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Educator Supply, Demand, Attrition, and Out-of-Field Teaching in Utah

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EDUCATOR SUPPLY, DEMAND, ATTRITION, AND OUT-OF-FIELD TEACHING IN UTAH

by

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ABSTRACT

Educator Supply, Demand, Attrition, and

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by

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This monograph reports the results of a comprehensive study of teacher supply and demand conditions in Utah. This research was conducted under contract with the Utah State Office of Education. The objectives of this research were as follows: (a) analyze year 2000 staffing patterns of Utah schools and estimate the potential effects of future retirement on current teacher pools; (b) use enrollment projections and base-year pupil-teacher ratios to predict teacher need for each geographic area and content area; (c) assess the supply of educators from Utah colleges of education and identify reasons why newly prepared teachers do not teach in Utah; (d) assess rates of early attrition among new teachers and identify reasons why new teachers leave; (e) assess the extent of unqualified teaching in Utah schools; (f) compare results from this study with results of nationally representative research; (g) make recommendations for future data collection. Information for this study was obtained from the deans of Utah's colleges of education, the Utah State Office of Education teacher licensure database (CACTUS), Utah State Office of Education enrollment projections, Utah Governor's Office of Planning and Budget demographic projections, and two opinion surveys.

Results indicate that between 2001 and 2005 teacher need from enrollment growth will be greatest in elementary teaching and special education assignments; that approximately 50% of new teachers educated in Utah between 1995 and 1998 did not teach in Utah within 3 years, and that most of these graduates either did not seek a teaching position or sought but did not obtain a teaching position in Utah; that 40% of new Utah teachers leave their positions during the first five years of employment, but that few leave because of dissatisfaction with teaching; that most former teachers and nonteaching graduates would consider teaching in Utah in the future; and that nearly 5% of teachers statewide have not been formally qualified for their assignments. Comparisons with findings from nationally representative studies reveal that the reasons for attrition among Utah educators are very similar to those of educators in other parts of the nation. This report concludes with a set of recommendations for making ongoing assessments of Utah teacher supply and demand conditions.

(207 pages)

DEDICATION

Both of my grandfathers worked in education throughout their careers, and both taught at Utah State University. Although I did not know either of them as well as I would have liked, the heritage I received from them has provided continual encouragement and inspiration. Accordingly, this monograph is dedicated to Dr. George T. Blanch and Von H. Robertson.

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I would like to thank my parents for their continual support and encouragement, and my children for tolerating a father who has been frequently preoccupied with less important things. Finally, I would like to thank my wife, Shawna, for her patience, for her support, and for her active participation in this seemingly endless and often frustrating process. I might have been able to complete a dissertation without her involvement, but it would not have been as interesting.

Daniel J. Robertson

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Introduction

Americans have high expectations of our public education system. Not only do we expect our schools to teach our children to be literate, skilled, and able to read, write, work and appreciate, but we also expect our schools to teach broader skills and values. We want our schools to teach our children to be productive in a modern society, to believe in something, to respect each other, and to be safe. In short, we expect public schools to facilitate the birth of a better society. The results of recent public opinion polls have indicated that Americans see the state of public education as one of the most critical problems facing our nation (Gallup News Service, 2001a, 2001b), and consequently it is no surprise that issues related to quality and effectiveness of public schooling always receive considerable popular attention.

Few issues related to educational quality have received more attention in recent years than the possibility that a "graying" teacher workforce, attrition among new teachers, and increasing enrollments could result in a disastrous teacher shortage (Ingersoll, 2001). Recently, the issue of teacher supply and demand has been the subject of magazine and newspaper articles, editorials, and political campaign promises (Winters, 2000). The potential for a teacher shortage has been labeled in the media as one of the more critical problems facing American public schools (e.g., Archer, 2000; Blair, 2000; Fields & Galloway, 2000; Henry, 2000; Keller, 2000; Lord, 2000; Sandham, 2000; "Teacher Recruitment," 2000). Teacher advocacy groups have used this media attention to seek support for their claims that better working conditions and higher pay are needed (e.g., National Education Association, no date; Nelson & Schneider, 1998). At the same time, however, some educational researchers have argued that the available evidence does not point to an impending and ruinous teacher shortage (Ingersoll, 1997; Wayne, 2000) and have suggested that the issues may be more subtle and complex than commonly supposed.

This is not the first time that a catastrophic teacher shortage has been projected and debated. In the mid 1980s, policymakers and researchers concluded that a projected rise in student enrollments and teacher retirements, coupled with decreases in the number of college of education graduates, would create an insurmountable shortage of teachers. At the time, these projections of mass teacher shortages were enthusiastically embraced by teacher advocacy groups, yet they proved to be premature and inaccurate, due to inadequate data and statistical modeling techniques of the time (Baker & Smith, 1997; Grissmer & Kirby, 1997; Ingersoll, 1997).

Although other education-related issues may have garnered more attention in Utah, the issue of teacher shortage is present. Some local media and advocacy groups have claimed evidence of localized teacher shortages (Estes, 2000; May, 2000; Smith, 2000; Sorensen, 2000), while others have not (e.g., Brunson, 2000). This variation in such anecdotal reports as these suggests that shortages, if they exist, may vary by area and degree.

Is there or will there be a shortage of teachers in Utah? Although anecdotal reports abound, no study has been conducted of statewide supply and demand conditions by the State Office of Education, nor anyone else, since 1994 (Utah State Office of Education, 1994). Certainly there has been no systematically conducted research in this area for some time—the 1994 Utah report consisted almost entirely of large tables of numbers extracted from state licensure databases, and offered no systematic interpretation or analysis of supply and demand conditions. Therefore, the data by which one would be able to offer an informed opinion on the subject has been largely unavailable.

Problem Statement

Given the importance of the issue, the virtual absence of current information, and the failure of prior attempts to address the issue in a competent and systematic way, it is clear that

Utah's educators need to assess the supply and demand problem. To be able to place a quality teacher in every classroom, Utah's educators need to frequently and consistently assess the most relevant components of supply and demand. A study that assessed teacher supply, projected teacher need, and assessed the movement of teachers out of the field would provide much needed information and would contribute a great deal towards both assessing the current state of supply and demand and providing a blueprint towards future data collection and analysis.

Through this study I sought to help solve this problem by addressing the following research questions, organized under seven objectives. It should be noted that this study is primarily the result of a contact with the Utah State Office of Education (USOE) and many of the research questions were determined in consultation with USOE staff. (See Methods section for details.)

The first objective was to analyze current Utah school enrollments and staffing patterns. The following research questions were related to this objective:

1.1. How will Utah school enrollments change between 2000 and 2005?

1.2. What percentage of the current teacher pool will be eligible for early retirement in each year between 2000 and 2005?

1.3. What are current staffing patterns of Utah's schools, and how many full-time equivalent teachers are teaching in each content area?

The second objective was to predict educator demand by geographic area and content area. The following research questions were related to this objective:

2.1. Between 2000 and 2005, how many new teachers will be required to compensate for the effects of enrollment growth?

2.2. How many teachers will be needed in each geographic area between 2000 and 2005, and how many will be needed in each content area?

The third objective was to estimate the supply of educators prepared by Utah colleges of education. The following research questions were related to this objective:

3.1. How many new teachers were prepared by in-state colleges of education between 1995 and 2000?

3.2. Of these, how many took teaching positions in Utah?

3.3. What were the major reasons why graduates who obtained a Utah teaching license did not seek teaching positions in Utah?

The fourth objective was to assess early attrition among new teachers. The following research questions were related to this objective:

4.1. What percentage of new teachers leave during each of the first five years of their careers?

4.2. What are the major reasons that new teachers leave teaching?

The fifth objective was to assess the extent of unqualified or out-of-field teaching. The following research question was related to this objective:

5.1. How many teachers in each geographic and content area are teaching in assignments for which they are not qualified?

The sixth objective was to compare results from this research with results of national studies. The seventh and final objective was to develop a set of recommendations for future assessments of teacher supply and demand in Utah.

REVIEW OF LITERATURE

Introduction to Teaching in Utah

Understanding the relationship between Utah teacher supply and demand and Utah staffing conditions requires some background into Utah's teacher training system. Accordingly, this first section of the literature review describes the process of educator training and certification in Utah. The review of literature pertinent to this study then follows.

Licensure and Endorsement Area

A *teaching license* is an official statement from the State of Utah that an individual has met formal requirements for teaching in a particular field or content area. At the time of this research, Utah operated on an "approved program" licensure system, whereby applicants graduating from any of the eight approved teacher preparation programs in Utah colleges and universities were issued teaching licenses upon request. Mere completion of the teacher preparation curriculum (as opposed to state-administered supplemental evaluations of subject-matter content or pedagogical skills) was considered adequate evidence of competence. Possession of a valid license is a formal (but not always necessary) requirement for teaching in a public school.

Utah issues four levels of licenses. A temporary or provisional license may be issued to prospective educators enrolled in approved educator preparation programs. A Level 1 or initial license is issued to a potential teacher upon completion of an approved teacher preparation program, is valid for 3 years, and may be renewed once. A Level 2 or career license is issued subsequent to the completion of 3 years of teaching (over a maximum 6-year period) and upon the recommendation of the district superintendent. A Level 2 license must be renewed every 5

years. A Level 3 license may be issued to an educator holding a Level 2 license upon completion of additional educational or certification requirements.

As of the 2000-2001 school year, USOE issued 26 kinds of teaching licenses within the categories of elementary education, secondary education, special education, school counselor, applied technology, library media, administration, and support services. To specify adequate preparation in a particular content area, particularly at the secondary level, *endorsements* may be added to existing licenses. For example, a "Math Level 4" endorsement may be added to a secondary education license, and this would permit the endorsee to teach high-level mathematics at the secondary level. It is common for a teacher who has met the requirements in multiple areas to hold multiple licenses or endorsements. In fact, very few teachers hold only a single endorsement. As of the 2000-2001 school year, the Licensure Division of USOE issued 243 endorsements within the eight major licensure areas.

Teaching Assignment Area

Teaching *assignment* refers to the content or subject area in which a teacher is assigned to teach. As of the 2000-2001 school year, USOE recognized 525 individual assignments within 24 major and 68 minor categories. Teachers typically have multiple assignments (i.e., teach multiple subjects) throughout the school day.

Officially, teachers can only be given a teaching assignment for which they are *qualified.* In this context, qualified is a purely technical term that merely indicates whether a teacher in a particular assignment possesses any combination of licenses and endorsements approved by the state for that assignment. As a technical term, it should not be confused with the colloquial usage of the word, which suggests acquisition of a broad range of skills and knowledge related to effective teaching in a particular content area. It is just as possible for a teacher to be qualified in

the eyes of the state, yet not actually possess the expected skills and knowledge, as it is for a perfectly capable teacher to lack formal authorization to teach in a particular area.

Under some circumstances, such as the absence of qualified teachers or for accommodating preservice student teaching experiences, a teacher may be assigned to teach in an area for which he or she is not qualified. In such a circumstance, district administrators may document the need for the waiver with the state and request a *letter of authorization* (which may also be called an *emergency certificate*). A letter of authorization authorizes an individual to teach in an area in which he or she is not qualified for one year, whereupon a new waiver must be requested. District administrators may, however, assign an unqualified teacher to a particular assignment *without* a letter of authorization, but the district can be fined by the state for doing so (J. Brittain, personal communication, October 15, 2000).

In other special cases, USOE personnel may formally authorize individuals who have not completed a certification program to teach in a particular assignment. The "Alternative Preparation for Teaching Program" allows individuals with a related college degree and some teaching experience in the field to be issued a Level 1 license while completing additional course-work leading to licensure (USOE, 2000).

Finally, there is one other way in which an unqualified teacher may teach in a given area. Individuals who are skilled in special fields (normally in Applied Technology areas) but who lack educator preparation training may be given *eminence certificates* that allow them to teach up to two periods per day in their area of skill (Riley, 1999).

Teacher Preparation in Utah

The road to licensure typically involves the completion of a certain body of courses at an approved educator preparation program. State approval of an educator preparation program certifies that the body of experiences provided to preservice educators by that program meets

certain requirements in such areas as procedures for screening of potential students, breadth and quality of coursework, provision for field experiences, and evaluation of learned competencies. In Utah, eight institutions of higher education have educator preparation programs that have been approved by USOE.

As stated previously, Utah currently operates on an *approved program* licensure system. Upon successful completion of an educator preparation program at an institution, the institution makes a recommendation to USOE that the prospective educator be licensed to teach, whereupon a Level 1 license is issued to the prospective educator by the state. Currently, Utah is one of only eight states that do not administer a statewide certification exam prior to licensure—a license is issued solely at the recommendation of the institution—although Utah's educational administrators plan to implement statewide competency exams within the next three years (Utah State Office of Education, 2000).

Review of Research on Educator Supply and Demand

The objective for this overview of the literature was to place the study in a context of supply and demand issues at both the local and national level. The purpose of this review was to assemble information that would both help guide the development of the study and help in interpreting results. The results of this review should also support the formation of recommendations for the Utah State Office of Education in their attempt to design an ongoing method for assessing teacher supply and demand conditions on an ongoing basis. Further, this study, in the context of a thorough literature review, should also provide valuable information to other researchers conducting similar studies.

Literature Review Procedure

In conducting this review of literature, I attempted to synthesize and integrate the research in each relevant topical area. This section describes the methods I used to collect and summarize research reports.

Scope of Review

I searched for reports in the following five areas: (a) supply and demand studies from other states, (b) projections of teacher need, (c) analyses of teacher attrition and turnover, (d) analyses of the extent and nature of out-of-field teaching, and (e) analyses of the nature of the supply of new teachers. For each area, I limited my review to high-quality reports of studies involving analysis of primary or secondary data. Opinion pieces, newspaper articles, advocacy pieces that did not report the results of primary research, and reports where the quality of the research was poor were excluded from this review.

Locating Reports

I used a standard process to locate reports in each of the five topical areas. First, I used computerized databases (ERIC, U.S. Department of Education publications, *Psychological Abstracts*, and *Educational Abstracts*) to search for existing research reviews in each area. Next, I used the same computerized databases to search for research reports in each area. Because of the scarcity of articles, I used a variety of search terms (e.g., teacher shortage, educator shortage, teacher supply and demand, teacher attrition, teacher turnover). Finally, upon locating reports, I searched their bibliographies or literature reviews for additional reports.

Coding Reports

For each of the five topical areas, I developed a list of the information needed from each study, which generally included the following: (a) bibliographical information, (b) data source

and method of data collection, (c) level of study (local or national), (d) type of teacher population being studied, (e) method of analysis used by researchers, (f) research questions addressed in report, and (g) conclusions drawn by authors. I created a small electronic database to record this information for each included report.

Literature Review Findings

Teacher supply and demand is a relatively new area of investigation to educational researchers. The predicted teacher shortages of the 1980s prompted the National Center for Educational Statistics to inaugurate widespread data collection efforts. However, the results of these efforts have only recently become available to researchers (Ingersoll, 1997; Wayne, 2000), and thus the amount of high-quality research on teacher supply and demand issues is relatively thin when compared to other areas of interest to educational policymakers. In no case was I able to locate existing research syntheses of even moderate quality or relevance on any of the five areas targeted, and I was able to locate only a handful of reports in each of the areas. In the sections that follow, I describe the results of my review in each of the five areas.

Supply and Demand Studies from Other States

The value of assessing supply and demand on a regular basis seems self-evident. Boe, Bobbit, and Cook (1997) noted that the failure to prepare for teacher demand can result in unexpected costs and time burdens due to teacher recruitment and disruptions of instruction resulting from induction of new and inexperienced teachers. Findings from recent studies in which investigators used regional and national school data have also demonstrated moderate relationships between student achievement and teacher quality (Ballou & Podgursky, 1999; Darling-Hammond, 2000a, 2000b), suggesting that a failure to maintain a qualified supply of teachers can also compromise student learning.

Evaluation of teacher supply and demand can be done in any number of ways, but at a minimum such a study should include estimates of the number of teachers needed, along with the capacity of primary supply sources to meet demand (Fetler, 1997). Examples of recent state level supply and demand studies using these criteria include assessments from California (Fetler), Oklahoma (Oklahoma State Regents for Higher Education, 1998), and Wisconsin (Wisconsin Department of Public Instruction, 1998, 1999, 2000). Authors of each of these studies estimated the effects of enrollment growth and teacher attrition on teacher demand, estimated the ability of supply sources to meet demand, and attempted to analyze basic factors affecting supply and demand in their respective states.

State supply and demand studies are tailored to meet the unique informational needs of local educational organizations, and findings are not intended to be generalized or useful in other contexts. For this reason, with the possible exception of the methodologies employed, the content of these state studies is of little interest in the context of supply and demand in Utah. The generalizable empirical research findings on supply and demand that would be most useful in planning a supply and demand study largely come from studies in which investigators addressed singular components of supply and demand. The major areas of research in the supply and demand context are projections of teacher need, assessments of teacher supply, and assessments of teacher attrition. These areas are discussed in the remainder of this section.

Projections of Teacher Need

As part of this review, I was unable to locate any published reports that included projections of teacher need for Utah. For this reason, this section will deal with teacher need projections made at the national level. Prior to the mid-1990s, the data and tools for projecting project teacher need were not available on a national level. However, soon after the initial teacher shortage scares of the 1980s, the U.S. Department of Education began a series of data

collection projects with the intent to provide researchers with data for making more accurate assessments of supply and demand (Ingersoll, 1997). Because these data have become available only recently, few researchers have attempted to use them for predicting teacher demand. The studies reviewed in the next paragraphs are the most sophisticated and comprehensive attempts to project teacher need to date. Because the investigators of these studies projected national or regional teacher need, rather than need for Utah or even for a single state, it is the methodology described that is of most interest in the context of this review.

Econometric modeling. Gerard and Hussar (1998) were among the first to use nationally representative data to project teacher demand. They used an econometric model to project the number of teachers who would be hired (which, they suggest, is not necessarily the same as the number of teachers *needed*) in 2008. Using data from the U.S. Department of Education and Census Bureau surveys, Gerard and Hussar modeled elementary and secondary teacher hires as a function of student enrollment, disposable income per capita, and education revenue receipts from state sources per capita, under the assumption that pupil-teacher ratios would remain constant over time. This model predicts increases in teacher hires when enrollment increases, disposable income increases, or education revenue receipts increase. The benefit of this model is its ability to take varying economic conditions into account, which is useful because of the self-evident relationship between economic conditions and the ability of school administrators to hire new teachers. Its disadvantage is the complexity of both the data required and the computational procedures involved.

Enrollment projections and pupil-teacher ratios. Hussar (1999) also projected teacher need using a common-sense approach: divide the number of projected students in a given year by a selected pupil-teacher ratio (Fetler, 1997, used a similar model for projecting teacher need in California). This method provides an estimate of the number of total teachers needed to achieve a given staffing level. Hussar used enrollment projections developed by the U.S. Census Bureau

and empirically derived pupil-teacher ratios obtained during previous U.S. Department of Education studies. This method by itself does not take economic conditions into account. In addition, it does not take into account the movement of teachers out of the teaching pool. Consequently, it does not identify the number of new teachers that must be hired each year to compensate for attrition.

Projections using estimated continuation rates. To alleviate this problem, Hussar (1999) also developed a non-econometric method for modifying existing teacher need projections in order to calculate the number of new teachers needed each year. The "Newly Hired Teacher Model" used estimates of the number of teachers who continue teaching from year to year, then applies these continuation rates to teacher-need projections. Estimates of continuation rates were empirically derived from Department of Education survey data. This model is advantageous in that it allows the researcher to distinguish between teacher need due to enrollment and teacher need due to attrition. However, computing continuation rates requires data that may not be available at the local level.

Analyses of Teacher Attrition and Turnover

One challenge in reviewing the research literature on teacher attrition is the methodological variation among studies. Studies on teacher attrition can be classified into at least three types: studies of yearly turnover, studies of long-term employment trends, and studies of reasons for teacher attrition or turnover.

Studies of teacher turnover. Many investigators have examined yearly changes in the employment status of teachers. The subject of such studies is "turnover." Investigators of these studies typically estimate continuation and attrition rates, which are useful for year-to-year assessments of supply and demand conditions.

Using nationally representative NCES data from 1994 and 1995, Whitener, Gruber, Lynch, Tingos, & Fondelier (1997) counted the number of teachers continuing teaching from the previous year in the same district ("stayers") or a different district ("movers") and the number who left teaching in the last year ("leavers"). They found that the overall annual attrition rate (i.e., rate of leavers) during this period was 6.6% (indicating an overall continuation rate of 93.4%). Unsurprisingly, they also found attrition rates to be highest among teachers with less than 5 years experience (between 6% and 9%) or more than 25 years experience (about 11%) and found attrition rates to be proportionally higher among women than men.

Findings from another study using nationally representative data from 1990 and 1991 revealed that teacher turnover occurred at a greater rate in smaller schools than in larger schools. The authors reported that higher rates of teacher turnover were more common in rural or urban schools than in suburban schools and that turnover was also more likely to occur in schools serving low-income populations (Ingersoll & Rossi, 1995).

As for Utah, little recent information on teacher turnover is available. In 1994, the USOE reported overall 1992 and 1993 turnover rates of 11.54% and 12.02%, respectively (Utah State Office of Education, 1994). More recent or detailed Utah data are not available.

Studies using longitudinal teacher career history data. A second kind of attrition study is longitudinal. In longitudinal studies, one or more cohorts of teachers are followed over the course of at least several years of their careers, usually starting with their first teaching assignment. Then, researchers estimate the percentage of teachers leaving at various intervals, producing experience-based attrition rates and average career lengths.

Longitudinal studies of attrition require the use of sophisticated statistical techniques because of a common characteristic of longitudinal data called *censoring* (Allison, 1984). Censoring is a kind of incomplete data that occurs when, for example, the observation period ends before some of the teachers leave. In such a case, the data set may include beginning

employment dates for all teachers but termination dates for only those teachers who terminated before the study ended.

Censored data precludes the use of standard linear regression methods. Instead, statisticians have developed a class of methods called *survival analysis*, which is able to compensate for and in fact maximize the information obtained from censored data. For this reason, longitudinal studies are frequently called *survival* studies.

In contrast to turnover studies in which investigators identify rates of employment transition among all teachers in a given year, investigators using longitudinal methods attempt to identify attrition rates among teachers at specify career mileposts. A common statistic in survival studies is the *survival rate*, or the estimated proportion of teachers still teaching after a given amount of time. The inverse of the survival rate at a given time gives the proportion of teachers leaving by that time (i.e., the attrition rate).

Another statistic of interest in survival studies is the *hazard rate*. The hazard rate can be generally defined as the probability that a randomly selected teacher will terminate at a given time or during a given time interval (Allison, 1984). Hazard rates can be computed for any time or time interval. Comparing hazard rates across the career time frame allows the investigator to identify periods at which a randomly selected teacher is at greatest risk of termination.

There are three main classes of survival methods (Allison, 1984). Life tables, a method that has been used by demographers for many years, involve the use of actuarial techniques to estimate survival and hazard rates (Gehan, 1975). Discrete-time methods, which are appropriate when the time variable is discrete, involve the use of modified forms of log-linear models that allow regression-type analysis of the hazard rate at different times. Finally, continuous-time methods are special regression-type models are used when the time variable is continuous. Some continuous time methods also permit predictors variables that vary by time, called *time-varying covariates*.

Table 1 displays results of studies in which investigators used longitudinal data and survival analysis methods to study early teacher attrition. These results suggest that women are at higher risk than men for early attrition, that the risk of leaving is highest during the first few years of teaching, and that as teachers gain experience they are less likely to leave.

Studies of teacher opinion. A third kind of study, which is frequently used in conjunction with studies of teacher attrition rates, involve the use of opinion surveys of teachers to identify reasons why teachers leave. Using results from a nationally representative survey of teachers, Whitener et al. (1997) found that the most common single reason for attrition among teachers at all ages is retirement. However, among teachers with fewer than five years of experience and who were younger, homemaking or child rearing and personal moves, rather than dissatisfaction with teaching, were the most common reasons for leaving teaching.

Baker and Smith (1997) and Wayne (2000) reported similar results using nationally representative data. Authors of both studies concluded that dissatisfaction is not a common reason for attrition among new teachers. Instead, most new teachers leave because of family responsibilities or personal moves. Although dissatisfaction does not appear to be a common reason for attrition, authors of another report in which national data were used found that among teachers who left because of dissatisfaction with teaching, the most common reasons for dissatisfaction were concerns over student discipline problems, poor student motivation, and a perceived lack of adequate recognition or support from administration (Henke et al., 1997).

The results of these studies suggest that the most common reasons for attrition among new teachers are associated with person factors, not dissatisfaction with teaching. The Utah State Office of Education has not historically analyzed either rates of teacher attrition or reasons for teacher attrition, so no comparable data were available for Utah at the beginning of this study.

Table 1

Studies of Teacher Attrition

Report	Data source	Conclusions
Adams (1996)	2,327 teachers tracked for 6.5 years	Attrition was least common among males, older teachers, minority teachers, teachers with graduate degrees, and teachers with alternative certifications.
Heyns (1988)	NLS-72, cohort tracked for 14 years	Attrition was most common among teachers with better qualifications or preparation
Miller, Brownell, & Smith (1999)	1,576 special education teachers tracked for two years	The risk of leaving was highest among teachers with inadequate certification, teachers who had higher perceptions of stress, and teachers who had higher perceptions of poor school climate
Stinebrickner (1998)	NLS-72, cohort tracked for 14 years	Attrition was least common among females, married teachers, teachers with children, and teachers who were paid less than average
Willett & Singer (1991a)	3,941 special education teachers tracked for 12 years	Attrition was most common among female teachers, younger teachers, and male or female teachers during the first 5 years of teaching. The risk of leaving declined sharply after the first few years of teaching. The median career lifetime for this sample was 6 years for women and more than 12 years for men

Note. NLS-72 = U.S Department of Education National Longitudinal Study of the High School Class of 1972.

Analyses of the Extent and Nature of Out-of-Field Teaching

Teachers are sometimes placed in assignments for which they are not qualified. Because the only rational reason to put an unqualified teacher in a particular assignment is because a qualified teacher was not available, out-of-field teaching has been used as an indicator of difficulty in recruiting qualified teachers (Ingersoll, 1997).

Because there is little consensus on what constitutes teacher quality (e.g., Ballou & Podgursky, 1999; Darling-Hammond, 2000a), it can be difficult to define out-of-field teaching. Ingersoll and Gruber (1996) listed several possible operational definitions of unqualified teachers: (a) whether the teacher is certified by an educational agency to teach in a given assignment; (b) whether the teacher has a college degree in the subject they are teaching; (c) whether the teacher has a college degree in any subject; and (d) whether the teacher has at least a minor in the subject they are teaching. Clearly, researchers studying the same set of teachers but using different definitions could easily find different and even incompatible results.

There has been a small amount of research done on rates and effects of unqualified teaching, but most studies have not been of very good quality or contain findings that are relevant only to localized geographic areas. For this review, the only recent study of high quality that I was able to locate was by Ingersoll and Gruber (1996). The authors of this frequently cited report used national data from the 1990-91 Schools and Staffing Survey that had only just become available. Ingersoll and Gruber defined out of field teaching rates as the percentage of students who were taught by someone without at least an academic minor in the subject being taught. They found that unqualfied teaching was relatively common in United States public schools. For example, one fifth of English classes, one quarter of mathematics classes, and over half of physical science classes were taught by teachers whose formal training did not prepare them to teach those subjects. They also found that out-of-field teaching was more common in schools

serving low-income or minority populations, and that student achievement tended to be lower in schools with higher out-of-field teaching. In a later article, Ingersoll (1997) argued that this rate of unqualified teaching was in fact not an indicator of a looming teacher shortage or of the inability of colleges to prepare sufficient numbers of graduates, but rather of the low perceived standing of the educational profession.

Authors of two recent reports have produced rates of out-of-field teaching in Utah. Investigators in both cases defined out-of-field teaching as the numbers of emergency authorizations of unqualified teachers. In 1994, 5.3% of Utah teachers overall were reported to have been employed on letters of authorization (Utah State Office of Education, 1994) while in 1998, the percentage was reported to be only 1% (Riley, 1999). No data were available on out-of-field teaching rates in specific geographic or content areas. Authors of neither report detailed the procedure used by investigators to estimate these rates, so it is impossible to tell whether the differences between the reported percentages are due to either an actual reduction in unqualified teaching rates or merely to inconsistencies in data collection. Further, because unqualified teachers may teach in Utah without emergency authorizations, and because it is possible for teachers without formal licensure to actually have substantially adequate preparation to teach in a given area, the percentage of teachers on emergency authorizations is not always a meaningful measure of out-of-field teaching.

Analyses of the Nature of the Supply of New Teachers

The supply of teachers into the current Utah teaching pool has three logically possible sources: new graduates from Utah schools, experienced Utah teachers returning to teaching, and teachers moving to Utah from other states. In 1995 the Utah State Office of Education stopped requesting graduation and placement information from Utah's teacher preparation institutions. As a consequence of this unfortunate decision, there have been no reliable reports on the number

of new teachers prepared in Utah between 1995 and 2000. The most recent information on primary sources of Utah teachers comes from the 1994 USOE report, which indicated that 55% of new teachers entering Utah schools in 1992-93 had graduated from Utah colleges of education, and the rest were from other sources. Unfortunately, the report failed to distinguish between new graduates and experienced teachers, although it did note that only 39% of the 1993 graduates from Utah colleges accepted employment in Utah schools.

The effect of newly prepared teachers on the current teacher pool is presumably easiest to identify. However, once teachers enter the pool, they may exit and reenter several times over the courses of their careers. Therefore, the effects of the reserve teacher pool on supply are more difficult to determine and predict. The *reserve teaching pool* is that set of teachers with active licenses who do not currently hold a teaching assignment in Utah. Clearly, not everyone who quits teaching can be considered equally a part of the reserve pool. For example, those who quit teaching in Utah to take a position in another state, or who are terminated due to criminal behavior, are far less likely to return to teaching in Utah than those who quit teaching due to childbearing or to further their education. Without more information, it is simply impossible to estimate the proportion of former teachers in the reserve pool who may be eligible or willing to return to teaching.

Because the reserve teaching pool appears to be a cost-effective source of experienced teachers, one would think that the characteristics of the reserve pool would be of key interest to state and local educational administrators. However, most teacher recruitment is aimed at new graduates of teacher preparation programs, not at experienced teachers who might consider returning to the field. In fact, USOE administrators know little about the characteristics of the reserve teaching pool in Utah (G. Carlston, personal communication, October 1, 2000). The director of the State Teacher Licensing office recently placed the size of the reserve pool at 24,000 teachers (Brunson, 2000). However, because USOE staff have not tracked either the

number of quitting teachers who would be eligible to teach again or the number of former teachers who reenter teaching, nor have they recently made an effort to assess the attitudes of former teachers towards returning, this statement appears to be without evidential support.

Summary of Literature Review

At least three implications emerge from the results of this review. The first implication is that more research needs to be done. Systematic assessments of issues related to teacher supply and demand are rare, and the body of research in each of the areas examined is in a formative stage.

The second implication is that research findings in at least two areas do not support common perceptions of the teacher shortage problem. The first area in which this is true is research on reasons why teachers leave the profession. The research findings in this area do not support the picture of teacher dissatisfaction alluded to in popular media reports. To the contrary, it appears that most teachers do not leave because they are discouraged by poor teaching conditions. In fact, across teachers of all age and experience levels, the most common reason for leaving is retirement. The picture of mass migrations of frustrated teachers out of the workforce cannot easily be reconciled with the fact that such a high number of teachers remain in the teaching workforce until retirement age. Instead, it suggests that many teachers are dedicated to their profession and find it sufficiently satisfying that they do not leave until retirement. Further, while it is true that many new teachers leave early in their careers, most leave for personal reasons, such as moves or childrearing, and not because of discouragement, and many return to teaching at a later time. Consequently, while teacher attrition is a real problem, the characterization of teachers as uncommitted or "burned-out" seems inaccurate and unfair in light of the best available evidence.

The second area in which research findings do not support popular belief is in regard to the fear of an impending teacher shortage. Findings from none of the reports reviewed suggested the possibility of a dramatic shortage of teachers in the near future. Instead, most authors concluded that school administrators are generally able to meet their staffing needs in one way or another. What is of concern, however, are the *ways* in which administrators are meeting their staffing needs. Findings from many studies showed high rates of out-of-field teaching, suggesting that the ways in which some school administrators are apparently meeting their staffing needs—namely, by placing unqualified teachers in high-demand assignments—could compromise students' educational experiences. Consequently, the true nature of the supply and demand problem appears to be more complex than commonly thought.

The third implication of this review relates to the best methodologies for studying supply and demand questions. The body of research in most of these areas is formative, and many researchers were using new techniques and were able to comment on how well those techniques worked. This information was invaluable for planning several components of this study.

METHODS

Purpose and Objectives

Because there has been no recent research on teacher supply and demand in Utah, this study was exploratory to a large extent. The lack of research had implications on the methodology, which was largely influenced by the review of literature, but also by the objectives of this study and the availability of extant data sources. Accordingly, this project had three overall goals: first, to fulfill the requirements of a contract with the Utah State Office of Education to assess educator supply and demand; second, to collect and analyze additional information needed to present a comprehensive picture of educator supply and demand in Utah; and third, to identify effective data collection and analysis procedures to inform and assist future research in this area.

The factors that initiated this project included my personal interest in teacher education policy, the absence of useful information about teacher supply and demand in Utah, and a contract awarded to Dr. Ron Thorkildsen and me by the Utah State Office of Education (USOE). I was the author of the contract proposal. The contract was originally awarded to a private company who ultimately decided they could not do the required work. The USOE administrators subsequently asked if Dr. Thorkildsen and I were still interested. The change in awardees, compounded with other factors, caused a delay of several months, and consequently we had to work within a constrained timeline. For this reason, with the approval of my committee, a few of the tasks described below, involving assembling only publicly available data provided by either USOE or Utah colleges of education, were started prior to the submission of the dissertation proposal. All data collection involving human subjects was done with the approval of the Utah State University Institutional Review Board.

The objectives for this dissertation study came largely but not entirely out of the objectives of the USOE study. The USOE staff were mainly interested in factors related to whether educator supply would meet demand. Addressing this issue required looking at a variety of related factors, including school-age enrollment trends, placement of qualified teachers from teacher preparation programs, retention and attrition of new teachers, retirement of current teachers, and the extent of out-of-field teaching.

The report submitted to the State Office of Education was organized by the objectives as ordered in the original Request for Proposal (RFP). Those objectives are presented in Appendix G. Because the research reported in this dissertation report went beyond the objectives of the USOE study, I have used a different order and grouping for this report. Descriptions of methodology and results will be organized by the following objectives and research questions:

The first objective was to analyze current Utah school enrollments and staffing patterns. The following research questions were related to this objective:

1.1. How will Utah school enrollments change over the next 5 years?

1.2. What percentage of the current teacher pool will be eligible for early retirement in each of the next 5 years?

1.3. What are current staffing patterns of Utah's schools, and how many full-time equivalent teachers are teaching in each content area?

The second objective was to predict educator demand by geographic area and content area. The following research questions were related to this objective:

2.1. Between 2000 and 2005, how many new teachers will be required to compensate for the effects of enrollment growth?

2.2. How many teachers will be needed in each geographic area? How many will be needed in each content area?

The third objective was to estimate the supply of educators prepared by Utah colleges of education. The following research questions were related to this objective:

3.1. How many new teachers were prepared by in-state colleges of education between 1995 and 2000?

3.2. Of these, how many took teaching positions in Utah?

3.3. What were the major reasons why graduates who obtained a Utah teaching license did not seek teaching positions in Utah?

The fourth objective was to assess early attrition among new teachers. The following research questions were related to this objective:

4.1. What percentage of new teachers leave during each of the first 5 years of their careers?

4.2. What are the major reasons that new teachers leave teaching?

The fifth objective was to assess the extent of unqualified or out-of-field teaching. The following research question was related to this objective:

5.1. How many teachers in each geographic and content area are teaching in assignments for which they are not qualified?

Objective 6 involved comparison of results from this research with results of national studies. Specifically, I intended to compare results from my survey of former teachers with results from the 1993-94 Teacher Follow-Up Study (Whitener et al., 1997) and to compare results from my survey of nonteaching teacher preparation program graduates with results from the 1993-94 Baccalaureate and Beyond Follow-up Study (Henke et al., 1997). These comparisons involved no additional data collection beyond information obtained from my surveys and from my review of literature, and so they are not discussed further in this section. Results relating to this objective are presented in the Results section.

Objective 7 dealt with recommendations for future data collection and analysis. This objective also involved no data collection and will be treated in the Discussion section.

Procedures

In producing this assessment of teacher supply, demand, attrition, and out-of-field teaching, I collected data from several different sources: some data were publicly available, some data were archival and required extraction, and some data were collected from primary sources. For most of the research questions, the information requested by USOE staff suggested a general approach to data collection or analysis, and from this I developed procedures based on results of the literature review and on generally accepted research procedures.

Objective 1: Analyze Current Enrollments and Staffing Patterns of Utah Schools

Current and Projected K-12 Enrollments

Source of data. Current enrollments and projected enrollments 2001–2005 for each district at each grade level are prepared annually by the Finance and Statistics division of the USOE, and were obtained from Patty Johansen, an economist at the USOE. The Demographic and Economic Analysis Division of the Governor's Office for Planning and Budget (GOPB) produces 10-year population estimates of school-age children (e.g., between the ages of 5 and 17) for each county. Therefore, overall K-12 enrollment projections can be made by geographic area, but projections broken out by grade level cannot be made using these data. The GOPB projections are publicly available, and projections for 2010 were already tabulated for each district by the Finance and Statistics division of USOE.

Projections using 2010 demographic projections should be interpreted with some caution. The GOPB projections are not directly comparable with USOE enrollment projections for two

reasons. First, GOPB projections include all school age children living within county boundaries, not only those attending public schools. The USOE does not have accurate estimates of the number of children living within county boundaries but who are not attending public schools (P. Bowles-Johansen, personal communication, November 15, 2000). Second, the GOPB projections are derived from a different model and use a different data source.

Procedure. The purpose of collecting enrollment data was to establish base year conditions for use in projections. Projections are made in reference to the base year, and base year data are used to create those projections. The USOE staff requested that projections and assessments be made for geographic areas consisting of two or more districts; they also requested that we determine reasonable geographic areas for this study.

The areas used in this study were constructed in an attempt to group districts into relatively homogenous clusters based on factors such as location, enrollment, and geographic locale. To determine groupings, I first tried to use cluster analysis procedure in SPSS, using as independent variables enrollment and economic data for each district obtained from the U.S. Department of Education's Common Core of Data. Cluster analysis is a name for a body of statistical techniques that attempt to assemble observations into groups based on quantitative characteristics (Hair & Black, 2000). However, the cluster analysis procedure consistently produced one cluster containing Granite School District and another cluster containing the other 39 districts, which was not a particularly useful grouping arrangement. Instead, I assembled clusters based first on geographic area and second on Census Bureau urbanicity labels taken from the Common Core of Data (e.g., urban, rural, etc.). However, because of the similarities between some districts, the assignment of a particular district to one cluster or another was sometimes arbitrary. The geographic area clusters were comprised as follows: (a) *Central Wasatch Front*, comprised of Granite, Jordan, Murray, and Salt Lake Districts; (b) *Northern Wasatch Front*, comprised of Davis, Ogden, and Weber Districts; (c) *Southern Wasatch Front*, comprised of

Alpine, Nebo, and Provo Districts; (d) *Northwest Utah*, comprised of Box Elder, Cache, Logan, and Tooele Districts; (e) *Southwest Utah*, comprised of Beaver, Garfield, Iron, Kane, Millard, and Washington Districts; (f) *Northeast Utah*, comprised of Daggett, Duchesne, Morgan, North Summit, Park City, Rich, South Summit, Uintah, and Wasatch Districts; (g) *Southeast Utah*, comprised of Carbon, Emery, Grand, and San Juan Districts; and (h) *Central Utah*, comprised of Juab, North Sanpete, Piute, Sevier, South Sanpete, Tintic, and Wayne Districts.

For 2000–2005 data, I aggregated actual and projected enrollment counts for each grade level and district by elementary (Grades K through 6) and secondary (Grades 7 through 12) levels, and again by geographic areas of the state. Aggregation by educational levels was done primarily for convenience, because the target teacher-need projections were going to be made at licensure levels corresponding with these educational levels. Further, the USOE economist who produced the enrollment projections agreed that, based on the nature of the source data, meaningful results were more likely to be obtained when the enrollment projections were aggregated in this way (P. Bowles-Johansen, personal communication, November 15, 2000). The 2010 enrollment projections were already aggregated by grade level, so I aggregated them by geographic area.

Number of Educators in Each Licensure Area

Source of data. The source data for calculating the number of educators in each licensure area, as well as for several other tasks, are collected by the USOE staff from districts on an annual basis and are housed in the CACTUS system. The acronym CACTUS stands for "Computer Accessed Credentials of Teachers in Utah Schools" and is a USOE database that contains teacher licensure information. The CACTUS data are updated by districts at the beginning of each school year, usually between September and October. At the time that this portion of the study was initiated in early October 2000, staff from several districts had not yet completed updating their

licensure information for the 2000-01 school year. The most recent data were from the 1999-00 school year, and these are what were used in this study.

Procedure. Data were extracted from CACTUS at the district level by USOE staff. I then aggregated licensure counts by geographic areas and tabulated the results.

Project Early Retirement Eligibility Rates

Source of data. It was important to predict rates of early retirement in order to assess the effects of retirement on the teaching pool. Because there were no historical data on yearly retirement rates, it was necessary to predict retirement rates from estimates of early retirement eligibility. District administrators may set unique retirement policies, but all district policies are based on or are similar to the Utah State Government retirement system eligibility policy, by which an individual is eligible for early retirement when any of the following conditions are satisfied: (a) the individual is 65 years of age with at least 4 years of experience, (b) the individual is 62 years old with at least 10 years of experience, (c) the individual is 60 years old with at least 20 years of experience, or (d) the individual is any age with 30 years of experience. Therefore, using age and experience data housed in CACTUS, we were able to estimate the number of in-service teachers, in total and by licensure area, who will be eligible for early retirement under State of Utah retirement system policy for each year from 2001 to 2005.

Procedure. Retirement eligibility counts for each district and major licensure area were extracted from CACTUS using the criteria specified above. Data were then aggregated by geographic areas.

Number of Full-Time Equivalent Teachers in Each Assignment Area in the Base Year

Source of data. Counts of teachers in each assignment are housed in CACTUS. Because USOE wanted projections made by assignment/licensure area, it was necessary to extract in-

assignment counts in full-time equivalent (FTE) units rather than in teacher headcount units.

Procedure. USOE staff extracted FTE counts from CACTUS for each district and selected assignment area. The extracted data were then aggregated by geographic areas.

Objective 2: Predict Educator Demand by Geographic Area and Content Area

Predicting Number of Needed Educators

Source of data. Teacher-need projections were made in reference to a base year of the 1999-00 school year. Base year district-level fall enrollments at each grade level and for special education were obtained from the Finance and Statistics Division of the USOE. Base year fall FTE-in-assignment counts for each district were obtained from the CACTUS database. Fall enrollment projections for each year, 2001 through 2005, were obtained from the USOE. School-age population projections for 2010 were obtained from data prepared by the Governor's Office of Planning and Budget.

Procedure. Projecting teacher need was computationally simple, requiring only algebraic manipulations of existing data. The procedure involved basing teacher need projections on base year pupil-teacher ratios and projected enrollments. Projections were made for each selected assignment area and district. District projections for each assignment area were then aggregated by geographic level.

Projecting teacher need was done in three steps. First, I computed pupil-teacher ratios for each assignment area within each district. Pupil-teacher ratios (PTRs) indicate the number of faculty resources allocated per student within a given domain. Pupil-teacher ratios are not the same as measures of *class size*, which identify the average number of students per classroom unit within a domain. No effort was made in this study to compute class size measures.

Pupil-teacher ratios are computed by dividing the number of pupils in a given domain by the number of full-time equivalent teachers with assignments in that domain. The pupil-teacher ratios used in this study differ from PTRs published by the USOE, which include student interns. The FTE data extracted from CACTUS for this study did not include interns. Because the object of this study was to project the number of regularly employed teachers required, it was necessary to exclude student interns from computations.

Enrollment data (both base-year enrollments and projections for 2000 through 2005) were provided by the USOE staff for each district and grade level. In computing PTRs, I first aggregated K-12 enrollment counts by elementary and secondary grade levels. Elementary enrollments were used for projecting FTE needs in elementary teaching assignments. Secondary enrollments were used for projecting FTE needs in secondary assignments. Special education enrollments were used for projecting FTE need in special education assignments. Total enrollments were used for projecting FTE need in administrative and library assignments, and for projecting total FTE need. I aggregated the enrollment counts by geographic areas and divided the geographic enrollment counts by geographically aggregated FTE counts to produce the base-year PTR's for each assignment area, grade level, and geographic area.

The second step was to produce teacher need projections by multiplying the base-year PTRs by enrollment projections for each year to calculate the minimum number of FTEs needed to maintain base-year staffing patterns given enrollment change. In order to make teacher need projections meaningful and consistent, I found it necessary to make two assumptions. First, I found it necessary to adjust the USOE's requirement that all teacher need projections be produced using stable PTRs. Instead, I assumed that if teacher need in a given district and assignment decreases from year t to year $t+1$ due to decreased enrollments, that the surplus teachers will not be eliminated—that is, rather than firing teachers to maintain year t's PRTs, surplus teachers would be retained and PTRs would be adjusted. Consequently, supposing that enrollment-based

need (given a particular PTR) decreases by n units from year t to year $t+1$, then increases n-1 units from year $t+1$ to year $t+2$, the *net* increase in enrollment-based need is -1, or one surplus teacher. In other words, the total FTE need is still less than it was in year t, so demand can be presumed to be met with existing supply, meaning that no new teachers will need to be hired. Therefore, 5-year surpluses and deficits were computed in light of the minimum and maximum needs during that period.

Second, when aggregating deficits within a geographic area, I assumed that a need in one district would not be met by a surplus in another district. A district having a teacher surplus is unlikely to temporarily transfer its surplus teachers to another district. Thus, I decided that except for dramatic surpluses (of which, it turned out, there were none), a surplus would not be counted as a negative need, but as the *absence* of need. Numerically, I represented all district-level surpluses as a need of zero, rather than a need of -2 or -5. This way, no bias would be introduced into aggregations when districts with deficits are aggregated with districts with surpluses.

The final step was to subtract projected FTE need for each year from the base year FTE. The resulting value was the enrollment-based FTE deficit or surplus.

Objective 3: Assess the Supply of Educators from Utah Colleges of Education

Number of Teacher Education Graduates 1995–2000 and Placement Rates

Source of data. Prior to 1994, staff within the Licensure Division of the USOE annually collected graduation counts from each Utah teacher education program and disseminated the results in an annual report (USOE, 1994). This report also contained limited placement data and other limited pieces of information related to supply and demand. In 1995, the USOE decided to discontinue this annual report, and between 1995 and 1999 no graduation or placement data were

collected at the state level. Because the USOE administrators wanted historical graduation counts as part of this study, it was necessary to obtain that information directly from the dean's office of each teacher preparation program.

Materials. I modeled the data collection form after the instruments used in the last USOE study in 1994. For that year and for prior years, each college was asked to report the number of graduates, male and female, graduating in each major area (e.g., with degrees in elementary education, secondary education, English teaching). Colleges were also asked to provide 1-year placement information. In addition to graduation and placement data, I also included a form that dealt with projected numbers of graduates for the next 5 years.

Procedure. In a September 2000 meeting of Utah college of education deans, the USOE administrators told the deans about this study. The next month, Dr. Thorkildsen sent an email to each college of education dean, reminding them of the study and informing them of the information they would be asked to provide.

I mailed data collection forms and instructions to each dean's office during the last week in October 2000 (a copy of the form in included in Appendix H). The cover letter explained the purpose of the study and requested that the information be returned within two weeks, if possible. The first reports were received within about 3 weeks, and the last report was received January 10, 2001.

Given the fundamental utility of the data we were asking for, we expected that completing the reports would only require readily available information and that the colleges would have little difficulty complying with our request. To the contrary, we found that while each college returned at least graduation counts for major elementary and secondary degree areas, none returned a report that was as complete as even the 1994 study. Most colleges could not provide exact graduation counts for many subject areas, and few provided any graduate follow-up information at all. Some schools indicated that they no longer had access to the graduation data

for past years and that the counts were only estimates, and most said that their graduate follow-up activities were sporadic. This lack of follow-up is discussed in greater detail in the Results section.

Reasons why Graduates Did Not Seek Teaching Positions in Utah

Source of data. When I began this project, I presumed that much of the data needed for determining the reasons why graduates did not seek teaching positions in Utah would come from college of education follow-up activities. Because teacher preparation programs must engage in extensive follow-up of its graduates to be accredited by the National Council for Accreditation of Teacher Education (National Council for Accreditation of Teacher Education, 2002), it seemed reasonable to presume that obtaining follow up data would be easy. As indicated above, this was not the case. I soon discovered, however, that there was a great degree of inconsistency among colleges of education in graduate-placement tracking. Because of this inconsistency and scarcity of existing information, I determined that the only other way to get at this information was by survey.

Between 1994 and 1998, Utah's colleges of education reported 14,426 graduates from their teacher preparation programs. During this same period, the CACTUS database had record of 14,077 persons taking new teaching licenses. Because only 13% of all current Utah teachers have one or more degrees from out of state (see Appendix Table A.7), it seemed likely that most of those new licensees were Utah graduates (and at any rate, new licensees made up the only possible sampling frame). Accordingly, with approval from USOE administrators, I defined the accessible population as being all people who obtained a Utah teaching license during 1996, 1997, or 1998 but did not have a teaching assignment by the third year after they received their license. A search of the CACTUS database revealed records for 6,526 persons who met these criteria.

When selecting an appropriate sample size for a survey, it is necessary to have an estimate of the variance in the population on the variable of interest. This estimate is required because the sample size required at a given level of accuracy is proportional not to the size of the population, but also to the amount of variance in the population. Estimating a parameter for a population with high variance on the variable of interest will require a large sample size, while estimating a parameter from a homogenous population will require a somewhat smaller sample (Sudman, 1976). When the parameter of interest is a proportion, the population variance on the parameter is largest when $\pi = .50$ and the population is divided "half and half." Therefore, if the researcher can establish through either reviews of prior research or a small-scale pilot survey that the population proportion is likely to be either greater or less than .50, he or she is justified in selecting a smaller minimum sample size, which is of particular interest when resources are limited. In the absence of such *a priori* information, however, accepted practice is to assume $\pi = .50$, because for this case, other considerations being the same, the minimum required sample size will be the largest that would possibly be required (Sudman, 1976; Thompson, 1992). Because there were no prior empirical findings specific to Utah, and because time constraints did not allow for a pilot survey, I had to assume a population proportion of .50.

I set the confidence level at .90 and the acceptable difference at plus/minus six percentage points. Using Thompson's (1992) equations for calculating appropriate random sample sizes for estimating a population proportion, I calculated the minimum sample to be 183.

When I met with Agency Computer Services staff to discuss using the CACTUS database as the source for the survey mailing list, I was told that recent efforts had been taken to eliminate bad addresses from the database and that we should plan for about 10% of the records in our sample to have bad addresses. Therefore, in anticipation of 10% nonresponse due to bad

addresses and anticipating an unknown amount of nonresponse for other reasons, and taking into account budget limitations, I oversampled by about 66% and chose a sample size of 300.

Procedure. Under my direction, the USOE staff extracted a systematic sample of 378 members of the defined population from the CACTUS database. The following information was extracted for each person: (a) name, (b) most recent mailing address on record, and (c) gender.

A systematic sample was drawn rather than a simple random sample because systematic samples are easier to obtain when, as in this case, the complete sampling frame is available. A systematic sample (not to be confused with a "purposive" sample, which is nonrandom, non-probabilistic, and unlikely to be representative) is taken by numbering all members of the sampling frame, picking a random starting point, and selecting sample members at equal intervals. Thus, for a sampling frame consisting of 100 units a systematic sample of 10 units could be taken by selecting a single unit at random (for example, element number 42) and by then selecting each tenth unit to the right or left of it (for example, 12, 22, 32, 52, ... , 92).

A systematic sample is not technically a random sample: only *one* of the units in a systematic sample is selected strictly at random, and all other units are necessarily included only as a consequence. However, systematic samples do share with random samples some properties that are critical to estimation, and so their use in estimation is justified. If there is no periodicity in the sampling frame, a systematically drawn sample will produce unbiased population estimates of the mean or variance. However, unless the ordering of the sampling frame itself can be considered random, estimator variances (i.e., standard errors) cannot be expected to be unbiased, and will tend to be too large (Thompson, 1992). Fortunately, the ordering of teachers in the CACTUS database is arbitrary and therefore can be considered "random," so no special precautions needed to be made in this regard.

Some consideration was also given to drawing a stratified sample. In a stratified sample, a simple random sample would be drawn from the populations of elementary teachers, secondary

teachers, special education teachers, and so forth. Stratified samples are useful when estimates are desired for each stratum but are more likely to be useful in reducing the required sample size by lowering within-group variances (Thompson, 1992). All other factors being the same, estimating a parameter at a given level of accuracy for a heterogeneous population will require a larger sample than would be required for estimating a parameter for a homogenous population. However, by dividing the population into several independent and relatively homogenous sub-populations, a relatively small sample can be drawn from each (a similar principle is employed in the randomized block design used in experimental research).

Although it would have been desirable to produce estimates for each of a number of teaching assignment levels, two problems of equal potency made stratification impossible. First, stratification requires independent categories, which would require in this case the existence of independent teaching assignment categories from which to sample. However, even the most basic teaching assignment categories are not independent, let alone more specific categories like math and science.

Second, stratification can reduce the required sample size only when subpopulations are sufficiently homogenous. Because there was no prior research in the area of interest, and no other a priori reason to suppose that most attitudes would be markedly differential across content areas, it could not be assumed that the subpopulations created by stratification would be more homogenous than the total population. Therefore, given these factors, stratifying would actually require a larger sample size than would be needed without stratifying. And although there are ways of addressing these problems that would have made stratification reasonable, the limitations of the project budget and timeline made stratification impossible.

After obtaining the initial sampling list from the USOE staff, I eliminated names with incomplete or obviously incorrect address data and then randomly selected 300 names from the remaining set (because a random sample drawn from a random sample is still a random sample).

Then, for addresses that were out-of-state or appeared incomplete, I used the address lookup feature on the United States Postal Service web page (http://www.usps.gov) to manually correct the address format and add the four-digit ZIP-code extension.

Materials. So that results from this survey may be compared with national data, I used the instrument from the 1993-94 Baccalaureate and Beyond Follow-up Study (B&B:93/94) (Henke et al., 1997) as a model. This 1994 study provided national information on 1992-93 teacher preparation graduates who did not enter the teaching workforce. I hoped that by aligning the content of this instrument with the previous national study, I could compare Utah data with national data.

During instrument development, I pretested the instrument with a small group of people to assess readability and utility. Pretest participants included the following: (a) four in-service teachers, (b) one former teacher who also had extensive experience in instrument development, (c) one current school district administrator, (d) the associate superintendent of the Utah State Office of Education, (e) one faculty member in the college of education, and (f) three additional persons. The suggestions of this group helped refine the instrument.

Following suggestions in Dillman's (1978) survey design book, I designed the instrument as a small booklet. Its dimensions were 5.5 inches by 8.5 inches, so that when flat it would fit inside a 6-inch by 9-inch mailing envelope, and when folded lengthwise it would fit inside a Number 8 return mailing envelope. I had the booklet duplicated directly from the electronic postscript file on good-quality paper at the Utah State University copy center. A copy of the instrument and accompanying materials are included in Appendix I.

Prior to the design of mailing envelopes I consulted with staff of the USU Central Distribution office regarding optimal procedures for large quantity mailings. Following their suggestions, I had envelopes and letterhead custom printed at USU Publication Design and Production. Mailing envelopes included the Utah State University word mark in the return

address and a "First-class Presort" mark where a stamp would normally be placed. Business reply envelopes were prepared according to United States Postal Service specifications. Although Dillman (1978) advised against the use of business reply envelopes, his recommendations are now nearly 30 years old, and given their current widespread use, it seemed reasonable that the stigma that may have once accompanied their use has lessened over time.

The cover letter was also prepared according to recommendations found in Dillman (1978). The text of the cover letter briefly explained the purpose and importance of the survey, stressed the confidentiality of the results, provided contact information in case of questions, and requested that the survey be returned within 2 weeks. The cover letter was printed on color Utah State University letterhead, which Dr. Thorkildsen and I signed.

Mailing the instruments. Once printing was completed, we assembled the mailing packets. Each packet included a cover letter, a survey booklet, and a business reply envelope.

The USU Central Distribution operates postal processing machines that can automatically address envelopes using a mailing list taken directly from an electronic file. The Central Distribution staff strongly recommended using automatic addressing because it adds a complete USPS POSTNET (Postal Numeric Encoding Technique) barcode and properly verifies the address format, helping ensure quick and accurate delivery. The disadvantage of automatic addressing is that the resulting envelope looks exactly like the mass-mailed letter that it is, which can discourage respondent participation (Dillman, 1978). In the end, however, the dual constraints of time and resources coupled with the advantages of address correction made automatic addressing the better option. The 300 mailing packets were delivered to Central Distribution on March 28, 2001, and all were mailed by Central Distribution within 2 days.

Objective 4: Assess Attrition Among New Teachers

Rates of Attrition Among New Teachers

Source of data. A proper analysis of teacher attrition requires longitudinal teacher career data from time of employment to termination (Singer & Willett, 1994). Fortunately, the CACTUS database contains over 15 years of teacher career data. Under my direction, the USOE staff drew from the CACTUS database a systematic sample of the records of 4,755 teachers who took a first teaching assignment between 1990 and 1999. This sample of 4,755 current and former teachers represented fully 25% of the population of interest. Data for each teacher in the sample included the district of first assignment, gender, dates of assignments and terminations, and initial licenses held. Dates of assignments and terminations were included because they form the basis of the survival analysis. Gender was included because prior research by others indicated that this variable was related to attrition, and the teaching content information was included in order to investigate any relationship between teaching content area and attrition.

Procedure. Attrition rates at each year of employment were computed using the SURVIVAL procedure in SPSS. Life tables were constructed overall and for each geographic area and major licensure area (elementary, secondary, and special education). In general, I followed methodological recommendations made by Willett and Singer (1991a, 1991b) for using survival analysis to study teacher attrition.

The SURVIVAL procedure employs actuarial methods to produce life tables, using algorithms taken from Gehan (1975). Some consideration was given to selecting the best survival analytic method for this study. Life tables, while methodologically sound and extensively used, are admittedly the crudest of survival analytic tools (Allison, 1984). The newer regression-based methods discussed in the Review of Literature (e.g., Cox regression, the Kaplan-Meyer technique, and modified log-linear modeling) produce survival and hazard rate statistics

comparable to those used in life tables, but have the advantage of being able to also produce regression-type coefficients for individual predictors. These methods make it possible to identify the relationship of various factors with attrition.

At first I planned to use Cox regression with dummy variables coded to represent gender, urbanicity of first district, and various content categories such as elementary, math, science, and special education. Despite the large sample size, however, the only predictor that achieved statistical significance at any reasonable significance level was gender—females in every category appeared more likely to leave than males (because the analysis was actually performed on a random sample, inferential tests were appropriate and meaningful). This finding suggested that the complexity of Cox regression was probably unnecessary. Because the life table information produced by SURVIVAL is roughly equivalent to output produced by the Cox regression procedure, SURVIVAL became the method of choice.

I computed life tables for the entire sample without reference to licensure or geographic area of first assignment. I also computed life tables for those holding elementary licenses, secondary licenses, and special education licenses for both the entire state sample and for each geographic area.

In some cases I ran inferential tests to assess whether the magnitude of differences between the survival patterns of subgroups was greater than would be expected due to sampling error. The SURVIVAL procedure in SPSS allows the differences between group survival patterns computed from a random sample to be tested for statistical significance using the Wilcoxon (Gehan) test (Norusis, 2000). The Wilcoxon (Gehan) test compares the number of censored and uncensored cases in each group at each interval. Under the null hypothesis that the groups are samples from the same survival distribution, the Wilcoxon (Gehan) test statistic is asymptotically distributed as a chi-square value with degrees of freedom equal to one fewer than the number of groups in the comparison.

Reasons for Attrition Among New Teachers

Source of data. Through this survey I sought to determine the principal reasons why new Utah teachers left teaching between 1995 and 2000. For this survey I defined the population as all Utah teachers who had first assignments between the 1995-96 school year and 1999-00 school year and had terminated by the 2000-01 school year, regardless of any later assignments. The CACTUS database contained records for 2,870 individuals fitting this description.

This survey was planned and administered concurrently with the survey of nonteaching graduates. As with the survey of nonteaching graduates, there were no prior research finding specific to Utah, so I again assumed a "best guess" population proportion of .50 for each item (Sudman, 1976; Thompson, 1992). I set the confidence level at .90 and the acceptable difference at plus/minus six percentage points. Using equations in Thompson (1992), I calculated the minimum size for a random sample given these parameters to be 177.

When I met with the Agency Computer Services staff to discuss using the CACTUS database as the source for the survey mailing list, I was told that efforts had been taken to eliminate bad addresses from the database and that we should plan for only about 10% of the records in our sample to have bad addresses. Therefore, in anticipation of 10% nonresponse due to bad addresses and anticipating an unknown amount of nonresponse for other reasons, I over-sampled by about 66% and chose a sample size of 300. Because the information to be gained from this study was more important to the client than the information from the survey of recent graduates, I decided to increase the sample size to 350.

Procedure. Procedures for this survey were carried out parallel to those used for the survey of nonteaching graduates described above. An initial systematic sample of 447 persons was extracted from the CACTUS database. The following information was extracted for each person: (a) name, (b) most recent mailing address on record, and (c) gender.

After obtaining the initial sampling list from the USOE staff, I eliminated names with obviously incorrect address data, then randomly selected 350 names from the remaining set. Then, for addresses that were out-of-state or appeared incomplete, I used the address lookup feature on the United States Postal Service web page (http://www.usps.gov) to manually correct the address format and add the four-digit ZIP-code extension.

Materials. I modeled my instrument on the instrument used in the 1993-94 Teacher Follow-up Study (Whitener et al., 1997). I hoped that by aligning the content of this instrument with that used in the previous national study, I could compare Utah data with national data.

During instrument development, I pretested this instrument in the same manner in which I pretested the survey of nonteaching graduates, and I used the same small group of people. The suggestions from this group helped refine the instrument. A copy of the instrument is included in Appendix J.

As with the survey of nonteaching graduates, I designed the instrument as a small booklet. Printing and mailing procedures for this survey were identical to those followed with the other survey. Mailing packets were delivered to USU Central Distribution on March 28, 2001, and all were mailed by Central Distribution within 2 days.

Objective 5: Assess the Extent of Out-of-Field Teaching

Measuring Out-of-Field Teaching

Source of data. To determine the proportion of teachers in Utah who are teaching outside of their area of training, it was necessary to first define out-of-field teaching. For this study, I chose to measure out-of-field teaching by the number of FTEs in teaching assignments for which they were not licensed. Although there are limitations to using this approach (Ingersoll, 1997), it was advantageous here for two reasons. First, the information could be collected and analyzed in the same units as teacher need projections, which would allow comparisons to be made between

teacher need and out-of-field teaching. Second, appropriate source data were available in the CACTUS database that could be extracted and analyzed with only minor manipulations.

Procedure. The CACTUS database records the following information about FTE assignments: (a) total number of FTE in the assignment, (b) total number of FTE who were qualified by either license/endorsement or by letter of authorization, and (c) total number of FTE who were qualified by letter of authorization only. This information was extracted at the district level from the CACTUS database by USOE staff for the 1999-00 school year, which was the most current information available at the time.

Because the information directly available from CACTUS did not include the statistic of interest, simple algebraic calculations were made to produce the following additional figures: (a) number of FTE qualified by license/endorsement, (b) number of FTE not qualified by either license/endorsement or letter of authorization, (c) number of FTE not qualified by license/endorsement, (d) percentage of FTE who were qualified by either license/endorsement or letter of authorization, (e) percentage of FTE qualified by license/endorsement, (f) percentage of FTE who were qualified by letter of authorization only, (g) percentage of FTE not qualified by either license/endorsement or letter of authorization, and (h) percentage of FTE not qualified by license/endorsement (e.g., all teachers not licensed for their assignments, including both those on letters of authorization and those not on letters of authorization).

As discussed in the literature review, qualification by letter of authorization is a formality that the USOE staff prefer but does not require district-level personnel to follow when placing an unqualifed teacher in a particular assignment. For this reason, no distinction can be made between the qualifications of teachers listed as qualified by letter and of teachers not qualified at all, so comparing the number of teachers in the two groups is of little use. Instead, percentage of FTE not licensed to teach in their area of assignment is the main statistic of interest. Non-

licensed FTE-in-assignment percentages were computed for each geographic area and major assignment area.

RESULTS

The results of each component of the study are described in this section by objectives, using the same order as was used in the Methods section. Sets of tables too large to be included in the narrative have been placed in appendices, as indicated.

Objective 1: Current Enrollments and Staffing Patterns of Utah Schools

Current and Projected K-12 Enrollments

Appendix Tables C.1 through C.5 display actual Fall 2000 and projected Fall 2005 public school enrollments by geographic area. Source data for these counts were produced by the Finance and Statistics division of USOE.

Base Year Enrollments

At the beginning of the 2000 school year, state enrollments totaled 475,269—250,535 students in elementary grades, 213,820 student in secondary grades, and 10,914 students in special education. As would be expected, the major part of state enrollment occurs along the Wasatch front and in larger Utah cities.

Enrollment Growth 2001–2005

Appendix Tables C.1 through C.5 display actual Fall 2000 and projected Fall 2005 public school enrollments by geographic area. Total state K-12 enrollment is expected to grow from 475,269 students in 2000 to 499,066 students in 2005, a net increase of 23,797 students, or an overall growth of 5% during this time period. Growth will be centered along the extended Wasatch Front and in larger cities in the north and southwest. Rural districts, particularly those in southeastern areas, may actually see enrollment declines.

Enrollment growth is expected to be largest in the elementary grades, which will see an overall growth rate of 8.0% between 2001 and 2005. Elementary growth will be greatest in the northwest area of the state at 26% (primarily centered in Tooele County). Growth will be 15% in the southwest (primarily centered in Washington County), and 13% in the southern Wasatch Front (particularly in the Alpine School District). Enrollments are expected to decrease by 10% in the southeast area of the state. Secondary enrollments are expected to remain fairly stable. With the notable exception of Utah County, most areas in the state will see secondary enrollments flatten out or decline. Special Education enrollment is expected to increase at a rate similar to that predicted for elementary enrollment, with largest growth expected to occur in the northwest (18%), southwest (8%), and southern Wasatch Front (12%).

Enrollment Growth 2005–2010

Projections obtained from the Governor's Office of Planning and Budget suggest that the overall school age population is expected to increase by about 14.4% between 2005 and 2010, with large increases expected in all geographic areas except the southeast. Given these projections, it appears that the need for teachers at all levels and in most districts may increase dramatically during the second half of the decade.

Experience of Educators in Each Licensure Area

Appendix Table A.1 displays statewide teaching experience categories of Utah educators holding teaching assignments at the beginning of the 2000 school year, in total and by licensure area. Experience categories represent the total amount of in-service experience, rather than elapsed time since a first teaching assignment. For example, a teacher who initially taught for three years, left for two years, then returned for an additional two years, would have five years of in-service experience. Thirty-six percent of educators had less than 10 years of in-service

experience, and about the same percentage had between 10 and 20 years of in-service experience. Experience distributions are quite similar for teachers across all licensure areas and areas of the state, with the exceptions of teachers holding administrative or library licenses, who tended to have more years of experience than average. These data are relatively unremarkable, displaying a trend that would be consistent with a steady but gradual movement of teachers into and out of the field.

I calculated the median number of years of in-service experience for teachers in each geographic area. At the beginning of the 2000 school year, the median amount of in-service experience among Utah educators was 13.8 years (see Appendix Table A.2).

Projected Rates of Early Retirement Eligibility

Appendix Tables A.3 and A.4 display early retirement eligibility estimates by geographic areas of the state. Results suggest that approximately 20% of Utah teachers who had assignments during the 1999–00 school year would be eligible for early retirement by 2005. This percentage is fairly stable across geographic areas and is slightly higher for educators with secondary licenses and slightly lower for educators with special education licenses. For obvious reasons, the percentage of teachers with administrative licenses who are close to retirement is higher than overall.

From this analysis we can estimate that approximately 700 teachers, or roughly 4% of the total teaching pool, may be eligible for early retirement each year. However, because the number of educators who seek early retirement could be related to other factors (e.g., economic conditions, individual preferences), this percentage can only be considered a rough estimate of the actual number of retiring educators in any given year.

Objective 2: Predicted Educator Demand by Geographic Area and Content Area

Appendix Table C.1 details the projected number of full-time equivalents that will be required each year to meet current staffing patterns and pupil-teacher ratios in major licensure areas. Given enrollment growth alone and using year 2000 district pupil-teacher ratios, I estimate that a total of 1,652 full-time equivalent teachers will be needed statewide by Fall 2005.

Given that enrollment growth is expected to be higher in the elementary grades, we can accordingly predict that the highest demand will be for elementary teachers (see Appendix Table C.2). The need for special education teachers will also increase but will not be as large as the demand for elementary teachers (see Appendix Table C.4). Because secondary enrollment growth is projected to level off during the next 5 years in most areas of the state, most areas will accordingly see lower enrollment-based demand for secondary teachers (see Appendix Table C.3).

Appendix Table C.5 displays projected 2010 school-age population as predicted by the Governor's Office of Planning and Budget. Total school-age population in Utah could increase by 14.4% between 2005 and 2010, which is quite dramatic in comparison to the 5% growth projected by the USOE staff between 2001 and 2005. Large increases are expected in all geographic areas except the southeast. If the school age population grows as projected, the demand for new teachers between 2005 and 2010 will be considerably larger than demand over the next 5 years. Appendix Table C.1 also provides estimated 2010 FTE need in major licensure areas given 2010 projections and 1990–00 staffing patterns.

Appendix Tables C.1 through C.4 display estimates of teacher full-time equivalent need by license area and geographic area. Because projected enrollment growth varies considerably across geographic areas of the state, the demand for new teachers also varies by district and area.

The areas expected to experience the largest growth, namely in the northwest and Utah County, will do so mainly because of exceptionally large projected enrollment increases in, respectively, Tooele and Alpine School Districts. These areas will see the largest demand for new teachers, particularly at the elementary level, but will also see increasing demand for teachers from virtually all other licensure areas. Accordingly, school districts in these areas are likely to experience the most difficulty staffing elementary assignments.

Enrollment growth will be moderate in other Wasatch Front areas and in regions with larger towns in the northwest and southwest. Enrollment-based demand will be larger overall for teachers in elementary assignments than for teachers in other areas; enrollment-based demand for teachers in other licensure areas will increase slightly or remain stable. Due to projected enrollment declines at all levels, the southeast area of the state may experience teacher surpluses in most licensure areas, particularly for teachers in secondary assignments.

Objective 3: Supply of Educators from Utah Colleges of Education

Number of Teacher Education Graduates and Placement Rates Between 1995–2000

Appendix Tables B.1 through B.11 display counts of graduating students from each teacher preparation program in Utah. These programs include Brigham Young University, Southern Utah University, University of Utah, Utah State University, Utah Valley State College, Weber State University, and Westminster College.

Historical Graduation Rates

According to data provided by Utah's teacher preparation programs, 20,745 educators were prepared between 1995 and 2000. Of these, 1,080 graduated in Early Childhood Education; 5,440 in Elementary Education; 578 in Dual Early Childhood/Elementary Programs; 9,837 in

Secondary Education; 1,244 in Special Education; and 284 in Administrative/Supervisory programs. Approximately 6% of graduates were experienced teachers completing a new kind of certification.

Totals for each college are as follows: Brigham Young University, 10,124; Utah State University, 3,832; Southern Utah University, 3,179; University of Utah, 1,880; Weber State University, 1,407; Westminster College, 229; and Utah Valley State College, 94. As of the time these data were collected, the Utah campus of the University of Phoenix did not have any graduates from its post-baccalaureate teacher preparation program. Beginning Fall 2001, University of Phoenix program administrators expect around 30 graduates annually.

As reported by the colleges, the numbers of math and science teachers prepared during this time were 669 and 655, respectively. However, these counts may underestimate the actual number of graduates in these content areas. Academic departments outside of colleges of education can be a source of secondary teachers, and some colleges of education do not currently track preservice teachers completing teacher preparation programs in colleges other than colleges of education.

Projected Graduation Rates

Although there was some variation by school and major, total graduation rates tended to increase slightly each year from 1995 to 2000, with an overall growth rate during this period of 5.9%. The deans of each college of education were asked to estimate the number of graduates they expected for each of the next 3 to 4 years. All deans reported that they anticipated graduation rates to remain fairly close to 1999–00 totals. If this is the case, in the next 3 to 4 years we can expect between 3,200 and 3,600 total graduates each year, one third of whom will be qualified to teach in elementary assignments.

Placement Estimates from Utah Colleges of Education

Given NCATE's emphasis on tracking and follow-up of graduated students (National Council for the Accreditation of Teacher Education, 2002), I anticipated that much of the data needed to answer this question would come from college of education follow-up activities. I soon discovered that the degree and quality of employment tracking in Utah varied considerably by school. Even so, most colleges were able to estimate initial (usually 1-year) placement data on at least a subset of preservice teachers graduating between 1995 and 1999. These estimates ranged anywhere from 23% to 91%, but the majority fell between 40% and 60%. Therefore, given the best available placement data from Utah's colleges, a rough estimate is that 50% of students obtain teaching positions in Utah within at least the first year following graduation. These results are detailed in Appendix Table B.12.

Estimating Placement from the CACTUS Database

Because Utah's teacher licensure is an approved program system, obtaining a Utah teaching license requires little additional effort beyond completing teacher preparation program requirements. Therefore, it is not unreasonable to assume that the majority of graduating students, whether or not they take assignments in Utah, obtain teaching licenses. For this reason, the CACTUS database provided two additional sources of information useful for estimating employment rates among graduating students.

First, Utah colleges of education reported that between 1995 and 1998, 14,426 students graduated from teacher preparation programs. The CACTUS database lists 14,077 individuals receiving Utah teaching licenses for the first time during approximately this same period. It is reasonable to assume that the majority of these were Utah graduates, because it is unlikely that a

teacher from out of state would obtain a Utah teaching license without the intention of teaching in Utah.

Of the 14,007 individuals who received Utah licenses during this period, about 54% took assignments in Utah within 3 years of receiving their license. If we assume that most of those receiving licenses graduated from Utah colleges, and that most of those receiving licenses did so soon after program completion, then this percentage provides a rough estimate of the proportion of graduating students teaching in Utah within 3 years of graduation.

Second, Utah's colleges of education reported that between 1995 and 2000, 20,651 newly prepared teachers graduated from teacher preparation programs. Using other information extracted from the CACTUS database for another component of this study, I estimated that a total of 11,224 new teachers were hired in Utah between 1995 and 2000, which is equal to 54% of the reported graduating students of teacher preparation programs during this period.

Therefore, using information from these sources, the best estimate is that between 50% and 55% of Utah teacher preparation program graduates took teaching positions in Utah within two to three years of graduation. This percentage is considerably higher than the estimate of 30% reported in the 1994 USOE report. If the 1994 results were accurate, then it appears that over recent years, the percentage of newly prepared teachers obtaining teaching positions in Utah has actually increased.

Reasons Why Graduates Did Not Seek Teaching Positions in Utah

Through a representative survey of graduates obtaining teaching licenses but not teaching in Utah, I estimated the major reasons why teacher preparation program graduates do not seek teaching positions in Utah. As indicated earlier, the CACTUS database served as the sampling frame for this survey. Unfortunately, the mailing list generated from the CACTUS records contained a much greater number of bad addresses than USOE staff anticipated, and this certainly

reduced the response rate by a significant amount. Of the original mailing, more than 25% were returned by the post office with bad addresses. In addition, although the mailing list included only licensed individuals with no CACTUS database employment record, seven respondents (or more than 8%) indicated that they had in fact taught in Utah schools. It is possible that there were others who received the survey packet but had taught in Utah and consequently did not respond to the survey because it did not apply to them.

The final sample size was 84, or about 37% of presumably delivered survey packets (28% of the original sample of 300). The overall margin of error was ± 9.1% (with 90% confidence and assuming $\pi = .50$). The response rate was disappointing, and the confidence intervals should be taken in consideration when interpreting the results of this survey. Survey results are detailed in Appendix Tables D.1 through D.10, and are summarized here.

Characteristics of Survey Respondents

Seventy-seven percent of respondents were female. Twenty-three percent of respondents were male. Because the colleges of education in general did not report graduation counts by gender, it is impossible to compare the group of survey respondents to the population of interest with regard to gender.

Table 2 allows comparison of relative percentages of graduates from each Utah college of education (as reported by the colleges of education) and the percentage of survey respondents who reported graduating from each college of education. Under the assumption that graduates from each school decide not to teach in Utah in equal proportions, these results suggest that the graduates of Brigham Young University may have been overrepresented in the survey, and that graduates of the University of Utah and Weber State University may have been underrepresented. However, if BYU attracts more students from out of state than do other Utah colleges, then it

Table 2

Number of Reported 1995-2000 Graduates from Each College and Reported Colleges of Survey Respondents

	1995-00 graduates		Survey respondents	
College of preparation	Count	Pct. of total	Count	Pct. of total
Brigham Young University	10,124	49	46	55
Utah State University	3,832	18	16	19
Southern Utah University	3,179	15	12	14
University of Utah	1,880	9	1	< 1
Weber State University	1,407	7	3	4
Westminster College	229	1	0	0
Utah Valley State College	94	< 1	1	1
Outside of Utah	--	--	5	6
Total	20,745	100	84	100

would seem likely that a greater proportion of BYU graduates would not seek positions in Utah but would want to return to their home states.

Table 3 allows comparison of relative percentages of graduates in each major content area (as reported by colleges of education) and the percentage of survey respondents who reported graduating in each major content area. These results suggest that the group of survey respondents may have included a disproportionately high number of elementary education majors.

Employment-Search Activities of Program Graduates

Figure 1 displays post-graduation employment-search activities of survey respondents. Of the persons responding to the survey, 36% indicated that they had sought teaching positions in

Table 3

Major Degree Areas of 1995-2000 College Graduates and Major Degree Areas of Survey Respondents

	1995-00 graduates		Survey respondents	
Major degree area	Count	Pct. of total	Count	Pct. of total
Elementary/Early Childhood	7,107	37	36	43
Secondary (all areas)	9,837	51	46	54
Special Education (all areas)	1,244	6	4	5
Other	1,010	5	4	5

Note. Percentages do not add to 100% because categories are not independent.

Utah and in other states. Twenty-four percent indicated that they had sought positions only in other states. Forty percent indicated that they did not seek any teaching positions after graduation.

Although only 36% of survey respondents originally sought positions in Utah, it is of particular interest that 76% of all respondents indicated that they would consider seeking a teaching position in Utah in the future. Given that 8,269 individuals held current teaching licenses but were not currently teaching in Utah at the beginning of the 2000 school year, this pool of trained educators appears to be a valuable but untapped source of teachers (see Appendix Table A.6).

Graduates Who Did Not Accept Teaching Positions in Utah

Of graduates who sought teaching positions in Utah, 43% reported that they had been offered positions in Utah but chose not to accept, while 57% sought positions in Utah but did not receive an offer for employment. For those who did not accept a Utah teaching position, 66.7%

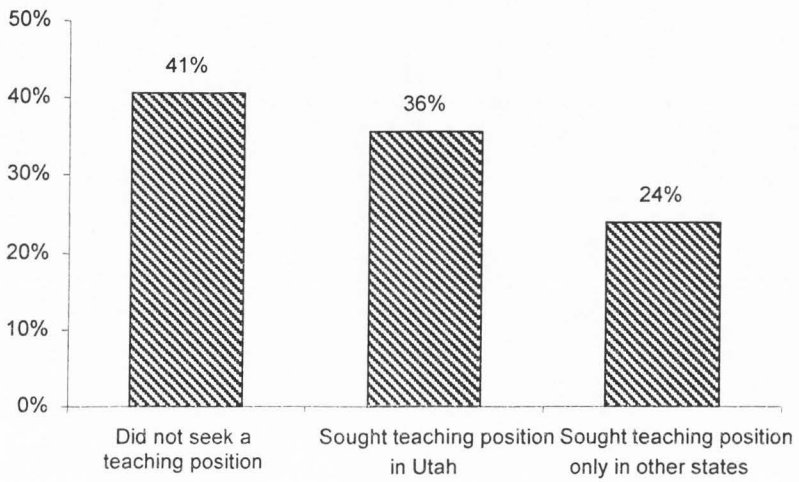

Figure 1. Post graduation activities of survey respondents.

said they had received better offers out of state.

Graduates Who Sought Teaching Positions Only in Other States

Of graduates who sought teaching positions only in other states, the most common reason for seeking employment only in other states was because a spouse obtained employment in another state (35%). Twenty-five percent said they believed teacher pay in Utah was too low, and another 25% reported that they sought teaching positions in other states in order to be closer to family members.

Graduates Who Did Not Seek a Teaching Position

Of those who did not seek teaching positions, 63% cited marriage or children as the primary reason for not seeking employment in education. Twelve percent said that they decided not to teach because they felt pay was higher in other occupations. About 7% reported that being discouraged by student teaching was a secondary reason for not seeking a teaching position.

Most Effective Steps to Recruit More Graduates

As noted previously, more than three fourths of respondents said they would consider seeking a Utah teaching position in the future. Respondents were also asked to identify the most effective steps that Utah school administrators might take to encourage more new educators to seek teaching positions in Utah. Not surprisingly, 78% thought the most effective step would be to increase teacher pay (which is not a very likely outcome given current statewide budget cuts in public education). Other common responses were to decrease class size, give teachers more authority in their classrooms, and provide better resources.

Objective 4: Attrition Among New Teachers

Determining Rates of Early Attrition

Estimation of Attrition Rates

Between 1994 and 1999, Utah school districts hired on average 1,825 new teachers each year (see Table E.1 in Appendix E). Using actuarial techniques to construct life tables, I analyzed teacher career history data for a sample of new teachers over a 10-year period and estimated attrition rates among this group. Supplemental tables in Appendix E provide detailed attrition estimates.

Overall survival rates. Results indicate that, statewide and across all licensure areas, 60% of new teachers are still teaching at the end of 5 years, while 40% have left. In other words, the probability of a randomly selected teacher leaving by the end of his or her fifth year of teaching is .40. The percentage of new teachers leaving employment is greatest in the first year of employment; the percentage then gradually decreases with each successive year of employment. Figure 2 displays the survival pattern for the overall sample. The height of the line

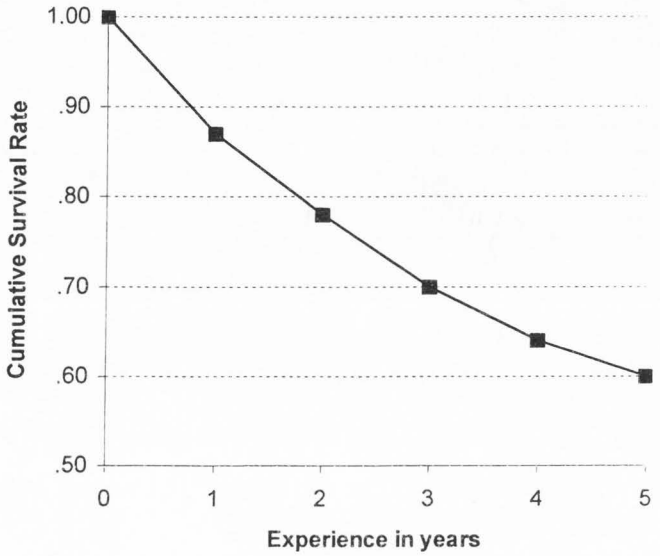

Figure 2. Overall cumulative survival rates by year of employment.

at each marker indicates the proportion of teachers still remaining in the teaching force at the end of each time interval.

Survival rates by licensure area. Because licensure groups are not independent, it is not possible to compare survival patterns by licensure area in the same way that I compared survival patterns by urbanicity or gender. However, because the overlap between licensure groups was relatively small, I created independent life tables for teachers with elementary licenses, secondary licenses, and special education licenses. These groups include teachers holding licenses in a particular area, but do not necessarily include teachers actually teaching in that area. Of new teachers licensed to teach in elementary assignments, 63% are still teaching after 5 years, while 37% have left. Of new teachers licensed to teach in secondary assignments, 58.5% are still teaching after five years, while 41.5% have left. And of new teachers licensed to teach in special education assignments (both classroom and support), 54.7% are still teaching after 5 years, while 45.3% have left.

Survival rates by urbanicity of first assignment. I divided the sample into two

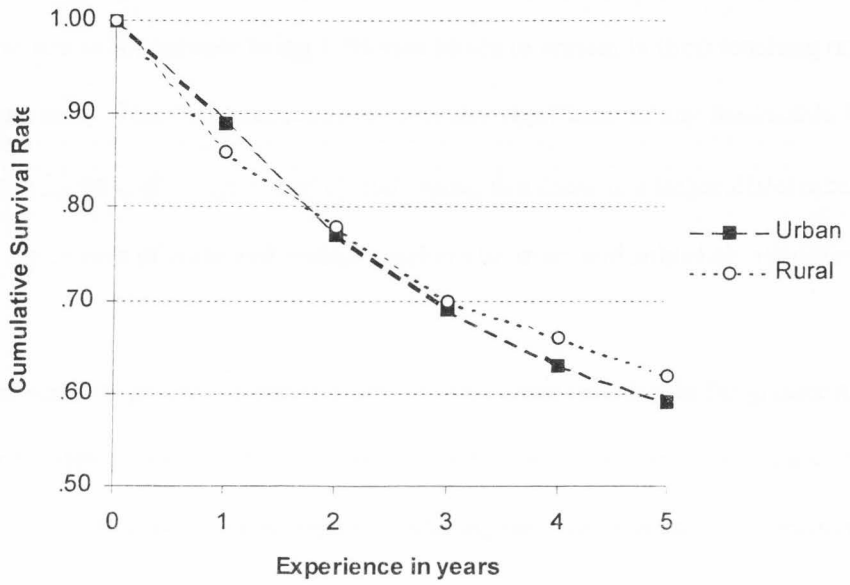

Figure 3. Cumulative survival rates by urbanicity of first assignment.

independent groups based on the urbanicity of first assignment, with one group for teachers who started in rural districts and one group for teachers who started in urban or suburban districts. I then computed and compared survival patterns for each group. Teachers in the sample who began in rural districts were slightly more likely to remain at the end of 5 years than wereteachers who began in urban or suburban districts. Figure 3 shows cumulative survival rates by urbanicity of first assignment. The results of the Wilcoxon (Gehan) test indicated that differences between groups were not statistically significant at any reasonable significance level ($\chi^2 = .473$, $df = 1, p = .492$).

I then tested the differences between survival patterns of each gender group for rural and urban/suburban groups individually. The difference between survival patterns for male and female teachers who began their teaching careers in rural districts appeared moderate in size, but was not statistically significant at a reasonable level of significance given the size of the sample ($\chi^2 = 2.697$, $df = 1, p = .101$). The difference between survival patterns for male and female teachers who began their teaching careers in urban or suburban districts was somewhat larger,

with female teachers in the sample being 13% less likely to remain in their teaching positions after 5 years than men. This difference was statistically significant at any reasonable level of significance ($\chi^2 = 22.661$, $df = 1$, $p < .0001$), indicating that there is a larger difference between the early teaching careers of male and female teachers in urban and suburban districts than in rural districts.

Survival rates by gender. Female teachers, who enter teaching in far greater numbers than men (3.4 new female teachers for each new male teacher), leave teaching at about the same rate as men during the first year of employment. During each subsequent year, however, female teachers leave at a greater rate than males. These results are consistent with results from many comparable regional and national studies (e.g., Whitener, et al., 1997; Ingersoll & Rossi, 1995; Willett & Singer, 1991a). Figure 4 shows cumulative survival rates by gender. Differences between male and female survival patterns were statistically significant at a near-zero level of significance ($\chi^2 = 23.584$, $df = 1$, $p < .0001$).

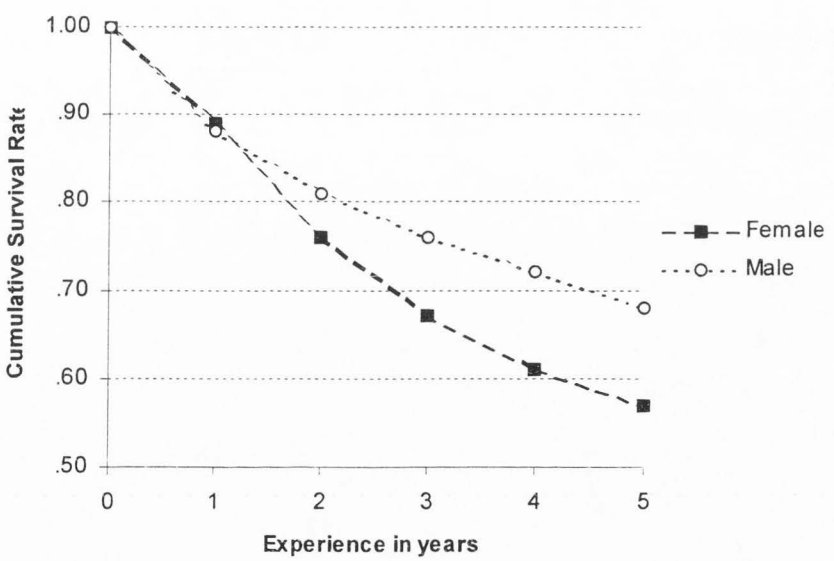

Figure 4. Cumulative survival rates by gender.

Hazard Rates

Hazard rates for a particular interval indicate the risk that a randomly selected teacher who has taught up until the beginning of the interval will terminate during the interval. In general, the hazard of leaving is greatest during the first year of employment and then slowly decreases with each successive year of teaching. Figure 5 shows hazard rates by gender (indicated by solid markers) and urbanicity (indicated by hollow markers). Hazard rates for rural and urban/suburban groups were fairly similar for all intervals, indicating that the risk of termination does not vary greatly by urbanicity. Hazard rates were greatest for both females and males during the first year of employment, and declined during each successive year, gradually for females but fairly sharply for males. The hazard was consistently greater for females than for males, indicating that female teachers were always at greater risk of early termination than males.

Average Length of First Assignments

From this sample I also estimated the median length of a first teaching spell for female

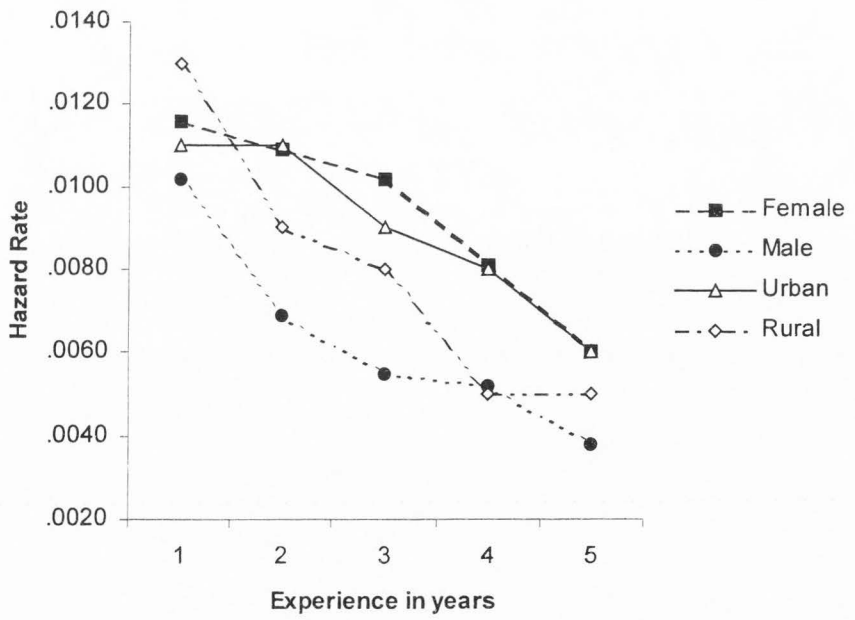

Figure 5. Hazard rates by urbanicity and gender.

and male teachers statewide. The median length of a first teaching spell for female teachers in this sample was approximately seven school years. In other words, 50% of new female teachers quit by the end of their seventh consecutive year of teaching. The median length of a first teaching spell for male teachers was greater than 10 years, but could not be estimated exactly because it exceeded the length of the observation period.

Reentry of Former Teachers

Because the data also included dates of second assignments for those teachers who had second assignments, the proportion of teachers leaving within 5 years who returned to teaching assignments within the next few years could be estimated. Life tables for teachers who terminated within 5 years were created, using time until the second assignment as the variable of interest. Appendix Tables E.10 through E.13 display estimated percentages of reentry among former teachers. Statewide, nearly 12% of former teachers in the sample took a second teaching assignment within 5 years of leaving their first assignment. The rate of reentry was greatest between 2 and 3 years following termination of the first assignment.

The proportion of men in the sample who returned within five years was about 6% greater than the proportion of women who returned. Teachers in special education, who left in greater numbers than teachers in other licensure areas, were also more likely than teachers in other licensure areas to return within 5 years.

Survey of Former Teachers

Through a representative survey of former teachers, I identified the major reasons that new teachers left the profession. As with the survey of program graduates described previously, the proportion of bad addresses was considerably larger than expected, and over 25% of the survey packets were returned by the post office as undeliverable. The final sample size was 108,

with an effective response rate of 40% (or 31% of the original sample of 350). The overall margin of error was ± 8% (with 90% confidence and assuming $\pi = .50$). The response rate was disappointing, and the confidence intervals should be taken into account when interpreting the results of the survey. Appendix Tables F.1 through F.7 display detailed results of the survey of former teachers. Survey results are summarized here.

Characteristics of Survey Respondents

Of the former teachers responding to the survey, 91.7% were female and 8.3% were male. Using the sample of 4,764 former teachers obtained from the CACTUS database, I estimated that during this same time period, about 85% of the new teachers terminating their teaching assignments were female and 15% were male. This finding suggests that the group of survey respondents may have included a disproportionately high number of females when compared with the proportion in the population.

Main Reasons for Leaving Teaching

The most common reasons for leaving did not involve dissatisfaction with teaching. Forty-seven percent of respondents cited pregnancy or child rearing as the primary reason for leaving, while 16% said the primary reason for quitting involved a family or personal move.

Dissatisfaction did not appear to be a major reason for leaving. In fact, many respondents included handwritten notes in their survey booklets emphasizing that they did not harbor negative feelings towards teaching or towards their former schools or districts, and that in fact they had positive memories of their teaching experience.

Main Reasons for Dissatisfaction with Teaching as a Career

Although dissatisfaction was not a common primary reason for leaving, 31% of respondents identified dissatisfaction with teaching as at least a secondary or tertiary reason for

leaving teaching. Of those who left because of dissatisfaction, 43% indicated the main reason was poor salary, while 13% said they felt they experienced inadequate support from school administrators. Of respondents who had a second reason for dissatisfaction, 32% reported that large class sizes contributed to their dissatisfaction.

Most Effective Steps to Retain New Teachers

Respondents were also asked to identify the most effective steps schools could take to encourage new teachers to remain in teaching. Not surprisingly, 60% said they felt that increasing teacher salaries would increase retention, while 13% said decreasing class size would increase retention.

Opinions Towards Returning to Teaching

Fourteen percent of former teachers reported that they had returned to teaching since leaving. Most of these returned within approximately 12 months of leaving. Of those who had not returned, a full 65% said they would consider returning to teaching in the future—this included half of those who left because they were dissatisfied with teaching!

However, few respondents indicated that they would consider returning to teaching in fewer than 5 years. Because most respondents left because of child rearing or personal moves, this finding is not surprising. A few respondents indicated in handwritten notes in their survey booklets that their interest in returning to teaching was discouraged by what they perceived as difficult state license renewal policies or because of difficulty in transferring work experience credits to new districts for retirement purposes.

Objective 5: The Extent of Out-of-Field Teaching

Appendix Table A.5 displays unlicensed teaching rates during the 1999-00 school year by assignment area and urbanicity, and Figure 6 displays unlicensed FTE rates by assignment

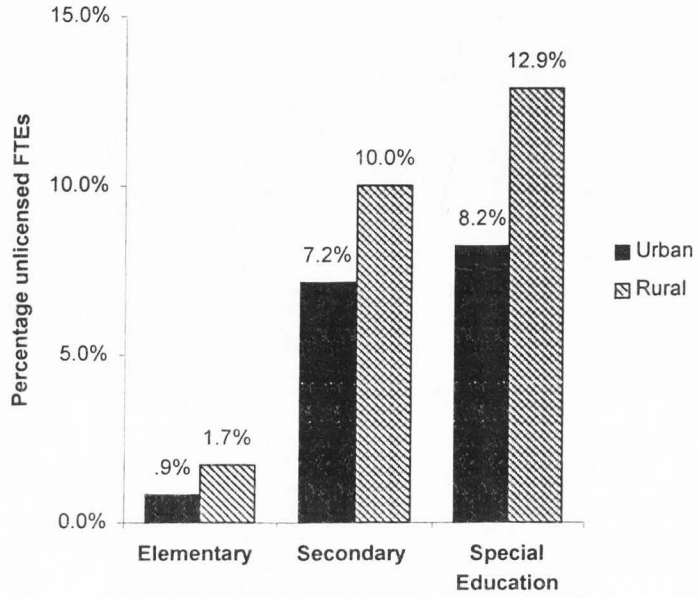

Figure 6. Unlicensed FTE percentages by content area and district urbanicity.

area and urbanicity of district. In 1999, 4.8% of FTEs in assignments statewide were teaching out of their areas of licensure. Rates of unlicensed teachers in assignments were higher in rural districts, suggesting that in 1999 rural districts had more difficulty recruiting qualified teachers. Rates of unlicensed teachers in assignments were also high across Utah in special education assignments.

At the beginning of the 2000 school year, the USOE administrators implemented the Alternative Preparation for Teaching program, which allowed teachers to be placed in assignments for which they were not qualified provided they are actively working towards qualification. As a consequence, the CACTUS database no longer records unlicensed teaching in the same way. Although comparable data can no longer be extracted from CACTUS, actual rates of unlicensed teaching are not likely to have changed dramatically since 1999.

Objective 6: Comparisons to Findings from National Studies

Survey questionnaire booklets based on existing instruments that had been used in national surveys of similar populations were used for Objective 6. My intention in doing so was to enable comparison of the results from this survey with national data in order to see how Utah supply and demand conditions compared with conditions nationwide. Unfortunately, the small sample sizes for both surveys make it difficult to interpret the results and make comparisons with findings from nationally representative studies. For this reason, comparisons are reported here for only a few of the questionnaire items. Complete survey results are presented in Appendix F.

Reasons Why New Teachers Leave Teaching

Although the results from the survey of former teachers are perhaps not consistent with popular preconceptions, they are in fact quite consistent with the results of a recent national survey of former teachers. For the 1994 Teacher Follow-up Survey, investigators asked a sample of former teachers who had three or fewer years of experience to indicate their main reason for leaving teaching (Henke et al., 1997). Table 4 displays a comparison of the results of the 1994 study with the results of the survey done for this project.

The most notable difference between response patterns is for the "pregnancy/child rearing" response option. This option was included in the Teacher Follow-Up survey instrument (Whitener et al., 1997), but for some reason was not included in the report (Henke et al., 1997) (which presumably would have used the same data). Otherwise, the results are surprisingly similar. This consistency in findings suggests that the factors influencing Utah teachers' decisions for leaving teaching may not differ substantially from those of teachers in the national population.

Table 4

Comparison of Results of 1994 Teacher Follow-Up Survey with Results of 2001 Utah Study

Main reason for leaving teaching	1994 TFS survey	2001 Utah survey
Pregnancy / child rearing	[a]	46.7%
Family or personal move	50.4%	15.9%
School staffing action	12.1%	11.2%
Taking courses to improve career opportunities	10.1%	3.7%
For better salary or benefits	11.5%	6.5%
To pursue another career	9.0%	5.6%
Dissatisfied with teaching as a career	4.8%	4.7%
Other	2.2%	6.8%

Note. TFS = U.S. Department of Education Teacher Follow-Up Survey.
[a]This option was not reported as a separate category in the 1994 TFS.

Reasons Why Graduates Do Not Seek Teaching Positions

Table 5 presents a comparison of the results of the 1993-94 Baccalaureate and Beyond Follow-Up Study (B&B:93/94) (Henke et al., 1997) with the results of the survey done for this project. Although I hoped to align my survey with results from the B&B:93/94 study, I found comparing my results with the B&B:93/94 data to be problematic because the populations of the two studies were defined differently. Because the CACTUS database was the only available sampling frame for the survey, I was required to define the accessible population for my survey as graduates who had completed educator preparation programs and received teaching licenses but had not taught in Utah. On the other hand, B&B:93/94 researchers defined their population

Table 5

Comparison of Results of B&B:93/94 with Results of 2001 Utah Study

Reason for not seeking teaching position	B&B:93/94	2001 Utah Survey
Had not taken/passed test	32.7%	n/a [b]
Other	25.8%	9.1%
Decided to continue formal education	24.4%	6.1%
Lost interest in teaching	15.5%	3.0%
Wanted other occupation	9.6%	[c]
More money in other job	5.2%	[c]
Decided that pay in teaching was too low	3.0%	14.7%
More prestige in other job	2.2%	[c]
Not ready to apply	1.6%	[c]
Teaching positions hard to get	1.4%	[c]
Discouraged by student teaching	1.0%	6.1%
Poor teaching conditions	1.0%	[c]
Decided not to work because of marriage, children, or other family reason	n/a [a]	61.8%

Note. B&B:93/94 = U.S Department of Education Baccalaureate and Beyond Survey, 1994 Follow-Up.
[a]This response option was not presented in B&B:93/94.
[b]This response option was not presented in the Utah study.
[c]Too few responses to allow accurate estimation.

as potential teachers who had prepared to teach or merely considered teaching as an option but did not seek teaching positions. Clearly, these are different populations, and the responses of these groups cannot be considered to be strictly comparable. Another consequence of comparing data from differing populations is the misalignment of the response categories. For example, the most common reason for not seeking a teaching position reported in the B&B:93/94 study was that the potential teacher had not taken or passed a required teacher certification test. However,

because Utah operated on an approved program licensure system at the time of this study, this response category was inapplicable to the Utah population. Consequently, the comparisons presented in Table 5 should be treated with caution.

Nevertheless, there is an interesting side note to this comparison. During pilot testing of this instrument, several members of the pilot test group, feeling that Utah was more family oriented than other areas of the country, recommended that I add an additional response category to my instrument: "Decided not to work because of marriage, children, or other family reason." Although that option was not presented in B&B:93/94, I added it to my survey instrument. This option was by far the most common response.

DISCUSSION

This discussion is organized into four parts. The first part contains a summary of the results of this study. In the second part limitations of this study are discussed. In the third part I suggest some implications that these findings may have for policies related to teacher recruitment and retention. In the final part I make methodological recommendations for future studies of educator supply and demand.

Summary of Educator Supply and Demand in Utah

Demand for New Teachers

Enrollment growth will increase demand for elementary and special education teachers and, to a lesser extent, secondary teachers. Both retirement of experienced teachers and attrition among new teachers will decrease the teaching pool in all areas, although, in general, retirement will have a greater effect on increased teacher demand than will early attrition. Efforts to reduce current rates of unqualified teachers or reduce class sizes will further increase demand for new teachers.

Attrition Among New Teachers

Nearly 40% of new teachers quit within 5 years. Attrition rates are higher among women and among teachers in specialized content areas and in rural geographic areas. Most new teachers quit due to personal moves. Few quit primarily due to dissatisfaction with teaching, although many quit to pursue other careers or for a better salary. Most former teachers would consider returning to teaching in Utah in the future. Results from the Utah survey of former teachers are surprisingly consistent with results of the most recent national survey of former teachers, suggesting that teaching conditions in Utah may not be as unique as commonly thought.

Supply of New Teachers

About 1,800 new teachers were hired each year between 1995 and 2000. The ratio of females to males among new hires is 3.5 to 1. Non-zero rates of unqualified teachers in assignments suggest that districts have not been able to hire sufficient numbers of qualified teachers, particularly in specialized content areas and in rural geographic areas. About 3,400 newly prepared teachers graduated each year between 1995 and 2000, but only 50 to 55% of new graduates appear to take teaching positions in Utah. Most newly prepared teachers who do not take Utah teaching positions either do not seek teaching positions at all, or seek positions only in other states. About a third appear to seek but not obtain Utah teaching positions. Most nonteaching newly prepared teachers would consider teaching in Utah in the future.

Limitations of This Study

The CACTUS Database

The CACTUS database proved to be of considerable value to this project. The CACTUS data were used for findings related teacher experience, early attrition, early retirement eligibility, and rates of unlicensed teaching. The CACTUS database was also used for creating pupil-teacher ratios, and acted as the sampling frame for both surveys. The study as such could not have been completed without the CACTUS database.

Unfortunately, the accuracy of the CACTUS data is not certain. School district personnel enter information housed in the CACTUS database, and the potential for error is inherent in the data collection process. The original purpose of the CACTUS database was apparently to track individual teachers, rather than serve as a tool for policy analysis and decision making. However, the CACTUS database has the potential to evolve into a very useful data warehouse system for USOE.

Availability of Data from Utah's Colleges of Education

For this study, each college of education provided data on historical and projected graduation rates in each major area, and in many cases provided estimates of one-year placement rates among graduates of their programs. Most colleges were able to provide graduation rates for the requested time frame, but a few indicated that they no longer had accurate counts and would have to provide estimates. None of the colleges was able to provide placement information to the extent requested by the USOE (e.g., 3-year placement data). As a result, the extent to which college graduate counts used in this study contain errors or inaccuracies is unknown.

Surveys of Former Teachers and Utah Teacher Preparation Program Graduates

To obtain information about the early career decisions of new Utah teachers who stop teaching and new graduates who chose not to teach in Utah, I mailed surveys to representative samples of both of these populations. The sampling frames for both surveys were obtained from the best available source, but the information proved to be less accurate than anticipated. As a result, the response rate for both surveys was disappointing, and the sample sizes for both were smaller than would be required for making estimations at a usual level of accuracy. As will be described in the last section, the information targeted by these surveys could be obtained by other methods at lower cost and with greater accuracy.

Policy Implications of These Findings

Because of the limitations noted above, the results of this study are not definitive and, as with all research, future evidence could either lend support to the conclusions drawn herein or

cast doubt on them. With this caveat in mind, implications of these results to two important areas of Utah educational policy are suggested here.

Reducing Attrition Among New Teachers

Utah's teacher attrition problem is not unique. Teachers in Utah appear to leave at about the same rate and for about the same reasons as teachers in other states. Early attrition is not the most significant cause of teacher supply and demand problems, but it is in the interest of districts to reduce the number of new teachers who leave. Although it has been suggested that most new teachers leave because of dissatisfaction, the results of the present survey suggest otherwise. While the survey results are by no means definitive for Utah, they are surprisingly aligned with the results of national studies. If most new teachers leave for personal reasons rather than for dissatisfaction, seeking to reduce early attrition by targeting dissatisfaction may not be effective.

Although many respondents expressed the belief that increasing pay would effectively reduce early attrition, in fact only 6% of former teachers participating in this survey listed low pay as a primary reason for leaving teaching. If, as survey results suggested, most teachers leave because of child rearing or because of personal moves and not over salary issues, increasing pay may not have a large impact on reducing early attrition. It is possible that increasing pay could increase the number of former teachers who reenter the field at a later date, or even reduce the number of teachers who leave because they cannot afford childcare. However, adapting licensing and hiring policies to better accommodate new teachers would probably go further towards solving the attrition problem than simply offering better pay.

Recruiting Greater Numbers of New Teachers

The poor response rate makes it difficult to interpret the results of the survey of non-teaching newly prepared teachers. However, some general conclusions can be extracted from the

data. The common perception that most new graduates are lured to better-paying teaching positions in other states is probably true in part. Of those who were offered positions in Utah, two thirds chose not to accept them because they received a "better" offer from out of state. Also, poor salary for Utah teachers was the second most commonly given reason both for seeking teaching positions only in other states and for not seeking teaching positions at all. Further, there was a perception among nearly all survey respondents that teacher pay in Utah is too low to make Utah positions attractive. Seventy-seven percent indicated that the most effective step Utah could take to attract more new teachers would be to increase teacher pay.

However, better salary is only part of the picture of why new graduates do not teach in Utah. Many graduated students do not seek teaching positions at all, due in large part to child rearing or other family reasons. And many of those who sought positions in other states did so because of family moves or to be near their hometowns. On the other hand, 69% of those surveyed indicated that they would consider seeking a teaching position in Utah in the future. Consequently, if the results of the survey are to be believed, many nonteaching Utah graduates did not intend to teach in Utah immediately after graduation. However, many would consider it as an option in the future.

So what can Utah do to attract more new teachers? First, it seems clear that increasing salary can be expected to increase the number of new graduates seeking teaching positions in Utah, not only for the obvious economic reason, but also because of the added respect and prestige that would come with a higher salary. Significant increases in teacher pay, however, are unlikely, given statewide budget cuts in public education.

A second reasonable option would be to increase recruitment efforts among nonteaching graduates who did not seek teaching positions upon graduation but who may be interested in teaching on a part-time basis. A third interesting solution is currently being tested in Utah. The Granite School District was recently awarded a $600,000 grant from the United States

Department of Education to implement an alternative teacher preparation program ("Major grant," 2001). The Granite program will target experienced professionals who have an interest in teaching but who lack teaching credentials. This kind of program could not only increase recruitment, but because research has shown that teachers certified via alternative programs have lower rates of attrition (Clewell, Darke, Davis-George, Forcier, & Manes, 2000), it could also help stabilize teaching pools. USOE is collaborating with Granite School District on this program. If its potential is realized, it could be implemented statewide.

As a teacher, one has the flexibility to enter and exit the field many times. Ingersoll (1997, 1999) suggested that this very flexibility is the reason that most new teachers, hoping to juggle family and career responsibilities, seek teaching careers in the first place. However, current educator licensure renewal requirements can make it very difficult for former teachers or not-so-recent graduates to obtain teaching positions. Rather than limiting this kind of career mobility with restrictive certification policies, educational administrators might do well to acknowledge the inherently transient nature of their workforce and make greater efforts to recruit teachers from these two largely untapped resources of trained educators.

Recommendations for Future Research and Monitoring

Towards a Simple Data Collection System for Assessing Supply and Demand

As the results of this research indicate, teacher supply and demand in Utah is a multi-faceted problem. Future assessments must involve focused and consistent analysis if they are to adequately facilitate decision-making. Such activities need not be complicated or expensive.

In this section I propose a basic and initial data collection model that is based on the results of our research. However, developing an adequate data collection system is an iterative

process. It can take years to develop and confirm even a single indicator (Shavelson, McDonnell, & Oakes, 1991). The adequacy of any indicator model should be assessed by the ability of stakeholders to use it to make accurate and useful assessments.

An adequate indicator system for assessing teacher supply and demand would have three characteristics. First, it would focus on relevant indicators by annually tracking basic teacher supply and demand indicators in the most cost-effective manner possible. Some past efforts have been inadequate because they have failed to focus on relevant indicators of teacher demand.

Second, an adequate indicator system would also provide timely information. One presumed goal of an analysis of teacher supply and demand is to anticipate potential shortages in time to enable corrective actions. Therefore, indicator data should be collected and analyzed in a timely manner, at least annually if not more frequently.

Third, an adequate indicator system would maximize the information gained from existing resources. When information about indicators already exists, it is generally more cost-effective to use extant data than to collect new data. Fortunately, some of the data needed to assess supply and demand is collected annually for other purposes. The CACTUS database, for example, was an invaluable source of information during this project, although it is my impression that this resource has not frequently been utilized for the purpose of assessing teacher supply and demand.

Components of a Utah Supply and Demand Indicator System

Information on key factors influencing teacher supply and demand must be collected annually in order to adequately assess the problem. Supply and demand are independent constructs, each influenced by a unique set of indicators. The main indicators of supply and demand are as follows: (a) expected number of retiring educators, (b) expected rates of non-retirement attrition, (c) changes in public student enrollment, (d) changes in staffing patterns, (e)

proportion of unqualified teachers in assignments, (f) number of Utah graduates expected to seek teaching positions in Utah, (g) number of former Utah teachers expected to seek reentry into the teaching pool, and (h) number of out of state teachers expected to seek employment in Utah

Although each of these indicators has an effect on supply and demand, the information benefit of each may not be large enough to warrant the cost of collecting the data. For example, the number of out of state teachers seeking positions in Utah is probably quite small when compared to the number of new graduates seeking Utah employment (see Appendix Table A.7). By reducing this set of indicators to only those expected to have moderate to large effects on supply and demand, we end up with the following key set of constructs and indicators, displayed in Table 6 with their respective data sources. Each demand indicator can be assumed to function independently of the other, so that the numbers of new required teachers due to each can be estimated independently (and summed together if desired). Indicators and their sources are described in greater detail below.

Table 6

Key Educator Supply and Demand Indicators with Data Sources

Construct	Key indicators	Source of data
1. Demand for new teachers.	Expected retirement among current teachers.	Historical retirement data, or age and experience of current pool.
	Changes in public school enrollment.	USOE enrollment projections.
2. Supply of new teachers.	Number of Utah graduates expected to seek positions in Utah.	Historical/projected graduation data from colleges for totals. Placement data provided by colleges for number expected to seek positions in Utah.

Indicator 1: Expected Number of Teachers Retiring

In general, retirement can be expected to cause the largest reductions to the teaching pool. Because retirement rates probably vary with location, economic conditions, and individual preferences, the best method for estimating expected retirement counts is to use historical retirement rates in conjunction with age/experience distributions of current teaching pool.

In the past, information on retirement rates was not routinely collected at the state level, so historical data are not available. Fortunately, beginning this past fall, districts have been asked to include a reason for quitting when recording termination information into the CACTUS database. Recording reasons for terminations will provide invaluable policy information, not only for estimating retirement rates, but also for assessing termination rates for other reasons among teachers at all experience levels. This practice will render unnecessary the more costly or less effective data collection methods that have been used to assess the problem in this project and elsewhere.

A related suggestion can be made here concerning the CACTUS database itself. As mentioned before, the primary purpose of the database has not been to facilitate policy research, and perhaps for this reason there has not been sufficient warrant to ensure the quality of the CACTUS data through rigorous data verification. But because of the potential value of the CACTUS data for policy and decision making, and because of the increasing need for accurate information, the USOE staff should give consideration to reviewing and possibly revising current the CACTUS data entry and verification procedures. Ensuring the reliability of the CACTUS data would be a crucial step in repositioning the database towards a data-warehousing role.

Indicator 2: Expected Changes in Public School Enrollments

In most areas, enrollment growth can be expected to have a significant impact on teacher

need. The Finance and Statistics Division of the USOE already produces accurate enrollment projections. In this study, I estimated teacher need by dividing projected enrollments by empirically derived pupil-teacher ratios. However, if we assume constant pupil-teacher ratios (as we did in this study), we can approximate the number of necessary additional teachers simply by calculating the percentage increase in enrollments at each level. For example, if elementary enrollments are projected to increase by 5% from one year to the next, then to keep pupil-teacher ratios constant, schools will need to likewise increase their current elementary teaching pool by 5%.

Indicator 3: Number of Graduates Expected to Seek Teaching Positions in Utah Schools

The supply of new teachers comes primarily from graduates of Utah's teacher preparation programs, and we have estimated that about half of new graduates take teaching positions in Utah in the first 2 or 3 years following graduation. Because most new teachers are recent instate graduates, it is important to consistently track both the number of new teachers graduating from Utah's colleges and the number expected to seek teaching positions in Utah.

Graduation counts should be obtained annually from Utah's colleges of education. Placement estimates should also be obtained annually. The best source of placement data are probably historical rates obtained through the follow-up efforts that most colleges of education do with their graduates 1 to 2 years following graduation. During this project, however, I found considerable variation in the degree and quality of follow-up data collected by teacher preparation schools. Although consistent follow-up efforts (such as those encouraged by NCATE accreditation standards) may be time consuming, the information they provide would be of great value to both the USOE and to Utah's colleges of education.

Another simple approach to estimating the career plans of new college graduates would be to include this topic in the exit surveys that many teacher preparation programs already use.

For example, upon completing program requirements (but before leaving), graduates could be asked a simple set of questions addressing the following: (a) whether they plan to take a Utah teaching license; (b) whether they have signed a contract for a teaching position in Utah; (c) if not, whether they plan to seek a teaching position in Utah; and (d) if they do not plan to seek a teaching position in Utah, why not. The advantage of having teacher education programs obtain this information from their graduates before they leave their colleges or universities is obvious. Further, because of the fundamental usefulness of this information to teacher preparation programs, I expect that some programs will already be collecting this information.

Most of Utah's colleges already have the information technology infrastructure required to accomplish this task. For example, a wholly adequate solution could have graduates complete a web-based questionnaire with multiple-choice responses. When the individual completes the form, the information would be automatically transmitted into a database. College personnel could then summarize the data (or, with little extra effort, program the database to do so automatically), and then forward the results to the USOE with their college's graduation counts.

Additional Indicators

Although I expect the three indicators above to be sufficient for basic supply and demand assessment, I identify these three additional indicators because they address issues of potential interest. Further, they require data that are (or easily could be) collected as part of existing efforts, and so would incur practically no additional expense.

Numbers of unqualified teachers. One of the most useful statistics for assessing teacher demand is the number of teachers who are not qualified for their positions. The only rational reason to place an educator in an assignment for which he or she is not qualified is because a licensed educator is not available. Unqualified teaching rates indicate the extent to which districts are unable to recruit enough qualified teachers to meet their needs. In 1999, for example,

Utah's rural districts had a higher percentage of unlicensed personnel in assignments than non-rural districts (see Appendix Table A.5), suggesting that these districts had more difficulty recruiting or retaining qualified teachers. While care should be taken in operationally defining out-of-field teaching, this information should be collected and analyzed as part of any supply and demand study.

Rates of attrition for reasons other than retirement. Although retirement may be the most common reason for attrition, it would also be of value to know the number of teachers who leave each year for other reasons, particularly in the case of new teachers. As discussed above, districts are presumably already entering this information into the CACTUS database, so these data should already be available.

Sources of new hires. Although it is probable that most newly hired teachers are new Utah college graduates, it would be useful to assess the effect of other sources of supply. Each fall districts are asked to enter information into the CACTUS database about newly hired teachers. Including the source of hire in that information would help assess the relative contributions of various teacher supply sources. For example, districts could specify whether the new teacher is (a) a new graduate from a Utah school, (b) an experienced Utah teacher returning to teaching following an absence, (c) an experienced teacher moving from another district, or (d) a new or experienced teacher from another state. This information would produce a much better picture of teacher supply, which would be useful in making policy decisions at the local and state levels. This information could be gathered as part of existing data collection activities, and so would incur practically no additional expense.

Summary of Recommendations

In summary, I suggest that a basic but adequate data collection system would involve three key indicators: projected retirement rates, projected enrollment changes, and projected

number of new Utah educators seeking position in Utah. Although existing research suggests that these three factors will have the largest influence on supply and demand, continued data collection and assessment efforts would result in a refined model. I also suggest methods for collecting data on three additional important indicators, particularly rates of unqualified teaching.

The data elements that I propose be collected by the state would require little, if any, additional cost, and would require only small modifications to existing data collection procedures. Data that would be collected by colleges may require some additional costs (costs which would be minimized through the use of information technology), but would provide information of considerable value to the colleges themselves.

REFERENCES

Adams, G. J. (1996). Using a Cox regression model to examine voluntary teacher turnover. *Journal of Experimental Education, 64*(3), 267-285.

Allison, P. D. (1984). *Event history analysis: Regression for longitudinal event data.* Newbury Park, CA: Sage.

Archer, J. (2000). Arkansas seeks long-term solution to teacher 'crisis' [Electronic version]. *Education Week, 20*(2), 23, 30.

Baker, D. P., & Smith, T. (1997). Trend 2: Teacher turnover and teacher quality: Refocusing the issue. *Teachers College Record, 99*(1), 29-35.

Ballou, D., & Podgursky, M. (2000). Reforming teacher preparation and licensing: Continuing the debate [Electronic version]. *Teachers College Record, 102*(1), 5-27.

Blair, J. (2000, August 2). Districts wooing teachers with bonuses, incentives [Electronic version]. *Education Week, 19*(43), 1, 17.

Boe, E. E., Bobbit, S. A., & Cook, L. H. (1997). Whither didst thou go? Predictors of retention, transfer, and attrition of special and general education teachers from a national perspective. *Journal of Special Education, 30*(4), 371-389.

Brunson, A. (2000, November 26). What teacher shortage? *The Herald Journal*. p. 1.

Clewell, B. C., Darke, K., Davis-Googe, T., Forcier, L., & Manes, S. (2000). *Literature review of teacher recruitment programs*. Washington, DC: U.S. Department of Education.

Darling-Hammond, L. (2000a). Reforming teacher preparation and licensing: Debating the evidence [Electronic version]. *Teachers College Record, 102*(1), 28-56.

Darling-Hammond, L. (2000b). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives, 8*(1). Retrieved December 20, 2000, from http://epaa.asu.edu/epaa/v8n1/

Dillman, D. A. (1978). *Mail and telephone surveys: The total design method.* New York: Wiley.

Estes, A. (2000, October 20). Survey: Teachers in short supply. *Salt Lake Tribune*, p. C2.

Fetler, M. (1997). Where have all the teachers gone? *Educational Policy Analysis Archives, 5*(2). Retrieved December 20, 2000, from http://epaa.asu.edu/epaa/v5n2.html

Fields, R., & Galloway, B. (2000). Teacher shortage puts the brakes on summer school. *CNN.COM.* Retrieved October 1, 2000, from http://www.cnn.com/2000/LOCAL/eastcentral/06/29/akr.teacher.shortage/index.html

Gallup News Service. (2001a). *Americans rank education as top priority for the Bush administration.* Retrieved November 10, 2001, from http://www.gallup.com/poll/releases/pr010110.asp

Gallup News Service. (2001b). *Education reform: The public's opinion.* Retrieved November 10, 2001 from http://www.gallup.com/poll/releases/pr010124.asp

Gehan, E. A. (1975). Statistical methods for survival time studies. In M. J. Staquet (Ed.), *Cancer therapy: Prognostic factors and criteria* (pp. 7-35). New York: Raven Press.

Gerard, D., & Hussar, W. (1998). *Projections of education statistics to 2008.* (NCES 1999-016). Washington, DC: National Center for Educational Statistics.

Grissmer, D., & Kirby, S. N. (1997). Teacher turnover and teacher quality. *Teachers College Record, 99*(1), 41-44.

Hair, J. F., & Black, W. C. (2000). Cluster analysis. In L. G. Grimm & P. R. Yarnold (Eds.), *Reading and understanding more multivariate statistics* (pp. 147-205). Washington, DC: American Psychological Association.

Henke, R. R., Choy, S. P., Chen, X., Geis, S., Alt, M. N., & Broughman, S. P. (1997). *America's teachers: Profile of a profession 1993-94* (NCES 97-460). Washington, DC: U. S. Department of Education.

Henry, T. (2000, August 23). Ph.D.s could fill teaching slots. *USA Today*. Retrieved October 1, 2000, from http://www.usatoday.com/weather/science/phdteach082300.htm

Heyns, B. (1988). Educational defectors: A first look at teacher attrition in the NLS-72. *Educational Researcher, 17*(3), 24-32.

Hussar, W. (1999). *Predicting the need for newly hired teachers in the United States to 2008-09.* (NCES 1999-026). Washington, DC: National Center for Educational Statistics.

Ingersoll, R. M. (1997). Teacher turnover and teacher quality: The recurring myth of teacher shortages. *Teachers College Record, 99(*1), 41-44.

Ingersoll, R. M. (1999). The problem of underqualifed teachers in American secondary schools. *Educational Researcher, 28*(2), 26-37.

Ingersol, R. M. (2001). *A different approach to solving the teacher shortage problem.* (CTP Teaching Quality Policy Brief No 3). Seattle, WA: Center for the Study of Teaching and Policy.

Ingersoll, R. M., & Gruber, K. (1996). *Out-of-field teaching and educational equity.* (NCES 96-040). Washington, DC: National Center for Educational Statistics.

Ingersoll, R. M., & Rossi, R. (1995). *Which types of schools have the highest teacher turnover?* (NCES 95-778). Washington, DC: National Center for Educational Statistics.

Keller, B. (2000). States move to improve teacher pool [Electronic version]. *Education Week, 19*(40), 1, 20.

Lord, M. (2000, August 14). Hello? Anybody there? *U. S. News and World Report.* Retrieved October 15, 2000, from http://www.usnews.com/usnews/issue/000814/education.htm

Major grant will "launch" alternative licensure program. (2001, October 12). *Granite District Newsletter, 1049*, p. 1.

May, H. (2000, August 27). 'Subs' run classes as districts scramble for teachers. *Salt Lake Tribune*, pp. B1, B5.

Miller, M. D., Brownell, M. T., & Smith, S. S. (1999). Factors that predict teachers staying in, leaving, or transferring from the special education classroom. *Exceptional Children, 66*(2), 201-218.

National Council for the Accreditation of Teacher Education. (2002). *Professional standards for the accreditation of schools, colleges, and departments of education.* Washington, DC: Author.

National Education Association. (No date). *Ready or not: A national teacher shortage looms.* Retrieved October 18, 2000, from http://www.nea.org/teaching/shortage.html

Nelson, F., & Schneider, K. (1998). *Survey and analysis of teacher salary trends: 1998.* Washington, DC: American Federation of Teachers.

Norusis, M. J. (2000). *SPSS 10.0 guide to data analysis.* Upper Saddle River, NJ: Prentice Hall.

Oklahoma State Regents for Higher Education. (1998). *Teacher supply and demand.* Retrieved October 13, 2000, from http://www.okhighered.org/teachsupply.html

Riley, R. W. (1999). *The initial report of the Secretary on the quality of teacher preparation.* Washington, DC: U. S. Department of Education.

Sandham, J. L. (2000, July 12). California sweetens pot to ease teacher shortage [Electronic version]. *Education Week, 19*(42), 24.

Shavelson, R. J., McDonnell, L., & Oakes, J. (1991). Steps in designing an indicator system. *Practical Assessment, Research & Evaluation, 2*(12). Retrieved January 5, 2001, from http://ericae.net/pare/getvn.asp?v=2&n=12

Singer, J. D., & Willett, J. B. (1994, April). *Methodological issues in the study of teachers' careers: Critical features of a truly longitudinal study.* Paper presented at the meeting of the American Educational Research Association, New Orleans, LA. (ERIC Document Reproduction Service No. ED370894).

Smith, H. G. (2000, August 19). Teacher shortage hits home in Utah. *Salt Lake Tribune*, pp. A1, A7.

Sorensen, P. (2000, August). *President's message*. Retrieved August 22, 2000 from http://www.utea.org/docs/about/leadership/president.htm

Stinebrickner, T. (1998). An empirical investigation of teacher attrition. *Economics of Education Review 17*(2), 127-136.

Sudman, S. (1976). *Applied sampling*. New York: Academic Press.

Teacher recruitment a tough assignment in rural Alaska. (2000). *CNN.COM*. Retrieved October 20, 2000, from http://www.cnn.com/2000/fyi/teachers.ednews/10/09/alaska.teachers.ap/

Thompson, S. K. (1992). *Sampling*. New York: Wiley.

Utah State Office of Education. (1994). *Status of teacher personnel in Utah, 1993-1994*. Salt Lake City, UT: Author.

Utah State Office of Education. (2000). *Utah plan for Title II reporting requirements of the Higher Education Act (Draft)*. Salt Lake City, UT: Author.

Wayne, A. J. (2000). Teacher supply and demand: Surprises from primary research. *Education Policy Analysis Archives*, *8*(47). Retrieved January 15, 2001, from http://epaa.asu.edu/epaa/v8n47.html

Whitener, S. D., Gruber, K., Lynch, H., Tingos, K., & Fondelier, S. (1997). *Characteristics of stayers, movers, and leavers: Results from the teacher followup survey: 1994-95* (NCES 97-450). Washington, DC: National Center for Educational Statistics.

Willett, J.B., & Singer, J.D. (1991a). From whether to when: New methods for studying student dropout and teacher attrition. *Review of Educational Research, 61*(4), 407-50.

Willett, J.B., & Singer, J.D. (1991b). How long did it take? Using survival analysis in educational and psychological research. In L. M. Collins & J. L. Horn (Eds.), *Best methods for the analysis of change* (pp. 310-327). Washington, DC: American Psychological Association.

Winters, R. (2000). How to lure teachers? *CNN.COM.* Retrieved November 15, 2000, from http://www.cnn.com/ALLPOLITICS/time/2000/11/06/teachers.html

Wisconsin Department of Public Instruction. (1998). *Supply and demand of educational personnel for Wisconsin public schools: An examination of data trends, 1998.* Retrieved July 15, 2001, from http://www.dpi.state.wi.us/dpi/dlsis/tel/supdem98.html

Wisconsin Department of Public Instruction. (1999). *Supply and demand of educational personnel for Wisconsin public schools: An examination of data trends, 1998.* Retrieved July 15, 2001, from http://www.dpi.state.wi.us/dpi/dlsis/tel/supdem99.html

Wisconsin Department of Public Instruction. (2000). *Supply and demand of educational personnel for Wisconsin public schools: An examination of data trends, 1998.* Retrieved July 15, 2001, from http://www.dpi.state.wi.us/dpi/dlsis/tel/supdem00.html

APPENDICES

Appendix A. Tables Related to Data on Teacher Demographics

Table A.1

Experience Distribution of Fall 2000 Utah Educators by License and Endorsement Area

License/endorsement area	Total number of licensed educators	Years of experience				
		0-4	5-9	10-19	20-29	30+
Early childhood	3,427	19%	16%	37%	26%	3%
Elementary education	13,344	18%	16%	37%	25%	4%
Middle education	977	0%	1%	36%	53%	10%
Secondary education (total)	10,451	18%	18%	34%	23%	6%
Fine art	1,794	17%	17%	35%	26%	5%
Foreign language	1,505	18%	17%	33%	25%	6%
Health, movement, and fitness	2,518	14%	15%	37%	29%	5%
Information technology	308	15%	23%	42%	16%	5%
Language arts	3,192	15%	16%	36%	27%	6%
Social studies	3,590	16%	17%	32%	27%	8%
Math	1,740	16%	20%	37%	20%	6%
Science	1,800	19%	18%	34%	22%	7%
Special education	3,865	17%	19%	37%	24%	3%
Administrative	1,614	2%	7%	32%	45%	13%
Library	459	6%	12%	36%	36%	10%
Applied technology (all)	952	16%	17%	35%	26%	6%
Total	25,988	18%	18%	35%	22%	6%

Note. Source data extracted from CACTUS for the 2000-01 school year.

Table A.2

Median Years of In-service Experience by Selected License Area and Geographic Area

	Median years of in-service experience								
License area	State Total	Central Wasatch Front	Northern Wasatch Front	Southern Wasatch Front	North-west Utah	North-east Utah	South-west Utah	South-east Utah	Central Utah
Elementary education	14.2	15.5	14.1	12.7	13.6	13.9	12.5	15.1	14.2
Secondary education	13.9	14.6	13.8	13.4	13.5	13.4	12.6	16.3	13.6
Special education	18.9	20.8	18.8	17.1	16.7	19.0	15.8	19.0	17.5
Administrative	13.7	14.8	14.2	13.0	11.8	13.6	10.9	13.5	14.3
Applied technology	14.7	14.9	14.2	14.9	16.0	16.0	13.8	16.9	8.3
Total	13.8	14.9	13.5	12.5	13.1	13.3	12.1	15.5	13.9

Table A.3

Total 2005 Early Retirement Eligibility Estimates by License Area

License area	1999 total number of licensed educators	Cumulative number eligible for early retirement by 2005[a]	Percentage eligible for early retirement by 2005
Early childhood	3,498	785	22%
Elementary	12,579	2,622	21%
Middle school	1,047	456	44%
Secondary	10,973	2,519	23%
Fine art	1,902	454	24%
Foreign language	1,614	434	27%
Health, movement, and fitness	2,685	596	22%
Information technology	334	54	16%
Language arts	3,516	973	28%
Social studies	3,919	1,172	29%
Math	1,921	397	21%
Science	1,982	476	24%
Special education	4,132	701	17%
Applied technology	1,014	232	23%
Administrative	1,751	647	37%
Total (unduplicated count)	25,379	5,093	20%

[a]Eligibility counts represent the number of teachers in each area meeting minimum age/experience criteria per State of Utah retirement system policy. Individual school districts may modify state retirement system policies. Estimates produced using 1999–00 CACTUS data.

Table A.4

Percentage of 1999 Educators Eligible for Early Retirement in 2005 by License Area and Geographic Area

	Geographic area							
License area	Central Wasatch Front	Northern Wasatch Front	Southern Wasatch Front	North-west Utah	North-east Utah	South-west Utah	South-east Utah	Central Utah
Early childhood	24%	25%	23%	21%	18%	11%	20%	23%
Elementary	24%	21%	18%	18%	19%	14%	22%	21%
Middle school	49%	41%	45%	42%	46%	37%	44%	40%
Secondary	25%	24%	20%	24%	21%	18%	24%	21%
Fine art	25%	26%	23%	17%	30%	18%	24%	34%
Foreign language	29%	25%	23%	33%	28%	23%	29%	26%
Health, movement, and fitness	24%	23%	20%	26%	21%	18%	23%	19%
Information technology	23%	12%	23%	12%	13%	4%	21%	6%
Language arts	30%	26%	25%	31%	30%	22%	32%	28%
Social studies	32%	29%	28%	32%	26%	27%	30%	34%
Math	25%	19%	18%	24%	16%	17%	18%	17%
Science	28%	26%	21%	23%	17%	18%	19%	17%
Special education	18%	19%	17%	11%	15%	13%	17%	24%
Applied technology	29%	26%	14%	23%	18%	16%	34%	11%
Administrative	40%	40%	32%	37%	38%	32%	34%	31%
Total (unduplicated count)	22%	21%	18%	18%	19%	15%	22%	20%

Note. Eligibility percentages represent the number of teachers in each area meeting minimum age/experience criteria per State of Utah retirement system policy. Individual school districts may modify state retirement system policies. Estimates produced using 1999–00 CACTUS data.

Table A.5

1999 Unlicensed FTE in Assignment by District Urbanicity and Assignment Area

	Urban/Suburban		Rural		Total	
Assignment area	FTE	Percentage	FTE	Percentage	FTE	Percentage
Elementary	68.5	0.9	30.7	1.7	99.2	1.0
Secondary (total, unduplicated)	522.2	7.2	164.1	10.0	686.3	6.5
Fine arts	33.2	4.3	15.8	8.4	48.9	5.2
Foreign language	16.5	4.3	3.8	5.8	20.3	4.5
Health, Movement, Fitness	138.2	22.8	21.7	11.9	160.0	6.6
Information Technology	3.0	14.2	2.5	27.5	5.5	18.0
Language Arts	58.9	4.9	22.9	7.9	81.8	5.6
Social Studies	48.5	5.9	18.9	8.8	67.3	6.5
Math	43.7	4.9	19.6	8.8	63.2	5.6
Science	55.6	7.3	32.4	16.7	87.9	9.3
Support	124.7	6.7	26.6	9.7	151.3	7.1
Special Education, Classroom	137.3	8.3	41.2	10.8	178.5	8.8
Special Education, Support	23.4	6.7	8.3	21.0	31.7	7.9
Applied Technology Education	154.0	11.7	49.3	13.1	203.3	11.7
Administration	7.4	0.7	17.0	5.4	24.4	1.9
State total	833.9	4.2	332.3	7.2	1,166.2	4.8

Note. FTE = Number of full-time equivalent teachers in assignments without an appropriate license/endorsement combination required by USOE, with or without a letter of authorization. Source data extracted from CACTUS.

Table A.6

Number of Licensed Educators Without Current Assignment

License area	Number of teachers without current assignment
Early childhood	1,076
Elementary	4,220
Middle school	609
Secondary (total, unduplicated)	7,647
Fine art	651
Foreign language	536
Health, movement, and fitness	932
Information technology	120
Language arts	1,353
Social studies	1,597
Math	700
Science	1,092
Special education	2,330
Administration	511
Applied technology (total, unduplicated)	521
Total (unduplicated)	8,269

Note. These counts represent the number of educators with current Utah licenses or endorsements who, for any reason, did not have assignments at the beginning of the 2000-01 school year. Source data extracted from CACTUS.

Table A.7

Percentage of Degrees Held by Current Educators from Each Utah Teacher Preparation Institution

Teacher preparation institution	Percentage of current educators holding degrees from institution
Brigham Young University	27.9
Southern Utah University	7.9
University of Phoenix	0.8
University of Utah	17.2
Utah State University	20.5
Utah Valley State College	0.1
Weber State University	10.2
Westminster College	1.9
Utah Total	86.5
All Other	13.5

Note. Source data extracted from CACTUS for the 2000-01 school year.

Appendix B. Tables Related to Reports Obtained from Utah Teacher Preparation Programs

Table B.1

Utah Teacher Education Program Graduates by Major Field and Year

Major field of preparation	Academic year						Total
	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	
Early childhood	138	186	213	188	191	164	1,080
Elementary	786	855	938	1,009	968	884	5,440
Dual early childhood/elementary	202	150	156	11	34	34	587
Secondary (total)	1,409	1,654	1,857	1,768	1,647	1,502	9,837
Special education (total)	242	228	182	197	209	186	1,244
Hearing impairments	2	1	5	6	3	4	21
Mild/moderate	79	48	81	105	105	85	503
Severe	12	12	23	20	14	23	104
Visual impairments	1	1	1	4	4	3	14
Preschool	4	9	6	6	4	6	35
Communicative disorders (total)	18	28	30	29	33	51	189
Audiology	0	0	0	0	0	2	2
Speech-language pathology	5	7	7	9	18	21	67
Applied technology (total)	82	61	71	77	67	59	417
Administrative/supervisory	16	58	36	61	49	67	287
School counselor	14	33	23	14	28	42	154
School psychologist	12	10	10	4	6	9	51
School social worker	11	4	9	12	19	6	61
Library media	5	11	0	12	2	10	40
Total	3,050	3,409	3,658	3,721	3,583	3,230	20,745

Note. Aggregated from data collected from each teacher preparation program. Details may not sum to totals due to missing or incomplete data.

Table B.2

Utah Secondary Education Teacher Preparation Program Graduates by Content Area and Year

Content area	Academic year						Total
	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	
Music	49	50	52	45	76	43	315
Art	31	40	39	34	51	37	232
Other fine arts	13	23	34	23	23	34	150
Foreign language	58	79	77	91	82	60	447
Health, movement, and fitness	89	115	108	131	130	137	710
English	156	141	145	163	173	170	948
English as a second language	0	4	4	11	9	12	40
Other language arts	12	11	18	18	34	6	99
History	75	84	107	104	89	99	558
Social sciences	31	34	50	33	17	26	191
Other social studies	113	94	103	105	87	71	573
Math	108	124	123	106	105	103	669
Science (total)	103	94	107	137	101	135	677
Biological science	47	47	62	66	80	88	390
Chemistry	4	6	7	10	5	8	40
Earth science	13	5	5	9	5	3	40
Physics	2	8	7	13	6	10	46
Physical science	15	11	10	14	5	10	65
Gifted/talented	16	16	4	6	1	1	44
Other secondary	31	17	35	33	40	28	184
Total	1,409	1,654	1,857	1,768	1,647	1,502	9,837

Table B.3

Brigham Young University Teacher Education Program Graduates by Major Field and Year

Major field of preparation	Academic year						Total
	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	
Early childhood	73	104	134	95	98	76	580
Elementary	390	422	517	460	435	365	2,589
Secondary (total)	882	1,033	1,200	1,129	1,080	997	6,321
Special education (total)	71	113	63	54	25	21	347
Mild/moderate	0	0	45	40	21	14	120
Severe	0	0	18	14	4	7	43
Communicative disorders (total)	2	8	3	2	9	9	33
Audiology	0	0	0	0	0	2	2
Speech-language pathology	0	0	0	0	0	7	7
Applied technology (total)	11	18	11	14	10	6	70
Administrative/supervisory	0	34	10	37	30	32	143
School counselor	0	15	1	5	1	11	33
School psychologist	0	4	3	0	0	0	7
School social worker	0	0	0	0	0	2	-2
Total	1,429	1,751	1,941	1,796	1,688	1,519	10,124

Table B.4

Brigham Young University Secondary Education Teacher Preparation Program Graduates by Content Area and Year

Content area	Academic year						Total
	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	
Music	18	30	16	22	30	26	142
Art	13	14	16	14	28	15	100
Other fine arts	4	13	21	13	13	17	81
Foreign language	38	53	50	63	62	41	307
Health, movement, and fitness	46	55	56	77	59	60	353
English	73	71	76	78	89	93	480
English as a second language	0	4	2	1	2	7	16
Other language arts	5	2	4	1	0	1	13
History	61	65	85	70	64	78	423
Other social studies	60	56	60	64	47	39	326
Math	57	78	78	72	63	75	423
Science (total)	44	42	59	71	69	84	369
Biological science	29	27	42	39	55	60	252
Chemistry	2	3	3	5	3	3	19
Earth science	4	0	2	6	2	3	17
Physics	2	6	6	10	6	8	38
Physical science	7	6	6	11	3	10	43
Gifted/talented	0	0	0	5	1	0	6
Other secondary	19	10	19	18	21	13	100
Total	882	1,033	1,200	1,129	1,080	997	6,321

Table B.5

Southern Utah University Teacher Education Program Graduates by Major Field and Year

Major field of preparation	Academic year						Total
	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	
Early childhood	49	45	36	33	51	51	265
Elementary	156	150	180	202	207	183	1,078
Secondary (total)	168	203	170	243	210	210	1,204
Music	6	2	9	2	11	4	34
Art	3	5	4	1	7	4	24
Other fine arts	1	2	8	5	1	0	17
Foreign language	11	15	15	14	11	4	70
Health, movement, fitness	21	28	27	22	25	31	154
English	14	14	12	11	11	20	82
Other language arts	1	2	3	7	5	1	19
History	3	8	10	7	9	11	48
Other social studies	27	18	20	20	24	21	130
Math	11	10	9	6	12	4	52
Science (total)	12	19	8	15	14	10	78
Biological science	8	12	7	12	10	9	58
Chemistry	1	2	1	1	1	1	7
Earth science	0	1	0	0	3	0	4
Physical science	3	4	0	2	0	0	9
Special education (mild/moderate)	38	22	13	37	57	39	206
Applied technology (total)	30	19	21	28	29	16	143
Total	445	439	420	653	684	444	3,179

Table B.6

University of Utah Teacher Education Program Graduates by Major Field and Year

Major field of preparation	Academic year						Total
	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	
Early childhood	1	0	2	7	18	11	39
Elementary	47	54	61	62	54	56	334
Secondary (total)	62	157	60	73	87	82	521
Special education (total)	45	34	31	35	35	43	223
Hearing impairments	2	1	5	6	3	4	21
Mild/moderate	26	11	14	13	14	14	92
Severe	12	12	5	6	10	16	61
Visual impairments	1	1	1	4	4	3	14
Preschool	4	9	6	6	4	6	35
Communicative disorders (total)	5	7	7	9	18	14	60
Speech-language pathology	5	7	7	9	18	14	60
Administrative/supervisory	16	24	26	24	19	35	144
School counselor	5	10	0	0	0	0	15
School psychologist	10	6	1	1	4	5	27
School social worker	11	4	9	12	19	4	59
Library media	0	0	0	8	0	0	8
Total	264	379	258	306	341	332	1,880

Table B.7

University of Utah Secondary Education Teacher Preparation Program Graduates by Content Area and Year

Content area	Academic year						Total
	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	
Music	8	8	11	7	20	0	54
Art	2	8	3	5	8	6	32
Other fine arts	2	5	2	0	2	9	20
Foreign language	4	6	4	6	4	5	29
Health, movement, fitness	2	5	1	6	6	7	27
English	16	16	10	23	16	21	102
Other language arts	0	0	1	2	0	0	3
History	4	4	5	6	6	1	26
Other social studies	7	8	9	6	8	5	43
Math	4	10	9	4	10	11	48
Science (total)	3	4	6	10	7	17	47
Biological science	1	2	2	5	6	13	29
Chemistry	1	1	2	1	1	4	10
Earth science	0	0	1	2	0	0	3
Physics	0	1	1	2	0	0	4
Physical science	1	0	0	0	0	0	1
Gifted/talented	10	9	0	0	0	0	19
Total	62	157	60	73	87	82	521

Table B.8

Utah State University Teacher Education Program Graduates by Major Field and Year

	Academic year						
Major field of preparation	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	Total
Early childhood	13	31	33	31	9	8	125
Elementary	178	218	156	173	177	170	1,072
Dual early childhood/elementary	39	22	18	11	34	34	158
Secondary (total)	191	161	300	213	169	117	1,151
Music	13	7	11	11	12	9	63
Art	9	10	12	9	7	6	53
Health, movement, fitness	19	22	22	22	35	30	150
English	29	19	25	32	40	20	165
Other language arts	6	7	10	8	29	4	64
Social sciences	31	34	50	33	17	26	191
Math	22	18	22	15	14	8	99
Science	21	17	16	25	22	16	117
Other secondary	12	7	16	15	10	11	71
Special education (total)	73	44	66	56	79	65	383
Communicative disorders	11	13	20	18	6	28	96
Applied technology (total)	29	18	32	32	22	27	160
School counselor	9	8	22	9	27	31	106
School psychology	2	0	6	3	2	4	17
Library media	1	11	0	4	2	10	28
Total	599	574	726	675	608	650	3,832

Table B.9

Utah Valley State College Teacher Education Program Graduates by Major Field and Year

	Academic year						
Major field of preparation	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	Total
Elementary	-	-	-	29	32	33	94
Total	-	-	-	29	32	33	94

Note. Dash indicates missing data.

Table B.10

Weber State University Teacher Education Program Graduates by Major Field and Year

	Academic year						
Major field of preparation	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	Total
Early childhood				12	9	12	33
Elementary				104	74	89	267
Dual early childhood/elementary	163	128	138				429
Secondary (total)	92	68	114	103	76	96	549
Special education (mild/moderate)	15	15	9	15	13	18	85
Applied technology (total)	12	6	7	3	6	10	44
Total	282	217	268	237	178	225	1,407

Note. Weber State University discontinued the dual early childhood/elementary program after the 1996-97 school year, replacing it with early childhood and elementary programs.

Table B.11
Weber State University Secondary Education Teacher Preparation Program Graduates by Content Area and Year

Content area	Academic year						Total
	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	
Music	4	3	5	3	3	4	22
Art	4	3	4	5	1	6	23
Other fine arts	6	3	3	5	7	8	32
Foreign Language	5	5	8	8	5	10	41
Health, movement, fitness	1	5	2	4	5	9	26
English	24	21	22	19	17	16	119
English as a second language	0	0	2	10	7	5	24
History	7	7	7	21	10	9	61
Other social studies	19	12	14	15	8	6	74
Math	14	8	5	9	6	5	47
Science (total)	23	12	18	16	11	8	88
Biological science	9	6	11	10	9	6	51
Chemistry	0	0	1	3	0	0	4
Earth science	9	4	2	1	0	0	16
Physics	0	1	0	1	0	2	4
Physical science	4	1	4	1	2	0	12
Other science	1	0	0	0	0	0	1
Gifted/talented	6	7	4	1	0	1	19
Other secondary	0	0	0	0	9	4	13
Total	92	68	114	103	76	96	549

Table B.12

Westminster College Teacher Education Program Graduates by Major Field and Year

	Academic year						
Major field of preparation	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00	Total
Early childhood	2	6	8	10	6	6	38
Elementary	15	11	24	8	21	21	100
Secondary (total)	14	32	13	7	25	-	91
Total	31	49	45	25	52	27	229

Note. Dash indicates missing data.

Table B.13

Percentage of Graduating Students Obtaining Employment in Utah Schools Within One Year of Graduation

Major field of study	Percentage employed in Utah within 1 year					Total for time period
	1994-95	1995-96	1996-97	1997-98	1998-99	
			Elementary Education			
Southern Utah University	43	55	45	45	43	46
University of Utah	56	59	76	50	23	53
Weber State University	-	-	-	30	-	-
Westminster College	-	-	-	-	90	-
			Secondary Education			
Southern Utah University	51	20	29	23	-	-
University of Utah	28	38	63	41	40	41
Weber State University	46	57	32	29	-	-
Westminster College	-	-	-	-	60	-
			Elementary/Secondary [a]			
Brigham Young University	69	65	66	65	65	66
			Special Education			
Southern Utah University	58	-	-	-	-	-
University of Utah	24	61	39	37	52	40

Note. Dash indicates missing data. Programs that are not listed either did not submit placement data or submitted aggregated placement data that included students graduating from programs other than teacher preparation.

[a]Brigham Young University submitted combined placement data for elementary and secondary program graduates only.

Appendix C. Tables Related to Projections of Public School Enrollment and Teacher Need

Table C.1

Fall 2000 Public School Enrollment and Projected Fall2005 Public School Enrollments, All Grade Levels

Geographic area	Actual 2000 enrollment	Projected 2005 enrollment	Net change	Percentage change
State total	475,269	499,066	23,797	5.0
Central Wasatch Front	175,283	176,166	883	0.5
Northern Wasatch Front	99,626	104,332	4,706	5.0
Southern Wasatch Front	81,424	91,550	10,126	12.4
Northwest Utah	39,052	45,622	6,570	16.8
Southwest Utah	33,234	35,948	2,714	8.2
Northeast Utah	22,682	23,044	362	1.6
Southeast Utah	11,260	9,806	-1,454	-12.9
Central Utah	12,708	12,598	-110	-0.9

Note. Aggregated from data obtained from Statistics and Finance Division, Utah State Office of Education.

Table C.2

Fall 2000 Public School Enrollment and Projected Fall2005 Public School Enrollments, Elementary Grades

Geographic area	Actual 2000 enrollment	Projected 2005 enrollment	Net change	Percentage change
State total	250,535	271,546	21,011	8.4
Central Wasatch Front	92,269	95,269	3,000	3.3
Northern Wasatch Front	51,977	56,193	4,216	8.1
Southern Wasatch Front	44,460	50,118	5,658	12.7
Northwest Utah	20,935	26,389	5,454	26.1
Southwest Utah	17,380	20,016	2,636	15.2
Northeast Utah	11,443	11,804	361	3.2
Southeast Utah	5,568	5,034	-534	-9.6
Central Utah	6,503	6,724	221	3.4

Note. Aggregated from data obtained from Statistics and Finance Division, Utah State Office of Education.

Table C.3

Fall 2000 Public School Enrollment and Projected Fall2005 Public School Enrollments, Secondary Grades

Geographic area	Actual 2000 enrollment	Projected 2005 enrollment	Net change	Percentage change
State total	213,820	216,152	2,332	1.10
Central Wasatch Front	78,395	76,247	-2,148	-2.70
Northern Wasatch Front	45,504	45,898	394	0.90
Southern Wasatch Front	35,101	39,352	4,251	12.10
Northwest Utah	17,541	18,555	1,014	5.80
Southwest Utah	15,294	15,328	34	0.20
Northeast Utah	10,533	10,541	8	0.10
Southeast Utah	5,485	4,592	-893	-16.30
Central Utah	5,967	5,639	-328	-5.50

Note. Aggregated from data obtained from Statistics and Finance Division, Utah State Office of Education.

Table C.4

Fall 2000 Public School Enrollment and Projected Fall2005 Public School Enrollments, Special Education

Geographic area	Actual 2000 enrollment	Projected 2005 enrollment	Net change	Percentage change
State total	10,914	11,368	454	4.2
Central Wasatch Front	4,619	4,650	31	0.7
Northern Wasatch Front	2,145	2,241	96	4.0
Southern Wasatch Front	1,863	2,080	217	11.6
Northwest Utah	576	677	101	17.5
Southwest Utah	560	604	44	7.9
Northeast Utah	706	699	-7	-1.0
Southeast Utah	207	180	-27	-13.0
Central Utah	238	236	-2	-0.8

Note. Aggregated from data obtained from Statistics and Finance Division, Utah State Office of Education.

Table C.5

Projected Fall 2010 School Age Population

Geographic area	Projected 2010 school age population (ages 5-17)	Percentage change from 2005 GOPB projections
State total	598,775	14.4
Central Wasatch Front	224,237	11.7
Northern Wasatch Front	114,251	14.2
Southern Wasatch Front	121,477	19.9
Northwest Utah	49,255	15.7
Southwest Utah	43,696	21.2
Northeast Utah	17,264	11.9
Southeast Utah	11,401	- 2.0
Central Utah	17,194	11.0

Note. Aggregated from data obtained from Governor's Office of Planning and Budget, Demographic and Economic Analysis Section, UPED Model System, May 2001.

Table C.6

Utah 2005 and 2010 Full-Time Equivalent Teacher Need Projections by Assignment Area

Assignment area	1999 actual FTE [a]	Projected 2005 FTE need [b]	New FTE needed [c]	Projected 2010 FTE need [d]
Elementary	9,779.1	10,659.3	942.6	14,302.6
Secondary total	8,916.5	8,918.1	293.5	10,607.4
Fine arts	945.4	945.5	31.9	
Foreign language	444.5	444.6	13.9	
Health, movement, and fitness	790.4	790.5	27.0	
Information technology	30.3	30.4	1.5	
Language arts	1,491.5	1,491.8	44.8	
Social studies	1,037.6	1,037.8	33.2	
Math	1,109.2	1,109.4	36.9	
Science	941.5	941.7	29.3	
Support	2,126.1	2,126.5	74.9	
Special education, classroom	2,037.4	2,157.2	264.8	
Special education, support	387.9	410.7	40.8	
Applied technology	2,567.5	2,567.9	55.7	
Administration	1,393.6	1,461.2	80.7	
Total	24,701.2	25,899.6	1,652.1	31,074.0

Note. FTE = Full-time equivalent.
[a]1999–2000 FTE counts extracted from USOE Cactus database. Does not include interns.
[b]Calculated using 1999–00 pupil-teacher ratios and USOE enrollment projections. Pupil-teacher ratios calculated by dividing 1999 Fall enrollments by 1999 FTE counts. Projections are not adjusted for effects of attrition or retirement.
[c]"New FTE" is not necessarily equal to the difference between "Projected 2005 FTE" and "1999 Actual FTE." See Methods section for details.
[d]Calculated using 1999 pupil-teacher ratios and 2010 school-age population projections produced by the Governors Office of Planning and Budget.

Table C.7

Projected Number of Additional Full-time Equivalent Teachers Needed in 2005 by Assignment Area and Geographic Area

	Geographic area							
Assignment area	Central Wasatch Front	Northern Wasatch Front	Southern Wasatch Front	North-west Utah	North-east Utah	South-west Utah	South-east Utah	Central Utah
Elementary	111.6	176.2	266.8	227.1	28.2	120.9	0.0	11.8
Secondary total	0.5	18.4	169.7	53.4	32.6	14.4	0.0	4.4
Fine arts	0.1	1.9	18.6	5.5	3.3	1.8	0.0	0.6
Foreign language	0.0	.9	8.4	1.8	2.1	0.6	0.0	0.0
Health, movement, fitness	0.0	1.3	14.7	4.6	4.0	1.8	0.0	0.5
Information technology	0.0	0.0	0.7	0.8	0.0	0.0	0.0	0.0
Language arts	0.1	3.2	26.4	7.6	.0	1.9	0.0	0.8
Social studies	0.0	2.1	18.1	6.6	3.9	1.9	0.0	0.6
Math	0.0	2.2	20.7	7.5	4.2	1.7	0.0	0.7
Science	0.0	1.9	16.0	5.6	3.7	1.8	0.0	0.4
Support	0.2	4.9	46.2	13.3	6.7	2.8	0.0	0.7
Special Education (classroom)	43.1	9.9	64.8	20.2	14.4	97.4	6.9	8.1
Special Education (support)	8.9	2.0	11.5	4.6	1.0	10.7	1.3	0.8
Applied technology	0.1	3.1	34.2	8.8	5.3	3.3	0.0	0.9
Administration	4.1	13.5	28.0	18.8	4.0	11.1	0.0	1.3
Total	171.2	225.4	581.2	337.9	88.0	268.9	8.9	28.3

Note. See Note for Table C.6.

Appendix D. Tables Related to Survey of Nonteaching Program Graduates

Table D.1

Post-Graduation Employment-Search Activities of Survey Respondents

Option	Percentage
Sought teaching positions in Utah	35.7
Sought teaching positions only in other states	23.8
Did not seek a teaching position	40.5

Note. Overall margin of error ±9.1% with 90% confidence.

Table D.2

Main Reason for Not Seeking a Teaching Position in Utah or Elsewhere

Option	Percentage
Decided not to work because of marriage, children, or other family reason	61.8
Decided that pay in teaching was too low	14.7
Decided to continue formal education	6.1
Discouraged by student teaching	6.1
Lost interest in teaching	3.0
Other	9.1

Note. Overall margin of error 9.1% with 90% confidence.

Table D.3

Additional Reason for Not Seeking a Teaching Position

Option	Percentage
Discouraged by student teaching	17.7
Decided that pay in teaching was too low	11.7
Other	11.7
No additional reason	58.9

Note. Overall margin of error 9.1% with 90% confidence.

Table D.4

Percentage of Teachers Who Sought and Were Offered Utah Positions.

Option	Percentage
Yes	42.9
No	57.1

Note. Overall margin of error 9.1% with 90% confidence.

Table D.5

Main Reason for Not Accepting Utah Teaching Position Offer

Option	Percentage
Received a better offer for a teaching position outside of Utah	66.7
Other (< 3% each)	33.3

Note. Overall margin of error 9.1% with 90% confidence.

Table D.6

Main Reason for Not Seeking a Teaching Position in Utah

Option	Percentage
Spouse obtained employment in another state	35.0
Teacher pay in Utah is too low	25.0
Sought employment near hometown, family, etc.	25.0
Other (< 3% each)	15.0

Note. Overall margin of error 9.1% with 90% confidence.

Table D.7

Most Effective Step Utah Schools Might Take to Encourage New Graduates to Teach in Utah

Option	Percentage
Providing higher salaries and/or better fringe benefits	77.1
Decreasing class size	7.2
Giving teachers more authority in the school and in their own classrooms	4.8
Providing tuition reimbursement for coursework required for certification or career advancement	4.8
Other (< 3% each)	6.1

Note. Overall margin of error 9.1% with 90% confidence.

Table D.8

Percentage of Survey Respondents Who Would Consider Seeking a Teaching Position in Utah in the Future

Option	Percentage
Yes	69.0
No	22.6
No response	8.3

Note. Overall margin of error 9.1% with 90% confidence.

Table D.9

Gender of Nonteaching Graduate Survey Respondents

Option	Percentage
Female	77.4
Male	22.6

Note. Overall margin of error 9.1% with 90% confidence.

Table D.10

Source of Teaching Degree of Nonteaching Graduate Survey Respondents

Option	Percentage
Brigham Young University	54.8
Utah State University	19.0
Southern Utah University	14.3
Weber State University	3.6
University of Utah	1.2
Utah Valley State College	1.2
Westminster College	0.0
From a college outside of Utah	6.0

Note. Overall margin of error 9.1% with 90% confidence.

Appendix E. Tables Related to Attrition and Reentry of New Teachers

Table E.1

Estimated Annual Number of New Teachers Hired by License Area and Year of Hire

	Year of Hire							
License area	1994	1995	1996	1997	1998	1999	2000	Average
Elementary	620	648	1,100	788	820	888	904	824
Secondary	724	704	720	836	716	704	784	741
Fine Arts	84	104	92	144	116	104	40	98
Foreign language	108	88	72	100	88	72	48	82
Health, movement, and fitness	120	76	88	156	76	96	24	91
Information technology	24	16	24	40	8	8	0	17
Language arts	152	136	176	184	148	168	76	149
Math	108	116	136	132	104	80	36	102
Science	136	144	100	84	144	100	56	109
Social science	220	196	160	204	168	144	92	169
Special education (total)	200	268	260	232	280	212	248	243
Applied technology (total)	84	112	96	140	116	96	64	101
Total	1,548	1,592	2,032	1,848	1,840	1,860	2,052	1,825

Note. New hire counts estimated using 25% sample of 1990-1999 new teacher data extracted from the CACTUS database.

Table E.2

Life Table Display of Early Attrition Rates for Teachers in All License Areas

Year of employment	Percentage terminating during year	Cumulative retention rate at end of year	Standard error
1	12.7	.873	.005
2	11.2	.775	.006
3	10.3	.696	.007
4	8.5	.637	.008
5	6.3	.597	.008

Table E.3

Life Table Display of Early Attrition Rates for Teachers Holding Elementary Education Licenses

Year of employment	Percentage terminating during year	Cumulative retention rate at end of year	Standard error
1	10.2	.898	.007
2	11.3	.797	.009
3	8.5	.729	.011
4	7.9	.671	.012
5	6.1	.630	.012

Table E.4

Life Table Display of Early Attrition Rates for Teachers Holding Secondary Education Licenses

Year of employment	Percentage terminating during year	Cumulative retention rate at end of year	Standard error
1	14.8	.852	.008
2	9.9	.768	.010
3	11.9	.677	.011
4	8.8	.617	.012
5	5.2	.585	.013

Table E.5

Life Table Display of Early Attrition Rates for Teachers Holding Special Education Licenses

Year of employment	Percentage terminating during year	Cumulative retention rate at end of year	Standard error
1	12.7	.873	.013
2	14.4	.748	.018
3	12.5	.655	.020
4	10.1	.589	.022
5	7.0	.547	.023

Table E.6

Life Table Display of Early Attrition Rates for Teachers in All License Areas, Separated by Gender

	Female teachers		Male teachers	
Year of employment	Percentage terminating during year	Cumulative retention rate at end of year	Percentage terminating during year	Cumulative retention rate at end of year
1	13.0	.870	11.7	.883
2	12.2	.764	8.0	.813
3	11.5	.676	6.3	.761
4	9.3	.613	6.1	.715
5	6.9	.570	4.5	.683

Table E.7

Life Table Display of Early Attrition Rates for Teachers Holding Elementary Education Licenses, Separated by Gender

	Female Teachers		Male Teachers	
Year of employment	Percentage terminating during year	Cumulative retention rate at end of year	Percentage terminating during year	Cumulative retention rate at end of year
1	10.4	.896	7.6	.924
2	11.7	.792	7.4	.856
3	9.0	.720	2.9	.830
4	8.3	.660	3.4	.803
5	6.2	.619	5.5	.758

Table E.8

Life Table Display of Early Attrition Rates for Teachers Holding Secondary Education Licenses, Separated by Gender

	Female Teachers		Male Teachers	
Year of employment	Percentage terminating during year	Cumulative retention rate at end of year	Percentage terminating during year	Cumulative retention rate at end of year
1	15.9	.841	12.8	.872
2	11.6	.743	7.2	.809
3	14.7	.634	7.7	.747
4	10.7	.566	6.3	.700
5	6.2	.531	3.9	.673

Table E.9

Life Table Display of Early Attrition Rates for Teachers Holding Special Education Licenses, Separated by Gender

	Female Teachers		Male Teachers	
Year of employment	Percentage terminating during year	Cumulative retention rate at end of year	Percentage terminating during year	Cumulative retention rate at end of year
1	13.3	.867	7.4	.926
2	14.7	.740	12.3	.812
3	13.2	.642	6.8	.757
4	9.9	.578	11.0	.674
5	8.2	.531	0.0	.674

Table E.10

Life Table Display of Teacher Reentry Rates for Former Teachers in All License Areas

Number of years following termination	Cumulative percentage of former teachers returning each year following termination		
	Total	Female	Male
1	0.6	0.6	0.7
2	6.8	6.0	10.1
3	9.3	8.1	13.6
4	10.8	9.8	14.7
5	11.9	10.6	16.8

Table E.11

Life Table Display of Teacher Reentry Rates for Former Teachers Holding Elementary Education Licenses

Number of years following termination	Cumulative percentage of former teachers returning each year following termination		
	Total	Female	Male
1	0.5	0.5	1.1
2	6.0	5.9	8.6
3	9.6	8.8	23.4
4	10.2	9.5	23.4
5	10.2	9.5	23.4

Table E.12

Life Table Display of Teacher Reentry Rates for Former Teachers Holding Secondary Education Licenses

Number of years following termination	Cumulative percentage of former teachers returning each year following termination		
	Total	Female	Male
1	0.7	0.7	0.8
2	7.7	6.0	11.0
3	9.3	6.6	14.4
4	11.2	8.9	15.8
5	12.7	10.3	17.5

Table E.13

Life Table Display of Teacher Reentry Rates for Former Teachers Holding Special Education Licenses

Number of years following termination	Cumulative percentage of former teachers returning each year following termination		
	Total	Female	Male
1	0.9		
2	6.7		
3	12.1		
4	14.3		
5	16.3		

Note. Data file contained too few male special education teachers to allow estimation by gender.

Appendix F. Tables Related to Survey of Former Teachers

Table F.1

Percentage of Survey Respondents Indicating Various Reasons for Leaving First Teaching Position

Option	Main Reason	Second Reason	Third Reason
Family or personal move	47.1%	5.8%	0.0%
Pregnancy / child rearing	16.3%	8.7%	0.0%
School staffing action	9.6%	5.8%	0.0%
To take courses to improve opportunities in the field of education	6.8%	0.0%	0.0%
For better salary or benefits	5.8%	7.7%	2.9%
To pursue another career	5.8%	4.8%	3.8%
Dissatisfied with teaching as a career	4.8%	13.5%	10.6%
Other family or personal reason	4.8%	0.0%	0.0%
Other	2.0%	5.8%	4.9%
None	0.0%	48.1%	75.0%

Note. Overall margin of error ±8.0 with 90% confidence.

Table F.2

Main Reason for Dissatisfaction With Teaching as a Career

Option	Percentage
Poor salary	16.3
Inadequate support from administration	4.8
Other responses (< 3% each)	17.4
No reason for dissatisfaction	61.5

Note. Overall margin of error ±8.0 with 90% confidence.

Table F.3

Most Effective Step Utah Schools Might Take to Encourage New Teachers to Remain in Teaching

Option	Percentage
Providing higher salaries and/or better fringe benefits	58.7
Decreasing class size	12.5
Providing more support for new teachers (e.g., mentor teacher programs)	7.7
Dealing more effectively with student discipline and making schools safer	5.8
Other responses (< 3% each)	12.6
No response	2.9

Note. Overall margin of error ±8.0 with 90% confidence.

Table F.4

Second Most Effective Step Utah Schools Might Take to Encourage New Teachers to Remain in Teaching

Option	Percentage
Decreasing class size	26.0
Providing better resources and materials for classroom use	16.3
Providing higher salaries and/or better fringe benefits	9.6
Increasing standards for students' academic performance	6.7
Reducing teaching workload	6.7
Reducing the paperwork burden on teachers	5.8
Giving teachers more authority in the school and in their own classrooms	4.8
Providing tuition reimbursement for coursework required for certification	4.8
Dealing more effectively with student discipline and making schools safer	3.8
Improving opportunities for professional advancement	3.8
Other responses (< 3% each)	7.7
No response	3.8

Note. Overall margin of error ±8.0 with 90% confidence.

Table F.5

Percentage of Survey Respondents Indicating They Would Consider Seeking a Teaching Position in Utah in the Future

Option	Percentage
Yes	16.3
Undecided	43.3
No	31.7
No response	8.7

Note. Overall margin of error ±8.0 with 90% confidence.

Table F.6

Gender of Former Teacher Survey Respondents

Option	Percentage
Female	91.3
Male	8.7

Note. Overall margin of error ±8.0 with 90% confidence.

Table F.7

Source of Teaching Degree of Former Teacher Survey Respondents

Option	Percentage
Brigham Young University	39.4
Utah State University	26.9
Weber State University	11.5
University of Utah	4.8
Southern Utah University	3.8
Westminster College	1.0
Utah Valley State College	0.0
From a college outside of Utah	9.6
No response	2.9

Note. Overall margin of error ±8.0 with 90% confidence.

Appendix G. Objectives of USOE Study as Listed in Original Request for Proposal

Phase 1: Analysis of existing data to include the following:

- Current student enrollments K-12
- Current age/experience distribution of practicing educators
- Number of educators prepared by licensure area for the years 1995–2000 reported in total and by Utah educator preparation institution

Phase 2: Estimate the demand for educators based on projected student enrollments and reference educator preparation adequacy as determined by survey of representative sample of educators prepared by Utah higher education institutions.

- Based on current pupil-teacher ratios and school staffing patterns, estimate the total number of educators needed in each area of state licensure based on total student population (actual and projected) for each year, 2000–2005, and project the same for 2010.
- Based on current pupil–teacher ratios and school staffing patterns, estimate licensure areas of over supply, adequate supply, and short supply.
- Determine educator estimated supply and demand categories by geographic areas of the state of Utah.
- Identify possible causes of educator supply and demand needs based on such factors as public school student enrollment growth, educators eligible for retirement, educators leaving the profession and for what purposes.
- Estimate the annual number of potential educators that need to be trained in each state licensure area to meet the estimated need for educators based on current staffing patterns and pupil-teacher ratios.
- Identify the number of preservice educators prepared by educator preparations in Utah who accept employment in Utah public schools in the first three years after successfully completing a preparation program.

- Utilizing a representative sample of the educator prepared population who did not accept or gain employment in Utah's public schools within the first three years of completion of their preparation program, determine the principle reasons these educators did not enter the profession.
- Using a representative sample of the population of educators who enter the profession upon completion of their educator preparation programs, determine how many left the profession and for what reasons after one year, three years, and five years.
- Consult with Utah State Office of Education staff regarding effective models of continued data collection regarding ongoing information related to the supply and demand for educators in Utah public schools.

Appendix H. Materials Sent to Deans of Utah's Colleges of Education

This appendix contains materials sent to the Deans of the eight Utah Colleges of Education. The cover letter was printed on Bureau of Research Services letterhead and was signed by Dr. Thorklidsen and myself. The data collection sheets were originally duplicated on 11-inch by 17-inch paper and have been reduced in size for presentation in this report.

October 25, 2000

Dear _____:

This letter is to request your participation in the 2000 Teacher Supply and Demand Study. This study is sponsored by the Utah State Office of Education and was discussed by Gary Carlston at this year's Utah Dean's Conference. We are requesting all Utah colleges of education to provide data on the number of teachers they prepared during the last five years. This information will be of critical importance in assessing teacher supply and demand in Utah. Accordingly, we need participation from each college.

We ask that you forward these materials to the appropriate person on your staff, and ask him or her to complete the survey as soon as possible. Given the project's constrained time schedule, we respectfully ask that data be returned by November 20, 2000 in the enclosed self-addressed envelope. We believe that completing the survey should only require data that you have readily available in your files.

We sincerely appreciate your assistance. If you have any questions, please contact Daniel Robertson at (435) 797-4506.

Sincerely,

Ron Thorkildsen
Professor Emeritus
College of Education
Utah State University

Daniel Robertson
Research Associate
College of Education
Utah State University

2000 USOE Teacher Supply and Demand Study

General Instructions for completing Part 1 (tan) and Part 2 (blue) of this survey

1. Please return the requested data by **20 November 2000**. We know this is a relatively short turnaround, but we believe completing the survey should only require data that you have readily available in your files. If you already have reports that contain all the information requested on the enclosed survey forms, you may send them instead. Otherwise, please use the enclosed forms.

2. Please use the following conventions on survey forms:

   - **"MD"** when data are missing or not available
   - **"0"** or leave the item **blank** when the numerical value is **zero** or for program areas that are not offered at your institution.

3. Tally graduates according to major field of preparation. Not every major will be listed, but each general category is listed. Please include counts for unlisted fields in their general category. For example, graduates in German, French, etc., should be counted together under "Foreign Language."

   - **Note**: If a student is majoring in two fields, please select only one to report, even if the decision is arbitrary.

4. Include in Bachelors and Masters columns only students completing licensure requirements for the first time.

   - Graduates with experience as fully certified educators who are completing a new kind of certification should be separately reported in the appropriate column. These educators do not need to be included in follow-up counts.

5. Special instructions for elementary and secondary graduates

a) Include in Elementary persons being recommended for teaching in regular elementary school classrooms. If graduates have completed programs which may lead to assignment at either elementary or secondary levels, include in elementary those who have given more attention to elementary teaching or those whom the institution expects would be more successful in elementary teaching.

b) Include in Secondary persons completing preparation leading to junior high school or high school assignment in the subject listed. If graduates have completed programs which may lead to assignment at either elementary or secondary levels, include in secondary those who have given more attention to secondary teaching or those whom the institution expects would be more successful in secondary teaching.

c) Do not include in Elementary or Secondary counts graduates who have been prepared to work with special needs children in either Special Education or Communicative Disorders assignments.

6. If 1-year follow-up data are available, please include it in Part 1 where requested. If 3-year follow-up data are available, please include it as well. If 3-year follow-up data are not available, please include a list of names and most recent contact information, if available, of graduates who were not employed by 1-year follow-up, so that we may attempt to contact them.

Please return data by 20 November 2000 in the enclosed self-addressed envelope to

Daniel Robertson
Utah State University
College of Education
Bureau of Research Services
2800 Old Main Hill
Logan UT 84322-2800

Thank you in advance for your assistance. If you have any questions, please contact Daniel Robertson at 435/797-4506 or danr@coe.usu.edu.

Part 1-A: 1994-95 Program Graduates and 1-year Follow-up

1994-95 Academic Year

IMPORTANT: Are 3-year follow-up data available for this cohort? (Circle one): **Yes No**

If *Yes*, **please attach 3-year follow-up data in the format above or in a similar format** (make copies of this form if necessary)

If *No*, **please attach *names* and *last known contact information* for those who had *not entered Utah public school teaching within 1 year***

Major field of study	Number of graduates recommended for licensure for the first time				Total number of experienced teachers completing a new certification	1-year follow-up Data (for first-time licenses only)							
	Bachelors Degree		Masters Degree			Number Teaching in Utah within 1 year	Number who had not entered Utah public school teaching within 1 year, and reason why						
	Male	Female	Male	Female			Teaching out of State	Employed outside of teaching	Continuing formal study	Family/ Child Rearing	Seeking teaching position	Other	No information
Early Childhood Education													
Elementary Teaching													
Secondary Teaching (total)													
Music													
Art													
Other Fine Arts													
Foreign Language (all)													
Health, Movement, Fitness (all)													
Computer Science													
Other Information Technology													
English													
Reading													
English as a Second Language													
Other Language Arts													
History													
Other Social Studies													
Math													
Biological Science													
Chemistry													
Earth Science													
Integrated Science													
Physics													
Physical Science													
Other Science													
Gifted/Talented													
Other Secondary													
Spec Ed - Hearing Impairments													
Spec Ed - Mild/Moderate													
Spec Ed - Severe													
Spec Ed - Visual Impairments													
Spec Ed - Preschool Special Ed.													
Com Dis - Audiology													
Com Dis - Speech-lang. Pathology													
ATE - Agricultural Science													
ATE - Business Education													
ATE - Family and Consumer Sciences													
ATE - Health Science and Technology													
ATE - Information Technology													
ATE - Marketing Education													
ATE - Technology Education													
ATE - Trade Technical and Industrial													
ATE - Other													
Administrative/Supervisory (K-12)													
School Counselor													
School Psychologist													
School Social Worker													
Library Media													

Part 1-B: 1995-96 Program Graduates and 1-year Follow-up — 1995-96 Academic Year

IMPORTANT: Are 3-year follow-up data available for this cohort? (Circle one): **Yes** **No**

If ***Yes***, **please attach 3-year follow-up data in the format above or in a similar format** (make copies of this form if necessary)

If ***No***, **please attach *names* and *last known contact information* for those who had *not entered Utah public school teaching within 1 year***

Major field of study	Number of graduates recommended for licensure for the first time				Total number of experienced teachers completing a new certification	1-year follow-up Data (for first-time licenses only)								
	Bachelors Degree		Masters Degree			Number Teaching in Utah within 1 year	Number who had not entered Utah public school teaching within 1 year, and reason why							
	Male	Female	Male	Female			Teaching out of State	Employed outside of teaching	Continuing formal study	Family/ Child Rearing	Seeking teaching position	Other	No Information
Early Childhood Education													
Elementary Teaching													
Secondary Teaching (total)													
Music													
Art													
Other Fine Arts													
Foreign Language (all)													
Health, Movement, Fitness (all)													
Computer Science													
Other Information Technology													
English													
Reading													
English as a Second Language													
Other Language Arts													
History													
Other Social Studies													
Math													
Biological Science													
Chemistry													
Earth Science													
Integrated Science													
Physics													
Physical Science													
Other Science													
Gifted/Talented													
Other Secondary													
Spec Ed - Hearing Impairments													
Spec Ed - Mild/Moderate													
Spec Ed - Severe													
Spec Ed - Visual Impairments													
Spec Ed - Preschool Special Ed.													
Com Dis - Audiology													
Com Dis - Speech-lang. Pathology													
ATE - Agricultural Science													
ATE - Business Education													
ATE - Family and Consumer Sciences													
ATE - Health Science and Technology													
ATE - Information Technology													
ATE - Marketing Education													
ATE - Technology Education													
ATE - Trade Technical and Industrial													
ATE - Other													
Administrative/Supervisory (K-12)													
School Counselor													
School Psychologist													
School Social Worker													
Library Media													

Part 1-C: 1996-97 Program Graduates and 1-year Follow-up

IMPORTANT: Are 3-year follow-up data available for this cohort? (Circle one): **Yes No**

If ***Yes***, **please attach 3-year follow-up data in the format above or in a similar format** (make copies of this form if necessary)

If ***No***, **please attach *names* and *last known contact information* for those who had *not entered Utah public school teaching within 1 year***

Major field of study	Number of graduates recommended for licensure for the first time				Total number of experienced teachers completing a new certification	1-year follow-up Data (for first-time licenses only)								
	Bachelors Degree		Masters Degree			Number Teaching in Utah within 1 year	Number who had not entered Utah public school teaching within 1 year, and reason why							
	Male	Female	Male	Female			Teaching out of State	Employed outside of teaching	Continuing formal study	Family/ Child Rearing	Seeking teaching position	Other	No Information
Early Childhood Education													
Elementary Teaching													
Secondary Teaching (total)													
Music													
Art													
Other Fine Arts													
Foreign Language (all)													
Health, Movement, Fitness (all)													
Computer Science													
Other Information Technology													
English													
Reading													
English as a Second Language													
Other Language Arts													
History													
Other Social Studies													
Math													
Biological Science													
Chemistry													
Earth Science													
Integrated Science													
Physics													
Physical Science													
Other Science													
Gifted/Talented													
Other Secondary													
Spec Ed - Hearing Impairments													
Spec Ed - Mild/Moderate													
Spec Ed - Severe													
Spec Ed - Visual Impairments													
Spec Ed - Preschool Special Ed.													
Com Dis - Audiology													
Com Dis - Speech-lang. Pathology													
ATE - Agricultural Science													
ATE - Business Education													
ATE - Family and Consumer Sciences													
ATE - Health Science and Technology													
ATE - Information Technology													
ATE - Marketing Education													
ATE - Technology Education													
ATE - Trade Technical and Industrial													
ATE - Other													
Administrative/Supervisory (K-12)													
School Counselor													
School Psychologist													
School Social Worker													
Library Media													

Part 1-D: 1997-98 Program Graduates and 1-year Follow-up — 1997-98 Academic Year

Major field of study	Number of graduates recommended for licensure for the first time				Total number of experienced teachers completing a new certification	1-year follow-up Data (for first-time licenses only)							
	Bachelors Degree		Masters Degree			Number Teaching in Utah within 1 year	Number who had not entered Utah public school teaching within 1 year, and reason why						
	Male	Female	Male	Female			Teaching out of State	Employed outside of teaching	Continuing formal study	Family/ Child Rearing	Seeking teaching position	Other	No Information
Early Childhood Education													
Elementary Teaching													
Secondary Teaching (total)													
Music													
Art													
Other Fine Arts													
Foreign Language (all)													
Health, Movement, Fitness (all)													
Computer Science													
Other Information Technology													
English													
Reading													
English as a Second Language													
Other Language Arts													
History													
Other Social Studies													
Math													
Biological Science													
Chemistry													
Earth Science													
Integrated Science													
Physics													
Physical Science													
Other Science													
Gifted/Talented													
Other Secondary													
Spec Ed - Hearing Impairments													
Spec Ed - Mild/Moderate													
Spec Ed - Severe													
Spec Ed - Visual Impairments													
Spec Ed - Preschool Special Ed.													
Com Dis - Audiology													
Com Dis - Speech-lang. Pathology													
ATE - Agricultural Science													
ATE - Business Education													
ATE - Family and Consumer Sciences													
ATE - Health Science and Technology													
ATE - Information Technology													
ATE - Marketing Education													
ATE - Technology Education													
ATE - Trade Technical and Industrial													
ATE - Other													
Administrative/Supervisory (K-12)													
School Counselor													
School Psychologist													
School Social Worker													
Library Media													

Part 1-E: 1998-99 Program Graduates and 1-year Follow-up — 1998-99 Academic Year

Major field of study	Number of graduates recommended for licensure for the first time				Total number of experienced teachers completing a new certification	1-year follow-up Data (for first-time licenses only)								
						Number Teaching in Utah within 1 year	Number who had not entered Utah public school teaching within 1 year, and reason why							
	Bachelors Degree		Masters Degree				Teaching out of State	Employed outside of teaching	Continuing formal study	Family/ Child Rearing	Seeking teaching position	Other	No Information
	Male	Female	Male	Female										
Early Childhood Education														
Elementary Teaching														
Secondary Teaching (total)														
Music														
Art														
Other Fine Arts														
Foreign Language (all)														
Health, Movement, Fitness (all)														
Computer Science														
Other Information Technology														
English														
Reading														
English as a Second Language														
Other Language Arts														
History														
Other Social Studies														
Math														
Biological Science														
Chemistry														
Earth Science														
Integrated Science														
Physics														
Physical Science														
Other Science														
Gifted/Talented														
Other Secondary														
Spec Ed - Hearing Impairments														
Spec Ed - Mild/Moderate														
Spec Ed - Severe														
Spec Ed - Visual Impairments														
Spec Ed - Preschool Special Ed.														
Com Dis - Audiology														
Com Dis - Speech-lang. Pathology														
ATE - Agricultural Science														
ATE - Business Education														
ATE - Family and Consumer Sciences														
ATE - Health Science and Technology														
ATE - Information Technology														
ATE - Marketing Education														
ATE - Technology Education														
ATE - Trade Technical and Industrial														
ATE - Other														
Administrative/Supervisory (K-12)														
School Counselor														
School Psychologist														
School Social Worker														
Library Media														

Part 1-F: 1999-2000 Program Graduates

1999-2000 Academic Year

Major field of study	Number of graduates recommended for licensure for the first time			
	Bachelors Degree		Masters Degree	
	Male	Female	Male	Female
Early Childhood Education				
Elementary Teaching				
Secondary Teaching (total)				
Music				
Art				
Other Fine Arts				
Foreign Language (all)				
Health, Movement, Fitness (all)				
Computer Science				
Other Information Technology				
English				
Reading				
English as a Second Language				
Other Language Arts				
History				
Other Social Studies				
Math				
Biological Science				
Chemistry				
Earth Science				
Integrated Science				
Physics				
Physical Science				
Other Science				
Gifted/Talented				
Other Secondary				
Spec Ed - Hearing Impairments				
Spec Ed - Mild/Moderate				
Spec Ed - Severe				
Spec Ed - Visual Impairments				
Spec Ed - Preschool Special Ed.				
Com Dis - Audiology				
Com Dis - Speech-lang. Pathology				
ATE - Agricultural Science				
ATE - Business Education				
ATE - Family and Consumer Sciences				
ATE - Health Science and Technology				
ATE - Information Technology				
ATE - Marketing Education				
ATE - Technology Education				
ATE - Trade Technical and Industrial				
ATE - Other				
Administrative/Supervisory (K-12)				
School Counselor				
School Psychologist				
School Social Worker				
Library Media				

Part 2: Projected Program Graduates

Major field of study	Projected number of graduates in each major field of preparation (if available)			
	2001-2002	2002-2003	2003-2004	2004-2005
Early Childhood Education				
Elementary Teaching				
Secondary Teaching (total)				
Music				
Art				
Other Fine Arts				
Foreign Language (all)				
Health, Movement, Fitness (all)				
Computer Science				
Other Information Technology				
English				
Reading				
English as a Second Language				
Other Language Arts				
History				
Other Social Studies				
Math				
Biological Science				
Chemistry				
Earth Science				
Integrated Science				
Physics				
Physical Science				
Other Science				
Gifted/Talented				
Other Secondary				
Spec Ed - Hearing Impairments				
Spec Ed - Mild/Moderate				
Spec Ed - Severe				
Spec Ed - Visual Impairments				
Spec Ed - Preschool Special Ed.				
Com Dis - Audiology				
Com Dis - Speech-lang. Pathology				
ATE - Agricultural Science				
ATE - Business Education				
ATE - Family and Consumer Sciences				
ATE - Health Science and Technology				
ATE - Information Technology				
ATE - Marketing Education				
ATE - Technology Education				
ATE - Trade Technical and Industrial				
ATE - Other				
Administrative/Supervisory (K-12)				
School Counselor				
School Psychologist				
School Social Worker				
Library Media				

Appendix I. Materials Used in Survey of Nonteaching Graduates of Utah's Teacher Preparation Programs

This appendix contains materials used in the survey of recent graduates. Included in this appendix are the cover letter that accompanied the questionnaire, the items used in the questionnaire, and the follow-up postcard. The cover letter was originally duplicated on white Bureau of Research Services letterhead and was signed by Dr. Thorkildsen and myself. The questionnaire was originally prepared as a booklet measuring 5.5-inches by 8.5-inches and was duplicated on white paper.

March 28, 2001

One of the most pressing concerns facing Utah's public schools is the adequacy of the supply of new teachers. Half of new teachers graduating from Utah's colleges take jobs in Utah schools, but little is known about those who choose other career paths. For this reason, we are conducting research to find out more about how newly prepared teachers feel about the prospect of teaching in Utah.

You are among a small number of people who are being asked to share your feelings on this matter. Your name was selected randomly from the group of recent graduates of Utah's teacher preparation programs. Your help is voluntary, but because this is a sample survey, it is extremely important that each questionnaire is returned. Even if you have never taught in public schools, your participation is still essential to ensure that the results are complete and representative.

A brief questionnaire is enclosed in this packet. It includes questions about your feelings towards teaching as a career. Your answers, of course, will be completely confidential. There is no way that you can be identified from your returned questionnaire, and the results from this research will be reported in summary form only.

Please complete the enclosed questionnaire and return it within one week. A preaddressed postage-paid envelope is also enclosed for your convenience. The results of this research will be reported to administrators at the Utah State Office of Education and at Utah's colleges of education. Your input will be of great worth in helping to plan for the future of Utah's schools.

We would be happy to answer any questions you might have about this research. Please feel free to contact us at (435) 797-4506 or danr@coe.usu.edu.
We sincerely thank you for your assistance.

Ron Thorkildsen
Professor Emeritus
College of Education
Utah State University

Dan Robertson
Research Administrator
Bureau of Research Services
Utah State University

Teacher Supply and Demand in Utah
Survey of Utah Teacher Program Graduates
2001

INSTRUCTIONS FOR COMPLETING THIS QUESTIONNAIRE

Please answer each question by marking the appropriate box with ✗ or ✓, or by writing your answer in the boxes provided.

Adjacent to some questions you will see a ☞. This symbol appears next to special instructions that will direct you how to answer certain questions, or whether to skip certain questions.

If you are unsure about how to answer a question, please give the best answer you can and make a comment on the back cover. Your comments will be taken into account.

When you have completed the questionnaire, please return it to Utah State University within one week in the enclosed preaddressed, stamped envelope.

PLEASE RETURN YOUR QUESTIONNAIRE WITHIN ONE WEEK

Thank you for your participation in this study!

Your answers to this questionnaire will be kept strictly confidential. Results from this survey will be reported in summary or statistical form only, so that individuals cannot be identified.

This research is being done for the Utah State Office of Education by the College of Education at Utah State University. If you have any questions, please contact Daniel Robertson at Utah State University at 435-797-4506 or danr@coe.usu.edu.

Bureau of Research Services
College of Education
Utah State University

This is the start of the questionnaire

Section A: Educational history

A1. **In what area(s) did you originally certify or prepare to teach?** (Mark all that apply)

01☐ Elementary Teaching

02☐ Special Education (Classroom)

03☐ Communicative Disorders

04☐ School Counseling

05☐ Administration

16☐ Other:

_____

Secondary Teaching

06☐ Fine Arts

07☐ Foreign Language

08☐ Health, Movement, and Fitness

09☐ Information Technology

10☐ Language Arts

11☐ Social Studies

12☐ Math

13☐ Science

14☐ Support/Other

15☐ Applied Technology Education

Some sections of this questionnaire will not apply to you. *This question will direct you to the sections that you should answer. Please mark the best option and follow the directions.*

A2. **Which of the following options best describes your job search activities after graduation?** (Mark only one option)

1 ☐ I sought teaching jobs both in Utah and in other states — *If you marked this option, go to* ***Section C*** *on page 4*

2 ☐ I sought teaching jobs only in Utah — *If you marked this option, go to* ***Section C*** *on page 4*

3 ☐ I sought teaching jobs only in other states — *If you marked this option, go to* ***Section D*** *on page 5*

4 ☐ I did not seek a teaching job — *If you marked this option, go to* ***Section B*** *on page 3*

Section B: Questions for graduates who did not seek any teaching jobs

Before answering this question, please review the list below and select your answers from this list.

Write number in box

B1. **What is the main reason you did not seek a teaching job after graduation?** ☐

B2. If you had a second reason for not seeking a teaching job, please write it here: ☐

Possible reasons for not entering the teaching profession

1. Decided that pay in teaching was too low/ pay was better in other occupations
2. Lost interest in teaching/became interested in another occupation
3. Discouraged by student teaching
4. Decided to continue formal education
5. Decided not to work because of marriage, children, or other family reason.
6. Felt that teaching jobs in Utah were too hard to get
7. Felt that working conditions for teachers were poor
8. Other reason_____

Skip to Section E on page 6

Section C: Questions for graduates who sought Utah teaching jobs

C1. **Were you offered a teaching position in Utah?**

1 ☐ Yes

2 ☐ No

If you marked NO to this question, skip to Section E on page 6

If you marked YES, continue to question C2 below

C2. **Did you accept a teaching offer and work in Utah?**

1 ☐ Yes

2 ☐ No

If you marked YES to this question, skip to Section E on page 6

If you marked NO, continue to question C3 below

Before answering this question, please review the list below and select your answers from this list.

Write number in box

C3a. **What is the main reason you didn't accept the Utah teaching offer?** ☐

C3b. If you had a second reason, please write it here: ☐

Possible reasons for not accepting an offer to teach in Utah

1. Received a better offer for a teaching job outside of Utah
2. Decided to seek out-of-state job to be near hometown, family, etc.
3. Received a better offer for a non-teaching job
4. Offered pay was too low
5. Working conditions were poor at school where job was offered
6. Offered job was too far away
7. Decided not to work because of marriage, children, or other family reason.
8. Spouse obtained employment in another state
9. Wanted to move to a new area
10. Decided to pursue another occupation
11. Other reason_____

Skip to Section E on page 6

Section D: Questions for graduates who sought teaching jobs only in other states

Before answering this question, please review the list below and select your answers from this list.

Write number in box

D1a. **What is the main reason you didn't seek a teaching job in Utah?** ☐

D1b. If you had a second reason, please write it here: ☐

Possible reasons for seeking only out-of-state teaching jobs

1. Teacher pay in Utah is too low / pay is higher out of state
2. Working conditions for Utah teachers are poor / conditions are better out of state
3. Sought job near hometown, family, etc.
4. Wanted to move to a new area
5. Teaching jobs in Utah were hard to find
6. Spouse obtained employment in another state
7. Other reason_____

Continue to Section E on the next page

Section E: Your opinions

Before answering this question, please review the list below and select your answers from this list.

E. **In your opinion, what would be the most effective steps that schools might take to encourage new graduates to teach in Utah?**

Write number in box

E1. Most effective step: ☐

E2. Second most effective step: ☐

E3. Third most effective step: ☐

Possible steps schools might take to encourage new graduates to teach in Utah

1. Providing higher salaries and/or better fringe benefits
2. Reducing the paperwork burden on teachers
3. Dealing more effectively with student discipline and making schools safer
4. Giving teachers more authority in the school and in their own classrooms
5. Increasing standards for students' academic performance
6. Providing better resources and materials for classroom use
7. Decreasing class size
8. Giving special recognition and/or special assignments to excellent or outstanding teachers
9. Improving opportunities for professional advancement
10. Providing more support for new teachers (e.g., mentor teacher programs)
11. Increasing parent involvement in the schools
12. Reducing teaching workload
13. Providing merit pay or other pay incentives to teachers
14. Improving opportunities for professional development
15. Providing tuition reimbursement for coursework required for certification or career advancement
16. Revising health insurance program to include stress reduction seminars, counseling, and physical fitness options

Section F: Additional information

F1. **If you have never taught in Utah, would you consider seeking a teaching job in Utah in the future?**

1 ☐ Yes
2 ☐ No

F2. **Where did you receive your teaching degree?**

1 ☐ Brigham Young University
2 ☐ Southern Utah University
3 ☐ University of Utah
4 ☐ Utah State University
5 ☐ Utah Valley State College
6 ☐ Weber State University
7 ☐ Westminster College
8 ☐ From a college outside of Utah

F3. **What is your sex?**

1 ☐ Female
2 ☐ Male

This completes the questionnaire.

Thank you for assisting us in this important research.
Your time and effort are appreciated.

Please fold the questionnaire lengthwise and return it in the enclosed envelope to:

Utah State University
College of Education
Bureau of Research Services
2800 Old Main Hill
Logan, UT 84322-2800

Utah State UNIVERSITY

COLLEGE OF EDUCATION
Bureau of Research Services
2800 Old Main Hill
Logan UT 84322-2800

PRESORTED
FIRST CLASS MAIL
U.S. Postage Paid
Logan, Utah
Permit No. 1

April 6, 2001

Last week a questionnaire seeking your opinions about teaching in Utah was mailed to you. If you have already completed and returned it to us, please accept our sincere thanks. If not, please do so today. Because it has been sent to only a small but representative sample, it is extremely important that your input is included so that the results can be complete and representative.

If by some chance you did not receive the questionnaire, or it got misplaced, please call me at 435-797-4506 (if you leave a message, please leave your full name as it appeared on the envelope), or email me at danr@coe.usu.edu (with your full name as it appeared on the envelope), and I will get another in the mail to you today.
Thank you for your help,

Dan Robertson
Research Administrator

Appendix J. Materials Used in Survey of Former Utah Teachers

This appendix contains materials used in the survey of former teachers. Included in this appendix are the cover letter that accompanied the questionnaire, the items used in the questionnaire, and the follow-up postcard. The cover letter was originally duplicated on white Bureau of Research Services letterhead and was signed by Dr. Thorkildsen and myself. The questionnaire was originally prepared as a booklet measuring 5.5-inches by 8.5-inches and was duplicated on white paper.

March 28, 2001

The early career decisions of new Utah teachers can have a large effect on Utah's teaching pool. Almost a third of new teachers interrupt their careers during their first five years, but little is known about their decisions for doing so. For this reason, we are conducting research to find out more about how new teachers feel about teaching in Utah.

You are among a small number of people who are being asked to share your feelings on this matter. Your name was selected randomly from the group of new Utah teachers who stopped teaching at some point during the last five years. Your help is voluntary, but because this is a sample survey, it is extremely important that each questionnaire is returned. Even if you only taught for a short time, or if you have since returned to teaching, your participation is still essential to ensure that the results are complete and representative.

A brief questionnaire is enclosed in this packet. It includes questions relating to your experiences teaching in Utah. Your answers, of course, will be completely confidential. There is no way that you can be identified from your returned questionnaire, and the results from this research will be reported in summary form only.

Please complete the enclosed questionnaire and return it within one week. A preaddressed postage-paid envelope is also enclosed for your convenience. The results of this research will be reported to administrators at the Utah State Office of Education and at Utah's colleges of education. Your input will be of great worth in helping to plan for the future of Utah's schools.

We would be happy to answer any questions you might have about this research. Please feel free to contact us at (435) 797-4506 or danr@coe.usu.edu.
We sincerely thank you for your assistance.

Ron Thorkildsen
Professor Emeritus
College of Education
Utah State University

Dan Robertson
Research Administrator
Bureau of Research Services
Utah State University

Teacher Supply and Demand in Utah
Survey of Experienced Teachers
2001

INSTRUCTIONS FOR COMPLETING THIS QUESTIONNAIRE

Please answer each question by marking the appropriate box with × or ✓, or by writing your answer in the boxes provided.

Adjacent to some questions you will see a ☞. This symbol appears next to special instructions that will direct you how to answer certain questions, or whether to skip certain questions.

If you are unsure about how to answer a question, please give the best answer you can and make a comment on the back cover. Your comments will be taken into account.

When you have completed the questionnaire, please return it to Utah State University within one week in the enclosed preaddressed, stamped envelope.

PLEASE RETURN YOUR QUESTIONNAIRE WITHIN ONE WEEK

Thank you for your participation in this study!

Your answers to this questionnaire will be kept strictly confidential. Results from this survey will be reported in summary or statistical form only, so that individuals cannot be identified.

This research is being done for the Utah State Office of Education by the College of Education at Utah State University. If you have any questions about this research, please contact Daniel Robertson at Utah State University at 435-797-4506 or danr@coe.usu.edu.

Bureau of Research Services
College of Education
Utah State University

This is the start of the questionnaire

Section A: Your Utah employment history

1a. **During your first Utah teaching job, what primary subject area(s) did you teach?** (Mark all that apply)

01 ☐ Elementary Teaching

02 ☐ Special Education (Classroom)

03 ☐ Communicative Disorders

04 ☐ School Counseling

05 ☐ Administration

16 ☐ Other:

_____

Secondary Teaching

06 ☐ Fine Arts

07 ☐ Foreign Language

08 ☐ Health, Movement, and Fitness

09 ☐ Information Technology

10 ☐ Language Arts

11 ☐ Social Studies

12 ☐ Math

13 ☐ Science

14 ☐ Support/Other

15 ☐ Applied Technology Education

1b. **In what school district was your first Utah teaching job?**

☐

Please write name of district in box

2. **Approximately how long did you teach before leaving? (do not count absences of six months or less or transfers to another district)**

Please write the number of school years that you taught before terminating. If you left prior to the end of a full school year, please write the number of months that you taught during the year that you left.

☐ Number of full school years

☐ Number of months during year that you left

Section A: Your Utah employment history (continued)

3a. **Since leaving your first teaching job, have you returned to teaching in Utah?** (Mark one)

1 ☐ Yes
2 ☐ No


If you marked YES to this question, continue to question 3b below
If you marked NO, skip to question 3c below

3b. **Approximately how much time passed between leaving your first teaching job and returning to teaching?**

☐ ☐
Years Months

Please now skip to question 4a on the next page

3c. **If you have not returned to teaching in Utah, do you plan to return to teaching in Utah in the future?** (Mark one)

0 ☐ Undecided
1 ☐ Yes
2 ☐ No


If you marked NO to this question, skip to question 4a on the next page
If you marked YES or UNDECIDED, continue to question 3d below

3d. **How soon might you return to teaching in Utah?** (Mark one)

1 ☐ Later this school year
2 ☐ Next year
3 ☐ Within five years
4 ☐ More than five years from now
5 ☐ Undecided

Section B: Your opinions

Before answering this question, please review the list below and select your answer from this list.

Write number in box

4a. **What was your main reason for leaving your first teaching job?** ☐

4b. If you had a second reason for leaving teaching, please write it here: ☐

4c. If you had a third reason for leaving teaching, please write it here: ☐

Possible reasons for leaving the teaching profession

1. Family or personal move
2. Pregnancy/child rearing
3. Dissatisfied with teaching as a career
4. To pursue another career
5. For better salary or benefits
6. Health
7. School staffing action (e.g., reduction-in-force, lay-off, school closing, school reorganization, reassignment, or other involuntary termination)
8. To take courses to improve career opportunities in the field of education
9. To take courses to improve career opportunities outside of the field of education
10. To take a sabbatical or other break from teaching
11. To retire
12. Other family or personal reason

4d. **Did you mark 3 (dissatisfaction) as a reason for leaving teaching?**

1 ☐ Yes

2 ☐ No

If you marked NO to this question, question 5 does not apply to you. Please skip to question 6 on page six.

If you marked YES, please continue to question 5a on the next page

Section B: Your opinions (continued)

Before answering this question, please review the list below and select your answer from this list.

Write number in box

5a. **What was your main area of dissatisfaction with teaching?** ☐

5b. If you had a second area of dissatisfaction, please write it here: ☐

5c. If you had a third area of dissatisfaction, please write it here: ☐

Possible areas of dissatisfaction with teaching career

1. Poor salary
2. Class sizes too large
3. Lack of resources and material/equipment for your classroom
4. Inadequate support from administration
5. Intrusions on teaching time (i.e., excessive paperwork, not enough time working directly with students, etc.)
6. Lack of control over own classroom
7. Lack of influence over school policies and practices
8. Inadequate time to prepare lesson/teaching plans
9. Poor student motivation to learn
10. Student discipline problems
11. Lack of recognition and support from administration
12. Poor opportunity for professional advancement

Section B: Your opinions (continued)

Before answering this question, please review the list below and select your answers from this list.

6. **In your opinion, what would be the most effective steps that Utah schools might take to encourage new teachers to remain in teaching?**

Write number in box

a. Most effective step: ☐

b. Second most effective step: ☐

c. Third most effective step: ☐

Possible steps Utah schools might take to encourage new teachers to remain in teaching

1. Providing higher salaries and/or better fringe benefits
2. Reducing the paperwork burden on teachers
3. Dealing more effectively with student discipline and making schools safer
4. Giving teachers more authority in the school and in their own classrooms
5. Increasing standards for students' academic performance
6. Providing better resources and materials for classroom use
7. Decreasing class size
8. Giving special recognition and/or special assignments to excellent or outstanding teachers
9. Improving opportunities for professional advancement
10. Providing more support for new teachers (e.g., mentor teacher programs)
11. Increasing parent involvement in the schools
12. Reducing teaching workload
13. Providing merit pay or other pay incentives to teachers
14. Improving opportunities for professional development
15. Providing tuition reimbursement for coursework required for certification or career advancement
16. Revising health insurance program to include stress reduction seminars, counseling, and physical fitness options

Section C: Additional information

7. **Where did you receive your first teaching degree?**

1 ☐ Brigham Young University
2 ☐ Southern Utah University
3 ☐ University of Utah
4 ☐ Utah State University
5 ☐ Utah Valley State College
6 ☐ Weber State University
7 ☐ Westminster College
8 ☐ From a college outside of Utah

8. **What is your sex?**

1 ☐ Female
2 ☐ Male

This completes the questionnaire.

Thank you for assisting us in this important research.
Your time and effort are appreciated.

Please fold the questionnaire lengthwise and return it in the enclosed envelope to:

Utah State University
College of Education
Bureau of Research Services
2800 Old Main Hill
Logan, UT 84322-2800

Utah State UNIVERSITY

COLLEGE OF EDUCATION
Bureau of Research Services
2800 Old Main Hill
Logan UT 84322-2800

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Logan, Utah
Permit No. 1

April 6, 2001

Last week a questionnaire seeking your opinions about teaching in Utah was mailed to you. If you have already completed and returned it to us, please accept our sincere thanks. If not, please do so today. Because it has been sent to only a small but representative sample, it is extremely important that your input is included so that the results can be complete and representative.

If by some chance you did not receive the questionnaire, or it got misplaced, please call me at 435-797-4506 (if you leave a message, please leave your full name as it appeared on the envelope), or email me at danr@coe.usu.edu (with your full name as it appeared on the envelope), and I will get another in the mail to you today.
Thank you for your help,

Dan Robertson
Research Administrator

CURRICULUM VITAE

Daniel J. Robertson
119 Penhurst Pl
Logan UT 84341

EDUCATION

Utah State University, Logan, Utah.
Ph.D. in Education, 2002.
Interdepartmental Program in Education (specialization in Research and Evaluation).

M.S. in Instructional Technology, 1996.
Specialization in instructional design and development.

Brigham Young University, Provo, Utah.
B.A. in Philosophy with concurrent major in Psychology, 1994.

PROFESSIONAL EXPERIENCE

Spectrum Consulting, LLC, North Logan, Utah.
Senior Research Associate, 8/01 – Present.

Independent Consultant, Logan, Utah. 1996 – Present.

Utah State University Research Foundation. North Logan, Utah.
Evaluation and Data Specialist, 2/99 – 8/01.

Utah State University, Logan, Utah.
Instructor (Introductory Statistical Methods), Department of Psychology, 5/99 – 5/01.
Graduate Research/Teaching Assistant, College of Education, 2/96 – 2/99.
Assistant Director, Educational Resources and Technology Center, 10/94 – 2/96.

Brigham Young University, Provo, Utah.
Research Assistant, Missionary Training Center, 4/94 – 8/94.

AWARDS AND HONORS

1997-98 Utah State University Presidential Fellowship.

Outstanding Graduate, 1997, Department of Instructional Technology, Utah State University.

1996 Memorial Scholarship, Association for Educational Communications and Technology.

Psi Chi (The National Honor Society in Psychology), Brigham Young University, April 1993.

PROPOSAL AND FUNDING SUMMARY

Contract for Study of Educator Supply and Demand in Utah, Utah State Office of Education. (State of Utah Contract # 016227). $22,280.

RECENT CONSULTATIONS

HOPE Publications, Inc., North Logan, Utah. 10/01 – Present. Statistical analysis and research design.

Research group within the Department of Special Education, Utah State University. 8/01 – Present. Statistical analysis and research design.

SKI-HI Institute, Utah State University. 11/00 – Present. Statistical analysis and evaluation.

Research group within the Department of Human Development and Family Studies, Penn State Altoona. 1/01 – 7/01. Statistical analysis and research design.

Department of Instructional Technology, Utah State University. 11/99 – 1/00. Statistical analysis and evaluation.

Research group within the Department of Special Education, Utah State University. 7/99 – 10/99. Statistical analysis and research design.

Research design and statistical analysis assistance to graduate students conducting and reporting thesis and dissertation research (four doctoral dissertations, two masters theses).

REFERRED JOURNAL ARTICLES

Gibbons, A., Robertson, D. J., Duffin, J, & Thompson, B. (In Press). *Effects of Administering Feedback Following Extended Problem Solving*. Journal of Educational Computing Research.

UNPUBLISHED RESEARCH/EVALUATION REPORTS

Robertson, D.J. & Thorkildsen, R. (2001, May). *Educator supply and demand in Utah: Final report to Utah State Board of Education*. Logan, Utah: Bureau of Research Services, Utah State University.

Robertson, D.J. & Thorkildsen, R. (2001, January). *Educator Supply and demand in Utah: Preliminary report to the Utah State Board of Education*. Logan, Utah: Bureau of Research Services, Utah State University.

Robertson, D. J., & Elwell, C. C. (2000, January). *Evaluation Report: Educational Technology Masters of Education Degree Program*. Report submitted to the Department of Instructional Technology, Utah State University.

Robertson, D. J. (1999, September). *A review of validated practices in safe schools programming*. Internal report. Logan, UT: Summit Research Laboratory, Utah State University Research Foundation.

Robertson, D. J. (1999, March). *1998 Annual Report on Safe and Drug-free Schools Program Effectiveness to the Utah State Office of Education.* Logan, UT: TRL-Monitoring, Utah State University Research Foundation.

Robertson, D. J. (1998, September). *A review of research reviews of the effects of arts education on academic outcomes*. Unpublished report to the Edith Bowen Laboratory School, Utah State University

Robertson, D. J. (1996, August). *A design guide to cognitive apprenticeship*. Department of Instructional Technology, Utah State University.

REFEREED PRESENTATIONS

Robertson, D. J. (2000, November). *Evaluating Web Sites using Web Server Log File Analysis*. Paper presented and distributed at the annual meeting of the American Evaluation Association, Waikiki, HI.

Elwell, C. C., & Robertson, D. J. (2000, November). *Building Evaluation Capacity Byte by Byte: More Computer-based and On-Line Resources for Evaluators*. Presidential Strand presentation at the annual meeting of the American Evaluation Association, Waikiki, HI.

Elwell, C. C., Lubke, M. L., & Robertson, D. J. (2000, November). *On-line Data Collection, Reporting, & Data-based Decision-making System for Safe Schools Violations*. Roundtable presentation at the annual meeting of the American Evaluation Association, Waikiki, HI.

Robertson, D. J., Elwell, C. C., & Lubke, M. L. (2000, February). *An internet-based data collection, analysis and reporting system*. Demonstration at 13th Annual Management Information Systems conference of the National Center for Education Statistics, Chandler, AZ.

Robertson, D. J., Lubke, M. L., Althouse, R. B., & Paskett, K. (1999, November). *Development and implementation of an Internet-based data collection, analysis and reporting system.* Poster presented at the annual meeting of the American Evaluation Association, Orlando, FL.

Gibbons, A. S., Duffin, J. R., Robertson, D. J., & Thompson, B. (1998, April). *Effects of administering feedback following extended problem solving.* Paper presented and distributed at the annual meeting of the American Educational Research Association, San Diego, CA.

Gibbons, A. S., Duffin, J. D., Robertson, D. J., & Thompson, B. (1997, October). *The effects of delayed feedback in computer-based instruction.* Paper presented and distributed at the meeting of the Rocky Mountain Educational Research Association, Jackson Hole, WY.

Gibbons, A. S., Robertson, D. J., & Cline, R. W. (1996, August). *Applying the theory of cognitive apprenticeship to distance education: Structural implications for instruction.* Paper presented and distributed at the 12th Annual Conference on Distance Teaching and Learning, Madison, WI.

OTHER PRESENTATIONS

Gibbons, A. S., Robertson, D. J., & Cline, R. W. (1996, March). *Applying the theory of cognitive apprenticeship.* Presentation made at the joint conference of the Utah Coalition for Educational Technology and the Utah Educational Library Media Association, Layton, UT.

TEACHING

University Courses Taught

Psychology 2800, "Introduction to Psychological Statistics," Summer Term 1999, Spring Semester 2000, Spring Semester 2001, Utah State University. Taught via distance education.

Instructional Technology 670, "Instructional Technology Programs: Technology for Teachers," Winter Quarter 1996, Utah State University.

Teaching Assistantships

College of Education Interdepartmental Doctoral Program Statistics Core, Education/Psychology 660 "Correlation and Regression" and Education/Psychology 661 "Inferential Statistics." Fall, Winter, and Summer Quarters, 1997-1998, Utah State University. Dr. Susan G. Friedman, Instructor.

Instructional Technology 618, "Instructional Simulations," Winter Quarter 1996, Utah State University. Dr. Andrew Gibbons, Instructor.

Instructional Technology 738, "Current Issues Seminar: Cognitive Apprenticeship in Distance Education," Fall Quarter 1995, Utah State University. Dr. Andrew Gibbons, Instructor.

Other

Instructor, Business Division, Bridgerland Applied Technology College, Logan, Utah, March 1998 – June 1999.

Guest Lecturer, Communicative Disorders 270 "Language, Hearing, and Speech Development," Fall and Spring Quarters 1996 – 1997, Utah State University, Dr. Carol Strong, Instructor.

Guest Lecturer, Instructional Technology 619 "Multimedia Video Graphics," Summer Quarter 1996, Utah State University, Dr. R. Kent Wood, Instructor.

OTHER

Member of American Educational Research Association since 1996.

Member of American Evaluation Association since 1997.

Member of American Psychological Association since 2002.