

## **AAG 2013**

### **Title: Master's Degree Programs In Geographic Information Systems**

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#### **Slide 1**

- The fastest growing and largest part of graduate education in the U.S. is the Master's Degree.
- The Master's in GIS is a new phenomenon in graduate education in geography

#### **Slide 2**

- The most current Association of American Geographers Guide to Graduate Programs lists 25 Masters in GIS programs
- Our research has documented 40 programs in the United States
- Growth of the Masters in GIS programs is a recent phenomenon with most programs beginning in the last decade.
- The focus of our presentation is to present some preliminary findings on the similarities and differences of these programs.
- Second, we engage the distinction of professional and academic pedagogy in graduate education.

#### **Slide 3**

- We began our research by seeking to determine how many Masters in GIS programs there are in the U.S. Using a spreadsheet found in the AAG's Guide to Graduate Programs as a base we then populated new data fields related to GIS programs. This data was derived from an examination of program websites. Note that are focus was only on Master's degrees and not graduate certificates in GIS.

- The data fields created are listed on the slide and those that are highlighted are ones we will discuss later in this presentation.

#### **Slide 4**

- The next step in our research was in-depth interviews with 13 Masters of GIS Program Directors.
  - Both in person and phone interviews were conducted.
- The selection process by which we determined who to interview was based on the following criteria:
  - We first wanted to reflect the entire U.S. by selecting programs from different regions of the country.
  - Second, we wanted to include both PhD granting institutions and terminal masters institutions
  - Third, we wanted to represent online and in-person programs.
  - Fourth, we wanted to hear from both public and private universities.
- IRB for the interviews was done through University of Colorado, Boulder. To maintain our confidentiality people and programs interviewed are not referenced in this talk.

#### **Slide 5**

- Interview questions related to four different categories
- Overview question which sought to provide a basic understanding of the program
- Staffing questions focused on who taught in the program as well as the student body.
- A single business model question sought to query how the program was funded which has broader implication for how the program operates on a campus.

- The category of professional relations sought to probe the connections of the program to the professional GIS community.
- Finally, education and curriculum questions queried how programs dealt with so called “soft skill” and how “professional education” was carried out.

### **Slide 7**

- The Masters in GIS programs in the United States that we found include: San Diego, Long Beach, Redlands, USC, Northridge, San Francisco, Washington, Montana, Northern Arizona, ASU, UofA, Denver, American Sentinel, Minnesota, Northern Missouri, Missouri State, Dallas, Sam Houston, Wisconsin, Central Michigan, Michigan State, Eastern Michigan, Southern Illinois, Central Arkansas, Delta State, Northern Alabama, Florida State, North Carolina State, John Hopkins, George Mason, Salisbury, Maryland, Maryland – Baltimore County, Penn State, Clark, Salem State, Northeastern.
- Three Universities have more than one Masters in GIS program. At the University of Denver, there is both an online and in person Masters in GIS. At Clark University there is a Master in GIS and a Masters in GIS in Development and Environment. At George Mason University there is a Masters in Geographic and Cartographic Sciences and a Master in Geoinformatics ad Geospatial Intelligence.

### **Slide 8**

- Of the programs that were interviewed, only one existed in the 1990s. Of the 40 different programs, two came into existence just this year.

### **Slide 9**

- 32.5% of the Masters in GIS programs derived from a PhD granting department.
- 20% of the programs can be completed in one year.
- And, 32.5% of the programs are online. Of those that are online, 4 of them required an in person component to complete the degree.

### **Slide 10**

- Based on the programs that we interviewed, enrollment varied between 0 (where the program had not yet started at the time of the interview) and 180 (a well-established program). Enrollment reflected total students in the Master program at the time of the interview.
- Programs which have many students continuing to pursue their degree from previous years can inflate enrollment numbers. Note the median size of enrollment was about 26, which I believe to be closer to reality than the average for most programs.

### **Slide 11**

- A secondary source for comparing student body size comes from the National Center for Education Statistics. In 2010 50% of the top 20 programs granting Master's in Geography had GIS programs. If we take a closer look at the #1 degree granting university, Arizona State University, a clearer relationship to the Master in GIS becomes apparent.

### **Slide 12**

- At ASU in 2010, 84% of the Master's degrees in Geography came from their GIS program.

### **Slide 13**

- The cost for a student to obtain a Masters in GIS varied widely across the U.S.

- Data from all 40 programs show an average cost to be \$29,082, with the most expensive exceeding \$58,000. These cost estimates were based on current out of state tuition rates and program fees published on websites which are not always easy to locate or calculate.

#### **Slide 14**

- One way to differentiate amongst the program was to inquire whether they were integrated or disintegrated with respect to the department within which they were situated. Rather than a continuum these categories help to better understand the realities of how institutions and units fund and manage these programs. Integrated programs tend to share curriculum with their home unit and may require students to take similar courses as other graduate student in the unit like geographic thought. Disintegrated programs have their own courses and their own course formats.
- Students in a disintegrated program may be removed from other graduate students in the unit by being online or in night classes or separated by curriculum. As Masters in GIS programs are the dominant graduate program in some units and online programs cater to a new type of student, how we define “traditional student” may be a changing target.
- Finally, who teaches and advises in these programs vary between one another as well as with traditional masters in geography programs. How faculty are funded and the desire by some programs to include working professionals as adjuncts are common components of the Masters in GIS experience.

#### **Slide 15**

- Here are two different Program Director’s discussing how they have to think differently than a traditional masters in geography program
- “I think that one of our biggest challenges is that our institutions, and ours is not unique in this aspect, are not yet internally prepared to deal with non-traditional students, graduate faculty issues and how do you advise all these people.”
- “to teach in this program, I really think that the person should have professional experience”

## Slide 16

- Masters in GIS programs on average are found in units which have 16.6 regular faculty.
- However, within the Masters in GIS programs, the number of regular faculty teaching in the program averages around 5. Adjunct faculty play a major role in these programs. In one program adjuncts made up 80% of the instructors.

## Slide 17

- Academic and professional pedagogy are not a binary distinction or a continuum.
- Many of the program directors interviewed called their programs a “professional program.”
- Think in terms of how the education being imparted must be both academic and geared towards training those seeking work in business, government, and nonprofit.
- Professional pedagogy may be seen in a emphasis on the masters project over the master’s thesis.
- It can also be seen as the foundation of the Department of Labor’s Geospatial Technology Competency Model. Here, interpersonal skills, integrity, professionalism, initiative, dependability, and lifelong learning provide the foundation of the pyramid. Move up above the academic level and workplace competencies emphasize professional education once again.

## Slide 18

- The purpose of study is to document an exciting new trend in geography graduate education.
- The masters in GIS highlights the importance of professional education and the skills needed for student's to find employment in business, government, and nonprofit.
- This research contributes knowledge to those
  - seeking to establish a GIS master's program
  - to administrators needing to understand the diversity of programs
  - for students to better understand their choice in graduate education
- The masters in GIS challenges geography to think differently about the future of graduate education.