The presentation will focus on predictive models designed by the DLIR Research and Statistics Office (R&S) for three of Hawaii's most essential industries: Health Care, Agriculture and Energy. In this workshop, the researcher will share the data R&S collects about jobs, employment, industries, and occupations, and the methods used to best predict the future of Hawaii's labor market and the economy as a whole.

The predictive models for these three industries served as a case study to better understand the long and complicated process of collecting and analyzing data, as well as the importance of using data from a variety of sources. You will learn about the factors that have an effect on the number of jobs in these industries. The presentation could be useful in providing guidance to students and their teachers or counselors on how to make more informed career choices.
Presentation Focus Areas

- Predictive Models
- 3 Industries: A Project for UHCC System
- Data collected by R&S (jobs, employment, industries, occupations)
- Factors
- Guidance to students

What are the methods used to project employment levels?

- Time series employment data
- Detecting patterns
- Events with a significant effect on employment levels
- Changes in industry coding
What are time series employment data?

- Employment levels by Industry per month
- Business establishments classified by industry using NAICS codes
- NAICS (North American Industry Classification System) is used to collect and analyze statistical data by industry
- Business units are classified by the Research & Statistics Office (Labor Force Research)

### NAICS codes (2-digit level)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Agriculture, Forestry, Fishing and Hunting</td>
</tr>
<tr>
<td>21</td>
<td>Mining, Quarrying, and Oil and Gas Extraction</td>
</tr>
<tr>
<td>31</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>41</td>
<td>Utilities</td>
</tr>
<tr>
<td>51</td>
<td>Construction</td>
</tr>
<tr>
<td>61</td>
<td>Wholesale Trade</td>
</tr>
<tr>
<td>44</td>
<td>Retail Trade</td>
</tr>
<tr>
<td>48</td>
<td>Transportation and Warehousing</td>
</tr>
<tr>
<td>52</td>
<td>Information</td>
</tr>
<tr>
<td>53</td>
<td>Finance and Insurance</td>
</tr>
<tr>
<td>54</td>
<td>Real Estate and Rental and Leasing</td>
</tr>
<tr>
<td>55</td>
<td>Professional, Scientific, and Technical Services</td>
</tr>
<tr>
<td>56</td>
<td>Management of Companies and Enterprises</td>
</tr>
<tr>
<td>61</td>
<td>Administrative and Support Services and Other Services (except Public Administration)</td>
</tr>
<tr>
<td>62</td>
<td>Health Care and Social Assistance</td>
</tr>
<tr>
<td>71</td>
<td>Arts, Entertainment, and Recreation</td>
</tr>
<tr>
<td>72</td>
<td>Accommodation and Food Services</td>
</tr>
<tr>
<td>81</td>
<td>Public Administration</td>
</tr>
</tbody>
</table>
NAICS codes subsectors

- Health Care (62)
- Ambulatory Services (621)
  - Physicians (6211)
  - Dentists (6212)
- Hospitals (622)

Factors that affect employment

- BLS List of variables
- Economic climate
- Job growth in related industries
- Government initiatives
- New factors not reflected in data
Occupational Projections

- Occupations are categorized by using the Standard Occupational Classification System (SOC)
- Classification is done by the Research & Statistics Office (Occupational Employment Statistics)

SOC Major Groups

2010 SOC Major Groups
Each occupation in the SOC is placed within one of these 23 major groups:

11:0000 Management Occupations
12:0000 Business and Financial Operations Occupations
13:0000 Computer and Mathematical Occupations
17:0000 Architecture and Engineering Occupations
18:0000 Life, Physical, and Social Science Occupations
21:0000 Community and Social Services Occupations
22:0000 Legal Occupations
23:0000 Education, Training, and Library Occupations
27:0000 Arts, Design, Entertainment, Sports, and Media Occupations
29:0000 Healthcare Practitioners and Technical Occupations
31:0000 Healthcare Support Occupations
32:0000 Protective Service Occupations
33:0000 Food Preparation and Serving Related Occupations
37:0000 Building and Grounds Cleaning and Maintenance Occupations
39:0000 Personal Care and Service Occupations
41:0000 Sales and Related Occupations
42:0000 Office and Administrative Support Occupations
43:0000 Farming, Fishing, and Forestry Occupations
47:0000 Construction and Extraction Occupations
49:0000 Installation, Maintenance, and Repair Occupations
51:0000 Production Occupations
52:0000 Transportation and Material Moving Occupations
53:0000 Military Specific Occupations
Each NAICS subsector has workers in various occupation groups

By finding the subsector’s staffing pattern (the proportion of workers by occupation), occupational projections can be made

SOC Subcategories

11-0000 Management Occupations

11-1060 Top Executives
  11-1061 Chief Executives
  11-1069 General and Operations Managers

11-1120 Financial and Insurance Managers
  11-1121 General and Operations Managers

11-1130 Legislative

11-2000 Advertising, Marketing, Promotions, Public Relations, and Sales Managers
  11-2060 Advertising and Promotions Managers
    11-2061 Advertising and Promotions Managers
    11-2062 Marketing Managers
    11-2063 Sales Managers

11-3000 Public Utilities and Federal Managers
  11-3020 Public Utilities and Federal Managers

11-5000 Operations Specialties Managers
  11-5009 Administrative Services Managers
    11-5091 Administrative Services Managers
    11-5092 Computer and Information Systems Managers
    11-5093 Computer and Information Systems Managers
How to use NAICS and SOC codes to do Occupational Projections

BLS Guidelines are very useful in building credible predictive models
Methods that have been tested and tried in the past
Researching similar projects is also very important
Issues that require a novel approach

- *How to predict employment in sectors such as Energy that are not categorized by NAICS?*
- By finding subsectors that
  1. Play a prominent role in the industry,
  2. Have a large number of workers, and
  3. Are expected to play a greater role in the future

Three Industries: Health Care

- Steady growth over time makes predictions easier
  (Note: Ambulatory Health Care Services is a Health Care Subsector)
Three Industries: Agriculture

- Regression models tell us that the loss of jobs will continue in the future
- Is this true? Can we rely only on statistical data to predict the future?
- This is an example of an industry where more factors need to be taken into account

Three Industries: Energy

- What subsectors to examine?
- The Energy sector includes a variety of subsectors: Utilities, Natural resource extraction, Renewable energy etc.
- Mature subsectors may have many new jobs or replacements in absolute numbers
- Emerging subsectors may have new occupations
Three Industries: Energy

- The Renewable Energy sector has the most potential
- Obstacles need to be overcome for the sector’s further development
- There is much uncertainty regarding the future
- The need for renewable energy is urgent

Lack of Data

- New variables that we may not be aware of
- Qualitative variables that cannot be translated to numbers
- Lack of historical data
Changes in Staffing Patterns

- New occupations emerge
- Some jobs become obsolete due to technology
- Others are created by technology
- New skills may be required
- Work environment becomes more green

Challenges and Tools

- Lack of necessary data and changes in the labor market make projections difficult
- Support from BLS and a national network of research agencies provides expertise and a stronger understanding of the market
The importance of Labor data to educators and students

- Guidance in developing a curriculum
- Historical data that provide a clearer picture of job growth patterns overtime
- An understanding of industry development and job growth
- Where the jobs are and what is needed to perform them

Questions?

R&S website: www.hiwi.org

E-mail address: john.k.kontos@hawaii.gov

Phone: (808) 586-9097