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A Study of Program Offerings and Factors Effecting Instructional Salary Costs in Major Curricula at the Four State Colleges in North Dakota

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A STUDY OF PROGRAM OFFERINGS AND FACTORS EFFECTING INSTRUCTIONAL SALARY COSTS IN MAJOR CURRICULA AT THE FOUR STATE COLLEGES IN NORTH DAKOTA

by

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This dissertation submitted by Larry L. Grooters in partial fulfillment of the requirements for the Degree of Doctor of Education from the University of North Dakota is hereby approved by the Faculty Advisory Committee under whom the work has been done.

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TABLE OF CONTENTS

LIST OF TABLES

ABSTRACT

The purpose of this study was to determine the differences in instructional salary costs per student credit hour of major program offerings that are common among the four state colleges in North Dakota and identify the factors which contributed to these cost differences. Dickinson, Mayville, Minot and Valley City State Colleges were the four institutions which were examined in the study. The ten major areas which were common at the four institutions were: art, biology, business education, chemistry, social science, mathematics, English, music, physical education and professional education.

The data pertaining to the information on instructional salary, class enrollment records and faculty activity were taken from the information supplied by each institution to the North Dakota Higher Education Facilities Commission. The selection of different factors which contribute to the differences in costs were determined from related research. The factors with the greatest influence on cost differences within and among the colleges were determined by statistical analysis.

The analysis of variance was the statistical method applied to determine significant differences in inter-institutional and intra-institutional cost comparisons. On the basis of the .01 level of significance there was no significant difference in student credit hour instructional salary cost between the four state colleges in the selected curricula. The same level of significance was used to

determine a significant difference in cost between the ten major areas. The coefficient of correlation was used to determine the factors which correlated significantly with student credit hour instructional salary costs. The level of significance chosen for the analysis was the .01 with an r of .380. Five factors exceeded the determined limit. Student credit hours produced, weighted average size class, number of small classes, average size of upper division classes and hours spent on outside school activities were the five factors which exceeded the limit.

The setwise regression analysis was an analytic method used to determine the set of factors which accounted for the greatest percentage of student credit hour instructional salary costs. The statistical technique eliminated one set at a time according to the effects the set had on increasing student credit hour costs in a regression procedure. Contact hours and credit hours were the set of factors with the greatest influence on student credit hour instructional costs.

Student credit hour instructional salary costs and factors effecting these costs were used as the basis for recommendations. Included in the recommendations of this study were:

1. The reduction of staff in the Art Department at Dickinson and the major in art at Mayville be reduced to a minor.

2. The reduction of the major in music at Mayville to a minor and the deletion of the major in music at Minot.

3. The following faculty members should be required to return to graduate school to improve their academic preparation: the faculty on the physical education staff at Dickinson, Mayville and Minot; the

business education faculty at Valley City; and the English faculty at Minot.

4. The average salary for faculty teaching in Minot's Art, Physical Education and English Department and the physical education faculty at Mayville and Dickinson be raised to a level equal the salary at other institutions.

A final recommendation of this study was that additional research be initiated concerning other curricula in all state institutions including the two universities by the same process used in this study.

All recommendations projected in this study must be viewed in light of their limitations. It was not the intent of this study to use standard credit hour instructional salary cost as the sole criteria for the evaluation of an institution or a major area. Other variables must be considered before making final decisions.

CHAPTER I

INTRODUCTION

One of the problems facing higher education in North Dakota is how to provide adequate financial support to keep up with the demands of quality education, increased facilities, higher salaries and large enrollments. This, coupled with the problem of a declining population, indicate the most careful evaluation must be made to insure the highest degree of efficiency in the utilization of funds available for higher education.

Higher educational institutions in North Dakota include liberal arts colleges, teachers colleges, junior colleges, and universities operating under either public or private auspices. There are thirteen such institutions of higher education in North Dakota, eight of which are completely state supported and under the control of the State Board of Higher Education. There are three local public junior colleges in the state and two private church related four-year liberal arts colleges.

According to the 1970 census (1), North Dakota declined in population from 632,446 in 1960 to 617,761 in 1970 or 2.3 per cent and a 9.3 per cent decline from its peak population of 681,000 taken during the 1930 census. At the same time the enrollments in the institutions of higher education in North Dakota colleges have increased from 13,552 in 1960 to 27,064 in 1970, which amounts to a doubling of enrollment in 10 years. This trend will continue until about 1977 or 1978 at which

time there is expected to be a decline in enrollment as evidenced in a report by Ostenson and Voelker (2). On the other hand, a decline in the 1971 fall enrollment may indicate a leveling off is approaching sooner than expected.

Considerable reorganization of school districts and school systems, both public and private, has been accomplished in North Dakota, but much more will need to be done to adjust school systems to decreased numbers of pupils. As a result of out migration and falling birth rates, total elementary enrollment (kindergarten through eighth grade) has been declining since 1966. The corresponding decrease in high school enrollment (ninth through twelfth grade) is expected to start in 1970 or 1971.

The situation which has developed is one of fewer people to support rising costs in higher education. A partial solution to the problem is the best possible use of the money available by a concentration of efforts and a search for ways to more efficiently use the funds available while still providing quality education. Determining quality education is difficult. However, some often used criteria for determining quality education are efficiency of operation, student credit hours and instructional staff.

The problem of providing quality education with the funds available has been approached in many ways and there is a tremendous amount of research completed and under way not only in this state but apparently in every state of the union. There are no clear, concise answers because research of this type eventually is concerned with output, the "product" of higher education. There is no generally accepted way to define or measure the "product" of higher education. The largest single "product" of higher education would seem to be an educated man. Many people have

an idea of what constitutes the educated person but few would agree on the definition. The measurement of the efficiency with which an educational institution produces educated persons has been investigated in many ways. The success of the research often depends on the success of the product. It starts with the individual's success in finding employment and then his advancements in the respected professional world. These may be criteria for measuring a successful product of higher education in a materialistic society but they are a poor indication of an educated person. The issue of quality in education is a subjective one and an area that is difficult to approach objectively. This is a very complex area of research and one that has not been answered, but attempts are being made. Other professionals can be more objective about their output. In the medical profession the patient is cured, the engineer builds a bridge that does not collapse and industry builds a car that runs, but when is a man educated and has this education been accomplished as efficiently as possible? The answer will not be found in this study but an attempt will be made to provide additional information to what has already been established in an effort to measure the output in education.

The approach in this study is made not from an evaluation of the product but rather an evaluation of the instructional cost differences in producing that product and the factors involved in this differentiation. One must use caution in the interpretation of data used in institutional-cost studies because the data may be misleading in determining efficiency and/or quality. If two institutions were fairly similar in efficiency the institutions with higher costs per student credit hour is generally regarded as having the higher quality of education.

On the other hand, if cost figures indicate about the same quality the institution with the lower student credit hour costs is generally judged more efficient. If high costs per student credit hour are associated with employment of capable and highly paid instructors as in the former situation and the data indicate the student credit hour production is average or better as in the latter, the institution would be considered as running an efficient program with high quality.

Research in this area is of vital concern to the State Board of Higher Education. Within the last fifteen years many studies have been conducted that have and will effect higher education in the state. The closing of one of the state's public institutions of higher learning in 1971 is an example of one of these decisions. Large scale research was started in 1958 when a state wide survey (3) was conducted by the United States' Office of Education for the Legislative Research Committee and the State Board of Higher Education. In 1964, under the direction of the Research Committee and the State Board of Higher Education, Russell (4) was asked to complete an instructional cost study. In 1968, the State Board issued a Working Master Plan for Higher Education in North Dakota colleges and universities (5) to provide information so that during the present years long range decisions will be made with positive action in the future. The purpose and objectives of the plan were as follows:

> The purpose of the Board of Higher Education in embarking upon this project was to formulate a basic plan for the orderly development of higher education during the next ten-year period. The plan encompasses the following objectives:
> 1. to provide North Dakota's qualified youth with adequate opportunities for higher education,
> 2. to help the state realize the greatest value for its investment in higher education through interinstitutional cooperation, appropriate divisions of responsibility, and consolidation of functions and services,

3. to assist the public in achieving greater understanding of, confidence in, and loyalty toward its institutions of higher learning in which most of the children of this state will receive their college and university education,
4. to assist North Dakota institutions in defining and achieving goals of quality education and challenging them to work together toward common goals (5).

Johnson and Davison (6) working with the State Board of Higher Education have contributed a great deal to North Dakota and higher education in research dealing with efficiency and quality education. In 1970 Sundre (7) completed his doctoral dissertation which centered around problems dealing with program duplication and efficiency, a problem outlined in the State Board's Working Master Plan mentioned earlier. This study is intended to provide more information about the present higher education programs.

Problem

If educators agree with the objectives outlined earlier in the Working Master Plan, they shall strive to help realize the greatest value for present investment in higher education and assist the institutions in defining and achieving goals of quality education. In doing so, the following questions should be answered:

1. Are there differences in per student credit hour instructional costs of selected curricula among the four North Dakota State Colleges?
2. Are there differences in per student credit hour instructional costs within each of the four North Dakota State Colleges?
3. If there are interinstitutional and intrainstitutional per student credit hour cost differences, what are the factors that contribute to these differences?

If cost differences are established, an evaluation of program offerings, considering various factors that contribute to the differences, will be made to determine the real differences among the programs. Actually, the cost difference might indicate a big difference in program offerings when in reality, it might be a minor indicator and other factors may become the prominent factors in the difference in program offerings. Based on this evaluation of major program offerings and the factors which contribute to cost differences, recommendations will be made for the possible continuance, revision, or elimination of major program offerings at the four institutions.

Purpose of Study

Information concerning the instructional cost of producing student credit hours and the factors effecting these costs should be helpful to the institutions of higher education, State Board of Higher Education, instructors, departments, students and the people of the state. In the last decade there have been many requests for objective analysis of instructional costs which have resulted in the preparation of many reports and studies. With this information, decision-makers should be better prepared to make decisions concerning the interpretation of efficiency in higher education. This study is designed to:

1. determine the differences in instruction salary cost per student credit hour of the major program offerings that are common among the four state colleges,
2. examine the factors which contribute to instructional salary cost differences,
3. evaluate the major program offerings based on the instructional salary costs and the factors which contribute to

the cost differences making comparisons among major program offerings within each institution and between the four institutions,

4. make recommendations for the possible continuance, revision, or elimination of major program offerings based on the evaluation of instructional salary cost differences and the factors effecting these differences.

Procedure

The information pertaining to instructional salary, class enrollment records, and faculty activity was taken from the information supplied by each institution to the North Dakota Higher Education Facilities Commission. The information concerning institutional budgets and instructional cost were taken from the records of North Dakota Budgets for Higher Education. The data were applied:

1. to determine the instructional cost of producing student credit hours in selected curricula at the four state colleges,
2. to identify the factors which contribute to instructional cost differences in the selected curricula at the four state colleges,
3. to develop a relationship between the instructional cost and the factors which contribute to differences in the selected curricula within and among the four state colleges.

A more detailed description of the collection of data and the application of this data is presented in Chapter III.

Definition of Terms

Credit Hour:--The credit hour is the measure of the subject matter covered in a course. The credit hour normally represents the number of class periods the class meets per week without reference to contact hours or clock hours. There are exceptions, however, with laboratory and activities classes which meet two or more class periods per week for one credit hour. This exception is covered under student contact hour.

The four state institutions in the study are all on the quarter system for determining credit hours.

Student Credit Hour:--The student credit hour is a measure of production and is derived by multiplying the enrollment in each class by the number of credit hours for the class.

Student Contact Hour:--The student contact hour is derived by multiplying the class periods the instructor meets the class each week by the number of students.

Full-time-equivalent Instructor:--This is a measure of instructional personnel. A full-time-equivalent faculty members are those instructors whose total budgeted and assigned responsibility is considered teaching. A full-time-equivalent is measured as 1.00. Those instructors whose teaching responsibilities are divided between departments or non-teaching activities are computed to the appropriate fraction of full-time-equivalent instructor in the department they are teaching. An instructor who is not teaching full time at the college is treated the same way.

Weighted Average Size of Classes Taught:--This determines the average size of class in a department or institution. The average is

derived by dividing the total number of student credit hours produced in a department or subject field by the number of quarter hour credits taught in that field. The analysis recognizes differences in credit hours. For example a class offering three quarter credit hours is included in the average as three times the weight of a class having one credit hour.

Instructional Salary Costs:--This is the instructor's gross salary before deductions or exclusions. This does not include the employer's contribution to retirement plans, medical insurance or any costs commonly referred to as fringe benefits. The instruction-salary-costs for the fall quarter of 1970 are determined by taking one-third of each instructor's gross salary for the nine-month academic year. If an instructor has other duties besides teaching, the total salary is divided according to his full-time equivalent fraction as an instructor. An instructor who divides his teaching time between different subject areas is treated in the same manner. He divides his salary according to the percentage of time he spends in the respective academic area.

Small Classes:--Small classes were arbitrarily defined for the purpose of this study as those with ten or less students.

Level of Instruction:--The level of instruction or academic level in this study is interpreted in two different ways. In one section references are made to course level and other sections to student level. The reference to student level means the academic level or year in school, for example, freshmen, sophomore, junior, or senior. The course level refers to the designated academic level of courses. The 100 and 200 level courses are generally included in the first two

years and referred to as Lower Division courses. The 300 and 400 level courses are generally included the last two years of undergraduate work and referred to as Upper Division courses.

Major Program Offerings:--The major program offerings used in this study refer to major curricula offered at all four state institutions. Major program offerings that are common at the four state colleges are: Art, Biology, Business Education, Chemistry, English, Mathematics, Music, Physical Education, and Social Science.

The area of Professional Education courses was also researched because this is another important area that is common at the four state institutions. The Professional Education courses include all of the Professional Education courses that are required to graduate with a Bachelor of Science Degree in education.

Four State Institutions:--The four state institutions investigated in this study were Dickinson, Mayville, Minot, and Valley City State Colleges. The major objectives and main purpose of these four institutions are the preparation of teachers.

Scope and Limitations

This study was primarily concerned with the instructors that teach in the major program areas that are common at the four state colleges and the instructional salary costs together with the factors that effect these costs. Although this includes a large portion of instructors it does not include the entire faculty or all course offerings. Instructional costs were limited to instructional salary costs and no costs were considered that included supplies, plant or administration. Administrative duties, however, within a department

that were handled by a member of that department were computed to the appropriate fraction of full-time equivalent instructor in that department.

The study was limited to the Fall quarter of 1970. Although this is considered a normal quarter in most situations, there could easily be exceptions. For example, one college had a new president and faculty involvement and committee assignments for the first year were probably higher than normal.

The limitations of cost-quality relationships as an accurate measure of output or amount of learning were realized and no inference is made to the contrary. However, cost quality is considered in the relationship with faculty workload because at the present time quality education has not been established, and although playing a minor role, it can be used in establishing cost-quality relationship.

A small portion of the data used in the study required the individual instructors to estimate the manner in which they used their time. Although this was minimal a certain loss of objectivity must be expected when the instructors have to estimate how their time was spent.

The data used in individual class enrollments were taken from the student data cards which proved the most accurate information. This information was taken from the student class schedule. The drops and adds were kept current through the first three weeks of the quarter. The faculty enrollment count on the Form "F" proved unreliable as faculty members had a tendency to pad their enrollment figures. Form "F" is information supplied by each faculty member to the State Board of Higher Education at the beginning of each quarter. An example of Form "F" is found in Appendix A. The students are checked against

their class cards at the time of registration and students are not allowed to add a class after the third week. The class schedules were kept current through the third week. This was not completely foolproof because human errors could be made but this was the most accurate count that could be determined.

The different types of teaching carried on in the classroom were eliminated on purpose. The reason for omitting this factor was because it is not the purpose of this study to evaluate the finished product or make comparisons on which type of teaching was considered to be the more effective.

CHAPTER II

REVIEW OF RELATED LITERATURE

This section of the study provided an overview of some of the recent research that has been done in the area of unit cost and the factors which effect the differences in instructional cost analysis. This research dates back to before the turn of the century and includes one of the first major unit cost studies to be published which was completed by Strayer (8) in 1905.

The student clock hour unit concept was introduced in 1915 and was used until the mid 1930's. In 1922 the student credit hour unit was developed and is used quite extensively even today.

There has been a dearth of research published since that time dealing with different types of cost studies. The related literature in this study is centered around research that has been completed in the last fifteen years. This was done because there appears to be a greater concentration on quality education and the cost relationship of different factors affecting this quality. In a recent article, Gustad (9) looked at it similarly.

> As a nation--and a very education-conscious and statistic happy one--we do know a lot about some parts of our educational system. We know how many teachers there are and how old and tall they are; we know how many language laboratories are in operation; we can calculate to the penny how much we are spending for education. The only thing we don't know is what is produced by all these teachers, buildings, laboratories, and dollars. We don't know what the students are learning.

This is a major problem facing education. It is not that the problem just came about; it has always existed. It is that the question and the persistence in answering the question is brought to light more now than previously. As the Western Interstate Commission for Higher Education pointed out (10):

> Something has happened on the American campus in the last decade, something has happened that has never occurred before in the two hundred year history of higher education in our country. A set of circumstances and conflicting interests met head on and brought the campus scene into sharper public focus than ever before.

Questions are asked by the student who does not find his education relevant to the needs of society. The parents of the student question the cost of their children's education. The State Legislature is being pressured from many other interests that want a share of the tax dollar. People want to see results so much that the school board in Texarkana (11) engaged a private corporation to come into their school system and set up the nation's first guaranteed performance contract to teach children, train teachers, and implement a learning system. In a similar arrangement Wilson (12) reported on a system of school administration by contract. "Utilizing the best features of industry and business management it will bring the element of competitiveness into a profession heretofore masked by degrees, years of service and even favoritism."

Now more than ever before, higher education has to justify itself, where it is going, its priorities, and its responsibilities to the student and society. In the process of accountability, the institution will have to examine its purpose for existence, the curricula, the faculty, the administration, and the student. This

information is no longer confidential but rather information of public concern. There has not been and there will not be one research project that will provide a simple answer to the many questions but a concentrated effort of many projects will eventually show the way.

This chapter is organized into two sections. The first section deals with the factors that affect instructional costs and the second section deals with unit costs of instruction. The first section will provide information for determining factors used later in this study as possible areas for consideration when distinguishing cost differences. These factors will be specifically indicated in the summary at the end of this chapter.

Factors Which Contribute to Instructional Cost Differences

There are many factors which contribute to instructional cost differences. In the related literature most of the factors that were considered come under the category of faculty-teaching-load or faculty-workload. Faculty load was not used in this study for a couple of reasons. Number one, it is too difficult to categorize various faculty activity under one classification, and number two, there is very little agreement on what constitutes measuring faculty load or its definition. This study will keep the factors that make up the so called faculty load separate because the term faculty load has different conotations. In a report prepared for the Commission of Higher Education in North Dakota, Koenker (13) looked at defining faculty load as almost impossible. He stated:

> Despite the need at all levels of academic administration for a neat, precise measure of faculty load and the efforts which have been made to devise a standard, there is increasing doubt about

the possibility of devising any single universal standard of faculty effort. The teachers role differs enormously - from mass lecturing to leading small seminar discussion, to individual training in techniques of therapy, to advising a doctoral candidate as he does research at the frontiers of knowledge. To use hours in class or credit hours times number of students as a common measure for all teaching effort is as spurious as measuring the contribution of members in a large law firm by the number of clients they see in a week. If teaching efforts in drawing out students were analogous to energy expended by tractors in drawing plows, then the load of different faculty members could also be measured in terms of some kind of draw bar capacity. But teaching is an art, with widely varying techniques, performed in different settings, in various size groupings, with different kinds of skill and knowledge to be gained, and with students of infinitely varying interests and capacities. Hence, the effort to derive a single, uniform measure of teaching load is doomed to failure.

Hicks (14) looked at the problem of defining faculty workload this way:

> Definitions are good only insofar as they are useful. Any quantification of faculty workload will probably be used for comparisons over a period of time with respect to the effect of changes in cost or perhaps even in quality as a result of changes in the faculty work load. In other words, faculty work load, to be defined so that it is useful, must be defined so that it is measurable. To be at all subject to measurement, it probably must be divisible into a definite member of sub-classifications, such as classroom time, preparation, grading papers, counseling, research, public service, and so on. And each of requiring "so much time." This is by no means wholly satisfactory, but it is difficult to see how work load can be measured unless these requirements are met.
>
> It also seems likely that in attempting to define and measure work load, one has really to deal with "faculty assignments." To measure what a professor does, with respect to the intensive and extensive use of his intellect, is, at least in 1960, still beyond the pale. But to set down specifically the jobs which are his responsibility those things which are formally and informally expected of him, should be possible. If this cannot be done, it must follow that the academic management in the department, school, or university has been woefully lacking. If one hires a professor, one should tell him, at least in general terms, what he is supposed to do.

Many attempts that have been made to study faculty workloads are often reported in terms of number of credit hours, class hours,

or student credit hours. Stecklein (15) in preparing a report for the American Council on Education stated:

> For more than twenty years experts have protested that such work analyses are incomplete and present a distorted picture of faculty duties. Some, in fact, attribute the popular misconception of the teacher as a person who has only a 15-hour work week to such practices.

At Capital College in Columbus, Ohio, a composite profile chart was established for establishing faculty load. Capital College is a church liberal arts college with an enrollment of 1,400 students. Six criteria were established to determine the instructor's load. The six criteria included the following: (1) student credit hours, (2) semester credit hours, (3) class contact or teacher laboratory hours, (4) number of class preparations per week, (5) number of hours of upper division work, and (6) committee, research, or administrative assignments. After the data from the professor's file were determined, they are transferred to the departmental profile where comparisons can be made. After examination of the profile charts the administration can make decisions regarding "increase in departmental staff, additional course offerings, increase in salary, realignment in teaching duties, and inequity in faculty load" (16).

Other authors look at the problem similarly, agreeing on the difficulty of equating faculty load but still conceding that there are delineating areas where comparisons can be made. The difficulty arises when the education for a master's student is compared with that of a first year student or the preparation of a medical student is compared to that of an engineer. However, this study concerns itself with four state colleges from the same state and all being primarily concerned with preparing teachers in nine major areas that

are common at all four institutions. The difficulty still remains in making comparisons on an intra-institutional level comparing the preparation of a music teacher and that of a social science teacher. Precautions will be used when making comparisons of this type. However, it is applicable to compare and contrast the preparation of a music teacher in one institution with that of a music teacher from another state institution.

Credit Hours

One of the factors common in most faculty load studies is that of credit hours. Standards for establishing credit hours vary considerably with different situations, but for this study, a look at the recommendations by the professional agencies which accredit the institutions was helpful. One of the largest and oldest accrediting agencies for all four state institutions is the North Central Association (17). The association does not have specific requirements for establishing faculty load but stated that "faculty overload is a threat to institutional quality." It is further stated that "faculty load is commonly measured by credit hours and student credit hours," but that this only provided a "partial" picture of the load situation. Also to be taken into account are such components as scholarly and research activity, class preparation time, faculty committee work, administrative responsibilities, student counseling, and community service. It is also understood that the distribution of time among faculty members is expected to vary markedly among the several components of the faculty load.

Another national accrediting association is the National Council for Accreditation of Teacher Education (NCATE) (18). NCATE is responsible for implementing accreditation procedures and determining the

accreditation status of teacher education programs. All four state colleges are visited by NCATE and the recommendation on faculty load which includes credit hours was stated the following way:

> The institution, recognizing that the faculty is the major determinant of the quality of its teacher education programs, makes provisions for the efficient use of faculty competence, time, and energy. Such provisions include policies which establish maximum limits for teaching loads; permit adjustments in teaching loads, when nonteaching duties are assigned, and allow time for the faculty member to do the planning involved in carrying out his assigned responsibilities.

In their standards, NCATE looked at "the assigned professional load (all services rendered) for each teacher education faculty member" and also "if the load of any faculty member exceeds the established institutional policy." NCATE does not establish a limit as to the number of credit hours that constitutes a faculty load. This is left up to the institution. It is interesting to note, however, that in the preliminary draft to establish these new standards, it was recommended that the assigned teaching load in teacher education should not exceed twelve semester hours or the equivalent (19). This preliminary draft was the result of a three-year study conducted by the American Association of Colleges for Teacher Education to establish improved criteria for accrediting institutions.

There are other organizations that consider credit hours as a measurement of faculty workload. Among these organizations is the American Association of University Professors (20). In 1966 members of the A.A.U.P. made the following statement:

> This association has been in a position over the years to observe workload policies and faculty performances in a great variety of American Colleges and Universities, and in its considered judgment the following workload limits

> are necessary for any institution of higher education seriously intending to achieve and sustain an adequately high level of faculty effectiveness in teaching and scholarship.
> A teaching load of twelve hours, involving not more than three separate course-preparations in any term, for undergraduate instruction.
> These presume also that means can be devised within each institution for determining fair equivalents in workload for those faculty members whose activities do not fit the conventional classroom lecture or discussion pattern.

In an instructional load study done for thirty colleges and universities in the central part of the United States, designed to analyze specific factors or components of instructional or teaching load, the results were similar (21). Only two of the North Dakota four state colleges participated in the study. The study indicated the average credit hours, taught by all instructional faculty in the thirty institutions combined, were 11.37. Dickinson and Minot, the two schools that participated from this area, were a little above the average. Statistics for credit hours for fall term of 1968 for full-time-equivalent faculty at Minot were 14.55 while Dickinson average credit hours for full-time-equivalent faculty were 13.05.

Contact Hours

Another element in considering factors which bring about cost differences is contact hours. The section on credit hours indicated that the average teaching load of faculty was expressed in quarter credit hours taught but did not indicate the number of class periods, clock hours, or student contact hours. The quarter credit hour teaching load should consider the number of class periods the class meets a week. If not, it would not adequately reflect the actual teaching load for a faculty member who teaches courses that require laboratory preparation in addition to lecture sessions as in biology or chemistry. It

would also neglect the instructor in music or physical education because in some situations their classes meet two hours a week per one hour of credit. For these reasons contact hours will be used as a factor in determining cost differences.

Student Credit Hours

Another factor which effects faculty instructional activity and salary cost is the student credit hour. Student credit hour costs are a reflection on instruction production and can be determined by multiplying the number of students in each class by the number of quarter hours the class carries. Thus, ten students in a two-hour class would represent twenty student credit hours. By totaling the student credit hours for all classes an institution total can be calculated. Student credit hour production can also be determined for each instructor or for each department. Coffelt prepared a report for the Oklahoma State System of High Education made this comment about student credit hour production as a factor in instructional activity:

> The number of student credit hours produced in a given subject field is a good index of student demand for instruction in the field. While student demand or interest is not the sole educational criteria for maintaining instruction in a subject field, it most certainly should be one of the factors considered by an institution or a coordinating agency in acting on proposals to expand course offerings (22).

In determining program cost differentials at the University of South Florida the Division of Planning and Analysis (23) also used student credit hours as one of the factors indicative of instruction load, course enrollment, and quality of instruction and later related these credit hours to costs. Adkins (24), reporting for the state controlled colleges and universities in Virginia, stated "the best measure of the

volume of instructional service which has been devised to this point is the number of student credit hours produced." Most of the recent instructional cost studies do include some variation of student credit hour production which is a good indication, but the criteria for measuring should go beyond these measures because student credit hour production alone can portray a very distorted picture. Class size is only one of the factors that can inflate the student credit hour measurement. Class size is regarded as an important factor in determining cost and effectiveness of instruction. To consider faculty load on a credit hour taught or contact hour basis is to ignore the factor of class size. The most recent studies take this into consideration by combining them into student credit hours taught.

Class Size

Class size is an important factor in determining cost differences. By overloading classes it might appear that an instructor has a high student credit hour production and as a result a very efficient operation. If related to instructional costs without brining in other factors, it might indicate that the public are really getting their money's worth but, in reality, it is to the contrary. McKeachie (25) stated:

> The earliest research on teaching was on class size. Are small classes really more effective for teaching than large classes? The answer of the professor has generally been "yes." But the refreshing empiricism of the 1920's looked hard at many "self-evident truths" about human behavior. Among them was the assumption that class size has something to do with educational effectiveness.

Bostrom (26) presented information regarding class size and critical thinking skills in a doctoral dissertation in 1969. It was determined that when the ability level of students was considered,

class size made a meaningful difference in student achievement: "High achieving students learned critical thinking more efficiently in large groups and low achievers learned critical thinking skills more efficiently in small classes."

Class size has always been a controversial subject because school administrators on all levels of education have been interested from the stand point of lowering the mounting school costs. Hollingsworth (27) of Arizona State University summarized the findings of a number of studies that dealt with class size. In the studies, very little difference in individual achievement was shown when measured by standardized tests, but as indicated by many other writers, standardized tests fail to indicate other significant advantages that occurred in small classes:

> If teachers teach a class instead of individuals, it matters relatively little how many students are in the classroom; however, if we are interested in teaching other values, class size may be important. To determine class size one must take into account many factors in the goals that the schools propose for its students.

Several studies were conducted by the Institute of Administrative Research, Teachers College, Columbia University, on class size. McKenna (28) stated, "No absolute decision can be made upon the appropriate range of class sizes at any level," but generally concluded that studies show small classes have special value because of their opportunity for creativity and the opportunity for adapting new class procedures is greater in smaller classes. Other factors stated by McKenna which pertained to this study were as follows: "(1) educational purpose must be taken into account, (2) quality or staff should not be sacrificed for class size, (3) the characteristics of pupils is a key factor in class size decisions" (28).

Much of the research supported these findings when comparing large classes with small classes. It often depends on the educational goals and large classes are not as effective as the small class in regard to attitude change, critical thinking and retention. Gage (29) supported this when he stated "research on class size can become more closely related to theory if it takes classroom activities and processes into account and does not confine 'results' to the score on an examination of limited significance."

Weighted Average Size Class

It is important when dealing with class size and in determining an average class size for a department or institution that the statistic which is presented is as accurate as possible. One common way of determining class size would be to divide the total enrollment for all classes by the number of classes taught. However, in the research (4, 22, 27) completed in this area especially when student credit hour production is considered, it appears that the interpretation of class size to one that gives consideration to credit values is preferable. A truer indication of faculty load can be obtained from the analysis. This is referred to as a weighted average size class and the data for classes taught are obtained by dividing student credit hour totals by the total of credit value of all classes. Therefore, a class assigned three quarter credit hours is counted in the average at three times the weight of a class carrying one quarter hour credit.

Level of Instruction

Another important factor to consider when dealing with instructional cost is that of the level of instruction. In the related

literature, it is evident the average instructional costs tend to be higher at University type institutions as compared to teachers colleges or liberal arts colleges. A comparison of instructional costs of the liberal arts and teachers colleges with that of the junior colleges reveals that the costs are lower at the latter. A closer study of the statistics shows a greater concentration of work on the upper levels that tends to raise instructional costs which in turn can be traced to lower student credit hours production because of more individualized instruction on the higher levels. When a student comes to a college as a freshman he registers in his basic courses such as English, Biology, and Mathematics. As sophomores, he continues in these basic courses in the various disciplines. The enrollment in these classes has a tendency to be larger than the average with the lecture dominating the type of class. The students are referred to as the freshmen or sophomores, carry a course number of 100 and 200 and are enrolled in the lower level or division. As the student continues into the junior and senior level, the 300 and 400 numbered courses or upper division classes become much smaller as the students now begin to specialize. It is not uncommon to find less than 20 students in courses at the upper level as compared to 40 or 50 at the lower level. The level of instruction is an important factor in instructional cost differences because upper division courses require a more specialized staff for producing more specialized students. Thus, more time and effort is put into each student at the upper level.

It is interesting to note that the American Council on Education (30) in an article dealing with the relationship of higher education and federal funding recommended a formula approach for support. It was

stated that this would tend to reward equally those institutions that have already achieved high quality and those that still at best aspire to it. There were two recommendations for establishing a formula that specifically pertained to this study:

1. There should be a factor in the formula that take account of quality, over and above sheer numbers. Such a factor is important for the purpose of recognizing and rewarding existing quality and of encouraging increased efforts on the part of institutions that at the moment simply aspire to it. A factor related to expenditures for instruction would be one way of measuring quality.
2. The formula for general support should also take into account that instructional cost varies according to the level of instruction. As a rough base, we suggest that a factor of one be applied to lower division (freshmen and sophomores) work and a factor of 1.5 to 2.0 for upper division work, with perhaps an added factor for masters and first professional level work (30).

If an investigation of student credit hour production was conducted without looking at other factors, it would appear that the instructor at the lower division was doing most of the teaching. As pointed out in the second recommendation above, the opposite is actually the case.

Faculty Salaries

One of the important factors in determining instructional salary costs is the amount of money spent for faculty salaries. Instruction costs can be raised or lowered depending on the amount of money spent directly and specifically on instructional salary. Since salaries do play such a major role in college finance, it is essential that information about salaries is available in order that decisions might be made concerning college expenditures. Russell (31) said, "The largest single object of expenditures in college and university budgets is salaries and wages." The most popular comparisons dealing with

instructional salary in the related literature is linking instructional costs with student credit hour production. Thus, in determining the general economy of an instructional program the expenditures for instructional salaries are divided into student credit hours produced in the subject-field or in each institution to arrive at cost data. It must be kept in mind, however, that these are instructional salary costs only and do not include any operating, building, or administrative expenses. Coffelt (22) stated, "The instructional salary costs at public institutions of higher education in Oklahoma represent about 45 per cent of total Educational and General Expenditures."

In this report which linked instructional costs with student credit hours, Coffelt also commented:

> Instructional salary cost per student credit hour represents a complex of at least three different factors: (1) average faculty salary; (2) number of full-time-equivalent teaching faculty; and (3) average class size. Instructional salary costs can be reduced by any one or a combination of the following three processes:
> a. Reduction in the average salary by filling staff vacancies with individuals holding lower academic rank, or with lower paid graduate assistants.
> b. Limiting course and/or class offerings, hence raising average class size by forcing students into fewer classes.
> c. Absorption of additional students without making corresponding increase to the teaching faculty or to the number of classes offered (22).

The State Council of Higher Education for Virginia (24) linked instructional costs with student credit hours because "the instructional salary cost per student credit hour produced is an index to the financial efficiency of the instructional programs since it is the product of faculty salaries and productivity." Lowering and raising faculty salaries or productivity will affect the instructional salary cost.

There are other elements of instructional salary which should be pointed out before decisions are made regarding the efficiency, quality, or cost of an instructional program. Russell (4) had this to say about instructional salaries in North Dakota:

> The North Dakota institutions and the State Board of Higher Education have already introduced all the economies of management and organization in the institutional programs that would normally be recommended in a study of this sort. The director of this study has rarely seen a state system of higher education of which this could be said. The people of North Dakota may be assured that money is not spent unnecessarily in the instructional programs of their state institutions of higher education.

If instructional programs in North Dakota appear to be operated efficiently it must be remembered that this is only one aspect of instructional cost. Russell went on to say:

> Low salaries for instructional staff members are characteristic of all the state-controlled institutions of higher education in North Dakota. This is the feature of the instructional programs in North Dakota that is most subject to adverse criticism. Compared with salaries for comparable services in other institutions throughout the United States, the amounts in North Dakota are miserably low. North Dakota would rank in the lowest one-fourth of all the institutions of higher education, either in the country as a whole, or in the region where the state is located.
>
> A review of the individual salaries indicates that the lowest level of salaries is reasonably adequate. What is missing is adequate recognition of the worth of superior faculty members, who have longer experience, higher academic attainment, and wider recognition as scholars than those at the beginning level.
>
> Inevitably, under conditions of low salaries, the general quality of a faculty tend to deteriorate. Even when the beginning salaries are about on a par with other institutions, the failure to promote capable instructors rapidly in salary will cause many of the abler ones to leave to accept better offers. The result almost certainly tends toward the loss of the best and the retention of the poorest of those annually recruited. Certainly ever institution has some loyal, underpaid faculty members who will not leave, even for the offer of a higher salary. Some who are truly competent will remain in spite of tempting salary offers for various personal reasons. These are exceptions, and the general rule still holds, that continued low levels of salary results in deterioration of faculty quality (4).

This is not regarded as a direct criticism of the qualities of faculties in North Dakota institutions because nothing was done in regard to the output or in evaluating the teaching which took place in the classroom. Nor, is the opposite necessarily true if, for example, an institution was staffed with all doctor's degree holders and a high instructional cost. Most educators realize there is a wide variation in ability and scholarship among those who hold higher degrees and unfortunately these educators have seen people with doctor's degree almost worthless as members of an instructional staff.

The State Council of Higher Education for Virginia (32) had a similar problem in evaluating the quality of a college faculty. They made the following statement regarding advanced degrees:

> There has never been developed a completely acceptable method of evaluating the quality of a college faculty, but probably the most widely used index has been the level of educational attainment of the faculty. Although substantial academic preparation alone will not insure a high level of teaching and research competence, studies have shown that there is a significant positive correlation between the proportion of the faculty who have had substantial advanced study and the general quality of the institution at which they are employed.

Academic Preparation

After reviewing the related literature this investigator concluded that the academic preparation of a faculty is an indicator of their competence (9, 24, 29, 32). Academic preparation is also considered when establishing faculty salary. Therefore, when determining instructional costs the degree or academic preparation is a factor to be considered.

Teaching Experience

Another factor which is considered and is often associated with faculty preparation is the number of years of experience. The members of the National Council for accreditation of Teacher Education (18) stated, "Competence of faculty members is also determined by their scholarly performance and their experience in professional practice." If used alone, experience has limited usefulness. However, it is given considerable consideration along with other qualifications when hiring college faculty. Most institutions will require incoming faculty to have a certain amount of field experience. The total years of experience in higher education is also a helpful indicator of the maturity of an institution's faculty. Experience by itself is not a leading factor in instructional cost but it must be given consideration because of the effect it has on instructor's salaries and also its effect on judging a teacher's competence.

Rank

One other factor that is given minimal consideration in respect to instructional costs is the instructor's rank. The reason for not using rank as a definite indicator of faculty competence is that there is no uniform practice of establishing rank in the state colleges. Actually, rank would take the place of both an instructor's degree and the years of experience but without any uniform standards for establishing rank, it is difficult to say an associate professor is more advanced than the assistant professor. It is, however, almost a universal practice among the colleges and universities to bestow faculty rank upon the teaching personnel as a means of academic standing. The

following are common characteristics of qualifications used to assign rank in colleges and universities throughout the country, as well as the state colleges used in this study:

Instructor:--This is the first step at the state colleges and is given to those who have a minimum graduate preparation and whose experience in college teaching is limited. This could include an instructor with less than a master's degree or one with a master's degree.

Assistant Professor:--This is the second step on rank assignment and includes instructors with a master's degree with a few successful years of college teaching experience and are working toward the completion of the doctor's degree. This step also includes the instructor with a doctor's degree who has very little teaching experience.

Associate Professor:--The third step includes those instructors with a master's degree, with at least 5 to 10 years of successful college teaching, with recent work toward the completion of the doctor's degree of a doctor's degree with the same qualification as mentioned without the maturity expected of a professor.

Professor:--The fourth and final step in the rank at the state college level and includes instructors with a master's degree and a great deal of past experience who have completed advanced work and demonstrate high academic quality, maturity and effectiveness in teaching.

Meeting the minimum requirements does not automatically place the faculty member in a given professional status. Nor are there any rigid standards in regard to the distribution of faculty rank. However, accrediting agencies sometimes raise questions when there is a disproportionate number at a certain level when compared to the

qualifications of the faculty. The reasons for keeping a balance in faculty rank are realistic. An institution with a large number of faculty in higher ranks will discourage young faculty from possible promotion. A large number in the lower ranks may indicate a lack of experience and maturity in the faculty.

If an institution of higher education is going to provide quality education the institution must have faculty who possess the academic preparation and maturity in their respected field of scholarship. These faculty members should be respected by the students they serve and known in the field outside their institution. To secure and retain people of this caliber on an institution's faculty, they must be compensated accordingly.

Unit Cost of Instruction

In the last decade there has been increasing public pressure to evaluate expenditure in education. Higher education is no exception, the taxpayer wants evidence that his money is being spent to the best advantage. Chambers (33), in his book on Financing Higher Education, said:

> Reports of the stewardship of their funds are necessary. Thus it has become necessary to adopt, with understanding of their weaknesses and unrealities, some concepts which will serve to denote some standard units of accomplishment.

Chambers was referring to the different forms of unit cost and cost analysis studies that were being prepared in institutions across the country. These "crude instruments" as he referred to them may,

> . . . if accompanied by an adequate comprehension of the differing aims, methods, and settings of the enterprises being compared, afford some useful coloring of the picture needed

> by a college president who wishes to study the operation of various elements within his own institution in relation to each other or to compare the operation of his own institution with other similar types, size and purposes.

Chambers also had this to say about the factors which effect these units of measurement:

> In efforts to fit the unit of measurement more realistically to the operation of the college or university, investigators use smaller units such as the student credit hour and the student-faculty contact hour. The former is probably the more practicable of the two, though certainly many conscientious persons will shrilly point out that a credit hour in Freshman English is not necessarily worth as much as one in sophomore physical education for the same student, nor as much as one in Freshman English for another student. Educators do not deal in standardized units; they only use a sort of fictitious psueodostandard which is known to be vastly variable.
>
> But to use this rubber yardstick is perhaps better than to plead that there is no measuring device. The resulting inaccuracies are in part mitigated wherever large numbers are involved, because of the well-known propensity of statistical data to cluster about a central tendency and to arrange themselves in a normal distribution, in which it is sometimes said that the extreme variants tend to cancel each other out so far as the line of central tendency is concerned. It goes without saying that whenever a variable unit is used as a basis of comparison, it must not be the sole basis but must be used only in conjunction with other appraisal devices which make due provision for the presence and distribution of individual variants.
>
> The student credit hour is often employed in connection with instructional costs as measured in faculty salary expenditures alone, because salaries constitute the largest element in costs of instruction, and are always on record. Excellence of faculty is the most important available index of excellence of instruction, and since in our modern economy money tends to buy quality, the cost of faculty salaries per student credit hour is thought to be one of the best available measures of quality in higher education. Obviously such a measure is not infallible in individual cases or with small numbers, but its usefulness increases as the numbers involved increase above the threshold of reliability (33).

Eurich (34), Vice President of the Fund for the Advancement of Education, had this to say about the necessity for developing efficient procedures to help educational institutions measure and utilize their resources:

> In education we seem to dread the word "efficiency." It is a word from business, and educational institutions must not be businesses. At the same time we know, however reluctantly, that competition was the principal factor that forced business to develop efficient procedures. Colleges and universities, now faced with the prospect of demands and expenditures rising faster than income, are just starting to learn what business had to find out long ago: that resources - financial, physical, and human - can and must go further in the future than they have in the past.

Russell (31), an acknowledged expert in the field of finance in higher education, had this to say about the unit cost technique:

> College and university executives have not been forced to adopt these careful accounting techniques because, in the past, they have usually found it easier to go out and get new money for any expansions that seemed necessary than to search carefully within the institution for possible economics that might release funds for other uses. During periods when money for expansion and even for necessary operating expenses of the existing program is difficult to obtain, institutions of higher education may well turn to the unit cost technique to improve their internal efficiency.

A study recently completed by Sundre (7), dealing with instruction efficiency and graduate production, is of particular relevance because of commonality in curricula and the use of the state colleges in North Dakota as the source of data. In the development of his study, Sundre sought to determine whether or not there existed unnecessary duplication in certain major/minor curricula. Three questions to be answered by the data were:

1. Are there certain major/minor curricula offered by the North Dakota State Colleges which have indicated inefficiency in the ratio of student credit hours taught to the full time equivalent instructors and/or a relatively low production of graduates for the academic years 1967-68 or 1968-69?
2. Is there a difference in production of graduates within any of the particular major/minor curricula between institutions when equated with the total number of graduates from each institution?
3. Is there a correlation between the "efficiency" in the ratio of student credit hours taught to full time equivalent instructions and the "production" of graduates of the same major/minor curricula when all institutions are considered?

The four state colleges that were studied by Sundre were Dickinson, Mayville, Minot, and Valley City. The major/minor curricula studied were art, business education, geography, music, physical education, and speech and drama. The conclusions established were as follows:

> There did exist some unnecessary duplication of major/minor curricula at the North Dakota State Colleges. This conclusion was based on the instruction "efficiency" as well as the graduate "production" of the curricula comparisons among the institutions.
>
> One recommendation of the study was the major/minor offering in business education and physical education be continued at all institutions. The "production" of graduates in both areas was relatively great, which reflected student demand; and the instructional "efficiency" ranked high, which indicated efficient utilization of faculty.
>
> Additional recommendations were concerned with possible revisions and deletions of major/minor offerings. These recommendations were the results of observing relatively low "production" and/or relatively low instructional "efficiency." These recommendations included: (1) that the art major/minor offering be limited to one or two institutions with special consideration given to Minot State College and Dickinson State College, (2) that the geography offering be limited to one or two institutions with special consideration given to Valley City State College and Dickinson State College, (3) that serious consideration be given to the possibility of deleting the music major/minor offering at one or more of the institutions, but no specific institution could be identified, and (4) that the speech and drama major/minor offering be limited to one or possibly two institutions, but no specific institution or institutions could be identified (7).

Sundre (7) pointed out in his final recommendations, "additional research should be initiated concerning other variables which are involved in curriculum revision decisions."

Gerber (35), in 1968, was concerned with faculty workload and unit cost on instruction in the Minnesota State Junior Colleges. Gerber was concerned with how the instructors in the Minnesota State Junior Colleges spent their time, the nature of their workload and the unit cost of instruction based on their salaries.

A portion of the findings concerning how the instructors spent their time, the nature of their workload are listed:

1. Instructors having only the Bachelor of Arts degree spent more time in instruction and less time in advising than did instructors having a greater academic preparation. Those having the most academic preparation also devoted more time to professional reading.
2. The least experienced and the most experienced instructors spent less time in administration than did those having one, two, and three years of experience.
3. The size of the college affected both the size of the classes that were taught and the number of student quarter credit hours that teachers produced.
4. The average class size per instructor, the number of different preparations that he had and the number of student quarter credit hours that his teaching load generated varied according to his teaching field (35).

The instructional costs in Gerber's study were determined on the basis of teaching salary only and a portion of the results are given below:

1. In each of the college classifications the combined subject field of English, humanities, mathematics, physical sciences, and social sciences accounted for about 75 per cent of the total teaching salary expenditures.
2. In combined classification 86.3 per cent of teaching salaries went for general education courses and 13.7 per cent went for occupational education courses (35).

The unit cost of instruction, which was determined by dividing the total teaching salary expenditures in a given field into the total student credit hours output, for each subject field were as follows:

Technical Education	$15.19
Business	9.36
Physical Sciences	9.28
Humanities	8.81
Mathematics	8.28
Physical Education	7.88
English	7.80
Biological Sciences	6.37
Social Sciences	5.27

The unit cost of instruction for all colleges for all subjects, based on teaching salaries and student credit hour output for the regular 1966-67 academic year was $7.67. The

classification of colleges with the highest enrollments had the lowest unit cost of instruction. However, the classification of colleges with lowest enrollments did not have the highest unit cost of instruction (35).

These two studies were regarded as being very significant because of their close relationship and relevance to this study.

A study conducted by Anderson (36) for the Bureau of Educational Research at the University of Illinois, determined the relationship of costs of special vocational and technical curricula in contrast to liberal arts or regular classroom type courses. The study was carried out to provide a basic knowledge of variable costs of curricula to help in planning or expanding the comprehensive type Junior College curriculum in Illinois. The Junior Colleges selected for the study were from various parts of the nation. Anderson selected two junior colleges from California, Florida, Michigan, and New York.

The study differed especially in its method for determining costs of specific curricula. The total cost of educating a student consisted of several factors. In determining cost, Anderson used administrative cost, teachers salaries, supportative instructional costs, operation and maintenance of plant, auxiliary services, fixed charges, and other identifiable expenses.

A portion of the conclusions that have a significant relationship to this study are given:

1. A majority of the vocational and technical curricula offered in comprehensive junior colleges cost more per student than liberal arts and transfer curricula in the same institution.
5. Curricula leading toward employment in Business and Office Occupations and Public Service Occupations cost slightly less per student than liberal arts and transfer curricula in the same institution.
6. The specialized courses in the vocational and technical curricula are more expensive on a student credit hour basis than courses in the general academic fields. In many

curricula the specialized courses are at least four times as costly on a student credit hour basis as the general courses. In a very few of the least expensive business curricula the cost per student credit hour was less for specialized courses than for general courses.

7. A combination of small class enrollments and large number of class contact hours required in vocational and technical courses seems to be the factors which account for most of the increased cost of education students in vocational and technical curricula when original equipment and capital outlay cost are excluded.

A report, prepared by Coffelt (22) for the Oklahoma State System of Higher Education, examined faculty teaching loads and student credit hour costs at higher education institutions in Oklahoma. This was an annual report and was designed to serve two purposes:

1. To provide the Oklahoma State Regents for Higher Education with faculty load data that will be helpful in state-wide planning and coordination of higher education.
2. To provide governing boards, college administrators faculties with objective data that will be of value in assessing the general efficiency of current instructional programs, planning future expansion of programs and services, and determining future staffing patterns and needs (22).

The eighteen institutions that were included in the report were divided into two groups. Group I included eight state institutions of higher education that offered a program leading to a graduate degree. Group II included three state institutions whose highest degree conferred was the baccalaureate degree and seven state two-year colleges. The portion of the data collected is similar to the information sought in this study. For example, total student credit hours produced, full-time-equivalent teaching faculty, average teaching load, average student credit hours produced per full-time equivalent faculty, instructional salary cost per student credit hour produced, small classes and weighted average class size were areas investigated in both studies. In the four year institutions offering no more than a baccalaureate

degree the instructional salary cost per student credit hour produced for all levels combined ranged from $13.96 to $11.26, the weighted average size class ranged from 22.0 to 26.3, the average teaching load went from 11.8 to 12.9 semester hours a semester and the average student credit hour produced per full-time-equivalent faculty ranged from 623 at the largest college to 547 at the smallest.

Anderson (37) completed a doctoral dissertation in 1963 on factors associated with instructional costs in Kansas Public Higher Education 1958-59. Anderson sought to measure the relative influence of selected factors upon the instructional unit costs of higher education. The factors selected were: individual institution, instructional types, faculty rank, class size, levels of instruction, type of instructor and subject field. Seven out of the forty-eight institutions of higher education in Kansas were chosen as the sample. Of these seven there were three types of colleges, the university, state college, and municipal type institutions. Full-time faculty members having attained the rank of instructor were included in the study. Findings of the study were:

1. Considerable variation in unit costs was found to exist between the different institutional types, but much less between institutions within a given type category.
2. Rank of faculty members appeared to have an important but less significant effect on instructional salary costs.
3. The variable of class size produced a marked difference in cost from one class size to another.
4. Level of instruction also had a dominant effect on the unit costs of instruction examined in the study.
5. Significant differences were observed to exist between instructional costs as taught under differing instructional arrangements.
6. The investigation of cost differences between subject fields revealed significant differences attributable to subject field (37).

Northern Michigan University Office of Instructional Research (38) completed an institutional study in 1966. The study was primarily

designed to provide information for the administration, department chairmen, and faculty committees to provide information for planning academic changes and policies. The report specifically stated it was not designed to indicate quality of academic instruction. The findings indicated that some departments were producing substantially more semester hours of credits per full-time-equivalent faculty than others. Departments producing the largest number of semester hours per faculty member were Geography, Economics, and Sociology, History and Philosophy, and Political Science. Departments producing the smallest number of semester hours per faculty member were Library Science, Music and Industrial Arts (38). In reference to average class size it was found the mean size of lower division courses was 27, upper division 20, and graduate 24.

In an analysis of the data collected at the University of South Florida (23) dealing with unit costs by department and level it was revealed that business administration ranked the lowest in classroom teaching salary cost and also total full-time-equivalent student cost per academic year. Music was the most expensive program in regard to salary costs and total costs. The expenditures in this unit cost study were grouped into three classifications: Classroom teaching salary, college expenditures, and general University overhead.

A unit cost study was prepared for the Public Colleges and Universities in Michigan (39) in 1969. The purposes, principles, and format were quite similar to other institutional cost studies. The study included information concerning credit hours by level, direct salary expenditure per credit hour and the different types of expenditures such as: non-instructional, direct and indirect expenditures and total expenditures per credit hours. One unique feature of the

Michigan study was that it included expenditures of off-campus instruction. It was also pointed out that the study was not conducted to streamline the budget, enable governmental officials to pinpoint areas for support, or non-support or provide proof that one institution was more effective than another. The unit cost study was prepared to provide data that, "if carefully and knowledgeably analyzed and evaluated, will enable the user to gain a better understanding of the operation of each institution" (39).

A study by the State Council of Higher Education in Virginia (24) presented a report of the resident courses taught, student credit hours produced and instructional salary costs at the state-controlled colleges and universities for the fall term of 1967-68. There were four, four-year institutions which did not offer a degree beyond the baccalaureate degree. At these four institutions, the full-time-equivalent student enrollments ranged from 1,077 at George Mason to 3,003 at Norfolk State College, the weighted average size class went from 24.2 in the institution at George Mason to 18.0 at Virginia Military Institution (V.M.I.) with an enrollment of 1,315. V.M.I. would be comparable in size to Dickinson and Valley City State in this study. The instruction salary cost per student credit produced was the highest at V.M.I. at $26.22 and lowest at George Mason with the least enrollment. The student-faculty ratio was also the lowest at V.M.I. In fact, it was the second lowest of all thirteen four-year state controlled colleges in Virginia. This was predictable, however, because V.M.I. had 104.51 full-time-equivalent teaching faculty producing the lowest numbers of student credit hours of the four institutions. However, these statistics were a rather poor base in making comparisons

without knowing the output. As Schreiber (40), a Research Analyst at Indiana University stated:

> There are many dimensions to higher education output, and a majority of these dimensions are not quantifiable. Strictly speaking, it is not valid to compare the costs of one firm or institution with another unless both are producing the same outputs.

Parry (41) completed a unit cost analysis of the educational offerings in six technical institutes and four comprehensive community colleges in North Carolina. "The major thrust of the study was to investigate the feasibility of establishing unit costs and to express these unit costs in a mathematical formula for budgetary purposes." In developing the formula, Parry sought to identify ten elements as the components of the total cost. The formula was then used as a base to determine cost per membership hour for each unit.

After applying the developed formula to the data gathered from the different area costs a consistent cost ranking for the school years of 1965-66, 1966-67 was located. From this it was determined that technical education programs were most expensive to operate, the liberal arts education which was transferrable to a four-year college was the least expensive and the vocation program was between the other two programs.

The mathematical formula developed by Parry could also be used in other institutions for budgetary purposes.

A study to develop an analytical system to determine educational program costs was completed by Robertson (42). The data for establishing the system were taken from two Michigan Community Colleges which offered educational programs for credit-transfer to a senior institution or for a position in the industrial or business community. Robertson

sought to identify key factors that comprised the expenditures per student necessary to support and foster educational programs and then attached a specific cost to each factor. This study differed from most of the other studies that have been reviewed in that Robertson tried to relate all educational expenditures to the areas and policies that were responsible for the costs. "School administrators must know the cost of an education program to effectively administer the revenue available for allocation" (42). Earlier studies that have been reviewed dealt with just instructional cost. Robertson felt the analysis of educational program costs provided "a more thorough and comprehensive way of reporting costs." One of the conclusions is of particular interest to this study:

> Both one and two-year programs which required a science major and/or extensive laboratory hours were the most costly. Factors which tend to make these educational program costs higher are: a greater number of single section courses, a higher portion of full-time instructors, a greater number of specialty courses, and a lower number of instructors having overload assignments (42).

Summary

This chapter has presented a review of the recent research and literature in the areas of unit costs and the relationship of the factors which are responsible for the variations in costs when related to different aspects of education. For the last five decades studies including cost accounting have been popular especially when emphasized to determine budget allocations. In recent years, studies involving full-time-equivalent students and the analysis of the costs have been most widely used as units of measurements. The purpose of this chapter has been to bring together the elements of earlier studies to form a theoretical framework as a basis for this study.

One point that was explicitly expressed in almost all the related literature was the hesitancy and caution on the part of the researcher to engage in any attempt to identify inefficiency or to measure quality in the educational program. The reason for this caution is that unit cost studies or any other types of study have not been successful in measuring the product or output of education. Without an evaluation of the end result, it is difficult to determine the competency of any program. Research goes as far as it is presently capable of measuring the different factors which constitute an efficient program without measuring the product. These tangible aspects of the educational program is being measured through effective projects. Examples of the different types of research are revealed in the related literature.

One difficulty in the evaluation of the educational programs is the selection of the different factors which contribute to the differences in expenditures. In the related literature, no two studies used identical factors in determining cost differences but there was a great deal of commonality of certain factors used in the research studies and the data analysis reports. From this the following factors were selected and used in this study:

1. Student-credit hours. Most studies and especially recent research used the student credit hour as the basic unit of measurement.
2. Credit hours. This factor is most common in most faculty load studies. An average base for credit hours taught is established and used in determining faculty workload.

3. Contact hours. This factor is also connected to faculty workload. Contact hours takes into consideration the number of class periods a class meets during the week.
4. Class size. This is an important factor when using student credit hours as a base. Any increase or decrease in class size can directly effect student credit hour production. (a) Weighted average size class. This is the fairest way of determining an average size class because it utilizes student credit hour totals rather than enrollment totals.
5. Level of instruction. Most studies separate the undergraduate courses into two levels or divisions when determining costs. (a) Lower level - considered the first two years of college (freshmen and sophomores). (b) Upper level - considered the third and fourth years of college (junior and senior).
6. Faculty salary. In determining instructional expenditures direct faculty salaries are used. There are other related factors which influence these salaries. (a) Degree or academic preparation - This helps to determine faculty salary and is considered as an indicator of their competence. (b) Years of experience - This also influences faculty salary and is considered as an indicator of the maturity of a faculty. (c) Rank - This is given minimal consideration because there is no uniformity of the establishment of rank.

7. Other indirect instructional duties. These duties will be given minimal consideration. They are included because they usurp a certain amount of the instructor's time. There are a variation of duties included in this area: (a) Research - Research done on your own or in the department. (b) Administration - This includes department administrative duties, committee work, and time spent on advisement. (c) Supplemental - Included in this category is time spent on extra-curricular activities such as music groups, athletic teams or student groups.

CHAPTER III

METHODOLOGY AND DESIGN OF THE STUDY

The two preceding chapters have been concerned with the purpose and the review of the related literature respectively. The methodology and design are based on those purposes and supported by the research that has been completed on unit cost studies and the factors which effect these costs.

This study is designed to determine instructional costs of student credit hour production in selected departments at the state colleges in North Dakota in order to provide information for making comparisons within and among the institutions selected. It is also the intent of this study to determine some factors which contribute to the differences in these instructional costs. Chapter III describes the design and methodology used to achieve the purpose of the study.

This chapter is divided into three sections. The first section describes the sources of data and the techniques used to gather the data. The second section describes the processing of the data and the third section includes the statistical methods applied and a summary of the methodology described in this chapter.

Source of Data

There are four institutions in North Dakota which are state supported and offer four-year programs predominantly in teacher education.

These four state institutions are Dickinson, Mayville, Minot and Valley City State Colleges. The State Board of Higher Education in 1968 established guidelines for the furthering of higher education in North Dakota. The board made the following identical recommendation for all four state colleges:

> Teacher education should continue to be the primary purpose of this institution. Although (Dickinson, Mayville, Minot, Valley City) it is authorized to grant the B. A. Degree, it is recommended that no majors be offered for this degree that resources be used to strengthen the teacher education program (5).

The four teacher education institutions are organized and administered along similar lines. They emerged from earlier institution-types known as normal schools with Valley City State Teachers College being the first to grant the bachelor's degree in 1921 (3). The others were given the same authorization within the next ten years.

Of these four institutions, according to the 1970 fall enrollment (6), Minot State College had the largest enrollment with 2615 full-time equivalent students. Dickinson State College was next with 1598 followed by Valley City State College with 1343 and Mayville State College with 865.

Since all four institutions have similar roles to perform in higher education in North Dakota, it is expected that curricula offering would likewise be similar. All four institutions offer the bachelor of science degree for elementary, junior and senior high school teachers and the bachelor of arts for those not seeking teacher certification (43, 44, 45, 46). In addition to these four year degrees, the institutions offer a variety of pre-professional, terminal or general curricula for transfer or for students who desire less than four years of college. Minot State College is the only institution to offer graduate work. This institution offers a Master of Science Degree of Speech and Hearing (45).

The four state institutions have a variety of curricula offerings and a student seeking a bachelor's degree has an opportunity to select a major in several different fields. However, all the major and minor curricula offerings are not identical at the four institutions. Some institutions may offer a major in one field while another institution will only offer a minor. Basically the programs at the four state colleges are quite similar with all four institutions offering a major in nine identical fields. These nine major fields have been selected for examination in this study. These fields include the major areas of art, biology, business education, chemistry, social science, mathematics, English, music, and physical education. Along with these nine major fields, one other area was selected, that of professional education. This area was selected because the function of these four state institutions is to educate future teachers and a major emphasis is placed on the field of professional education courses in all four institutions.

Since all four institutions have similar major areas of concentration there exists the possibility that there are differences in instructional salary expenditures in producing student credit hours in each of these major fields. When the differences have been determined it will be necessary to examine the factors which contribute to these differences to evaluate the major program offerings. Therefore, the ten major areas provide the basis for making comparisons within each institution and between the four state colleges of North Dakota.

The raw data used in this study were drawn from the faculty and student data collected by the North Dakota Higher Education Facilities Commission. There are three main stores of data involved. The data concerning courses taught, contact hours, credit hours, faculty work

hours per week, committee assignments, advisees, percentage of time spent on direct and indirect instruction, supplementary instruction, research, administrative service, other activities, and activities outside of school were taken from the information provided by the individual faculty members for the Higher Education Facilities Commission. This information is supplied each quarter by each faculty member on a sheet called Form "F" and sent to the State Board of Higher Education at Bismarck. An example of the form and instructions for filling the form out are located in Appendix A. The data concerning individual class enrollments was taken from the student data forms. A sample of this form may be found in Appendix B. This is a student class schedule which is filled out by the student at the time of registration. Class drops and adds are kept current through the third week of the quarter. After the third week, these forms are sent into the State Board of Higher Education at Bismarck to provide information on class enrollment. The third store of data involved concerns information about the faculty employed at the state institutions. This information included faculty salary, rank, degree, college experience, related experience, and the percentage of instructional time spent in a department. These data were taken from a faculty information form which is completed by the Academic Deans at each institution and sent to the State Board of Higher Education. A cross examination of faculty salaries was also made by using the North Dakota Executive Budget (47). A section of this budget deals with institutional expenditures and includes individual faculty salaries by department. One other cross examination was made and that was in the area of instructional time devoted to a department. As stated before, the source of this data was the faculty information form supplied by the institution's central

office but a check could be made by comparing this information with the instructor's salary outlined in the Executive Budget. A third check was made by examining the course numbers taught by the individual instructors on the faculty load form. If a discrepancy was found, the instructional time was divided into different departments according to the courses the instructor actually taught and not from the department to which he was assigned, or the department that paid his salary.

The reason for a close cross examination of this data is that full-time equivalent instructors by department is a very critical aspect of this study. If only one half an instructor is added or subtracted from a department it makes a difference in student credit hour instructional costs. This is especially true in a small departmental instructional staff.

Processing of the Data

The information on individual faculty and form "F" along with the student class data was received from the project director of the North Dakota Higher Education Facilities Commission, Thomas Johnson. One of the first steps after receiving the information was to prepare it for a computer program. The data were transposed to Fortran Coding Forms and punched on I.B.M. cards, and run through the computer. This produced a printout of specific data on each faculty member at all four state colleges. The data were then transferred to a special work sheet specifically designed for this study. The purpose of the work sheet was to transfer individual statistics into departmental statistics. This was done by hand to correct any errors or discrepancies that had occurred with individual faculty members. There were a total of thirty

items on the departmental worksheet. The steps for processing the data, after it was transferred from the computer prinout to departmental worksheet, are listed below:

1. Determine the percentage of time an instructor spends in a department. Check the course numbers of classes listed on the printout against the departmental budget and the percentage of time listed by the college. Add the number of full-time equivalent instructors in the department.

2. Determine the instructional salary according to the percentage of full-time equivalent instructors teaching in the department. This study is based on the fall quarter, which is one third of the nine month teaching period. The salary for a full-time equivalent instructor is one third the nine month salary. Salaries are tabulated for both the nine month and three month salary periods of employment. If an instructor taught less than full-time in a department the salary expenditure for that instructor in that department corresponded with the percentage of time he devoted to that department. In short, the instructional salary was determined by dividing the number of full-time equivalent instructors in a department into one third of the total salary for the department.

3. Determine the number of student credit hours produced by each department. As stated earlier this is taken from the data on student class schedules received and tabulated by the Higher Education Study. After transferring this to the worksheet, class enrollments for individual instructors were added up to determine a total student credit hours produced in each major field.

4. Determine the instructional salary expenditure per student credit hour in each major field. This is obtained by dividing the total number of student credit hours produced in a major field (step #3) into the total salary received by full-time equivalent instructors in that major field for fall quarter (step #2). This produces the average instructional salary expenditures in dollars and cents for producing each student credit hour in the respected major field.

5. Total the columns of the different factors. These factors include: rank, degree, college experience, related experience, advisees, committee assignment, average hours per week, per cent of direct and indirect instruction, per cent of supplementary instruction, research, administrative service, outside school activities, different preparations, contact hours, credit hours, average size of upper division and average size class in lower division, and number of small classes.

6. Determine a major field average for certain factors by dividing the total number of faculty teaching in the major field into these factors: rank, degree, college experience, related experience, outside school activities, and average hours per week.

7. Determine a major field average for the other factors by dividing the total of full-time equivalent faculty teaching in the major field into the following factors: advisees percentage of direct and indirect instruction, per cent of supplementary instruction, research, administrative service, different preparations, number of classes on upper and lower level, contact hours, credit hours and average size of upper and lower division classes.

8. Determine weighted average size of classes taught. The weighted average is derived by dividing the student credit hours in each major field by the number of credit hours taught in that field.

This procedure was followed for each of the major areas in each of the four institutions.

The organization for the preceding data followed a similar pattern to the one already established in this study. The data were summarized in three sections. The first section was concerned with the instructional salary expenditures and student credit hour production. The second section dealt with tabulating the influencing factors effecting instructional costs within each institution and within each major area. A rank ordering of each influencing factor was also established and placed in the appendix for future reference. The rank ordering tables do not directly apply to the analytical procedure established to determine the factors which effect instructional costs within institutions or within major areas. However, the rank ordering tables do provide an opportunity for cross-college inspection and comparison. The third section of the organization of data involved the statistical testing.

Organization of Summary Tables

Instructional Costs and Student
Credit Hour Production

1. Number of full-time equivalent faculty in each major area at each institution.
2. Average instructional salary per full-time equivalent faculty in each major area at each institution.
3. Instructional salary expenditures per student credit hour produced in each major area in each institution.

4. Student credit hours produced per full-time equivalent instructor in each major area at each institution lower division.
5. Student credit hours produced per full-time equivalent instructor in each major area at each institution upper division.
6. Student credit hours produced per full-time equivalent instructor in each major area at each institution both divisions combined.

Factors Effecting Instructional Costs

1. Per cent of instructional time spent in producing upper division student credit hours by full-time equivalent instructors in each major area in each institution.
2. Weighted average class size in each major field at each institution.
3. Number of small classes in each major area at each institution.
4. Data averages for each major program offering--Factors influencing instruction cost differences at Dickinson State College.
5. Data averages for each major program offering--Factors influencing instruction cost differences at Mayville State College.
6. Data averages for each major program offering--Factors influencing instruction cost differences at Minot State College.

7. Data averages for each major program offering--Factors influencing instruction cost differences at Valley City State College.
8. Data averages for Art--Factors influencing instructional cost differences.
9. Data averages for Biology--Factors influencing instructional cost differences.
10. Data averages for Business Education--Factors influencing instructional cost differences.
11. Data averages for Chemistry--Factors influencing instructional cost differences.
12. Data averages for Social Science--Factors influencing instructional cost differences.
13. Data averages for Mathematics--Factors influencing instructional cost differences.
14. Data averages for English--Factors influencing instructional cost differences.
15. Data averages for Music--Factors influencing instructional cost differences.
16. Data averages for Physical Education--Factors influencing instructional cost differences.
17. Data averages for Professional Education--Factors influencing instructional cost differences.
18. The rank ordering of selected curricula according to factors affecting instructional cost (Appendix C).

Analysis of Data

The preceding summary charts will be presented in Chapter IV together with brief explanations of each chart. Chapter V will include the main conclusions and recommendations of the study.

The analysis of the data was done by inspection, description, comparison, and statistically. The judgmental decisions are based on the inter-institutional and intra-institutional comparisons of factors. Averages are presented to indicate the mid-point of the factors used in making comparisons.

The statistical methods applied to the data were the analysis of variance, correlation analysis of factors and the setwise regression analysis.

The analysis of variance was used to determine the significant difference of factors effecting instructional cost within and among the four state colleges. The null hypothesis assumed there was no difference among the factors effecting student credit hour instructional costs between the colleges and among the departments within the four state colleges. The one per cent level of significance was chosen as the level necessary to reject the null hypothesis.

The second statistical method applied to the data was the correlation of factors effecting student credit hour instructional costs. This analysis was used to determine factors that have an effect on instructional costs. The null hypothesis assumed there was no significant difference in the factors which effected student credit hour instructional costs. The one per cent level of significance was chosen to reject the null hypothesis.

The third statistical method applied to the data was a setwise regression analysis. This technique was recently developed by Williams and Lindem (48) as an analytic method to allow sets of variables to be eliminated in a regression procedure. This technique was applied to the data to eliminate sets of factors in the regression order, determined by their effect on instructional costs. The factors which effected instructional costs the least were eliminated first and the factors which had the greatest effect on instructional costs were eliminated last.

CHAPTER IV

ANALYSIS OF DATA

Chapter IV is devoted to the presentation and analysis of the data. The data are presented in table form with brief explanations to better facilitate the interpretation of the information concerning the selected major areas in this study. The pattern followed for the presentation of these data in table form is identical to the organization of data outlined in the latter part of Chapter III. The data in each table are briefly described and certain aspects are identified. The data are presented in such a manner that comparisons within and among institutions can be made.

In order to determine differences in instructional salary costs it is necessary to determine instructional salary expenditures and student credit hour production; therefore the summary tables are developed to follow this pattern. The first section of this chapter presents data which are concerned with instructional salary costs and student credit hour production. After the cost differences were presented it was necessary to inspect the factors which contribute to the differences.

The second section of this chapter includes the summary tables of factors which have an effect on instructional salary costs. The summary tables represent data for making comparisons first between departments within each institution and secondly in departments in all four institutions. The rank order of selected curricula was also established for making comparison among the selected curricula in all institutions.

The third section of this chapter presents the results of three types of statistical testing. The analysis of variance was the statistical method applied to determine significant differences in inter-institutional and intra-institutional comparisons. Coefficient correlation was the statistical method used to determine a relationship of the different factors and the effects each factor had on instructional salary cost differences. The third statistical technique used was the setwise regression analysis which calculated the set of factors which had the least effect on instructional salary cost in a regression type process until the factor which had the greatest effect on salary cost remained.

The Data Summary

Table 1 presents the number of full-time equivalent faculty in each major area at each institution. A full-time equivalent instructor is one who devotes 100 per cent of his teaching assignments to a department. The teaching assignments were determined by the classes the instructor taught. The instructor who divided his teaching duties between different departments was calculated into the average of a full-time equivalent instructor on the basis of classes he taught. Included in the data are instructors who gave part-time service to the institution. An example is someone in the community who taught one or two courses. This part-time instructor is computed as a fraction of a full-time equivalent instructor.

The table also presents the average of full-time equivalent instructors for each major area which were common in the four state colleges. An average and total of full-time equivalent faculty for the four institutions is also presented.

TABLE 1

NUMBER OF FULL TIME EQUIVALENT FACULTY BY MAJOR AREA AT EACH INSTITUTION

	Dickinson	Mayville	Minot	Valley City	Department Average
Art	3.50	1.	4.	1.75	2.56
Biology	4.	1.75	8.	1.75	3.87
Business Education	8.	3.15	11.	2.50	6.16
Chemistry	3.	1.30	5.	1.50	2.70
Social Science	6.	5.05	14.50	9.	8.63
Mathematics	6.	2.	8.	3.25	4.81
English	8.	4.70	13.40	8.75	8.71
Music	7.25	5.	12.75	5.75	7.68
Physical Education	9.	6.75	13.00	8.	9.18
Professional Education	8.25	6.85	13.50	12.00	10.15
Total	63.	37.6	103.2	54.3	

It should be noted that the full-time equivalent student enrollment at the four state colleges correspondents with the number of full-time equivalent faculty. Minot with an enrollment of 2615 has the highest number of full time faculty. Dickinson with an enrollment of 1598 is next followed by Valley City with an enrollment of 1343 and Mayville with an enrollment of 865 has the least number of full-time equivalent faculty. The department with the least number of full-time equivalent faculty is the Art Department at Mayville with one full time

faculty member. The Social Science Department at Minot had more full-time equivalent faculty than other departments. The highest average of full-time equivalent instructors for the four state colleges is in the area of Professional Education.

There was also a greater tendency for smaller institutions to divide the instructional time of the instructors into other departments. As the institution increased in size the diversion of full-time equivalent faculty tended to decrease. Minot had fewer faculty teaching in more than one department than did Mayville and Valley City.

Table 2 presents the average instructional salary per full-time equivalent faculty in each major area at each institution. The average salary for each major area within the four state colleges is presented together with an average for each institution. The data on salaries are tabulated for nine months of employment with quarter salary averages in the parentheses. If an instructor taught less than full time in a department the salary expenditure for the instructor in the department corresponded with the percentage of time he devoted to the department. Both nine-month and three-month salary averages are presented for comparison convenience. The reason for presenting two salary figures is because the three-month salary is the actual salary expenditure used for the 1970 fall quarter and the nine-month salary is the salary used to compute the three-month salary.

There is one exception when considering average salary in Table 2. In the data presented in Table 1 there is only one full-time equivalent instructor in the Art Department at Mayville. The salary for Art Instruction at Mayville is paid to one instructor

TABLE 2

AVERAGE INSTRUCTIONAL SALARY PER FULL TIME EQUIVALENT FACULTY IN EACH MAJOR AREA AT EACH INSTITUTION

	Dickinson	Mayville	Minot	Valley City	Department Average
Art	$10,085.73 (3361.91)	$12,825.00 (4275.00)	$8,911.24 (2937.08)	$9,442.86 (3147.62)	$10,316.20 (3438.73)
Biology	10,800.00 (3600.00)	10,825.71 (3608.57)	10,901.88 (3633.96)	10,145.00 (3381.67)	10,668.14 (3556.04)
Business Education	10,242.85 (3414.28)	10,425.71 (3475.24)	9,780.90 (3260.30)	10,163.63 (3388.34)	10,153.27 (3384.42)
Chemistry	11,167.68 (3722.56)	10,386.58 (3462.19)	11,457.99 (3819.33)	11,800.35 (3933.45)	11,203.15 (3734.38)
Social Science	9,995.83 (3331.94)	10,457.97 (3485.99)	9,908.40 (3302.80)	10,021.00 (3340.33)	10,095.80 (3365.26)
Mathematics	9,817.50 (3272.50)	11,229.75 (3743.25)	9,892.50 (3297.50)	9,800.00 (3266.67)	10,184.93 (3394.97)
English	9,606.36 (3202.12)	9,533.97 (3177.99)	9,060.44 (3020.14)	9,196.00 (3065.33)	9,349.19 (3116.39)
Music	10,306.90 (3435.63)	9,399.60 (3133.20)	9,994.22 (3331.41)	9,436.98 (3145.66)	9,784.42 (3261.47)
Physical Education	9,080.55 (3026.85)	9,201.09 (3067.03)	8,486.31 (2828.77)	9,807.31 (3269.10)	9,143.81 (3047.93)
Professional Education	11,227.27 (3742.42)	10,537.48 (3512.49)	11,156.58 (3718.86)	10,406.25 (3470.14)	10,831.89 (3610.63)
Institution Average	10,233.07 (3411.02)	10,482.86 (3494.10)	9,955.05 (3315.02)	10,021.94 (3340.83)	

and therefore is not an average. This is one instructor's full salary and is the only situation where an average is not taken.

Table 3 presents the instructional salary expenditures per student credit hour produced in each major area at each institution. The departmental average and institution average is also presented. The

TABLE 3

INSTRUCTIONAL SALARY EXPENDITURES PER STUDENT CREDIT HOUR PRODUCED IN EACH MAJOR AREA AT EACH INSTITUTION

	Dickinson	Mayville	Minot	Valley City	Department Average
Art	$21.91	$ 9.08	$ 8.48	$14.02	$13.37
Biology	10.85	8.19	10.02	8.86	9.48
Business Education	8.40	7.59	7.61	7.51	7.77
Chemistry	10.32	15.52	15.49	18.21	14.88
Social Science	6.32	6.40	6.48	6.59	6.44
Mathematics	9.44	8.63	8.39	7.52	8.49
English	10.06	10.08	12.33	11.69	11.04
Music	19.93	18.43	34.48	17.53	22.59
Physical Education	9.51	14.22	12.84	11.85	12.10
Professional Education	8.01	10.26	14.43	11.03	10.93
Institution Average	11.48	10.84	13.06	11.48	

instructional salary expenditure was computed by dividing the total student credit hours produced in each major area into the instructional salary allocations for the same area. This measure indicates how much instructional salary is used in producing one student credit hour in the indicated major area of the institution. The range in student credit hour instructional costs is quite great. The Music Department at Minot has the highest instructional cost per student credit hour at $34.48, while the Social Science Department at Dickinson tabulated $6.32 which is the least expensive. This is only one aspect of the program and the factors effecting these costs must be considered before drawing any conclusions. The factors effecting high and low costs will be presented in this chapter, and the facts illustrated in Chapter V.

Table 4 presents the lower division student credit hours produced by full-time equivalent instructors in each major field at the four institutions. Averages for each department are included in the column on the right. Institutional averages are also presented. The level of instruction relates to the qualifications of the students for whom the class is intended. The lower level of instruction has references to students at the freshmen and sophomore level or classes with a 100 or 200 course number. The data in Table 4 represent the number of credit hours produced at the lower level in each major area. The lower and upper levels of instruction in each major department were separated to clarify instructional costs in the major areas. Lower level classes have a tendency for larger than average enrollments, less specialization and individualized instruction.

TABLE 4

LOWER DIVISION STUDENT CREDIT HOURS PRODUCED BY FULL-TIME EQUIVALENT INSTRUCTORS IN EACH MAJOR FIELD AT EACH INSTITUTION

	Dickinson	Mayville	Minot	Valley City	Department Average
Art	417	441	1111	282	562
Biology	879	715	2471	836	1225
Business Education	1343	907	2891	650	1447
Chemistry	1015	210	1112	218	638
Social Science	2163	2325	5249	3224	3240
Mathematics	1799	676	2864	1156	1623
English	1947	1295	2865	1757	1966
Music	587	754	936	854	782
Physical Education	1996	973	1821	1033	1455
Professional Education	1306	392	876	928	875
Institution Average	1345	869	2220	1094	

Table 5 presents upper division student credit hours produced by full-time equivalent instructors in each major area and averages for each department and each institution. The upper division courses are offered to juniors and seniors and carry 300 and 400 course numbers. These classes tend to be smaller in size, more individualized and thus more expensive which is indicated in a lower student credit hour production.

TABLE 5

UPPER DIVISION STUDENT CREDIT HOURS PRODUCED BY FULL-TIME EQUIVALENT INSTRUCTORS IN EACH MAJOR AREA AND AVERAGES FOR EACH DEPARTMENT

	Dickinson	Mayville	Minot	Valley City	Department Average
Art	120	30	275	111	134
Biology	447	56	430	214	286
Business Education	1502	535	1817	590	1111
Chemistry	67	80	125	106	94
Social Science	998	427	2137	1522	1271
Mathematics	281	192	282	256	252
English	597	186	419	534	434
Music	661	96	296	178	307
Physical Education	870	482	860	1170	845
Professional Education	2547	1953	2604	2848	2488
Institution Average	809	404	925	753	

The data presented in Tables 5 and 6 serve a dual purpose. First they are essential in determining student credit hour production used in calculating credit hour cost and secondly they serve as factors which help indicate differences in cost of producing credit hours. The summary table illustrates professional education as an area in which a larger percentage of instruction time is spent with upper division students which indicates one factor in raising student credit hour instructional costs.

Table 6 presents the student credit hours produced by full-time equivalent instructors in each major area at each institution both divisions combined. Departmental and institutional averages are also presented. These data are calculated by taking the student credit hours produced in each major area divided by the number of full-time equivalent instructors in the department. The individual class enrollments for determining student credit hours were taken from the student data form. A sample of this form is found in Appendix B.

TABLE 6

AVERAGE NUMBER OF STUDENT CREDIT HOURS PRODUCED BY EACH FULL-TIME INSTRUCTOR IN EACH MAJOR AREA AT EACH INSTITUTION BOTH DIVISIONS COMBINED

	Dickinson	Mayville	Minot	Valley City	Department Average
Art	153	471	345	224	289
Biology	332	441	363	381	379
Business Education	406	457	428	451	435
Chemistry	361	223	247	216	261
Social Science	526	541	509	506	520
Mathematics	347	434	393	435	402
English	318	316	245	262	285
Music	172	170	97	180	154
Physical Education	318	216	206	276	254
Professional Education	453	342	258	315	342
Institution Average	339	361	309	325	

Table 6 is also an illustration of student-teacher relationships. The instructors in the Social Science departments in all four institutions produced a larger number of student credit hours when compared to other departments especially the areas of Art and Music, and consequently this limited their time for individual relationships with their students.

Table 7 presents the weighted average class size in each major field at each institution together with averages for departments and

TABLE 7

WEIGHTED AVERAGE CLASS SIZE IN EACH MAJOR FIELD AT EACH INSTITUTION

	Dickinson	Mayville	Minot	Valley City	Department Average
Art	12.2	15.7	21.7	14.6	16.0
Biology	31.6	35.0	51.8	23.3	35.4
Business Education	31.6	28.3	31.8	28.8	30.1
Chemistry	29.2	12.6	37.5	10.8	22.5
Social Science	35.1	38.2	39.9	32.6	36.5
Mathematics	28.1	28.9	29.7	28.2	28.7
English	27.4	26.	20.4	20.8	23.6
Music	16.0	25.0	16.2	12.1	19.6
Physical Education	34.1	29.7	24.4	29.4	29.4
Professional Education	29.9	24.7	28.1	12.9	23.9
Institution Average	27.5	26.4	30.1	21.4	

institutions. The weighted average class size is derived by dividing the student credit hours in each major field by the number of credit hours taught in the field. The weighted average size class considers credit value of classes in place of considering size alone. The data in summary Table 7 indicated the Biology Department at Minot had an average of 51.80 students which was the largest average size class. The weighted average size class in Minot's Biology Department had an average of 12 students more than the next highest department. The reason for the high average in biology at Minot was revealed in the manner in which class enrollments were recorded. The Biology Department at Minot divides their classes into large group instruction and small group laboratory classes. All credit hour production is given to the large group classes with laboratory work a requirement of the class but no credit allotted. All other departments divide the allocation of credit production to correspond with the different types of class instruction.

Table 8 presents the number of small classes in each major area at each institution and includes institution totals. The minimum enrollment for a class to be classified in the small class category is arbitrarily set at ten or fewer students. The number of small classes in a major area has an influence on the instructional cost of student credit hours, however other factors must be considered. For example, the data in Table 8 indicate the Music Department at Valley City as having 37 small classes. This large number of small classes would indicate low student credit production and high instructional costs. The data in Table 6 indicated the faculty in the Music Department at Valley City produce an average of 180 student credit hours which is the highest of

the four state college music departments. An inspection however of the data in Table 12 indicate the faculty in the Valley City Music Department as having 9.2 different preparations. To compensate for the large number of small classes more classes are assigned to faculty members.

TABLE 8

NUMBER OF SMALL CLASSES IN EACH MAJOR AREA AT EACH INSTITUTION

	Dickinson	Mayville	Minot	Valley City
Art	3	8	1	2
Biology	1	0	3	1
Business Education	2	1	2	1
Chemistry	1	1	5	4
Social Science	1	0	2	2
Mathematics	0	0	4	1
English	2	1	5	3
Music	2	3	14	37
Physical Education	2	2	0	1
Professional Education	0	0	2	9
Total	14	16	39	61

Tables 9, 10, 11 and 12 present the data averages of factors effecting instruction costs in each major program offering at Dickinson, Mayville, Minot and Valley City State Colleges. The data in summary Tables 9, 10, 11 and 12 represent an average of all instructors within

each department in the four institutions. The data were determined from information provided by individual faculty from each institution on Form "F." An example of this form and the instructions for filling the form out are found in Appendix A. The individual information was transmitted into major area averages and presented in tabular form.

To facilitate intra-institutional comparisons the data are presented for each institution separately. To facilitate inter-institutional comparisons, data are presented by major program offering for all the institutions. The rank order of the most influential factors of effecting student credit hour costs is found in Appendix C and established to make cross-college comparisons of all major program offerings. Conclusions concerning intra-institutions and inter-institution comparisons are reserved for Chapter V.

In the column on rank, numbers were used in place of rank titles. The number 2 represents instructor, 3 represents assistant professor, 4 represents associate professor and 5 represents professor.

In the degree column, the number also represents a degree or a step interval toward a degree. The number 1 represents a Bachelor's Degree, 2 represents a Master's Degree, 3 represents a Masters plus 20 hours, 4 represents Masters plus 40, 5 represents a specialist degree and 6 represents the Doctoral Degree.

The column on teaching experience is divided into college teaching and related experience. Related teaching experience has reference to public or private school education at either the elementary or secondary level. Certain types of professional experiences are also included.

The explanation for the information included in advisees, committee assignment, average hours per week, per cent of direct and indirect instruction, per cent of supplementary instruction, per cent of research, per cent of administrative service, and hours of outside school activities is found in Appendix A and will not require further explanation.

The column on different preparations, contact hours, and credit hours are averages taken from the full-time equivalent instructors in each major area.

The average size classes are divided into lower and upper division to facilitate comparisons between these two divisions within each major area. The data presented on per cent of instruction time devoted to producing upper division student credit hours represents a percentage of instructional time spent in producing upper division credit hours. This percentage is derived by dividing the total student credit hours produced into the upper division credit hours. The data are taken from Tables 4 and 5 which represent the student credit hours produced in lower and upper divisions within each department.

Table 9 presents the data averages for major program offering at Dickinson State College. The data indicate that the faculty teaching in the physical education department hold less than a master's degree. The teaching experience in all departments is similar with the exception of the professional education department which is above all others in related experience. This is an indication of valuable experience at the elementary and secondary teaching level. The English department has a much higher percentage of direct and indirect

TABLE 9

DATA AVERAGES FOR EACH MAJOR PROGRAM OFFERING--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES AT DICKINSON STATE COLLEGE

	ART	BIOLOGY	BUSINESS EDUCATION	CHEMISTRY	SOCIAL SCIENCE	MATHEMATICS	ENGLISH	MUSIC	PHYSICAL EDUCATION	PROFESSIONAL EDUCATION	INSTITUTION AVERAGES
Rank	3	4.2	3.1	4.2	3.6	3.3	3.3	2.8	2.8	4.2	3.5
Degree	3.8	4.4	2.9	5.	4.	2.7	2.4	3.4	1.7	4.4	3.5
College Experience	8.2	9.6	4.6	4.8	5.9	6.7	8.6	7.9	5.9	8.9	7.1
Related Experience	2.5	.8	5.1	.8	2.1	5.6	2.9	5.5	6.6	13	4.5
Weighted Average Size Class	12.2	31.6	31.6	29.2	35.1	28.1	27.4	16	34.1	29.9	27.5
Number of Small Classes	3	1	2	1	1	0	2	2	2	0	1.4
Average Hour Per Week	62.5	60.8	51	66	54.7	63.7	58.3	53.6	56.7	52.2	60
% of Direct and Indirect Instruction	78.5	79.4	77.3	80.2	81.3	52.7	87	72.9	60.9	82.1	75.2
% of Supplementary Instruction	2.	3.	9.6	2.5	5.3	4.6	2.3	13.8	22	.4	6.6
% of Research	8.4	3.6	3.1	6.8	1.6	3.7	5.1	3.1	3.5	3.9	4.1
% of Administrative Service	11.	14.	9.8	8.	9.9	22.9	5.	9.8	13.4	11.2	11.5

TABLE 9---Continued

	ART	BIOLOGY	BUSINESS EDUCATION	CHEMISTRY	SOCIAL SCIENCE	MATHEMATICS	ENGLISH	MUSIC	PHYSICAL EDUCATION	PROFESSIONAL EDUCATION	INSTITUTION AVERAGES
Hours Spent on Outside School Activities	9.8	2.2	3.1	3.5	4.7	3.1	2.7	2.6	10.7	6.	4.8
Different Preparations	3.7	2.5	3.2	3.	3.8	3.3	2.8	4.6	4.3	1.9	3.3
Contact Hours	19.7	13.3	13.8	21	14.7	14.3	11.6	22.2	13.8	16.	16
Credit Hours	12.6	10.5	12.8	12.3	15.	12.3	11.6	10.7	9.3	15.2	12.1
Average Size Class Lower Level	18.3	32.2	21.3	47.7	22	34	37.6	20	23.3	15.9	27.2
Average Size Class Upper Level	6	25	30.6	3	51.8	8.8	17.9	19.7	30.3	34.7	22.8
% of Time Spent in Upper Division	22.3	33.7	52.8	6.1	31.5	13.5	23.4	52.9	30.3	66.1	33.3
Cost Per Student Credit Hour	21.91	10.85	8.40	10.32	6.32	9.44	10.06	19.93	9.51	8.01	11.48

instruction when compared to the Mathematics Department. The data indicate that the Mathematics Department members spend a high percentage of their time in administrative services. In comparing contact hours, the data indicate music, art, and chemistry higher than the other departments. By using credit hours with contact hours a 2 to 1 ratio develops. Two contact hours are required for one credit hour in music, art, and chemistry but this same factor is not indicated in English or social science where a one for one relationship is evident. Social Science and professional education are the two departments with highest numbers of credit hours while physical education had the lowest.

Table 10 presents the data averages for major program offerings at Mayville State College. As indicated earlier the Art Department has one instructor and the data in the art column is not an average but a reflection on the work of one instructor who holds a doctor's degree and has been in the department a large number of years. The physical education department is the only department with an average degree less than a master's degree. With the exception of the Art Department, the English Department has the highest average in number of years of college teaching experience. Physical Education indicates the lowest average percentage in direct and indirect instruction but have the highest percentage in supplementary instruction. This indicates almost one fourth of the instruction time is spent on extra curricular activities. The Business Education Department has the highest average of administrative services and indicates one-fourth of their time spent on administrative service. The Art Department leads all other departments in different preparations, contact hours and credit hours. The

TABLE 10

DATA AVERAGES FOR EACH MAJOR PROGRAM OFFERING--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES AT MAYVILLE STATE COLLEGE

	ART	BIOLOGY	BUSINESS EDUCATION	CHEMISTRY	SOCIAL SCIENCE	MATHEMATICS	ENGLISH	MUSIC	PHYSICAL EDUCATION	PROFESSIONAL EDUCATION	INSTITUTION AVERAGES
Rank	5.	4.	3.4	3.7	3.5	3.7	3.4	3.2	2.6	3.7	3.6
Degree	6.	4.	3.6	4.	3.6	3.7	3.1	3.	1.8	4.2	3.7
College Experience	21	6.5	3.6	9.3	7.6	5.7	10.7	3.8	5.8	6.7	8.1
Related Experience	5.	5.	4.8	11.7	12.6	1.3	9.4	8.8	3.8	12.2	7.5
Weighted Average Size Class	15.7	35	28.3	12.6	38.2	28.9	26	25	29.7	24.7	26.4
Number of Small Classes	8	0	1	1	0	0	1	3	2	0	1.6
Average Hour Per Week	40	57.5	50.1	55.7	51	58	54.7	54.6	58.6	51.3	53.2
% of Direct and Indirect Instruction	93	75	62.8	72.3	72.7	75	67.9	71.6	51.6	67.3	70.9
% of Supplementary Instruction	0	3.5	5.8	2.3	6.3	6.3	4.7	8	23.6	2.7	6.3
% of Research	0	9.	3.6	7.	14.1	5.	6.	7.4	3.2	4.3	5.3
% of Administrative Service	7.	5.	25.6	18.3	6.9	9.7	14.6	13	13.8	21.3	13.5

TABLE 10--Continued

	ART	BIOLOGY	BUSINESS EDUCATION	CHEMISTRY	SOCIAL SCIENCE	MATHEMATICS	ENGLISH	MUSIC	PHYSICAL EDUCATION	PROFESSIONAL EDUCATION	INSTITUTION AVERAGES
Hours Spent on Outside School Activities	0	7	2.4	4.7	4.4	3.7	3.	4.2	9.9	3.9	4.3
Different Preparations	8.	2.9	3.8	2.2	2.8	3.5	2.3	3.2	4.3	2.3	3.5
Contact Hours	46	21.1	18	19.4	13.5	16	14	23.4	12.6	9.3	19.3
Credit Hours	30	12.6	16	12.7	14.3	15	12.1	6.8	7.3	13.9	14.1
Average Size Class Lower Level	15	49	38.1	8.3	45	60	41.5	28.8	32	7.2	32.5
Average Size Class Upper Level	3	14	17.7	15.6	29.1	21.5	5.7	10.2	18.4	38.	17.3
% of Time Spent in Upper Division	6.3	7.2	37.1	27.5	15.5	22.1	12.5	11.2	33.1	83.2	25.6
Cost Per Student Credit Hour	9.08	8.19	7.59	15.52	6.40	8.63	10.08	18.43	14.22	10.26	10.84

contact hours with 46 and credit hours at 30 tend to be unusually high when compared with other departments. In the departments requiring laboratory classes and also in the area of music there is a greater difference between contact and credit hours.

Table 11 presents the data averages for major program offerings at Minot State College. The Physical Education and English Departments do not have degree averages that are equivalent to a master's degree. Biology and chemistry indicate the highest averages in college teaching experience. Biology, on the other hand, has by far the lowest average in related teaching experience. Physical education averages for direct and indirect instruction are the lowest of any department but the highest in supplementary instruction which indicates that almost 30 per cent of their time is spent on extra curricular activities. The Music and Art Department indicate a greater number of hours spend on outside school activities. The Music Department indicates the greatest difference between contact hours and credit hours followed closely by the Chemistry and Biology Department. There are three departments that indicate a greater average number of credit hours than contact hours. Art, mathematics, and professional education tend to have less student-teacher contact than credit received for the class.

Table 12 presents the data averages for major program offerings at Valley City State College. The Business Education Department and Music Department both have an accumulation of degrees below the masters level average. The Biology, Social Science, and Mathematics Departments have high averages in college teaching experience. If related experience is included the Biology Department has an average of 23.7 years of

TABLE 11

DATA AVERAGES FOR EACH MAJOR PROGRAM OFFERING--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES AT MINOT STATE COLLEGE

	ART	BIOLOGY	BUSINESS EDUCATION	CHEMISTRY	SOCIAL SCIENCE	MATHEMATICS	ENGLISH	MUSIC	PHYSICAL EDUCATION	PROFESSIONAL EDUCATION	INSTITUTION AVERAGES
Rank	2.8	4.1	2.9	4.	3.5	3.1	2.8	3.1	2.5	3.5	3.2
Degree	2.5	5.5	2.4	5.2	3.	2.5	1.8	2.4	1.6	3.9	3.1
College Experience	2.2	13.	6.1	11.4	10.8	9.2	7.1	5.8	4.1	8.8	7.9
Related Experience	3.5	.4	5.6	1.4	6.1	2.9	4.8	6.	8.2	11.1	5.
Weighted Average Size Class	21.7	51.8	31.8	37.5	39.9	29.7	20.4	16.2	24.4	28.1	30.1
Number of Small Classes	1	3	2	5	2	4	5	14	0	2	3.8
Average Hour Per Week	60	56.5	48.5	55.2	61.3	52.4	50.4	52.1	63.2	47.6	54.7
% of Direct and Indirect Instruction	60	72.8	80.8	70.2	75.4	70.8	74	69.8	53.2	58.1	68.5
% of Supplementary Instruction	5.	2.	7.5	4.	1.4	4.2	3.2	9.1	29.5	5.9	7.2
% of Research	24.2	9.6	.3	12.4	10.8	14.1	10.1	10.5	.6	2.8	9.5
% of Administrative Service	10.5	16.1	7.8	9.8	11.8	10.9	3.	7.5	15.6	13.8	10.7

TABLE 11--Continued

	ART	BIOLOGY	BUSINESS EDUCATION	CHEMISTRY	SOCIAL SCIENCE	MATHEMATICS	ENGLISH	MUSIC	PHYSICAL EDUCATION	PROFESSIONAL EDUCATION	INSTITUTION AVERAGES
Hours Spent on Outside School Activities	13.2	1.4	2.5	2.4	5.8	4.9	7.	10.7	2.5	5.1	5.6
Different Preparations	3.5	1.6	2.7	2.	3.6	2.8	2.9	3.3	4.2	1.3	2.6
Contact Hours	15.5	15.1	13.5	17.6	13.4	13.	12.5	20.5	12.	7.6	14.1
Credit Hours	16.	7.	13.5	6.6	12.7	13.2	12.1	5.9	8.5	9.2	10.1
Average Size Class Lower Level	23.5	39.5	24.6	45.8	53.2	8.2	24.2	29.2	25.8	6.5	28.1
Average Size Class Upper Level	9	11.8	23.7	2.6	27	35.5	7	7.1	19	17.3	16
% of Time Spent in Upper Division	19.8	14.8	38.5	10.1	28.9	8.9	12.7	24.	30.6	74.3	26.3
Cost Per Student Credit Hour	8.48	10.02	7.61	15.49	6.48	8.39	12.33	34.48	12.84	14.43	13.06

TABLE 12

DATA AVERAGES FOR EACH MAJOR PROGRAM OFFERING--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES AT VALLEY CITY STATE COLLEGE

	ART	BIOLOGY	BUSINESS EDUCATION	CHEMISTRY	SOCIAL SCIENCE	MATHEMATICS	ENGLISH	MUSIC	PHYSICAL EDUCATION	PROFESSIONAL EDUCATION	INSTITUTION AVERAGES
Rank	2.5	3.	3.	4.5	3.1	3.5	3.	2.3	3.	3.3	3.1
Degree	3.	3.3	1.7	4.	3.3	2.5	2.3	1.8	2.2	3.3	2.7
College Experience	4.	13.	8.3	9.	13.3	14.5	6.6	2.8	9.9	9.9	9.1
Related Experience	1.	10.7	8.3	6.	6.5	4.2	7.7	4.7	5.3	8.1	6.3
Weighted Average Size Class	14.6	23.3	28.8	10.8	32.6	28.2	20.8	12.1	29.4	12.9	21.4
Number of Small Classes	2	1	1	4	2	1	3	37	1	9	6.3
Average Hour Per Week	61	51	65.3	60	59.3	53.2	61	66.1	55	56.3	58.8
% of Direct and Indirect Instruction	67.5	60.7	84.3	63.5	78	76.2	73.2	65.8	52.9	71.2	69.3
% of Supplementary Instruction	3.	25	0	4.5	2.5	12	14.4	4.8	22	5.9	8.3
% of Research	11.5	1.7	10	2.5	7.9	2.2	8.	15	1.4	3.9	6.4
% of Administrative Service	15	6.7	5.7	24.5	10.7	6.8	4.7	11.8	22	16.9	12.5

TABLE 12--Continued

	ART	BIOLOGY	BUSINESS EDUCATION	CHEMISTRY	SOCIAL SCIENCE	MATHEMATICS	ENGLISH	MUSIC	PHYSICAL EDUCATION	PROFESSIONAL EDUCATION	INSTITUTION AVERAGES
Hours Spent on Outside School Activities	7	3	.3	9	4.1	.5	4.5	10	2.1	5.4	4.6
Different Preparations	4.5	3.2	4.4	4.7	2.8	4.3	3	9.2	5	1.6	4.3
Contact Hours	20.6	18.9	18	34	15.1	16.6	12.2	17.6	13.1	15.2	18.1
Credit Hours	15.4	16.4	17.2	20	15.1	15.8	12.2	14.8	9.4	24.3	16.1
Average Size Class Lower Level	27.4	33.1	34.4	32	39.1	39.7	23.2	20.5	27.1	12.1	28.9
Average Size Class Upper Level	9.7	12.8	37.6	10	20.9	14.	12.8	3.8	30.8	20.9	17.3
% of Time Spent in Upper Division	28.2	20.3	47.5	32.7	32.6	18.1	23.3	17.2	53.1	75.4	34.8
Cost Per Student Credit Hour	14.02	8.86	7.51	18.21	6.59	7.52	11.69	17.53	11.85	11.03	11.48

teaching experience. The Music department leads the departmental averages in average hours per week with 66.1 and also in hours spent on outside school activities with 10. This indicates a 76.1 hours a week or an average of eleven hours a day, seven days a week. The Music department is also high in different preparations with an average of 9.2. One reason his figure is high is because individual music lessons are given on a credit basis. Contact and credit hours corresponded with the types of class offered in a department. Social Science and English had identical ratios of contact hour to credit hour, while chemistry with laboratory sessions had many more contact hours. The reverse is true in professional education with credit hours exceeding contact hours. The contact hours are affected by student teaching supervisors who do not contact their student-teachers daily.

Table 13 presents the data averages of factors influencing instructional cost differences for the four institutions. These data are presented to facilitate comparisons between the four colleges. The averages represent the institutional average for all major areas within the college. The overall average represents an average of each factor derived from the average of each institution. For example, the average degree of instructors teaching in the ten major areas at Valley City is 2.7. This figure represents the average degree is between a master's and masters-plus-twenty for all faculty teaching in the ten major areas. This is the lowest average of the four institutions and also below the overall institutional average of 3.3.

Tables 14 through 23 present the data averages of factors effecting instructional costs at the four state colleges in each major area. Tables 14 through 23 provide information for inter-

TABLE 13

DATA AVERAGES FOR EACH INSTITUTION--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES

	DICKINSON	MAYVILLE	MINOT	VALLEY CITY	OVERALL AVERAGE
Rank	3.5	3.6	3.2	3.1	3.3
Degree	3.5	3.7	3.1	2.7	3.2
Weighted Average Size Class	27.5	26.4	30.1	21.4	26.4
Number of Small Classes	14	16	38	63	32
Advisees	22.8	30.	24.8	25.7	25.8
Committee Assignment	1.2	2.1	1.3	1.5	1.5
Average Hour Per Week	60.	53.2	54.7	58.8	56.6
% of Direct and Indirect Instruction	75.2	70.9	68.5	69.3	70.9
% of Supplementary Instruction	6.6	6.3	7.2	8.3	7.1
% of Research	4.1	5.3	9.5	6.4	6.3
% of Administrative Service	11.5	13.5	10.7	12.5	12.
Hours Spent on Outside School Activities	4.8	4.3	5.6	4.6	4.8
Different Preparations	3.3	3.5	2.6	4.3	3.4
Contact Hours	16.	19.3	14.1	18.1	16.8
Credit Hours	12.1	14.1	10.1	16.1	13.1
Average Size Class Lower Level	27.2	32.5	28.1	28.9	29.1
Average Size Class Upper Level	22.8	17.3	16	17.3	18.3
% of Time Spent in Upper Division	33.3	25.6	26.3	34.8	27.5
Cost Per Student Credit Hour	11.48	10.84	13.06	11.48	11.71

institutional comparisons of major program offerings. The factors involved are identical to the factors used in Tables 9 through 12. Therefore, any further explanation of these factors will not be necessary.

Tables 14 through 23 were developed to determine the factors which were affecting cost differences within a major program area at the four institutions.

Art

Table 14 presents the data averages for the major area of art. Student credit hour instructional costs are the highest at Dickinson where $21.91 is necessary to produce a credit hour as compared to $8.48 at Minot. Minot also has the largest of the weighted average size classes and the least number of small classes. Table 1 indicates that Mayville has only one full time instructor in the Art Department. The data presented represents information concerning one instructor and therefore is not an average. The contact and credit hours at Mayville are unusually high when compared to the other institutions. The ranking in Table 37, Appendix C, indicates the Art Department at Mayville ranked number 1 in contact and credit hours when compared with other major areas. The data on Form "F" indicate that this instructor taught more than one class at a time which could account for the high rate of contact and credit hours. This indication is supported by the number of small classes which is the highest of the four institutions for the area of art and the percentage of instruction time spent in producing upper division credit hours which is the lowest and ranked number 39 in Table 33, Appendix C, when compared to all major areas.

TABLE 14

DATA AVERAGES FOR ART--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES

	DICKINSON	MAYVILLE	MINOT	VALLEY CITY
Rank	3	5	2.8	2.5
Degree	3.8	6	2.5	3
College Experience	8.2	21	2.2	4
Related Experience	2.5	5	3.5	1
Weighted Average Size Class	12.2	15.7	21.7	14.6
Number of Small Classes	3	8	1.	2
Average Hour Per Week	62.5	40	60.	61
% of Direct and Indirect Instruction	78.5	93	60	67.5
% of Supplementary Instruction	2	0	5	3
% of Research	8.4	0	24.2	11.5
% of Administrative Service	11	7	10.5	15
Hours Spent on Outside School Activities	9.8	0	13.2	7
Different Preparations	3.7	8	3.5	4.5
Contact Hours	19.7	46	15.5	20.6
Credit Hours	12.6	30	16.	15.4
Average Size Class Lower Level	18.3	15	23.5	27.4
Average Size Class Upper Level	6	3	9	9.7
% of Time Spent in Upper Division	22.3	6.3	19.8	28.2
Student Credit Hour Costs	21.91	9.08	8.48	14.02

Biology

Table 15 presents the data averages for biology. There is a difference of $2.66 in instructional student credit hour costs between the four institutions ranging from $8.19 at Mayville to $10.85 at Dickinson. The faculty in the Biology Department at Minot has an average degree of 5.5 which is higher than the other three colleges and indicates an average academic preparation between a specialist and doctoral degree. When ranked with all other selected departments in the four state colleges, Minot's Biology Department ranks second to the Art Department at Mayville, which has one instructor with a doctorate degree. The rank order of degree is found in Table 33, Appendix C. The weighted average size class is unusually high at Minot and is ranked number 1 in the rank ordering of weighted average size classes in Table 31, Appendix C. The reason for this was explained earlier in Table 7. Minot also had the highest number of contact hours produced while Valley City had the highest number of credit hours. The faculty at Dickinson spends a greater share of their instructional time producing upper division credit hours. Valley City and Minot faculties have the largest number of years of college experience and the Valley City faculty has the largest number of related experiences.

Business Education

Table 16 presents the data averages for business education. The student credit hour costs are quite similar in three state institutions with costs about 80 to 90 cents higher at Dickinson. Valley City's Business Education Department is staffed by faculty with average

TABLE 15

DATA AVERAGES FOR BIOLOGY--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES

	DICKINSON	MAYVILLE	MINOT	VALLEY CITY
Rank	4.2	4	4.1	3
Degree	4.4	4	5.5	3.3
College Experience	9.6	6.5	13	13
Related Experience	.8	5	.4	10.7
Weighted Average Size Class	31.6	35	51.8	23.3
Number of Small Classes	1	0	3	1
Average Hour Per Week	60.8	57.5	56.5	51
% of Direct and Indirect Instruction	79.4	75	72.8	60.7
% of Supplementary Instruction	3.	3.5	2.	25
% of Research	3.6	9	9.6	1.7
% of Administrative Service	14.	5	16.1	6.7
Hours Spent on Outside Activities	2.2	7	1.4	3
Different Preparations	2.5	2.9	1.6	3.2
Contact Hours	13.3	21.1	15.1	18.9
Credit Hours	10.5	12.6	7.	16.4
Average Size Class Lower Level	32.2	49	39.5	33.1
Average Size Class Upper Level	25	14	11.8	12.8
% of Time Spent in Upper Division	33.7	7.2	14.8	20.3
Student Credit Hour Costs	10.85	8.19	10.02	8.86

TABLE 16

DATA AVERAGES FOR BUSINESS EDUCATION--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES

	DICKINSON	MAYVILLE	MINOT	VALLEY CITY
Rank	3.1	3.4	2.9	3
Degree	2.9	3.6	2.4	1.7
College Experience	4.6	3.6	6.1	8.3
Related Experience	5.1	4.8	5.6	8.3
Weighted Average Size Class	31.6	28.3	31.8	28.8
Number of Small Classes	2	1	2	1
Average Hour Per Week	51	50.1	48.5	65.3
% of Direct and Indirect Instruction	77.3	62.8	80.8	84.3
% of Supplementary Instruction	9.6	5.8	7.5	0
% of Research	3.1	3.6	.3	10
% of Administrative Service	9.8	25.6	7.8	5.7
Hours Spent on Outside Activities	3.1	2.4	2.5	.3
Different Preparations	3.2	3.8	2.7	4.4
Contact Hours	13.8	18	13.5	18
Credit Hours	12.8	16	13.5	17.2
Average Size Class Lower Level	21.3	38.1	24.6	34.4
Average Size Class Upper Level	30.6	17.7	23.7	37.6
% of Time Spent in Upper Division	52.8	37.1	38.5	47.5
Student Credit Hour Costs	8.40	7.59	7.61	7.51

degrees less than a masters. The Valley City faculty also has the most years of college and related experience and spends on an average of fifteen hours a week more on school duties. The faculty in Mayville's Business Education Department spends one fourth of their time on administrative duties. Valley City leads the other three institutions in different preparations, credit hour production and equals Mayville in contact hours. The faculty at Dickinson spends the highest percentage of their time producing upper division student credit hours with Valley City five percentage points lower. In the area of business education Dickinson and Valley City rank 7 and 8, respectively, when ranked with all major areas in the four state colleges. The rank ordering the major areas for per cent of instructional time spent in producing upper division student credit hours is found in Table 32, Appendix C.

Chemistry

Table 17 presents the data averages for chemistry. The student credit hour costs range from $18.21 at Valley City to $10.32 at Dickinson. The average degree for chemistry instructors at Minot is 5.2 or an average above a specialist's degree. The lowest average of degree for chemistry instructor is 4 at both Valley City and Mayville. The faculty in Minot's Chemistry Department rank third and the faculty in the Chemistry Department at Dickinson rank fourth when ranked with all other major areas. The rank order of major areas by degree is found in Table 33, Appendix C. The faculty teaching in Chemistry Departments in the four colleges combined have a higher average degree than any other major area. The student credit hour costs for all Chemistry Departments combined is an average of $14.88 as presented in Table 3.

TABLE 17

DATA AVERAGES FOR CHEMISTRY--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES

	DICKINSON	MAYVILLE	MINOT	VALLEY CITY
Rank	4.2	3.7	4	4.5
Degree	5	4.	5.2	4.
College Experience	4.8	9.3	11.4	9.
Related Experience	.8	11.7	1.4	6
Weighted Average Size Class	29.2	12.6	37.5	10.8
Number of Small Classes	1	1	5	4
Average Hour Per Week	66	55.7	55.2	60
% of Direct and Indirect Instruction	80.2	72.3	70.2	63.5
% of Supplementary Instruction	2.5	2.3	4	4.5
% of Research	6.8	7.	12.4	2.5
% of Administrative Service	8	18.3	9.8	24.5
Hours Spent on Outside Activities	3.5	4.7	2.4	9
Different Preparations	3	2.2	2.	4.7
Contact Hours	21	19.4	17.6	34
Credit Hours	12.3	12.7	6.6	20
Average Size Class Lower Level	47.7	8.3	45.8	32
Average Size Class Upper Level	3	15.6	2.6	10
% of Time Spent in Upper Division	6.1	27.5	10.1	32.7
Student Credit Hour Costs	10.32	15.52	15.49	18.21

Chemistry ranks second only to Music in student credit hour instructional costs. The faculty teaching in Valley City's chemistry department spend approximately one fourth of their time in administrative duties. Valley City also leads the other three institutions in hours spent in outside school activities, different preparations, contact hours, credit hours, and percentage of time spent in producing in upper division credit hours.

Social Science

Table 18 presents the data averages for social science. Student credit hour costs for social science range from $6.59 at Valley City to $6.32 at Dickinson. The costs of producing student credit hours in the social science area is the lowest when compared to the other nine major areas. Table 30, Appendix C, presents the ranking of student credit hour cost and the four social science departments are ranked 37, 38, 39, and 40. The weighted average size class in the social science area is the highest in all four institutions. When compared to the other major areas Minot ranks second, Mayville third, Dickinson fifth, and Valley City eighth. The rank ordering of average weighted size class is presented in Table 31, Appendix C. Social science instructors also spent a large portion of their time on direct and indirect instruction. This is an indication of fewer classes involving extra curricular activities or laboratory sessions. Credit hours exceed contact hours at both Dickinson and Mayville. This indicates that some classes do not meet the requirements of one hour of class per week for one hour of credit. Valley City has an identical relationship between contact hours and credit hours. The instructors at Valley City spend the highest percentage of their time in producing upper division credit hours while

TABLE 18

DATA AVERAGES FOR SOCIAL SCIENCE--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES

	DICKINSON	MAYVILLE	MINOT	VALLEY CITY
Rank	3.6	3.5	3.5	3.1
Degree	4	3.6	3	3.3
College Experience	5.9	7.6	10.8	13.3
Related Experience	2.1	12.6	6.1	6.5
Weighted Average Size Class	35.1	38.2	39.9	32.6
Number of Small Classes	1	0	2	2
Average Hour Per Week	54.7	51	61.3	59.3
% of Direct and Indirect Instruction	81.3	72.7	75.4	78
% of Supplementary Instruction	5.3	6.3	1.4	2.5
% of Research	1.6	14.1	10.8	7.9
% of Administrative Service	9.9	6.9	11.8	10.7
Hours Spent on Outside Activities	4.7	4.4	5.8	4.1
Different Preparations	3.8	2.8	3.6	2.8
Contact Hours	14.7	13.5	13.4	15.1
Credit Hours	15	14.3	12.7	15.1
Average Size Class Lower Level	22	45	53.2	39.1
Average Size Class Upper Level	51.8	29.1	27	20.9
% of Time Spent in Upper Division	31.5	15.5	28.9	32.6
Student Credit Hour Costs	6.32	6.40	6.48	6.59

the social science faculty at Mayville spent 64.5 per cent of the time producing lower division credit hours.

Mathematics

Table 19 presents the data average for mathematics. Student credit hour costs in mathematics range from a low of $7.52 at Valley City to a higher of $9.44 at Dickinson. The faculty at Valley City had the greatest number of years of college teaching experience. The weighted average size classes for all four institutions is similar. The faculty at Dickinson spend less time in direct and indirect instruction as compared to the other three colleges. On the other hand, the faculty at Dickinson spent 23.9 per cent of their time on administrative duties. The faculty at Valley City had the greatest number of different preparations, contact hours, and credit hours. The faculty at Minot produced more credit hours than they had contact hours. The faculty at Mayville spent 22.1 per cent of their time producing upper division student credit hour. When compared to other nine major areas concerning percentage of instructional time spent producing upper division credit hours the area mathematics ranks the lowest. Table 32, Appendix C, presents the ranking of percentage of instructional time spent producing upper division credit hours.

English

Table 20 presents the data averages for English. The student credit hour costs in English range from $12.33 at Minot to $10.66 at Dickinson. Dickinson and Mayville are only two cents apart when comparing instructional costs in the area of English. The faculty in

TABLE 19

DATA AVERAGES FOR MATHEMATICS--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES

	DICKINSON	MAYVILLE	MINOT	VALLEY CITY
Rank	3.3	3.7	3.1	3.5
Degree	2.7	3.7	2.5	2.5
College Experience	6.7	5.7	9.2	14.5
Related Experience	5.6	1.3	2.9	4.2
Weighted Average Size Class	28.1	28.9	29.7	28.2
Number of Small Classes	0	0	4	1
Average Hour Per Week	63.7	58	52.4	53.2
% of Direct and Indirect Instruction	52.7	75	70.8	76.2
% of Supplementary Instruction	4.6	6.3	4.2	12
% of Research	3.7	5	14.1	2.2
% of Administrative Service	22.9	9.7	10.9	6.8
Hours Spent on Outside Activities	3.1	3.7	4.9	.5
Different Preparations	3.3	3.5	2.8	4.3
Contact Hours	14.3	16	13	16.6
Credit Hours	12.3	15	13.2	15.8
Average Size Class Lower Level	34	60	8.2	39.7
Average Size Class Upper Level	8.8	21.5	35.5	14
% of Time Spent in Upper Division	13.5	22.1	8.9	18.1
Student Credit Hour Costs	9.44	8.63	8.39	7.52

TABLE 20

DATA AVERAGES FOR ENGLISH--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES

	DICKINSON	MAYVILLE	MINOT	VALLEY CITY
Rank	3.3	3.4	2.8	3
Degree	2.4	3.1	1.8	2.3
College Experience	8.6	10.7	7.1	6.6
Related Experience	2.9	9.4	4.8	7.7
Weighted Average Size Class	27.4	26	20.4	20.8
Number of Small Classes	2	1	5	3
Average Hour Per Week	58.3	54.7	50.4	61
% of Direct and Indirect Instruction	87	67.9	74	73.2
% of Supplementary Instruction	2.3	4.7	3.2	14.4
% of Research	5.1	6	10.1	8
% of Administrative Service	5	14.6	3	4.7
Hours Spent on Outside Activities	2.7	3	7	4.5
Different Preparations	2.8	2.3	2.9	3
Contact Hours	11.6	14	12.5	12.2
Credit Hours	11.6	12.1	12.1	12.2
Average Size Class Lower Level	37.6	41.5	24.2	23.2
Average Size Class Upper Level	17.9	5.7	7	12.8
% of Time Spent in Upper Division	23.4	12.5	12.7	23.3
Student Credit Hour Costs	10.06	10.08	12.33	11.69

Minot's English department hold an average degree less than a masters. The faculty at Mayville have the highest number of years of college experience and related experience, having an average of 20.1 years of experience. The faculty at Mayville have the highest number of contact hours while all four institutions were similar in credit hour production. The faculty at Dickinson and Valley City spend the greatest percentage of their time producing upper division credit hours.

Music

Table 21 presents the data averages for music. Student credit hour costs ranged from $34.48 at Minot to $17.53 at Valley City. The student credit hour costs for Minot's music department ranked number 1 when compared to all other major areas as presented in Table 30, Appendix C. The music department at Dickinson ranked third, the music department at Mayville ranked fourth and Valley City's music department ranked sixth. When compared to the other nine major areas, music has the highest costs in producing credit hours than any other major area as indicated in department averages presented in Table 3. The faculty in Valley City's music department hold less than a master's degree. Valley City has the greatest number of small classes and the smallest weighted average size classes. When compared to the other nine major areas, Music had the smallest average in weighted size class with Valley City's music department ranked number 39 as presented in Table 31, Appendix C. The faculty at Minot and Valley City spent more time on outside school activities as compared to the other two music departments. The faculty at Dickinson spent more than half of their instructional time producing upper division credit hours.

TABLE 21

DATA AVERAGES FOR MUSIC--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES

	DICKINSON	MAYVILLE	MINOT	VALLEY CITY
Rank	2.8	3.2	3.1	2.3
Degree	3.4	3	2.4	1.8
College Experience	7.9	3.8	5.8	2.8
Related Experience	5.5	8.8	6	4.7
Weighted Average Size Class	16	25	16.2	12.1
Number of Small Classes	2	3	14	37
Average Hour Per Week	53.6	54.6	52.1	66.1
% of Direct and Indirect Instruction	72.9	71.6	69.8	65.8
% of Supplementary Instruction	13.8	8	9.1	4.8
% of Research	3.1	7.4	10.5	15
% of Administrative Service	9.8	13	7.5	11.8
Hours Spent on Outside Activities	2.6	4.2	10.7	10
Different Preparations	4.6	3.2	3.3	9.2
Contact Hours	22.2	23.4	20.5	17.6
Credit Hours	10.7	6.8	5.9	14.8
Average Size Class Lower Level	20	28.8	29.2	20.5
Average Size Class Upper Level	19.7	10.2	7.1	3.8
% of Time Spent in Upper Division	52.9	11.2	24	17.2
Student Credit Hour Costs	19.93	18.43	34.48	17.53

Physical Education

Table 22 presents the data averages for Physical Education. Student credit hour costs range from $14.22 at Mayville to $9.51 at Dickinson. The average degree for faculty at Dickinson, Mayville and Minot is less than a Masters. The faculty at Valley City are the only faculty to hold a degree above a masters. Table 33, Appendix C, presents the rank ordering of average degree for faculty in all major areas and Physical Education at Minot ranks number 40. When compared to the other nine major areas Physical Education ranks the lowest of faculty holding degrees. The area of Physical Education also ranks the lowest in faculty rank. The rank ordering of faculty rank is presented in Table 34, Appendix C. The Physical Education faculty in all four institutions indicated a high percentage of supplementary instruction. This indicates that about one fourth of their time is spent on coaching activities. The faculty at Valley City indicated the highest percentage of administrative duties. The faculty at Dickinson have the highest number of contact hours while Valley City and Dickinson produced the greatest number of credit hours. The faculty at Valley City spent the largest percentage of their instructional time producing upper division credit hours.

Professional Education

Table 23 presents the data averages for Professional Education. Student credit hour costs in Professional Education ranged from $14.43 at Minot to $8.01 at Dickinson. The faculty teaching in Professional Education had the highest average for number of years of experience when compared to the other nine major areas. When combining related

TABLE 22

DATA AVERAGES FOR PHYSICAL EDUCATION--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES

	DICKINSON	MAYVILLE	MINOT	VALLEY CITY
Rank	2.8	2.6	2.5	3
Degree	1.7	1.8	1.6	2.2
College Experience	5.9	5.8	4.1	9.9
Related Experience	6.6	3.8	8.2	5.3
Weighted Average Size Class	34.1	29.7	24.4	29.4
Number of Small Classes	2	2	0	1
Average Hour Per Week	56.7	58.6	63.2	55
% of Direct and Indirect Instruction	60.9	51.6	53.2	52.9
% of Supplementary Instruction	22	23.6	29.5	22
% of Research	3.5	3.2	.6	1.4
% of Administrative Service	13.4	13.8	15.6	22
Hours Spent on Outside Activities	10.7	9.9	2.5	2.1
Different Preparations	4.3	4.3	4.2	5
Contact Hours	13.8	12.6	12	13.1
Credit Hours	9.3	7.3	8.5	9.4
Average Size Class Lower Level	23.3	32	25.8	27.1
Average Size Class Upper Level	30.3	18.4	19	30.8
% of Time Spent in Upper Division	30.3	33.1	30.6	53.1
Student Credit Hour Costs	9.51	14.22	12.84	11.85

TABLE 23

DATA AVERAGES FOR PROFESSIONAL EDUCATION--FACTORS INFLUENCING INSTRUCTIONAL COST DIFFERENCES

	DICKINSON	MAYVILLE	MINOT	VALLEY CITY
Rank	4.2	3.7	3.5	3.3
Degree	4.4	4.2	3.9	3.3
College Experience	8.9	6.7	8.8	9.9
Related Experience	13	12.2	11.1	8.1
Weighted Average Size Class	29.9	24.7	28.1	12.9
Number of Small Classes	0	0	2	9
Average Hour Per Week	52.2	51.3	47.6	56.3
% of Direct and Indirect Instruction	82.1	67.3	58.1	71.2
% of Supplementary Instruction	.4	2.7	5.9	5.9
% of Research	3.9	4.3	2.8	3.9
% of Administrative Service	11.2	21.3	13.8	16.9
Hours Spent on Outside Activities	6	3.9	5.1	5.4
Different Preparations	1.9	2.3	1.3	1.6
Contact Hours	16	9.3	7.6	15.2
Credit Hours	15.2	13.9	9.2	24.3
Average Size Class Lower Level	15.9	7.2	6.5	12.1
Average Size Class Upper Level	34.7	38	17.3	20.9
% of Time Spent in Upper Division	66.1	83.2	74.3	75.4
Student Credit Hour Costs	8.01	10.26	14.43	11.03

and college experience the faculty for this major area averaged 20.4 years of experience. Credit hours exceeded contact hours in three of the four institutions, Valley City indicated the greatest difference. The reason for credit hours exceeding contact hours is because of student teacher supervision. In all but one institution 75 per cent of the instructional time was spent producing upper division credit hours. When compared to other major areas the professional education departments ranked one, two, three, and four, for spending the greatest portion of their time producing upper division credit hours (Table 32, Appendix C).

The Statistical Analysis

The analysis of variance statistical method was used to determine the significant difference of instructional salary student credit hour costs between the four state colleges. The analysis of variance was also used to determine the significant difference of instructional salary student credit hour costs between departments within the four state colleges. The assumed hypothesis was that there is no difference among instructional salary student credit hour costs between the colleges and among the major departments within the four state colleges. On the basis of the .01 level of significance there is no significant difference in factors effecting student credit hour costs for the four colleges. The calculated F-value of .67 is below the limit of 4.60. Therefore, the null hypothesis is retained. In determining significant differences of student credit hour costs among different departments the null hypothesis was rejected. The F-value of 6.42 exceeds the limit of 3.14 at the .01 level of significance.

TABLE 24

ANALYSIS OF VARIANCE FOR COLLEGES X DEPARTMENTS

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F
Colleges	3	26.74	8.91	.67
Departments	9	763.80	84.87	6.42
Error	27	356.62	13.21	
Total	39	1147.16		

The second statistical process included with this study was the correlation analysis of factors effecting student credit hour instructional costs. This analysis was used to determine the factors that have an effect on student credit hour instructional costs. The level of significance chosen for this analysis was .01 with an r of .380. The null hypothesis assumed there was no significant difference in the factors which effected student credit hour instructional costs. The null hypothesis was rejected for the five factors which exceeded the determined limit. The factors of hours spent on outside school activities correlates with increasing student credit hour costs. The more hours an instructor spends on out of school activities corresponds with high student credit hour costs. The other factor with a plus correlation greater than the established limit was the number of small classes. As the number of small classes increased so did the cost of producing student credit hours. There were three factors which exceed the .380 limit with a negative correlation. The only difference in the negative correlation was in the relationship. The

TABLE 25

THE CORRELATION ANALYSIS OF STUDENT CREDIT HOUR INSTRUCTIONAL COSTS AND FACTORS EFFECTING STUDENT CREDIT HOUR COSTS

Variable	Coefficient of Correlation
Rank	-.061
Degree	-.077
College teaching experience	-.191
Related teaching experience	-.033
Advisees	-.268
Committee assignments	.084
Average hours worked per week	.074
% of direct and indirect instruction	-.187
% of supplemental instruction	.099
% of research	.099
Administrative service	.071
Hours spent on outside school activities	.420
Different preparations	.138
Contact hours	.236
Credit hours	-.361
Average size classes lower division	-.225
Average size classes upper division	-.447
Number of small classes	.426
Weight average size class	-.549
Student credit hours produced	-.856
Average salary	-.042
% of time producing upper division credits	-.106

$P \leq .01$, $r = .380$

factor of average size class in upper division has an r = -.446. This factor had a significant influence on student credit hour costs. The smaller the average class size the greater were the costs. This also held true for two other factors with negative correlation which exceeds the .01 level of significance. Weighted average class size with an r = -.549 and student credit hours produced with an r = -.856 have a significant effect on student credit hour costs. As the average weighted size class decreases in numbers the student credit hour costs increase. When student credit hours produced decreases the size is a significant effect on the increase of student credit hour costs.

The third and final statistical method used in this study is a setwise regression analysis. This technique is an analytic method to allow sets of variables to be eliminated in a regression procedure. The factors which effect instructional costs were grouped together in sets and eliminated one set at a time according to the effect the set of factors had on increasing student credit hour costs. The first factor to be eliminated was salary. Therefore salary has the least effect on influencing student credit hour costs of the factors selected. The factors which have the greatest effect on student credit hour costs were the factors which were eliminated last. These factors were contact and credit hours and hours spent on outside school activities. These two sets of factors account for 40 per cent of the variables.

TABLE 26

SETWISE REGRESSION ANALYSIS FOR SELECTED VARIABLES WITH STUDENT CREDIT HOURS AS A CRITERION

Step	Set Eliminated	R	R^2
1	None	.781	.610
2	Salary	.781	.609
3	College Work (Committee Assignment, Advisees, Average hours week)	.779	.607
4	College and related teaching experience	.777	.602
5	Different preparations	.773	.597
6	Percentage of time allotments	.767	.588
7	Rank and degree	.750	.562
8	% of instructional time spent on producing upper division credits	.727	.528
9	Hours of outside school activity	.634	.402
10	Contact hours and credit hours	-	-

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Chapter IV presented data concerning student credit hour costs and factors which effected these instructional costs of the selected curricula offered at the four state colleges in North Dakota. This chapter presents a summary of these data, conclusions drawn from the analysis of the data and recommendations.

The pattern used to summarize the data in Chapter V will follow the organizational procedure used in Chapter IV to present the data. In the first section of Chapter V the relationship between student credit hour costs and major program offerings within and among the four state colleges was analyzed. The second section of Chapter V included the summary, conclusions, and recommendations of student credit hour instructional salary costs and the factors which effected a difference in these costs within each major area. The order of inspection followed the organizational pattern utilized earlier: Art, Biology, Business Education, Chemistry, Social Science, Mathematics, English, Music, Physical Education, and Professional Education. The conclusions of each major area were summarized by institution in the third section of this chapter. Chapter V concludes with a summary of the recommendations.

Student credit hour instructional salary costs will be used as the basis for comparisons, conclusions and recommendations. These

costs were limited to instructional salary costs and did not include other costs involved in the education of the student. This study recognized the limitations of making recommendations concerning the deletion or retention of a major area based on instructional salary costs and student credit hour production. This study does not recommend that student credit hour instructional salary costs be used as the sole criteria for the evaluation of an institution or a major program area. Other variables must be taken into consideration before final decisions can be made. However, it is the intent of this study to provide information concerning a specific aspect of education and the results of this study contribute to the decision-making policy in education.

The first step for establishing student credit hour instructional salary costs was to determine instructional salary costs. First, the average salary of the full-time equivalent instructors was determined. Table 2 illustrated the average salary for each major area in the four state institutions. The nine month salary was used for comparisons. The institution whose faculty received the highest average salary for all ten major areas was Mayville. Dickinson was second, followed by Valley City and Minot. The major area having the highest average salary was chemistry. Physical Education was the major area with the lowest average salary. In the rank order of instructional salaries for all major areas, the Art Department at Mayville ranked number one with a salary of $12,825 while the physical education at Minot ranked number forty with an average salary of $8,486.31. The difference between these two salaries is $4,338.69.

The next step in establishing student credit hour cost was to determine student credit hour production. Tables 4 and 5 presented

the student credit hour production for the upper and lower divisions of instruction. Table 6 presented the average student credit hours produced by instructors in each major area. When comparing student credit hour production by institution, Mayville produced the highest average of student credit hours with 361 for each instructor. Dickinson was second with 339 followed by Valley City with 325 and Minot with 309. This order was identical to the order of average salary paid by these institutions. When major departments were compared for student credit hour production, social science had the highest average with 520 while music had the lowest average with 154.

The procedure followed in determining student credit hour institutional salary costs was to multiply the student credit hours produced by the average instructional salary. The student credit hour instructional salary costs were presented in Table 3. The average of $13.06 at Minot was the highest average student credit hour instructional salary cost when compared to costs at the other three institutions. Dickinson and Valley City had identical student credit hour costs with an average of $11.48 while Mayville's $10.84 costs were the lowest. This order corresponded to the comparisons made with student credit hour production. The institution which produced the greatest number of student credit hours had the lowest student credit hour costs. Mayville produced the highest number of student credit hours and had the lowest costs per student credit hour. Minot produced the lowest average number of student credit hours and had the highest student credit hour costs. The direct opposite was true when average salaries are considered. Mayville paid the highest average salary of the four institutions and yet had the lowest student credit hour costs. Minot paid

the lowest average salary of the four institutions and had the highest student credit hour costs. This analysis of salary having a minimal effect on student credit hour costs was supported by the setwise regression analysis in Table 27. Salary was the first factor to be eliminated as a factor effecting student credit hour costs.

The rank order of student credit costs for all major areas in the four institutions is found in Table 31, Appendix C. The Music Department at Minot had the highest student credit hour costs with $34.48. The four social science departments ranked the lowest of all major areas. This corresponded with student credit hours produced. In the rank order of major area production of student credit hours in Table 30, Appendix C, the four social science departments ranked 1, 2, 3, and 4 while Minot's Music Department ranked number forty.

The analysis of variance was the statistical method used to determine significant differences in student credit hour costs. Table 25 presented the analysis of this method. The analysis of variance determined there was no significant difference in student credit hour costs between the four state colleges. The .01 level of significance was used to retain the null hypothesis which stated there was no significant difference in student credit hour costs between the four state colleges. The analysis of variance was also used to determine a significant difference in student credit hour costs among major areas. The null hypothesis stated there was no significant difference and was rejected at the .01 level of significance. In other words there was no significant difference in student credit hour costs between the four state colleges but there was a significant difference in student credit hour cost among the major areas at the four state colleges.

Summary, Conclusions and Recommendations by Major Area

Art

Table 14 presented the data for factors effecting instructional costs for art. This curriculum area indicates a large difference in student credit hour instructional salary costs between the four institutions. The student credit hour instructional costs of $21.80 at Dickinson were the highest of the four institutions. Valley City was second with a student credit hour cost of $14.02 followed by Mayville with a cost of $9.08 and the costs of $8.48 at Minot were the least expensive.

When compared with all other major areas in Table 31, Appendix C, Dickinson's Art Department ranked as the second most expensive program for student credit hour instructional costs. The Art Department at Valley City ranked eleventh.

The correlation of factors effecting cost presented in Table 27 indicated the reasons for high student credit hour instructional costs at Dickinson and Valley City. The factor with the highest correlation to costs was the production of credit hours. The Art Department at Dickinson produced 153 credit hours which represents the lowest number of credit hours when compared to the other three institutions. When compared with the other major areas in all four institutions, Dickinson ranked 39th in student credit hour production as presented in Table 30, Appendix C.

The setwise regression analysis also helped establish a reason for high student credit hour instructional cost at Dickinson. The set of factors eliminated last in the regression analysis were credit hours and contact hours. The faculty teaching in Dickinson's Art Department

compiled the lowest average credit hours per full-time equivalent faculty of the four institutions with 12.6 and only Minot had fewer contact hours. The Art Department at Mayville produced more credit hours and has more contact than any other department in all the institutions. The instructor in Mayville's Art Department has 46 contact hours and 30 credit hours along with 8 different preparations.

Instructional salary was not an important factor in influencing student credit hour instructional costs as indicated in the setwise analysis. Instructional salary should be recognized, however, because of the ranking position of two institutions presented in Table 28, Appendix C. The Art Department at Mayville occupies the number one ranking position for departmental salaries while the Art Department at Minot occupies the 39th ranking position.

The following conclusions were determined from the information presented:

1. The student credit hour costs at Dickinson were higher than usual when compared to other major offering in the four institutions. The reason for these high costs was because of low credit hour production. There were not enough students for the number of faculty on the staff at Dickinson.

2. The contact hours and credit hours at Mayville were higher than usual when compared to other major offerings in the four institutions. The size of classes and number of classes indicated a limited number of students.

3. Mayville's student credit hour costs were low because of high credit hour production by the instructor.

4. The average salary paid to art instructors at Minot was low when compared to other major areas in four institutions.

5. Valley City's student credit hour costs compared favorably to the averages in the other three institutions. The only factor which would indicate an area of improvement would be in the weighted average size classes. This average should be increased in an effort to lower costs.

The following are recommendations of this study for the major area of Art:

1. This study recommends the Art Department at Dickinson increase the number of student credit hours produced by each full-time equivalent instructor.

2. This study recommends the elimination of one staff member in the Art Department at Dickinson.

3. This study recommends the major in art at Mayville be reduced to a minor or less. The size of classes and the number of small classes in Mayville's Art Department indicated a limited number of students interested in the program. This coupled with an instructor teaching 8 different preparations, 46 contact hours and 30 credit hours was the basis for recommending the reduction of the Art major at Mayville to an Art minor. Sundre (7) supports this recommendation on the basis of production.

4. This study recommends that the annual salary for the faculty teaching in Minot's Art Department be increased to a level equal to the salary paid at the other three institutions.

Biology

Table 15 presented the data for factors effecting student credit hour instructional cost for Biology.

The analysis of variance in Table 25 indicated no significant difference in student credit hour costs between the four institutions. This analysis was supported by the difference in student credit hour instructional costs between institutions in the area of biology. The costs were similar at the four institutions. The Biology Department at Dickinson had student credit hour costs of $10.85, which was the highest of the four colleges. The costs at Minot were $10.02 followed by Valley City with $8.86 and Mayville with $8.19.

The setwise regression analysis substantiated higher costs at Dickinson. Dickinson's 33.7 per cent was the highest percentage of instruction time spent in producing upper division credit hours of the four institutions.

The second highest student credit hour instructional costs were recorded at Minot. Minot also had the highest weighted average size class of the four institutions. Although a high average of weighted average size classes would reduce costs, an inspection of credit hour production indicated that Minot's Biology Department produced the lowest number of credit hours when compared to the other institutions. Therefore, the high enrollment in weighted average size classes and the low credit hour production offset one another and stabilized costs.

Valley City had the smallest weighted average size class but produced the highest number of credit hours. The Biology Department at Mayville combined weighted average size classes and high credit hour production for the lowest costs.

The average degree held by the biology instructors at the four institutions ranked second to chemistry when compared with the other

nine major areas. The average number of years of experience for faculty teaching in the area of biology was also high when compared to other major areas. The faculty at Valley City had an average of 23.7 years of experience when college and related years of experience were combined.

The following conclusions were drawn from the information presented:

1. Dickinson had the highest student credit hour instructional costs. These costs were supported by a high percentage of instructional time spent producing upper division credit hours an influential factor in effecting student credit hour instructional costs.

2. The weighted average size class at Minot was unusually high when compared to other major areas. This indicated low student credit hour instructional costs. However, credit hour production at Minot was the lowest of the four institutions which would cause costs to increase. These two factors contradicted one another and stabilized costs at Minot.

3. Valley City credit hour production was the highest of the four institutions and indicated a faculty overload.

4. Student credit hour instructional costs in biology at all four institutions compared favorably to the averages in other major areas.

The following is a recommendation of this study for the major area of biology:

1. This study recommends the credit hour production of the faculty in the Biology Department at Valley City be reduced by an average of three to four credit hours for each faculty member. To accomplish

this, another one half full-time equivalent instructor should be added to the biology staff.

Business Education

Table 16 presented the data for factors effecting student credit hour instructional costs for business education.

There was very little variation in student credit hour instructional cost between the four state colleges in business education. These costs ranged from a high of $8.40 a student credit hour at Dickinson to a low of $7.51 at Valley City. Minot's Business Education Department had costs of $7.61 while the costs at Mayville were $7.59. The similarity of student credit hour costs supported the results of the analysis of variance which determined no significant differences of costs in major program offerings between the four state colleges.

The higher costs at Dickinson were supported by two factors, the percentage of instructional time devoted to producing upper division credit hour and total credit hours produced. The setwise regression analysis in Table 27 indicated both factors as being influential in determining student credit hour costs. Dickinson had the highest percentage of time spent in producing upper division credit hours as compared to the other four institutions and the lowest credit hour production. Both factors would account for high costs. However, the weighted average size class at Dickinson was large enough to hold costs in a range comparable to the other institutions.

Valley City indicated the lowest student credit hour costs of the four institutions. These lower costs were influenced by contact hours and credit hour production. The faculty at Valley City had the

highest production of credit and contact hours of the four institutions. The faculty teaching in Valley City's Business Education Department ranks 4th in credit hour production when compared to all major areas in Table 39, Appendix C. Both credit and contact hours are influential factors for determining student credit hour costs as indicated in the setwise regression analysis and the correlation analysis. Although Valley City's percentage of instructional time was second to Dickinson's and the weighted average size classes were lower than two institutions the costs were held down by a large credit hour production. The hours spent on outside school activities also had a significant correlation to high costs. Valley City's .3 hour is the lowest of the four institutions and indicate lower costs as determined by the setwise regression analysis.

The average degree held by the faculty at Valley City is 1.7 or less than a master's. When compared to other major areas in all institutionsin Table 34, Appendix C, Valley City's Business Education Department ranked number 38.

The Business Education Department at Mayville had the lowest percentage of direct and indirect instruction and the highest percentage of time spend on administrative duties. The other three institutions averaged 80 per cent of their time on direct and indirect instruction while Mayville's average was 62.8. Mayville's business education faculty spent one fourth of their time on administrative duties.

The following conclusions were drawn from the information presented:

1. There was very little difference in the student credit hour instructional costs in the area of business education between the four institutions.

2. Both Dickinson and Valley City spent approximately 50 per cent of their instruction time producing upper division credit hours.

3. Valley City had the highest number of credit hours produced. Valley City's Business Education Department ranked fourth when compared to other major areas in all institutions in credit hour production. This is an indication that staff members are overloaded.

4. The faculty in the Business Education Department at Valley City hold an average degree less than a master's which indicated lower academic preparation when compared to other institutions.

5. Mayville's Business Education Department spent a smaller percentage of their time on instruction and larger percentage of their time on administrative duties when compared with the faculty at the other three institutions.

6. Minot's student credit hour cost compared favorably to the averages in the other three institutions.

The following are recommendations of this study for the major area of business education:

1. This study recommends the Business Education Department at Valley City add one qualified full-time equivalent instructor to the department in order to reduce the number of credit hours offered by each instructor.

2. This study recommends the faculty employed in Valley City's Business Education Department who do not hold master's degrees be required to strengthen their academic preparation.

3. This study recommends that future instructors hired in the Business Education Department at Valley City be required to hold a master's degree.

4. This study recommends the administration at Mayville relieve the business education faculty of their administrative duties to allow the faculty to spend a higher percentage of their time on instruction.

Chemistry

Table 17 presented the data for factors effecting instructional student credit hour costs for chemistry. There was a difference of $7.89 in student credit hour costs at Valley City as compared to Dickinson. Student credit hour instructional costs were the highest at Valley City where the costs were $18.21 for student credit hour production. Mayville's costs were $15.52 which compared favorably to Minot's $15.49. Dickinson's costs of $10.32 were the lowest of the four institutions.

The two factors effecting high costs at Valley City were percentage of instructional time devoted to upper division credit production and weighted average size classes. Valley City had the highest percentage of upper division production of the four colleges and the lowest weighted average size class. The factor of weighted average size classes in Table 26 correlated significantly with high costs. The percentage of instruction time spent on producing upper division credit was the 7th set to be eliminated in the setwise regression analysis indicated in Table 27. Valley City also lead all institutions in different preparations, contact hours, and credit hours. Valley City's Chemistry Department ranked third in Table 39, Appendix C, for credit hour production when all major areas in the four institutions were considered. Valley City also had the highest percentage of time spent on administrative duties and the lowest percentage of time spent on direct and indirect

instruction. Although salary is not considered an important factor in affecting student credit hour costs it deserves mention in defense of higher costs at Valley City. On the rank ordering of salaries in Table 28, Appendix C, the Chemistry Department at Valley City ranked number 2 in average salary when compared with other major areas in the four institutions.

The student credit hour costs were lower at Dickinson for the same reasons they are higher at Valley City. The faculty at Dickinson spent 6.1 per cent of their instructional time producing upper division credits. The average weighted size classes were large and the average size class in the lower division was the largest of the four institutions.

Mayville's Chemistry Department had an average class size of 8.3 in the lower division which is the lowest of the four institutions. Mayville's upper division average class size was second to Valley City.

The Chemistry Department at Minot had the lowest average of credit hour produced of the four institutions. Minot Chemistry Department ranked 39 in Table 39, Appendix C, when compared to other major areas in all institutions. The large weighted average size class compensates for the low number of credit hours produced and helped to stablize costs.

The overall degree held by faculty teaching in the Chemistry Departments at the four institutions was the highest of the major areas investigated. The average salary which corresponded with a higher degree was also higher for the area of chemistry than any other area.

The following conclusions were drawn from the information presented:

1. There was a wide variation in student credit hour instructional costs between Valley City and Dickinson. A limited number of students in the major areas at both institutions accounted for a portion of this difference.

2. Valley City compensated for their small average weighted size class by increasing the number of different preparation, contact and credit hours for each full-time equivalent faculty.

3. Dickinson's low costs were a result of large average size class in lower level courses. No explanation was indicated as to what happened to students in this area after their sophomore year of college.

4. Mayville's average size class at the lower level were unusually small when compared to the institutions. This was an indication of fewer students interested in this major area.

5. Minot's student credit hour costs compared favorably to the averages in the other three institutions.

6. The academic degree, rank, years experience, and salary was the highest for this major area when compared to other major areas.

The following is a recommendation of this study for the major area of Chemistry:

1. This study recommends that an investigation be completed in the Chemistry Departments at Valley City, Mayville and Dickinson to determine the production of major and minors in this area. The data in this study indicated a small number of students enrolled in upper division courses. If these findings are upheld in future research this study would support the recommendation of reducing the major to a minor in institutions with a limited number of graduates in an effort to reduce unnecessary duplication of course offering among the four

institutions and lower costs. The costs do not initiate this action but the factors effecting costs indicate limited student interest. Therefore, the final recommendation is based on student participation supported by student credit hour instructional costs.

Social Science

Table 18 presented the data for factors effecting instructional student credit hour costs for social science. The analysis of variance in Table 25 indicated no significant difference in student credit hour costs between the four institutions. The area of social science contributed to this finding as the difference in costs between the institution with the highest costs and the institution with the lowest costs was 27 cents. Valley City had the highest costs with $6.59 followed closely by Minot with $6.48, Mayville with $6.40 and Dickinson with $6.32. The area of social science had the lowest instructional salary student credit hour costs when compared to the other major areas as indicated in the rank ordering of student credit hour costs by major areas in Table 31, Appendix C.

The setwise regression analysis in Table 27 indicated two main reasons for low costs. Credit hour production was high and the weighted average size classes were the largest of any other major area.

Valley City's instructional salary costs were slightly higher than the other three institutions. The reason for this was the percentage of instructional time spent producing upper division credit hours was higher at Valley City and the weighted average size class was the smallest.

Minot had the lowest credit hour production with 12.7 but compensates for higher costs with the higher averages in weighted average

size classes. Minot's social science staff of 14.5 instructors was the largest staff when compared to other major areas.

The following conclusions were drawn from the information presented:

1. The area of social science is conducive to low student credit hour instructional costs. The reason for this was because of larger classes and high credit hour production.

2. Student credit hour instructional costs in social science at all four institutions compared favorably to the averages in other major areas. This comparison was based on the similarity of data representing the factors effecting costs and the comparison of student credit hour instructional costs to the other major areas.

The following is a recommendation of this study for social science:

1. This study recommends the social science major be continued at all four institutions. The student credit hour costs were low and the factors indicated the student demand is high in this area.

Mathematics

Table 19 presented the data for factors effecting instructional student credit hour costs in mathematics. The costs varied from $9.44 at Dickinson, to $8.63 at Mayville, to $8.39 at Minot and the lowest cost of $7.52 at Valley City for student credit hour production.

The reason for higher costs at Dickinson was indicated in lower credit hour production by each faculty member. As determined by the setwise regression analysis and the correlation analysis credit hour production was the most influential factor in effecting student credit hour costs. The Mathematics Department at Dickinson had a credit hour

production of 12.3 the lowest of the four institutions. Dickinson also spent the lowest percentage of instructional time on direct and indirect instruction. This factor was the fifth set to be eliminated in the setwise regression analysis. Although this factor does not account for a higher percentage of variables it does effect costs. Dickinson also had the highest percentage of time devoted to administrative duties.

Valley City's costs are the lowest of the four institutions. When compared to other major areas in the four institutions the Mathematics Department ranked 35th in student credit hour costs as indicated in Table 31, Appendix C. The reason for the lower costs at Valley City was the same reason costs at Dickinson were higher. Credit hour production was the highest of the four institutions at Valley City. Valley City also had the highest number of contact hours and different preparations. The average number of years of college teaching experience was the highest at Valley City. An inspection of Table 36, Appendix C, indicated the Mathematics Department at Valley City ranked second when compared to other major areas in all institutions in college teaching experience.

Another factor which had a tendency to lower costs in the area of mathematics was the percentage of time spent producing upper division credit hours. As indicated in the setwise regression analysis this factor contributed to higher cost. Mathematics ranked with English as the two departments which produce the lowest number of upper division credit hours. Mayville's Mathematics Department had the highest percentage of instructional time devoted to producing upper division credit with 22.1 per cent.

The following conclusions were drawn from the information presented:

1. Student credit hour instructional costs were similar at the four institutions. The same factor accounted for the variation of costs between Dickinson and Valley City. The faculty at Dickinson produced fewer credit hours than Valley City. Valley City costs are lower because the faculty produced the greatest number of credit hours.

2. The administrative duties held by the faculty at Dickinson detracted from the percentage of time an instructor could devote to the classroom.

3. The faculty at Valley City continued to have the highest number of different preparations, contact and credit hours. All three factors are above average when compared to the other three institutions.

4. The large percentage of time devoted to producing lower division credit hours indicated that mathematics instructors devote more instructional time on general education requirements.

5. Student credit hour instructional costs in mathematics at all four institutions compared favorably to the averages in other major areas.

The following are recommendations of this study for the major area of mathematics:

1. This study recommends the mathematics faculty at Dickinson devote a larger percentage of instruction time to direct and indirect instruction and less time on administrative duties.

2. This study recommends a reduction in different preparations and credit hours for the faculty at Valley City. This can be accomplished by an additional staff member or a reduction of classes offered.

English

Table 20 presented the data for factors effecting instructional costs for English. Minot had the highest student credit hour instructional costs in this area with costs of $12.33 followed by Valley City with $11.69, Mayville with $10.08 and Dickinson with $10.06. Mayville's and Dickinson's costs are almost identical.

Although no significant difference in costs between the colleges had been established according to the analysis of variance the costs between Minot and Dickinson varied $2.27. This difference could be greater than calculated at Minot because of the absence of factors effecting higher costs. The English Department at Minot was equal to and in some instances lower than the other colleges in factors which have the greatest effect on high costs. In other words,Minot had the highest student credit hour instructional costs with little justification for these costs.

Credit hour production is the most influential indicator of student credit hour costs determined by the setwise regressional analysis. Minot ranked even with Mayville, and Valley City in credit hours produced and higher than Dickinson. Minot ranked above the four institutions in outside school activities, a factor correlating with higher costs. In percentage of instructional time devoted to upper division credit hours, Minot ranked below both Valley City and Dickinson and was equal to Mayville. As indicated earlier, faculty salary had little effect on higher student credit hour costs. This factor deserves mention because if anything, it would have a tendency to lower costs at Minot. The rank ordering of salary in Table 28, Appendix C, indicated

the average salary paid to the faculty teaching in the English Department at Minot ranked number 38 when compared to all other major areas in the four institutions.

In weighted average size classes, Minot ranked slightly below Valley City. This together with the number of small classes were the only factors which supported high costs. The average degree held by the instructors teaching in the English Department at Minot was less than a master's degree.

Dickinson's English Department had the lowest student credit hour instructional costs which was reflected in the largest weighted average size class as compared to the other three institutions. Dickinson produced the fewest number of credit hours but spent a higher percentage of instructional time on producing upper division credit.

The size of the weighted average size class at Mayville helped to maintain low student credit hour instructional costs. Class enrollments in upper division courses averaged 5.7 and upper division student credit hour production was 186, the lowest of the four institutions as indicated in Table 5. Upper division credit hour production at the other three institutions were: Dickinson 597, Valley City 534, and Minot 419, which was considerably higher than Mayville's.

The following conclusions were determined from the information presented:

1. Student credit hour costs were the highest at Minot with no justification for higher costs. Based on factors which have the greatest effect on high costs the English Department at Minot should maintain

costs below the other three institutions. One reason for higher costs at Minot relates to low student enrollment in upper division classes.

2. The average degree held by the faculty teaching in Minot's English Department is less than a master's degree. This was also a reflection of the average salary paid to English instructors at Minot.

3. Upper division credit hour production was the lowest at Mayville, and indicated limited student participation in the major area.

4. Dickinson and Valley City's student credit hour costs compared favorably to the averages in the other institutions.

The following are recommendations of this study for the major area of English:

1. This study recommends that more research be completed to investigate the production of majors in both Minot and Mayville. It was indicated in this study that the production was limited to a small number of students. If this is upheld in future research, this study would support a recommendation to reduce the major to a minor in both institutions to allow instructors the opportunity of devoting more time to general education English requirements. This recommendation would be based on production supported by cost. It is not the responsibility of this study to make recommendations based on production.

2. This study recommends that the administration at Minot require the faculty in the English Department to attend graduate school in an effort to strengthen their academic preparation.

3. This study recommends that future instructors hired in the English Department at Minot be required to hold a master's degree.

4. This study recommends that Minot increase the average salary paid to English instructors to a level equal to the other institutions in an effort to attract new faculty with higher academic degrees.

Music

Table 21 presented the data for factors effecting instructional student credit hour costs for music.

The student credit hour instructional costs for music at Minot were $34.48 followed by Dickinson with costs of $19.93, Mayville $18.43 and Valley City with costs of $17.53.

The major area of music had the highest student credit hour instructional cost of all the major areas investigated. In the rank ordering of major areas in all institutions in Table 31, Appendix C, Minot's Music Department ranked as the most expensive producer of student credit hours. The Music Department at Mayville was fourth and Valley City Music Department ranked sixth.

The results of the analysis of variance indicated a significant difference in costs between major areas. A comparison of two major areas ranked number one and number forty contributed to the findings. The major areas were Minot's Music Department which had student credit hour costs of $34.48 compared to Dickinson's Social Science Department with costs of $6.32.

An inspection of the setwise regression analysis indicated factors influencing high costs at Minot. Credit hour production, the factor with the greatest influence on student credit hour costs was the lowest at Minot when compared to other institutions. Table 39, Appendix C, presented the credit hour production of all major areas in the

four institutions and Minot's Music Department with a credit hour production of 5.9 for each faculty ranked 40th. Mayville's Music Department ranked 38th in credit hour production for each full-time equivalent faculty. This corresponded with total student credit hour production by department which was ranked and presented in Table 30. The Music Department at Minot ranked the lowest of all major areas in the four institutions. Minot's Music Department also has the highest number of hours spent on outside school activities which is a factor which correlates significantly with higher costs. The number of small classes was also high at Minot. Small classes contributed to high student credit hour costs.

The Music Department at Dickinson was second to Minot in student credit hour instructional costs. However, the student credit hour instructional costs at Dickinson, Mayville and Valley City were similar. The higher costs at Dickinson were attributed to a higher percentage of instructional time devoted to the production of upper division credits. Dickinson had the highest percentage of instructional time devoted to producing upper division credits of the four institutions and ranked sixth in Table 33, Appendix C, when compared to all major areas at the four institutions.

The Music Department at Mayville kept credit hour costs comparable to the other institutions by larger weighted average size classes. Mayville had the highest average of the four institutions. Credit hour production at Mayville was also low especially at the upper division where the total production of upper division credits was 97 credits. This was also indicated by the lowest percentage of instruction devoted to producing upper division credits of the four institutions.

Valley City's student credit hour instructional costs were lower than the other four institutions because of high credit hour production by each faculty. High credit hour production indicated a greater number of different preparations and Valley City's Music Department lead all other major areas in the four institutions in this ranking which is presented in Table 37, Appendix C. The Music Department at Valley City had an unusually high number of small classes which accounted for their number 39 ranking in weighted average size class in Table 39, Appendix C. The average size of upper division classes was the smallest at Valley City but this average was influenced by the number of small classes. Upper division credit hour production at Valley City was 178 credits and ranked above Mayville as indicated earlier.

The following conclusions were drawn from the information presented:

1. The area of music had characteristics which are not common in other areas. In order to provide more individualized instruction smaller enrollments in classes were required. These classes had low credit hour value which in turn raised the student credit hour instructional costs. These costs are unusually high when compared to other major areas.

2. The unusually large number of small classes indicated private lessons are being offered at the expense of instructional budgets.

3. Sundre (7) recommended two of the four institutions offering a major in music be deleted. This recommendation was based on the number of students graduating with a major in music. The two institutions were not named by Sundre.

The following are recommendations of this study for the major area of music:

1. This study recommends that the major program offering of music at Minot be deleted. This recommendation is based on unjustifiable high student credit hour costs.

2. This study recommends that the major program offering at Mayville be reduced to a minor or less. This recommendation is based on high student credit hour instructional costs and the lack of credit hour production at the upper level.

3. This study recommends that all Music Departments and especially Valley City combine smaller classes in an effort to reduce costs.

Physical Education

Table 22 presented the data for factors effecting student credit hour instructional cost for physical education.

The student credit hour costs for physical education ranged from a high of $14.22 at Mayville to $9.51 at Dickinson. The costs of $12.84 at Minot and $11.85 at Valley City fell between the institutions with high and low student credit hour costs.

The Physical Education Department at Mayville was low in credit hour production, a factor determined by the setwise regression analysis which accounted for higher costs. Mayville's credit hour production of 7.3 hours for each instructor is the lowest of the four institutions. Minot's Physical Education Department had the second lowest credit hour production and the next to the highest of student credit instructional hour costs.

The Physical Education Department at Dickinson maintained the lowest costs with the largest weighted average size class. Valley City and Dickinson produced an equal number of credit hours for each instructor. Higher costs at Valley City can be attributed to a larger portion of instruction time spent producing upper division credit hours. When compared to the other major areas in the four institutions in Table 33, Appendix C, Valley City ranked fifth behind the four departments of professional education in percentage of instructional time spent producing upper division credit hours.

The major area of physical education ranked below all other major areas in degrees held. The average degree held by the faculty in three of the four institutions was less than a master's. The faculty at Valley City were the only faculty to hold an average degree of master's or higher. The Physical Education Department at Minot ranked number 40 in Table 34 when compared to all other major areas in the four institutions.

The average degree corresponded with average salary. The average salary received by the physical education faculty at Minot was also the lowest of all major areas in the four institutions. The rank order of faculty salary was presented in Table 38, Appendix C.

The major area of physical education maintained the highest average of supplementary instruction when compared to the other major areas. This was an indication that physical education instructors spent an average of one fourth of their time on teaching activities. The faculty at Minot maintained the highest average of the four institutions.

The following conclusions were drawn from the information presented:

1. Credit hour production influenced the variation of student credit hour costs at the four institutions.

2. Valley City student credit hour costs are influenced by a large percentage of their instructional time being devoted to producing upper division credits.

3. The academic preparation of the faculty teaching in the Physical Education Department at Dickinson, Mayville and Minot was below a master's degree. This indicated that faculty have been hired as a coach rather than a physical education instructor. The degree is also reflected in faculty salary which are unusually low when compared to other major areas.

4. Valley City's student credit hour costs compared favorably to the averages in the other institutions.

The following are recommendations of this study for the major area of physical education:

1. This study recommends the credit hour production at both Minot and Mayville be increased in an effort to decrease student credit hour costs.

2. This study recommends the physical education faculty at Dickinson, Mayville and Minot be required to return to graduate school in an effort to strengthen their academic preparation. It is also the recommendation of this study that only faculty with master's degrees be considered for a position.

3. This study recommends the administration at Minot, Mayville and Dickinson raise the average salary in an effort to attract instructors with higher academic preparation.

Professional Education

Table 23 presented the data for factors effecting instructional cost for professional education. The professional education program at Minot with student credit hour instructional costs of $14.43 were the highest of the four institutions. Minot was followed by Valley City with costs of $11.03, Mayville with costs of $10.26 and the institution with the lowest costs in the area of professional education was Dickinson with costs of $8.21.

Credit hour production, percentage of instructional time spent producing upper division credits and weighted average size classes accounted for the variation in student credit hour costs between the four institutions. All three factors accounted for the lower costs at Dickinson. Dickinson has the lowest percentage of time spent in producing upper division credits, a factor determined by the setwise regression analysis for contributing to higher costs. Dickinson leads the other three institutions with the largest weighted average size classes and was second to Valley City in credit hour production. High averages of both of these factors contribute to lower costs. Minot's higher costs were attributed to low credit hour production and a high percentage of instructional time spent in producing upper division credits. The costs at Valley City were traced to a high percentage of instructional time spent producing upper division credits and small averages in weighted average size classes. Valley City indicated unusually small weighted average size classes when compared to the other three institutions and an unusually large production of credit hours for each instructor.

Credit hour production was greater than contact hours in three of the four institutions. The reason for this was because of student-teacher supervision.

The area of professional education had the highest average of all major areas in percentage of instruction time spent in producing upper division credits. Table 33, Appendix C, presented the ranking of all major areas in the four institutions with Mayville ranking number 1 followed by Valley City number 2, Minot number 3 and Dickinson number 4.

The professional education area had the highest number of full time equivalent instructors as presented in Table 1.

When compared to the other major areas, professional education ranked second to chemistry in average departmental salary. Average salaries are presented in Table 2.

Professional education had the highest average in years of experience (college and related) when compared to the other nine major areas. The instructors in the area of professional education averaged 20.4 years of experience.

The following conclusions were determined from the information presented:

1. The analysis of the data presented for professional education was the most difficult to summarize when compared to the other nine major areas. The reason for this difficulty was because each institution utilized different procedures in preparing future teachers for teaching.

2. The reason for higher percentages of instructional time devoted to the production of upper division credits was because most

education courses including student teaching were taken by upper classmen.

3. The average number of years of experience held by faculty teaching professional education courses and supervising student-teachers was the highest of all departments investigated.

4. Student credit hour instructional costs in the area of professional education at all four institutions compared favorably to the averages in other major areas.

The following are recommendations for the area of professional education:

1. This study recommends that research be conducted on the professional education departments in all colleges in North Dakota in an effort to determine the most successful procedures used in preparing students for teaching.

2. This study recommends that research be conducted in the area of professional education that would include the examination of the total costs for student credit hour production. This study anticipates a greater variation in costs when variables such as mileage, faculty expense allotments and payments to the high school supervising teacher are taken into consideration.

Summary of Conclusions by Each Institution

Dickinson

1. Dickinson State College had higher student credit hour instructional costs than the other three institutions in four major areas: Art, Biology, Business Education and Mathematics.

2. The institutional average of student credit hour instructional costs for the ten major areas at Dickinson was $11.48. This

average was identical to the average at Valley City and ranked below Minot, the institution with the highest average.

3. The data indicated limited student participation in upper division courses in the area of chemistry. An investigation should be conducted to determine the number of graduates and establish a need for a major program offering in chemistry.

4. The high student credit hour instructional costs in the major area of art were not justified. Low faculty credit hour production indicated the area is over-staffed. By raising the credit hour production of the other staff members to a level equal to the other three institutions, one staff member could be eliminated.

5. The faculty in the major area of physical education held an average degree of less than a master's. The faculty who do not hold a master's degree should be required to strengthen their academic preparation.

6. The average salary paid to the instructional staff in the area of physical education was low when compared to other major areas. This was reflected in the average degree held by the members of the department. The salary should be increased to equal the salary in other institutions.

Mayville

1. Mayville State College had higher student credit hour instructional costs in one major area when compared to the other three institutions. That major area was physical education.

2. Mayville had an institutional average of student credit hour cost of $10.84 for the ten major areas. This average was the lowest of the four institutions.

3. The faculty teaching in the ten major areas at Mayville held the highest average degree, had the highest average rank and were paid the largest average salary when compared to the other three institutions.

4. The faculty teaching in the ten major areas at Mayville spent a greater percentage of their instructional time on administrative duties and a smaller percentage on direct and indirect instruction than faculty at the other three institutions.

5. The data indicated limited student participation in the area of art. Costs are kept low by unusually high credit hour production. An analysis of the data indicated a reduction of the art major to a minor should be recommended.

6. The data indicated limited student participation in upper division classes in chemistry. Analysis of the data indicated an investigation should be conducted to determine the need for a major program offering.

7. The data indicated limited student participation in the area of English in upper division courses. An analysis of the data indicated an investigation should be conducted to determine the need for a major program offering.

8. The high student credit hour instructional costs in music are not justified. The data also indicated limited student participation. Consideration should be given to the deletion of the program.

9. The average degree held by the instructors in the major area of physical education was less than a master's. The physical education faculty at Mayville should be requested to improve their academic preparation.

10. Credit hour production was low in the area of physical education and should be increased in an effort to decrease costs.

11. The average salary in the area of physical education was low when compared to other major areas and should be increased to equal the salary in other institutions.

Minot

1. Minot State College had the highest student credit hour instructional costs of the four institutions in 3 areas: English, Music, and Professional Education.

2. Minot State College had the highest student credit hour instructional costs of the four institutions. The average for the ten major areas at Minot was $12.33.

3. The average salary paid to the instructors in the ten areas was the lowest at Minot when compared to the other three institutions.

4. The Music Department had the highest student credit hour instructional costs when compared to all major areas in the four institutions.

5. The Social Science Department had the lowest student credit hour instructional costs when compared to all major areas in the four institutions.

6. The data indicated that the average salary paid to the faculty in the Art Department was low when compared to other institutions and should be increased to equal the salary paid at other institutions.

7. The average degree held by faculty teaching in the English Department was below a master's degree. The data also indicated a limited student participation in upper division courses in the areas

of English. The average salary paid to the faculty in the English Department was low when compared to other institutions. The academic preparation and salary should be increased to equal other institutions. An investigation of upper division credits should be undertaken to determine a need for a major program.

8. The student credit hour instructional costs in the area of music was not justified and consideration should be given to the possible deletion of the program.

9. The average degree held by the faculty in the area of physical education was less than a master's. The average salary paid to physical education instructors at Minot is the lowest of the forty major areas considered in this study. Both the degree and the salary should be increased to a level equal that of other institutions.

Valley City

1. Valley City State College had the highest instructional credit hour costs in two major areas. These two major areas were chemistry and social science.

2. Valley City ranked with Dickinson in the instructional average of student credit hour cost with an average of $11.48.

3. The faculty at Valley City lead all other institutions with the highest average for different preparations and average credit hours produced.

4. The data indicated limited student participation in upper division course in chemistry. An investigation should be conducted to determine a need for a major program offering.

5. The faculty in the Business Education Department at Valley City holds degrees less than a master's and should be requested to improve their academic preparation.

6. The faculty in the area of mathematics had the highest average in different preparations and credit hours produced. Consideration should be given for the addition of staff to decrease this average to a level equal to other institutions.

7. Data indicated the staff should be increased in the area of biology in an effort to lower the average of credit hours for each faculty.

Summary of Recommendations

1. It is the recommendation of this study that the decisions based on the following recommendations must realize the limitation of these recommendations. This study investigated one aspect of the problem and was not intended to be the final answer. Final decisions should not be made until all variables have been researched.

2. The high student credit hour instructional costs in the area of art at Dickinson is attributed to low credit hour production. It is the recommendation of this study to increase the average credit hour production by the faculty and eliminate one staff member in an effort to reduce student credit hour instructional costs to a level equal to that of the other three colleges. This study also recommends reducing the major in art at Mayville to a minor on the basis of student participation in the program.

3. The data indicated limited student participation in upper division courses in the major area of chemistry at Dickinson, Mayville

ald Valley City. Variables which account for the differences in costs were established but the production of graduates was not considered in this study. Therefore, it is the recommendation of this study that further investigation be conducted to determine the number of students graduating with majors in chemistry. If a need is not established through future research then this study would support a recommendation to reduce the major to a minor in two of the three institutions.

4. The major area of English at both Mayville and Minot produced a small number of upper division student credit hours. This is an indication of a limited number of students interested in the major program. It is the recommendation of this study that research be conducted to establish a need for a major program at the two institutions. If a need is not established through research it is recommended that the major offerings in the area of English at both Minot and Mayville be reduced to a minor on the basis of production supported by costs.

5. This study recommends that the major program of music be deleted at Minot on the basis of unjustifiable high student credit hour costs. It is also a recommendation of this study that the major program of music at Mayville be reduced to a minor or less. This recommendation is based on high student credit hour costs and the limited student participation in upper division classes.

6. The percentage of instructional time devoted to administrative duties by the faculty teaching in the Business Education Department at Mayville and the Mathematics Department at Dickinson was higher than the average indicated by faculty in the other major areas. It is a recommendation of this study that the administration at these two institutions relieve the instructional staff of

administrative duties to allow them to spend a larger percentage of time for direct and indirect instruction.

7. It was indicated in the data that the instructional staff in the major areas of biology, business education and mathematics at Valley City were overloaded with different preparations and credit hour production. This study recommends that one or a fraction of a full-time equivalent instructor be added to each of these departments.

8. Five of the forty departments investigated in this study employed instructional staff that held an average degree less than a master's. The physical education faculty at Dickinson, Minot, and Mayville; the business education faculty at Valley City; and the English faculty at Minot had degree averages below a master's. It is a recommendation of this study that the instructional staff in these departments who do not have a master's degree be required to return to graduate school to improve their academic preparation. This study also recommends that new staff members should be required to hold a master's degree before being considered for a position in all major areas in the four institutions.

9. It was a recommendation of this study to raise the average salary for faculty teaching in Minot's Art, Physical Education and English Department and the physical education faculty at Mayville and Dickinson to a level equal the salary at other institutions.

10. It is a recommendation of this study that additional curricula be examined in all state institutions including the two universities by the same process used in this study.

APPENDIX A

White Copy - Board of H. Educ.
Canary Copy - Academic Dean or Vice President
Pink Copy - Department Chairman

FORM F
FACULTY ACTIVITIES, ROOM UTILIZATION AND CLASS ENROLLMENT RECORD

(1) College Name ________ ☐☐ Faculty Name ________ Last ________ First ________ Middle Initial ☐☐☐

(3) Number Student Advisees
Undergraduate ________
Graduate ________

(4) Number Committee Assignments ________

(5) Term 19__ 19__
____ First Quarter or Semester
____ Second Quarter or Semester
____ Third Quarter
____ Summer

ACTIVITIES FOR WHICH COMPENSATION IS RECEIVED FROM THE COLLEGE:

(6) A. Estimate of average number of hours spent per week . . . . ________ Hours

(7) B. Percentage breakdown of hours listed in A.

(8) 1. Direct and Indirect Instruction (This percent should equal total percent in column 29 below.) . . . ________ Percent

(9) 2. Supplementary Instruction . . . . ________ Percent

(10) 3. Organized or Project Research . . . . ________ Percent

(11) 4. Other Research . . . . ________ Percent

(12) 5. Administrative Service . . . . ________ Percent

(13) 6. Other activities for which you receive regular salary . . . . ________ Percent

(14) TOTAL 100 Percent

(15) Hours in Non-Compensated Professional Activities . . . . ________ Hours

(16) Hours in Compensated Professional Activities . . . . ________ Hours

(17) Hours in Other Activities (Specify) . . . . ________ Hours

Must be the same

INSTRUCTIONAL LOAD

Special Code (18)	Department Number (19)	Course Number (20)	Section (21)	Type Class (22)	Credit Hours (23)	Percent Responsibility (24)	Building Number (25)	Room Number (26)	Enrollment (27)	Class Meeting Times (Begins and Ends) (28)	% Instruction Time (29)	Contact Hours (30)

(31) TOTAL TIME ________

INSTRUCTIONS FOR COMPLETING FORM F

ITEM

1. Number Student Advisees: List the number of student advisees assigned to you, separated according to whether the student is an undergraduate or graduate. Include graduate students on whose committees you serve.

2. Committee Assignments: Indicate the number of college committees on which you serve.

3. Estimate the Average Hours: Enter the total number of hours you spend in any college related activity other than those activities for which specific additional financial compensation is made. Be sure to include your professional reading time, your departmental research time, and other activities you consider a part of your position as a college staff member. Express the number of such hours as an average number of hours per week.

4. Direct and Indirect Instruction: Include on-campus teaching and off-campus teaching for which no additional compensation is received; research advisement with undergraduate and graduate students in which instruction is the primary goal (If the goal is both instruction and research, estimate the amount of research instruction and attribute non-instructional research to 6 below.); preparation of course materials; procurement and preparation of class and laboratory apparatus and supplies; paper grading; and supervision of undergraduate teaching. Do not include outside-the-classroom advisement on selection of major courses, etc. Include the latter under administrative service in 7 below.

5. Supplementary Instruction: Include direction of non-credit hour extra curricular activities such as coaching of athletics, direction of drama, music groups, speech activities, student groups, student publications, etc. Also include remedial teaching, supervision of language laboratories, and other nonscheduled laboratories which do not relate to a specific course.

6. Research: The principle here relates to research done for which funds have been earmarked for specific projects. If instruction of students is involved as well as research attribute the proper percentage of instruction to 4 above. Include research done in the department or on your own for which an account number has not been assigned. Be sure to include writing reading, and all creative work associated with research but not directly related to a specific class.

7. Administrative Service: Include all department and college administrative duties including committee work and duties as department chairman except time spent in a position in the

central administration. Also, include the advisement and counseling of students which is not related to instruction but rather to guidance in course selection, vocational choice, and informal counseling.

8. Hours of outside school activities: Estimate the hours you spend in an average week performing activities which are considered professional in nature or related to your faculty position for which you do or do not receive additional financial compensation and which you consider part of your college workload. List the time spent per week in other activities not included above, which you would like considered in order to provide an accurate picture of your activities as a college faculty member.

APPENDIX B

NORTH DAKOTA HIGHER EDUCATION COMPREHENSIVE PLANNING STUDY
STUDENT DATA FORM

College _____ ☐☐ _____ Term 19___

Social Security ___-___-___ Name _____
Last First Middle

Permanent Home Address _____
Street Address City County ☐☐ State ☐☐ Zip Code

High School from which Graduate _____ ☐☐☐

SEX:	MARITAL:	U.S. CITIZEN:	N.DAK. RESIDENT:	VETERAN:
( ) 0 Male	( ) 0 Single	( ) 0 Yes	( ) 0 Yes	( ) 0 Yes
( ) 1 Female	( ) 1 Married	( ) 1 No	( ) 1 No	( ) 1 No

Class Rank:	Race:	Residence at College:	Major(s): ☐☐☐
( ) 0 Freshman	( ) 0 Am. Indian	( ) 0 Dormitory	_____ ☐☐☐
( ) 1 Sophmore	( ) 1 Afro-American	( ) 1 At Home	Minor(s) ☐☐☐
( ) 2 Junior	( ) 2 Orintal-American	( ) 2 Campus Married Housing	_____ ☐☐☐
( ) 3 Senior	( ) 3 Spanish-Surname Am.	( ) 3 Off-Campus Housing	
( ) 4 Graduate	( ) 4 White		
( ) 5 Special	( ) 5 Other		
( ) 6 Unclassified		If New Student-College Previously Attended:	Dates:

Call Number	Department	Course Number	Section	Course Title	Credit Hours	Date of Add	Date of Drop
				TOTAL	___		

APPENDIX C

TABLE 27

SELECTED CURRICULA RANKED ACCORDING TO AVERAGE NINE MONTH INSTRUCTIONAL SALARY EXPENDITURES IN ALL INSTITUTIONS

Rank	Curricula	College	Salary	Rank	Curricula	College	Salary
1	Art	Ma	12,825.00	21	Soc Sci	VC	10,021.00
2	Chemistry	VC	11,800.35	22	Soc Sci	D	9,995.83
3	Chemistry	Mi	11,457.99	23	Music	Mi	9,994.22
4	Math	Ma	11,229.75	24	Soc Sci	Mi	9,908.40
5	Prof Edu	D	11,227.27	25	Math	Mi	9,892.50
6	Chemistry	D	11,167.68	26	Math	D	9,817.50
7	Prof Educ	Mi	11,156.58	27	Phy Educ	VC	9,807.31
8	Biology	Mi	10,901.88	28	Math	VC	9,800.00
9	Biology	Ma	10,825.71	29	Bus Educ	Mi	9,780.90
10	Biology	D	10,800.00	30	English	D	9,606.36
11	Prof Educ	Ma	10,537.48	31	English	Ma	9,533.97
12	Soc Sci	Ma	10,457.97	32	Art	VC	9,442.86
13	Bus Educ	Ma	10,425.71	33	Music	VC	9,436.98
14	Prof Educ	VC	10,406.25	34	Music	Ma	9,399.60
15	Chemistry	Ma	10,386.58	35	Phy Educ	Ma	9,201.09
16	Music	D	10,306.90	36	English	VC	9,196.00
17	Bus Educ	D	10,242.85	37	Phy Educ	D	9,080.55
18	Bus Educ	VC	10,163.63	38	English	Mi	9,060.44
19	Biology	VC	10,145.00	39	Art	Mi	8,911.24
20	Art	D	10,085.73	40	Phy Educ	Mi	8,486.31

TABLE 28

THE SELECTED CURRICULA RANKED ACCORDING TO FULL TIME EQUIVALENT INSTRUCTORS IN ALL INSTITUTIONS

Rank	Curricula	College	Instructors	Rank	Curricula	College	Instructors
1	Soc Sci	Mi	14.50	20.5	Soc Sci	D	6.00
2	Prof Educ	Mi	13.50	22	Music	VC	5.75
3	English	Mi	13.40	23	Soc Sci	Ma	5.05
4	Phy Educ	Mi	13.00	24.5	Music	Ma	5.00
5	Music	Mi	12.75	24.5	Chemistry	Mi	5.00
6	Prof Educ	VC	12.00	26	English	Ma	4.70
7	Bus Educ	Mi	11.00	27.5	Biology	D	4.00
8	Soc Sci	VC	9.00	27.5	Art	Mi	4.00
8.5	Phy Educ	D	9.00	29	Art	D	3.50
10	English	VC	8.75	30	Math	VC	3.25
11	Prof Educ	D	8.25	31	Bus Educ	Ma	3.15
12	Bus Educ	D	8.00	32	Chemistry	D	3.00
12	English	D	8.00	33	Bus Educ	VC	2.50
12	Biology	Mi	8.00	34	Math	Ma	2.00
12	Math	Mi	8.00	35	Biology	VC	1.75
12	Phy Educ	VC	8.00	35	Biology	VC	1.75
17	Music	D	7.25	35	Art	VC	1.75
18	Prof Educ	Ma	6.85	38	Chemistry	VC	1.50
19	Phy Educ	Ma	6.75	39	Chemistry	Ma	1.30
20.5	Math	D	6.00	40	Art	Ma	1.00

TABLE 29

THE SELECTED CURRICULA RANKED ACCORDING TO STUDENT CREDIT HOUR PRODUCTION BY FULL TIME EQUIVALENT INSTRUCTORS IN ALL INSTITUTIONS

Rank	Major Area	Institution	Hours	Rank	Major Area	Institution	Hours
1	Soc Sci	Ma	541	21	Biology	D	332
2	Soc Sci	D	526	22.5	Phy Educ	D	318
3	Soc Sci	Mi	509	22.5	English	D	318
4	Soc Sci	VC	506	24	English	Ma	316
5	Art	Ma	471	25	Prof Educ	VC	315
6	Bus Educ	Ma	457	26	Phy Educ	VC	276
7	Prof Educ	D	453	27	English	VC	262
8	Bus Educ	VC	451	28	Prof Educ	Mi	258
9	Biology	Ma	441	29	Chemistry	Mi	247
10	Math	VC	435	30	English	Mi	245
11	Math	Ma	434	31	Art	VC	224
12	Bus Educ	Mi	428	32	Chemistry	Ma	223
13	Bus Educ	D	406	33.5	Chemistry	VC	216
14	Math	Mi	393	33.5	Phy Educ	Ma	216
15	Biology	VC	381	35	Phy Educ	Mi	206
16	Biology	Mi	363	36	Music	VC	180
17	Chemistry	D	361	37	Music	D	172
18	Math	D	347	38	Music	Ma	170
19	Art	Mi	345	39	Art	D	153
20	Prof Educ	Ma	342	40	Music	Mi	97

TABLE 30

THE SELECTED CURRICULA RANKED ACCORDING TO INSTRUCTIONAL COSTS PER STUDENT CREDIT HOUR PRODUCED BY FULL TIME EQUIVALENT INSTRUCTORS IN ALL INSTITUTIONS

Rank	Curricula	College	Cost	Rank	Curricula	College	Cost
1	Music	Mi	34.48	21	English	D	10.06
2	Art	D	21.91	22	Biology	Mi	10.02
3	Music	D	19.93	23	Phy Educ	D	9.51
4	Music	Ma	18.43	24	Math	D	9.44
5	Chemistry	VC	18.21	25	Art	Ma	9.08
6	Music	VC	17.53	26	Biology	VC	8.86
7	Chemistry	Ma	15.52	27	Math	Ma	8.63
8	Chemistry	Mi	15.49	28	Art	Mi	8.48
9	Prof Educ	Mi	14.43	29	Bus Educ	D	8.40
10	Phy Educ	Ma	14.22	30	Math	Mi	8.39
11	Art	VC	14.02	31	Biology	Ma	8.19
12	Phy Educ	Mi	12.84	32	Prof Educ	D	8.01
13	English	Mi	12.33	33	Bus Educ	Mi	7.61
14	Phy Educ	VC	11.85	34	Bus Educ	Ma	7.59
15	English	VC	11.69	35	Math	VC	7.52
16	Prof Educ	VC	11.03	36	Bus Educ	VC	7.51
17	Biology	D	10.85	37	Soc Sci	VC	6.59
18	Chemistry	D	10.32	38	Soc Sci	Mi	6.48
19	Prof Educ	Ma	10.26	39	Soc Sci	Ma	6.40
20	English	Ma	10.08	40	Soc Sci	D	6.32

TABLE- 31

THE SELECTED CURRICULA RANKED ACCORDING TO WEIGHTED AVERAGE SIZE CLASS IN EACH MAJOR AREA IN ALL INSTITUTIONS

Rank	Curricula	College	Size	Rank	Curricula	College	Size
1	Biology	Mi	51.8	21	Math	D	28.1
2	Soc Sci	Mi	39.9	22	Prof Educ	Mi	28.1
3	Soc Sci	Ma	38.2	23	English	Ma	27.4
4	Chemistry	Mi	37.5	24	English	Ma	26.0
5	Soc Sci	D	35.1	25	Music	Ma	25.0
6	Biology	Ma	35.0	26	Prof Educ	Ma	24.7
7	Phy Educ	D	34.1	27	Phy Educ	Mi	24.4
8	Soc Sci	VC	32.6	28	Biology	VC	23.3
9	Bus Educ	Mi	31.8	29	Art	Mi	21.7
10	Bus Educ	D	31.6	30	English	VC	20.8
11	Biology	D	31.6	31	English	Mi	20.4
12	Prof Educ	D	29.9	32	Music	Mi	16.2
13	Phy Educ	Ma	29.7	33	Music	D	16.0
14	Math	Mi	29.7	34	Art	Ma	15.7
15	Phy Educ	VC	29.4	35	Art	VC	14.6
16	Chemistry	D	29.2	36	Prof Educ	VC	12.9
17	Math	Ma	28.9	37	Chemistry	Ma	12.6
18	Bus Educ	VC	28.8	38	Art	D	12.2
19	Bus Educ	Ma	28.3	39	Music	VC	12.1
20	Math	VC	28.2	40	Chemistry	VC	10.8

TABLE 32

THE SELECTED CURRICULA RANKED ACCORDING TO PER CENT OF INSTRUCTIONAL TIME SPENT IN PRODUCING UPPER DIVISION STUDENT CREDIT HOURS BY FULL TIME EQUIVALENT INSTRUCTORS IN ALL INSTITUTIONS

Rank	Curricula	College	Per Cent	Rank	Curricula	College	Per Cent
1	Prof Educ	Ma	83.2	21	Music	Mi	24
2	Prof Educ	VC	75.4	22	English	D	23.4
3	Prof Educ	Mi	74.8	23	English	VC	23.3
4	Prof Educ	D	66.1	24	Art	D	22.3
5	Phy Educ	VC	53.1	25	Math	Ma	22.1
6	Music	D	52.9	26	Biology	VC	20.3
7	Bus Educ	D	52.8	27	Art	Mi	19.8
8	Bus Educ	VC	47.5	28	Math	VC	18.1
9	Bus Educ	Mi	38.5	29	Music	VC	17.2
10	Bus Educ	Ma	37.1	30	Soc Sci	Ma	15.5
11	Biology	D	33.7	31	Biology	Mi	14.8
12	Phy Educ	Ma	33.1	32	Math	D	13.5
13	Chemistry	VC	32.7	33	English	Mi	12.7
14	Soc Sci	VC	32.6	34	English	Ma	12.5
15	Soc Sci	D	31.5	35	Music	Ma	11.2
16	Phy Educ	Mi	30.6	36	Chemistry	Mi	10.1
17	Phy Educ	D	30.3	37	Math	Mi	8.9
18	Soc Sci	Mi	28.9	38	Biology	Ma	7.2
19	Art	VC	28.2	39	Art	Ma	6.3
20	Chemistry	Ma	27.5	40	Chemistry	D	6.1

TABLE 33

THE SELECTED CURRICULA RANKED ACCORDING TO DEGREE HELD BY FULL TIME EQUIVALENT FACULTY IN ALL INSTITUTIONS

Rank	Curricula	College	Instructors	Rank	Curricula	College	Instructors
1	Art	Ma	6	21	English	Ma	3.1
2	Biology	Mi	5.5	22	Music	Ma	3
3	Chemistry	Mi	5.2	22	Soc Sci	Mi	3
4	Chemistry	D	5	22	Art	VC	3
5.5	Biology	D	4.4	25	Bus Educ	D	2.9
5.5	Prof Educ	D	4.4	26	Math	D	2.7
7	Prof Educ	Ma	4.2	27	Math	VC	2.5
8	Chemistry	VC	4	27	Art	Mi	2.5
8	Soc Sci	D	4	27	Math	Mi	2.5
8	Biology	Ma	4	30	Bus Educ	Mi	2.4
8	Chemistry	Ma	4	30	Music	Mi	2.4
12	Prof Educ	Mi	3.9	30	English	D	2.4
13	Art	D	3.8	33	English	VC	2.3
14	Math	Ma	3.7	34	Phy Educ	VC	2.2
15.5	Soc Sci	Ma	3.6	35	Music	VC	1.8
15.5	Bus Educ	Ma	3.6	35	English	Mi	1.8
17	Music	D	3.4	35	Phy Educ	Ma	1.8
18	Prof Educ	VC	3.3	38	Bus Educ	VC	1.7
18	Soc Sci	VC	3.3	38	Phy Educ	D	1.7
18	Biology	VC	3.3	40	Phy Educ	Mi	1.6

TABLE 34

THE SELECTED CURRICULA RANKED ACCORDING TO THE RANK OF FULL TIME EQUIVALENT FACULTY IN ALL INSTITUTIONS

Rank	Curricula	College	Rank	Rank	Curricula	College	Rank
1	Art	Ma	5	19	English	D	3.3
2	Chemistry	VC	4.5	22	Music	Ma	3.2
3	Biology	D	4.2	23	Bus Educ	D	3.1
3	Chemistry	D	4.2	23	Soc Sci	VC	3.1
3	Prof Educ	D	4.2	23	Math	Mi	3.1
6	Biology	Mi	4.1	23	Music	Mi	3.1
7.5	Chemistry	Mi	4	27	Biology	VC	3
7.5	Biology	Ma	4	27	Bus Educ	VC	3
9	Chemistry	Ma	3.7	27	English	VC	3
9	Math	Ma	3.7	27	Phy Educ	VC	3
9	Prof Educ	Ma	3.7	27	Art	D	3
12	Soc Sci	D	3.6	32	Bus Educ	Mi	2.9
13	Soc Sci	Ma	3.5	33	Art	Mi	2.8
13	Soc Sci	Mi	3.5	33	English	Mi	2.8
13	Prof Educ	Mi	3.5	33	Music	D	2.8
13	Math	VC	3.5	33	Phy Educ	D	2.8
17.5	Bus Educ	Ma	3.4	37	Phy Educ	Ma	2.6
17.5	English	Ma	3.4	38.5	Phy Educ	Mi	2.5
19	Prof Educ	VC	3.3	38.5	Art	VC	2.5
19	Math	D	3.3	40	Music	VC	2.3

TABLE 35

THE SELECTED CURRICULA RANKED ACCORDING TO COLLEGE TEACHING EXPERIENCE OF FULL TIME EQUIVALENT FACULTY IN ALL INSTITUTIONS

Rank	Curricula	College	Years	Rank	Curricula	College	Years
1	Art	Ma	21	21	Soc Sci	Ma	7.6
2	Math	VC	14.5	22	English	Mi	7.1
3	Soc Sci	VC	13.3	23.5	Prof Educ	Ma	6.7
4.5	Biology	Mi	13	23.5	Math	D	6.7
4.5	Biology	VC	13	25	English	VC	6.6
6	Chemistry	Mi	11.4	26	Biology	Ma	6.5
7	Soc Sci	Mi	10.8	27	Bus Educ	Mi	6.1
8	English	Ma	10.7	28.5	Soc Sci	D	5.9
9.5	Phy Educ	VC	9.9	28.5	Phy Educ	D	5.9
9.5	Prof Educ	VC	9.9	30.5	Music	Mi	5.8
11	Biology	D	9.6	30.5	Phy Educ	Ma	5.8
12	Chemistry	Ma	9.3	32	Math	Ma	5.7
13	Math	Mi	9.2	33.5	Chemistry	D	4.8
14	Chemistry	VC	9	33.5	Bus Educ	D	4.8
15	Prof Educ	D	8.9	35	Phy Educ	Mi	4.1
16	Prof Educ	Mi	8.8	36	Art	VC	4
17	English	D	8.6	37	Music	Ma	3.8
18	Bus Educ	VC	8.3	38	Bus Educ	Ma	3.6
19	Art	D	8.2	39	Music	VC	2.8
20	Music	D	7.9	40	Art	Mi	2.2

TABLE 36

THE SELECTED CURRICULA RANKED ACCORDING TO DIFFERENT PREPARATIONS FOR FULL TIME EQUIVALENT INSTRUCTORS IN ALL INSTITUTIONS

Rank	Curricula	College	Preparations	Rank	Curricula	College	Preparations
1	Music	VC	9.2	20	Bus Educ	D	3.2
2	Art	Ma	8	20	Biology	VC	3.2
3	Phy Educ	VC	5	23.5	Chemistry	D	3
4	Chemistry	VC	4.7	23.5	English	VC	3
5	Music	D	4.6	25.5	Biology	Ma	2.9
6	Art	VC	4.5	25.5	English	Mi	2.9
7	Bus Educ	VC	4.4	27	Math	Mi	2.8
8	Math	VC	4.3	27	Soc Sci	Ma	2.8
8	Phy Educ	D	4.3	27	English	D	2.8
8	Phy Educ	Ma	4.3	27	Soc Sci	VC	2.8
11	Phy Educ	Mi	4.2	31	Bus Educ	Mi	2.7
12.5	Bus Educ	Ma	3.8	32	Biology	D	2.5
12.5	Soc Sci	D	3.8	33.5	English	Ma	2.3
14	Art	D	3.7	33.5	Prof Educ	Ma	2.3
15	Soc Sci	Mi	3.6	35	Chemistry	Ma	2.2
16.5	Art	Mi	3.5	36	Chemistry	Mi	2
16.5	Math	Ma	3.5	37	Prof Educ	D	1.9
18.5	Math	D	3.3	38.5	Biology	Mi	1.6
18.5	Music	Mi	3.3	38.5	Prof Educ	VC	1.6
20	Music	Ma	3.2	40	Prof Educ	Mi	1.3

TABLE 37

THE SELECTED CURRICULA RANKED ACCORDING TO CONTACT HOURS FOR FULL TIME EQUIVALENT INSTRUCTORS IN ALL INSTITUTIONS

Rank	Curricula	College	Hours	Rank	Curricula	College	Hours
1	Art	Ma	46	21.5	Biology	Mi	15.1
2	Chemistry	VC	34	21.5	Soc Sci	VC	15.1
3	Music	Ma	23.4	23	Soc Sci	D	14.7
4	Music	D	22.2	24	Math	D	14.3
5	Biology	Ma	21.1	25	English	Ma	14
6	Chemistry	D	21	26.5	Phy Educ	D	13.8
7	Art	VC	20.6	26.5	Bus Educ	D	13.8
8	Music	Mi	20.5	28.5	Soc Sci	Ma	13.5
9	Art	D	19.7	28.5	Bus Educ	Mi	13.5
10	Chemistry	Ma	19.4	30	Soc Sci	Mi	13.4
11	Biology	VC	18.9	31	Biology	D	13.3
12.5	Bus Educ	VC	18	32	Phy Educ	VC	13.1
12.5	Bus Educ	Ma	18	33	Math	Mi	13
14.5	Music	VC	17.6	34	Phy Educ	Ma	12.6
14.5	Chemistry	Mi	17.6	35	English	Mi	12.5
16	Math	VC	16.6	36	English	VC	12.2
17.5	Prof Educ	D	16	37	Phy Educ	Mi	12
17.5	Math	Ma	16	38	English	D	11.6
19	Art	Mi	15.5	39	Prof Educ	Ma	9.3
20	Prof Educ	VC	15.2	40	Prof Educ	Mi	7.6

TABLE 38

THE SELECTED CURRICULA RANKED ACCORDING TO CREDIT HOURS FOR FULL TIME EQUIVALENT INSTRUCTORS IN ALL INSTITUTIONS

Rank	Curricula	College	Hours	Rank	Curricula	College	Hours
1	Art	Ma	30	20.5	Chemistry	Ma	12.7
2	Prof Educ	VC	24.3	22.5	Biology	Ma	12.6
3	Chemistry	VC	20	22.5	Art	D	12.6
4	Bus Educ	VC	17.2	24.5	Math	D	12.3
5	Biology	VC	16.4	24.5	Chemistry	D	12.3
6.5	Bus Educ	Ma	16	26	English	VC	12.2
6.5	Art	Mi	16	27.5	English	Ma	12.1
8	Math	VC	15.8	27.5	English	Mi	12.1
9	Art	VC	15.4	29	English	D	11.6
10	Prof Educ	D	15.2	30	Music	D	10.7
11	Soc Sci	VC	15.1	31	Biology	D	10.5
12.5	Soc Sci	D	15	32	Phy Educ	VC	9.4
12.5	Math	Ma	15	33	Phy Educ	D	9.3
14	Music	VC	14.8	34	Prof Educ	Mi	9.2
15	Soc Sci	Ma	14.3	35	Phy Educ	Mi	8.5
16	Prof Educ	Ma	13.9	36	Phy Educ	Ma	7.3
17	Bus Educ	Mi	13.5	37	Biology	Mi	7
18	Math	Mi	13.2	38	Music	Ma	6.8
19	Bus Educ	D	12.8	39	Chemistry	Mi	6.6
20.5	Soc Sci	Mi	12.7	40	Music	Mi	5.9

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