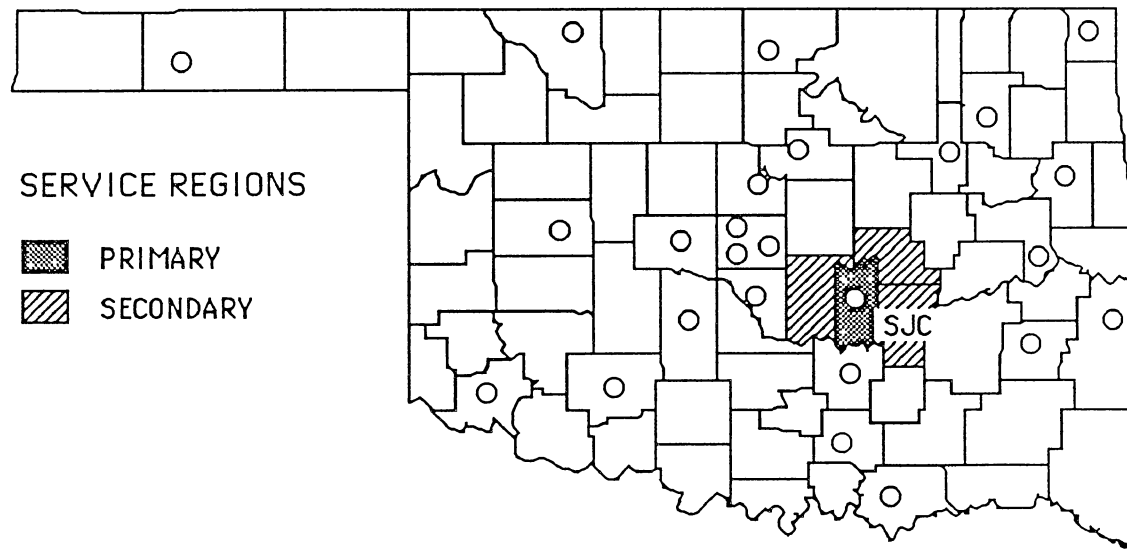
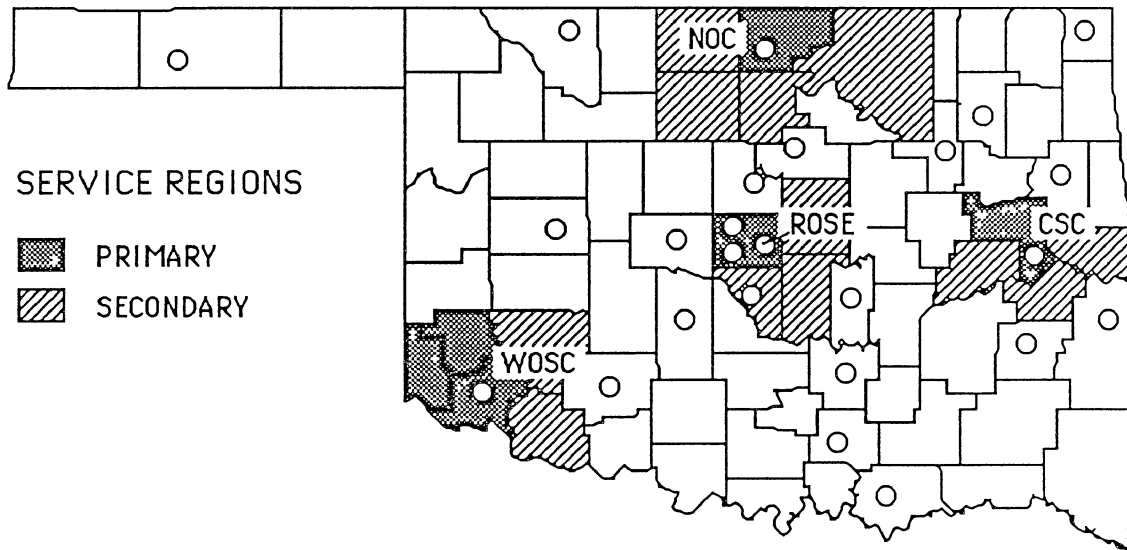
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| (4) Murray State College (MSC) | - Tishomingo |
| (5) Rogers State College (ROGERS) | - Claremore |
| (6) Carl Albert Junior College (CAJC) | - Poteau |



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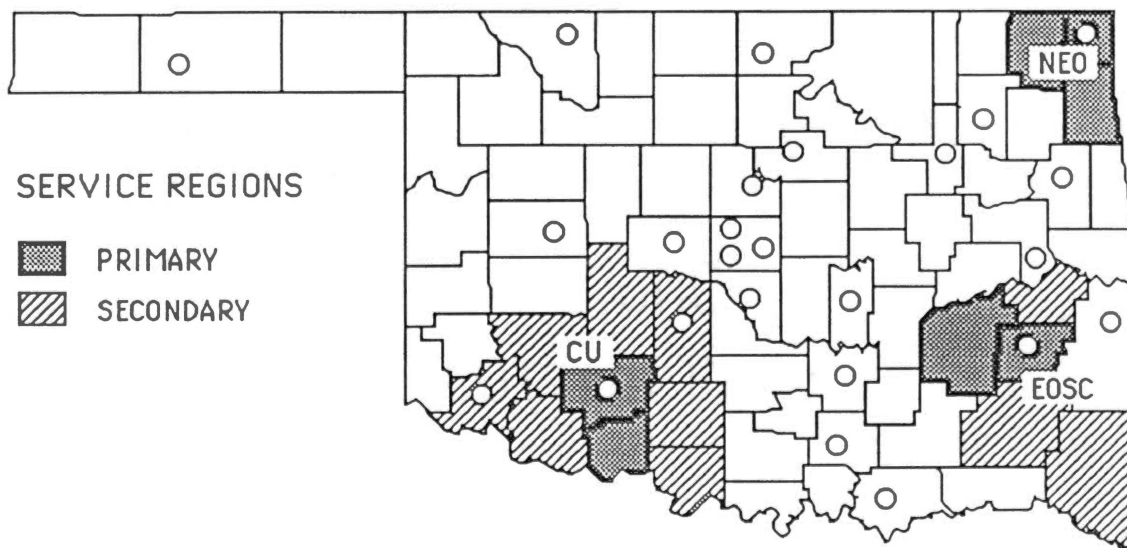
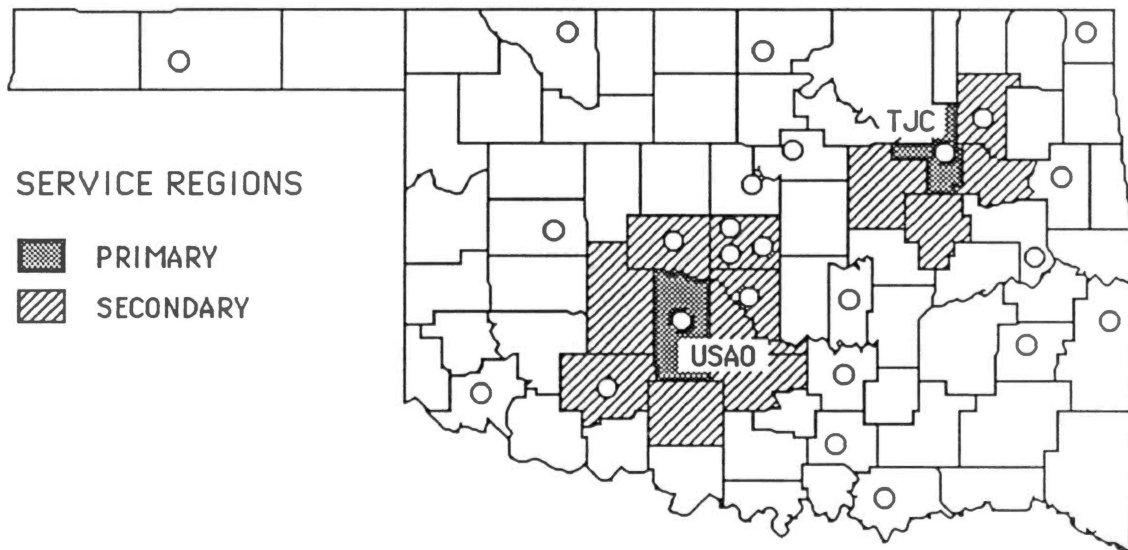
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| (2) Northern Oklahoma College (NOC) | - Tonkawa |
| (3) Western Oklahoma St. College (WOSC) | - Altus |
| (4) Seminole Junior College (SJC) | - Seminole |
| (5) Rose State College (ROSE) | - Midwest City |



INSTITUTIONS:

LOCATION:

- | | |
|---|-------------|
| (1) Cameron University (CU) | - Lawton |
| (2) Univ. of Sc. and Arts of Ok. (USAO) | - Chickasha |
| (3) Eastern Oklahoma St. College (EOSC) | - Wilburton |
| (4) N.E. Oklahoma A&M College (NEO) | - Miami |
| (5) Tulsa Junior College (TJC) | - Tulsa |

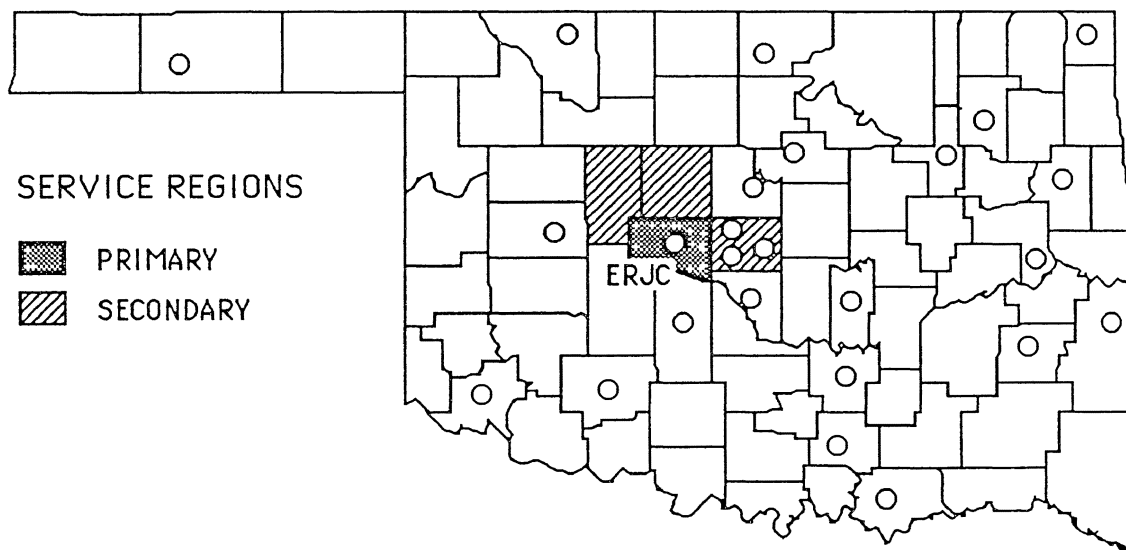
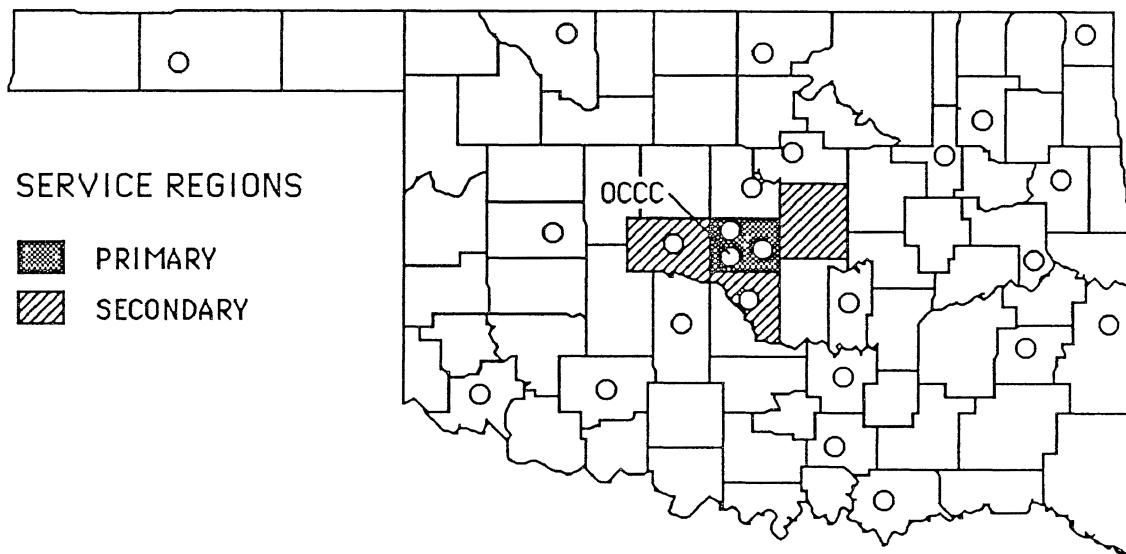


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- El Reno
- OKC



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