Proposal to Establish a Certificate Program in Demography

Executive Summary

This is a proposal to develop a new Demography Certificate program within the College of Social and Behavioral Science at the University of Utah. This proposed program will provide students with a new opportunity to study demographic principles and techniques with faculty conducting research in an interdisciplinary context. Demography certificate students would, as part of the certificate requirements, work with faculty mentors on specific demographic research projects to gain experience in applying their skills to real problems. Students earning this certificate will have acquired marketable skills necessary to conduct applied demographic analyses in a variety of employment settings.

Need for a Demography Certificate

Introduction

Demography is the statistical study of human populations and factors that affect their size, density, distribution, and growth. Demographers are widely employed by government agencies, private companies, and universities. They analyze populations for research and planning purposes. No formal program exists at the University of Utah that provides a coherent curriculum on the concepts and technical skills used in demography although there is a need for such a program.

We have assessed the general employment prospects to be very good for persons who successfully complete the Certificate program. Table 1 summarizes job opportunities for persons with training in demography and populations studies from the Utah State Department of Health
(DOH), a likely employer. This table is based on discussions with administrators at the DOH and data they provided. In Table 2, we show the primary websites that list employment options for persons with training in demography. These websites are primarily maintained by government agencies (e.g., U.S. Bureau of the Census) as well as professional organizations. Vacancies listed span both the private and government sectors. Again, there are a wide range of job prospects.

Interdisciplinary Training in Demography

Demography addresses issues that cover an important constellation of social, economic, and biological forces affecting the structure and dynamics of human populations. Primary among these are marriage, fertility, migration, morbidity and mortality, forces that affect central aspects of society including housing, education, health care, and business. These elements of population change are fundamental to principles taught in numerous degree programs at the University of Utah including economics, geography, sociology, anthropology, epidemiology, business, family and consumer studies, public health, urban planning, and history. Students in these distinct degree programs are generally exposed to only some facets of demography, and often not in a systematic fashion. A certificate program in demography would therefore provide a coherent curriculum and training to students in a wide variety of disciplines regarding a subject that is fundamental to their field of study.
Preparation for Advanced Study

Masters-level students seeking advanced degrees may benefit from this proposed certificate because it may better prepare them (and indeed make their applications more competitive) for further study in a wide range of disciplines. Some students may become interested in advanced study of demography per se after having completed the certificate.

Skills Enhancement and Career Development

Employed individuals may be applying demographic tools and concepts as part of their on-going work but could benefit from formal course work that offers a systematic treatment of demography. Examples of these individuals are planners in state and local government, analysts in health care and housing industries, and persons engaged in market analysis. A good example of persons who may benefit from a Demography Certificate are staff members and users of the Utah State Data Center (SDC) program. The Utah SDC program, housed within the Governor's Office of Planning & Budget (GOPB), provides technical assistance in accessing and using Census data for research, administration, planning, and decision-making by the government, the business community, and university researchers. The numerous users of the SDC have often expressed a serious interest in a curriculum addressing demographic methods. Indeed, the GOPB has expressed an interest in hosting demography interns as part of the certificate training requirements.

Educational and Training Objectives

The Demography Certificate would be a new, interdisciplinary program that would teach students the principles and methods of demography that are useful in decision making and
addressing population problems in both public and private settings. Students successfully completing the certificate requirements would be qualified to conduct applied demographic analyses in corporations, research organizations, and government agencies. The Demography Certificate program would also prepare students seeking advanced study in demography and closely associated disciplines. Successful students will acquire the skills necessary to use demographic data to identify and analyze important population problems and their consequences.

Course work will emphasize the fundamentals of demographic techniques, statistics, and research methods as well as issues and debates revolving around current population issues (e.g., contraception, population growth, international migration). Computer, statistical, and data management skills will be an integral part of the Demography Certificate program.

The principles and techniques of demography that will be covered include: measurement of population size, its geographic distribution and age-sex-race structure; measurement and analysis of population growth, fertility and mortality; construction and demographic application of life tables; internal and international migration; population forecasting (for small-areas, states and nations) and for applied problems (housing, schools, and health); and evaluation of data quality.

The Population Research and Teaching Laboratory (described below) will provide students resources to obtain hands-on computing training and experience in demographic analysis and data management. Students will learn how to use a variety of demographic and socio-economic data from sources such as the Bureau of the Census and federal and state surveys that are used for research and business and government planning. Training in spatial aspects of demography and the uses of geographic information systems (GIS) as tools in research and decision-making will also be provided.
As part of the Demography Certificate program, each student will work with a faculty member on an applied research problem as part of an internship with a public or private agency or on a demographic research project. This feature of the certificate would serve to facilitate faculty research while also providing students with a real-life demographic research experience.

The proposed constellation of courses and research activities will help students prepare for a number of applied positions in various industries including hospitals and HMOs, local and state planning agencies, marketing firms, and insurance/actuarial companies.

Impact on Existing Programs

The University of Utah does not offer any program in demography at the graduate or undergraduate level and, accordingly, the proposed Demography Certificate program would not duplicate nor compete with any existing certificate or degree programs on campus. Demographic principles and methods are topics that arise in a number of disciplines. Given that no formal systematic course work exists in demography on campus, the option for students to obtain training in demography would enhance their educational experience.

At Utah State University, population studies is part of the Department of Sociology, Anthropology, and Social Work. Research on population is conducted under the aegis of the Population Research Laboratory, but does not represent an area of major specialization. As of Autumn 2001, there are two faculty members in the Population Research Laboratory emphasizing demographic research. These faculty members do not represent the multi-disciplinary structure of our proposed program. We also note that they lack the inclusion of GIS systems that will be an important element to the proposed certificate program.
Curriculum (15 credits)

Proposed curriculum is shown below. Courses will be offered at times and days that will make them accessible to students already on campus as well as those in the community.

Multivariate Statistics is a prerequisite; this prerequisite can be satisfied by courses such as:

- Graduate Multivariate Statistics (FCS 5110/6110)
- Advanced Statistics I (Soc 7120)
- Applied Econometrics (ECON 6630)

Core Classes (9 Credits)

Demographic Concepts and Methods

- Urban and Regional Planning Analysis (URPL 5020) 3 credits
- Demographic Methods (new and approved FCS 5120/6120) 3 credits

Database Management

- Database Theory and Design (ACCT 6420) 3 credits

Independent Project or Internship (3 Credits)

- Independent Research Study (FCS 5950)

Special Topics in Demography (select 1 for 3 credits)

Family/Fertility
- Divorce and Remarriage (FCS 5280)
- Families and Social Policy (FCS 5200/6200)
- Maternal and Child Health (DFPM 6958)

Morbidity/Mortality
- Families, Consumers, and Health (focus on morbidity and mortality) (FCS 5430)

Population Change (SOC 5510/6510)
- Research for Consumer and Community Needs (FCS 5700)
- Methods in GIS (GEOGR 5140)
- Economic Demography
- Discrimination in Labor Markets (Econ 5140)
- Poverty and Inequality (Econ 5180)
- Health Economics (Econ 5190)
- Environmental and Natural Resource (Econ 5250)
- Development (Econ 5530)
Details of Topics Covered in Core Courses

Topics Covered in URPL 5020 Urban and Regional Planning Analysis

Planning and Models
  Measures of Rates of Change of a Series
  Matrix Methods & Regression
  Introductory Demographics
  Cohort Component Models
  Introductory Mortality
  Introductory Fertility
  Introductory Migration
  Measures of Concentration
  Data Sources
  Economic Base Projections
  Input-Output Models
  Gravity Models

Topics Covered in FCS 5120 Demographic Methods

  Basic Concepts and Measures
  Age-Specific Rates and Probabilities
  The Life Table and Single Decrement Processes
  Multiple Decrement Processes
  Fertility and Reproduction
  Population Projections
  The Stable Population Model
  Demographic Relations in Non-stable Populations
  Modelling Age Patterns of Vital Events
  Methods for Evaluating Data Quality
  Indirect Estimation Methods

Topics Covered in ACCTG 6420 Database Theory and Design

  Overview of Database Design Process
  Data Flow Diagram (DFD)
  Conceptual Database Design: Extended Entity-Relationship Data Model
  Transformation of Extended E-R to Relational Data Model
  Normalization Theory
  Physical Database Design: Process, File Organization, and Index Structure
  SQL
  Concurrency Control
  Recovery Management
  Distributed Databases
  Data Warehousing/Mining
Assessment

The Demography Certificate would provide students with training in the principles and methods of demography used to address and analyze population problems in public and private settings. Course work will emphasize the fundamentals of demographic techniques and associated data management of population data. The core courses (URPL 5020, FCS 5120) cover the principles and methods of analyzing core population and demographic problems such as fertility, mortality, migration, marriage, and population growth. These courses also examine the core methods used by demographers to examine these population dimensions. Both courses will use the Population Research and Teaching Laboratory as a core resource. The additional core course (ACCTG 6420) provides students a formal treatment of database management that is needed to manipulate, store, query and merge diverse and complicated sets of data used by demographers. Overall, these core courses give the student the conceptual, statistical, and data management skills needed to perform demographic analysis. The elective courses expose students to specific content material in a more in-depth manner that consider specific population issues. The final project requires the student to work with a faculty member affiliated with the Population Studies Group on a problem that requires the application of the material covered in the course work. This project may take the form of working on a demographic project on site where the student is employed.

Population Research and Teaching Laboratory

A central component of the Demography Certificate program would be course work on statistical computing and management of population data. This component requires significant computing resources for the storage, management and processing of population datasets used for
instruction and research. CSBS possesses a computing infrastructure that provides support services for statistical instruction and research activities throughout the college. The core of this infrastructure is established by two enterprise class Sun servers, one acting as a high performance data server, and the other providing raw computational power for advanced research applications.

These servers are a shared investment between CSBS and the DIGIT (Digitally Integrated Geographic Information Technologies) Laboratory in the Department of Geography. The DIGIT Lab provides research services, data processing and educational support for applied geographic information analysis, and has become expert in the management of complicated and large geographic databases. The combination of DIGIT=s data management expertise and CSBS=s professional computer support staff makes these servers an ideal physical home for the Population Research and Teaching Laboratory. Additionally, CSBS operates 6 student lab facilities with approximately 150 workstations with direct access to the resources of the core servers. Workstations in these lab facilities and the computational server have the software necessary to conduct state-of-the-art statistical analyses of population datasets. By leveraging the combined experience and investment of CSBS and the DIGIT Lab, server capacities could be extended to provide data storage and computation services to the Demography Certificate Program with nominal costs.
Current Faculty Members in the University of Utah Populations Studies Group

Economics
Gunseli Berik
Tom Maloney
Norm Waitzman

Family and Consumer Studies
Jessie Fan
Lori Kowaleski-Jones
Ken Smith
Sonia Salari
Nick Wolfinger
Cathleen Zick

Geography
Tom Kontuly
Harvey Miller
Pam Perlich

Sociology
Lee Bean
Michael Timberlake

Medicine
Marlene Egger
Geraldine Mineau (Huntsman Cancer Institute)
Joe Stanford

Business
Paul Hu

Coordinator
Professor Ken R. Smith, Department of Family and Consumer Studies, will direct the Demography Certificate Program. (see attached CV)

Advisory Committee

An advisory committee will be formed with representatives from sectors that the program is designed to serve. We have identified two excellent individuals who have agreed to serve on this committee, Dr. Barry Nangle, Director of Vital Records and Statistics, Utah Department of
Health, and Dr. Neil Ashdown, Director of Governor’s Office of Planning and Budget. We will also recruit a third member who will represent the private sector.

Costs

The start up costs of the Demography Certificate Program have been funded by the Senior Vice President for Academic Affairs through the College of Social and Behavioral Science. This includes the supporting the Director of the certificate program for start-up time and the development of a new course that will serve as a core class, consultants from other institutions, a research assistant, development of web site, and funds to develop the Population Research and Teaching Laboratory.

All classes are offered as regular courses and will be taught as part of participating faculty’s normal teaching duties. The Director will need to be released from teaching one course per year (approximately $5,500/yr to compensate the Director’s home department) to promote and manage the program and to recruit and advise students. Given that seed funds have already been secured to initiate this certificate program, they will be used to support a single course release per year for the Director for the first three years of the Certificate program.
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<th>TITLE</th>
<th># INCUMBENTS</th>
<th>SKILLS</th>
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<td>Research Analyst I</td>
<td>7</td>
<td>- Use logic to analyze or identify underlying principles or facts assoc. with info or data to draw conclusions.</td>
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<tr>
<td>Research Analyst II</td>
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<td>- Evaluate information against a set of standards,</td>
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<td>Research Analyst III</td>
<td>2</td>
<td>- Perform statistical data analysis,</td>
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<td>Research Analyst IV</td>
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<td>- Find, gather and collect information or data.</td>
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<td>Research Consultant I</td>
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<td>- Perform research using the internet and other computer-related sources.</td>
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<tr>
<td>Research Consultant II</td>
<td>9</td>
<td>- Communicate info and ideas clearly and concisely in writing; read and understand info presented in writing.</td>
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<tr>
<td>Epidemiologist I</td>
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<td>- Evaluate information against a set of standards.</td>
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<td>Epidemiologist II</td>
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<td>Information Analyst I</td>
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<td>- Use logic to analyze or identify underlying principles or facts assoc. with info or data to draw conclusions.</td>
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<td>Information Analyst II</td>
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<td>- Read, interpret and apply laws, rules, regulations, policies and/or procedures</td>
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<td>IT Programmer Analyst I</td>
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<td>- Design and analyze computer systems (i.e., hardware)</td>
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<td>IT Programmer Analyst II</td>
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<td>- Design and maintain a computer database,</td>
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<td>198</td>
<td>- Coordinate computer systems and application design.</td>
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<td>Table 2</td>
<td>Websites for Demography Employment</td>
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<td>Census</td>
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<td>Advantage of starting out as an intern</td>
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<td>American Public Health Association</td>
<td><a href="http://www.apha.org/">http://www.apha.org/</a></td>
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<td>Utah State Government jobs</td>
<td><a href="http://www.dhram.state.ut.us/employment/bulletin.htm">http://www.dhram.state.ut.us/employment/bulletin.htm</a></td>
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<td>OPM (Office of Personnel Management)</td>
<td><a href="http://www.usajobs.opm.gov/">http://www.usajobs.opm.gov/</a></td>
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