

Professional Publishing Trends of Recent GPS Doctoral Students

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Abstract—There are 2413 doctoral dissertations that refer to GPS, but only 197 that relate to both GPS and navigation. Of those, 100 have been published since 2000. These 100 authors are the subject of this paper. A search was performed for the authors of these 100 dissertations in the IEEE Xplore® database. This paper shows the statistical results of this research. It includes how many of these dissertation authors published from 1995 through 2005, what are their publishing rates, analysis by year, degree, gender, university, and country.

The significance of this work is that it quantifies for the first time, the significant academic activity related to GPS at the doctoral level and the scholarly publishing activity (or lack thereof) that those dissertation authors produce.

This study found 100 doctoral graduates from 2000 to 2005 with GPS and navigation in their abstract graduate at the rate of about 16 per year, 90% were Ph.D.s, from 40 schools, were 80% male, and were from eight countries.

It was found that 10% of all graduates published in IEEE peer reviewed journals, and 39% published in both IEEE peer reviewed journals and conferences. The 39 authors published 80 articles in journals and conferences – 95% of the papers were written by male doctoral graduates, 4% by female doctoral graduates, and 1% by doctoral graduates with names of unknown gender.

Dissertations have many characteristics such as integrity and objectivity, and “high-quality research should be characterized by publication” [1, p. 15]. This research study will provide an accurate description of doctoral publishing in the GPS navigation field because “unless researchers first generate an accurate description of an educational phenomenon as it exists, they lack a firm basis for explaining or changing it” [2, p. 374].

1. INTRODUCTION

Authors and the subjects of their writing, people or ideas, fact or fiction, become part of history. Written and verbal stories are the basis of knowledge that is passed from generation to generation, but only written knowledge has the longevity to consistently transcend multiple generations. The transfer of knowledge is the reason that authors publish their work. The ProQuest dissertation database indicates there is an average of over 50,000 doctoral dissertations produced every year for the last 10 years. Dissertations have many characteristics such as integrity and objectivity, and “high-

quality research should be characterized by publication” [1, p. 15] so it is available to the people who can use it. Although the research described in a dissertation should be publishable, there has been limited research focused on the scholarly publishing rates of doctoral students. Scholarly publishing is important, for doctoral students attempting to enter the academic profession, because “published research leads to promotions and tenure. Higher salaries come with publications ... [and] many good things happen to those who publish” [3, p. 116]. A National Science Foundation study of 10,000 doctorate holders identified the three major components of job satisfaction to be 1) salary, 2) relationship of job to graduate study, and 3) publication – however, the authors point out that publication is on the job satisfaction list only because it relates to salary [4]. It is important for doctoral students to publish because “early publication, including publication before the doctorate, predicts future production rate and total production” [3, pp. 79-80].

One researcher’s view is “failure to publish is a scientific crime ... [because] the information is lost to the world” [5, p. 390]. While this may sound extreme, it does emphasize the point that, for researchers, publishing is important. But why?

Publishing is important because faculty “scholarship is viewed as research and publication” [6, p. 2]. Publishing rates have been used as an indication of how much research is being done by a particular person, group, or an industry, and many studies “find that research productivity is the principal factor in determining faculty rewards [7, p. 728]. An individual’s publishing rate is often used in the education field to evaluate that individual for recruitment, reappointment, promotion, tenure, and salary [8].

There have been studies in several fields (e.g., accountants, chemists, economists, experimental psychologists, library and information sciences, American literature majors, and social workers) that address publishing rates in those fields. They find that about 50% of doctoral graduates never publish [9-13]. Another common finding is that previous publishing experience is an indication of future publishing rate [14], even as far back as before the doctorate [3]. It was noted that accounting faculty “researchers who were successful in obtaining dissertation-based publications had higher subsequent research productivity” [15, p. 59]. Furthermore, one study found that there “is an important relationship between an institution’s faculty publication record and that of its graduates” [16, p. 497]. Even though there is significant research on faculty publication in various fields,

and one dissertation survey of UCLA education graduates [17], there has not been a review of publishing rates of doctoral students.

This section has introduced the need for research into the publishing trends of doctoral students and the next section will discuss the research process that was used.

2. RESEARCH PROCESS

2.1 Research Flow

The general flow of the research started by identifying the doctoral graduates in the ProQuest *Dissertations and Theses* database, recording the dissertation information (first row of Figure 1), searching for published articles in the IEEE Xplore® database, and recording publishing information (second row of Figure 1). The recorded information was subjected to statistical analysis and is discussed in this paper (third row of Figure 1).

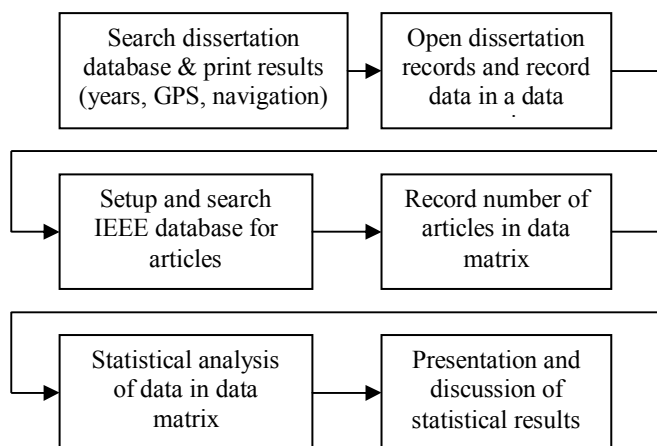


Figure 1. Overview of Research Flow.

2.2 Research Criteria

This research, into publishing trends of doctoral students, was performed on a subset of the entire doctoral population: graduates from 2000 to 2005 with the terms (a) *GPS* and (b) *navigation* in their abstract or citation.

2.3 Limitations

There are limitations to this work. This research only addresses doctorates with the terms *GPS* and *navigation* in their abstract or citation. There are other combinations of words. For example, a search for *space* and *navigation* yielded 155 dissertations and 59 of them do NOT contain the term *GPS*. Those 59 dissertations that did not contain the term *GPS* were excluded from this study by the research criteria. The result of this limitation is that many outstanding dissertations from excellent universities were not included in the search for

publications.

A second limitation is the number of dissertations in the ProQuest Dissertations and Theses database. Their website claims they have access to over 90% of dissertations from North America and is vague about the number of dissertations from outside North America.

A third limitation is the IEEE Xplore® database. There will be an undercount due to publications that are not in the database. Many authors have published quality articles in journals that are not indexed in the IEEE Xplore® database. This limitation is expected to be uniform across all graduates and would also scale across years, schools, and gender.

2.4 Publishing rates

Authors can present publishing rates differently based on how they count articles or members or years in the sample. The publishing rate is defined as the number of published articles per person per year (Equation 1). Equation 1 can apply to an individual, or can be applied to groups by year, university, gender, or country.

$$PR = P/AY \quad (1)$$

Where:

- PR is publishing rate.
- P is number of publications written by all the doctoral graduates in the sample (n) during a period of Y years.
- A is the quantity of published authors in the sample.
- Y is the number of years in which publications are counted. Y will always be ten for this study.

The units of equation 1 are publications per author-year. Author-year is used because A is the number of authors, not the number of graduates.

This section described the research process that was followed, the research criteria, limitations, and defined the calculation for publishing rates. The next two sections will discuss the characteristics of the 100 doctoral graduates and their publishing results in IEEE conferences and journals.

3. CHARACTERISTICS

The results of this study showed there were 2413 dissertations that refer to *GPS* and 197 that refer to both *GPS* and *navigation* (at the time this paper was written). Of those, 100 students have been awarded their doctorate since 2000. This section presents the descriptive characteristics of these 100 graduates, and how many published from 1995 through 2005, what was their publishing rate (as defined above) by year, university, gender, and country.

3.1 Characteristics – Year

The 100 doctoral graduates were spread across the years 2000 to 2005. The results, summarized in Figure 2, show 14 to

19 graduates per year. The customer service personnel from the ProQuest *Dissertations and Theses* database confirmed that the final 2005 dissertations will be entered in April 2006. The final update of this paper was done in April 2006.

3.2 Characteristics – Degree Type

The vast majority (90%) of the 100 doctoral graduates were awarded the degree of Ph.D. The results are summarized in Figure 3 and are hard to read, so Table 1 presents the results in a readable form. The degree types were recorded directly as listed by the ProQuest *Dissertation and Theses* database.

Table 1. Quantity of Doctoral Degrees in Sample

Degree	Quantity
Ph.D.	90
Dr.Techn.	3
Dr.Ing.	2
Ed.D.	1
Dr.	1
D.Sc.	1
Dr.Scient.	1
Dr.sc.tech.	1

3.3 Characteristics – Gender

The gender of the graduate was determined by the use of a gender identification software program (ActiveGender 3.0 by the Software Company of Brooksville, Florida, USA). The software identifies the gender to be male, female, neutral, or unidentifiable. *Neutral* indicates that the software has identified the name, but the name has less than a 70% gender-confidence level. *Unidentifiable* indicates the name is not in the software’s database. In the case of neutral or unidentifiable names, the researcher reviewed the (a) acknowledgment, (b) dedication, and (c) the vita to search for key phrases (e.g., to my wife Kathy ...) for positive gender identification. Neutral and unidentified names were listed as unknown, and the results are summarized in Figure 4.

The vast majority of the 100 doctoral graduates were male. There were 10 names that were initially not identifiable by the research methodology. However, there several attendees at the PLANS2006 conference that knew the genders of some of these names. I adding this information to the database, it was found that there were 83% male, 12% female, and 5% with unknown gender.

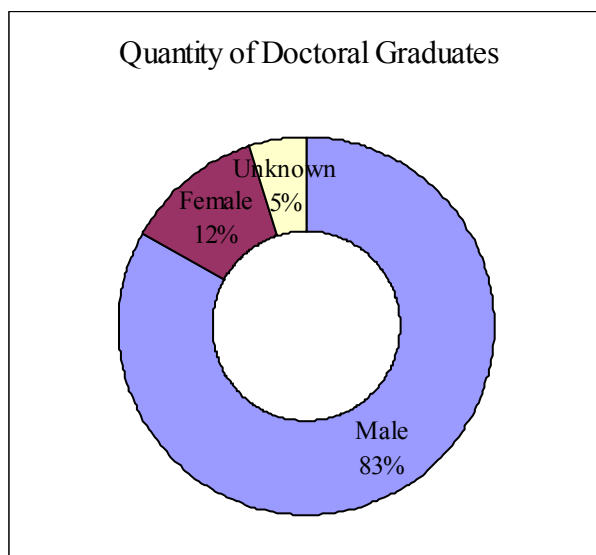


Figure 4. Quantity of Doctoral Graduates for this study, by Gender

3.4 Characteristics – University

The 100 doctoral graduates were awarded degrees from 41 universities. Only one doctoral degree was awarded by 25 of the schools. The 16 schools that awarded two or more degrees are summarized in Figure 5. Half of the students identified in this study graduated from five universities -- Stanford University (25 graduates), the University of Calgary (12 graduates), the University of Texas at Austin (5 graduates), the University of Florida (4), and UCLA (4).

3.5 Characteristics – Country

These 100 graduates were awarded degrees from eight countries (Figure 6). Most of the graduate (89%) are from the United States (76 graduates) and Canada (13 graduates).

4. PUBLISHING RESULTS

This section will discuss the publishing results of the 100 doctoral graduates who published in a) IEEE journals and b) in both IEEE journals and conferences.

4.1 Publications in Journals

These 100 doctoral graduates were not very prolific in IEEE journals. There were 10 authors (10%) that published a total of 11 articles in peer-reviewed journals. This is a publishing rate of 0.11 publications per author-year over the 10 year study period. The number of peer-reviewed publications by year is provided in Figure 7. Three of these authors were early publishers; defined as those who published before their graduation year. This is important because

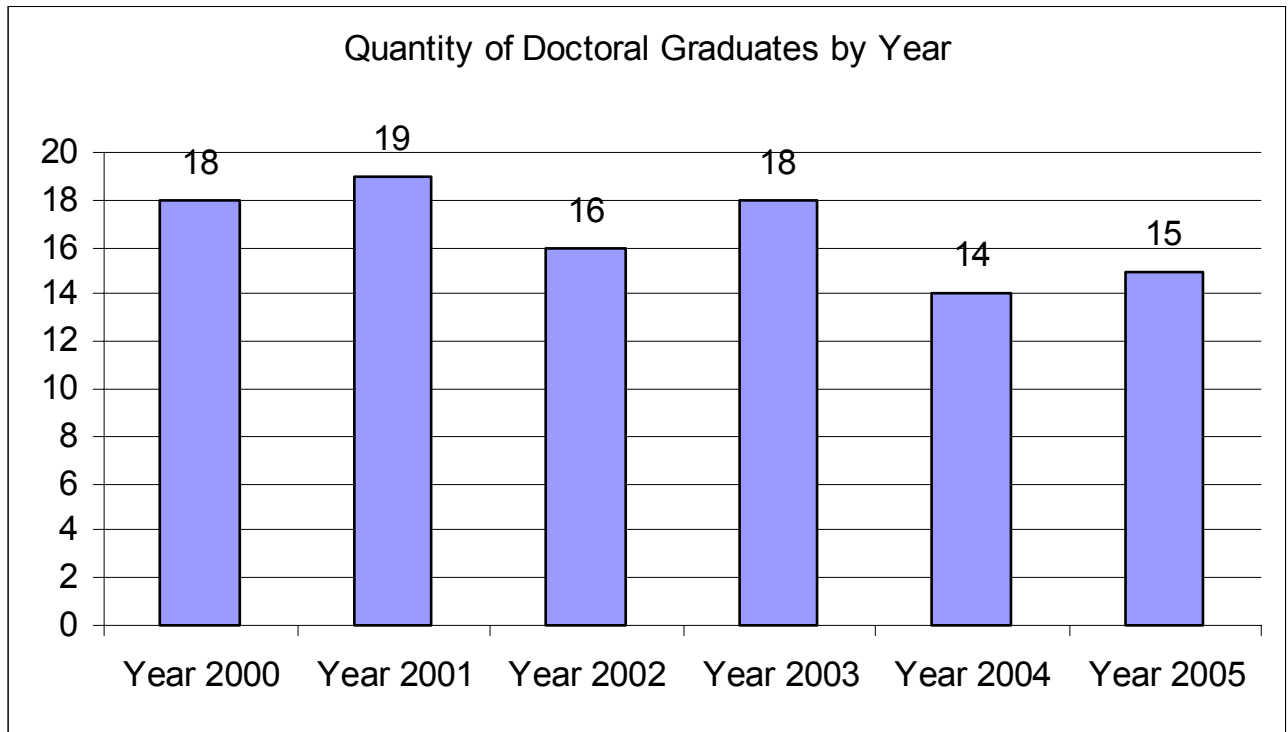


Figure 2. Quantity of Doctoral Graduates for this Study, by Year.

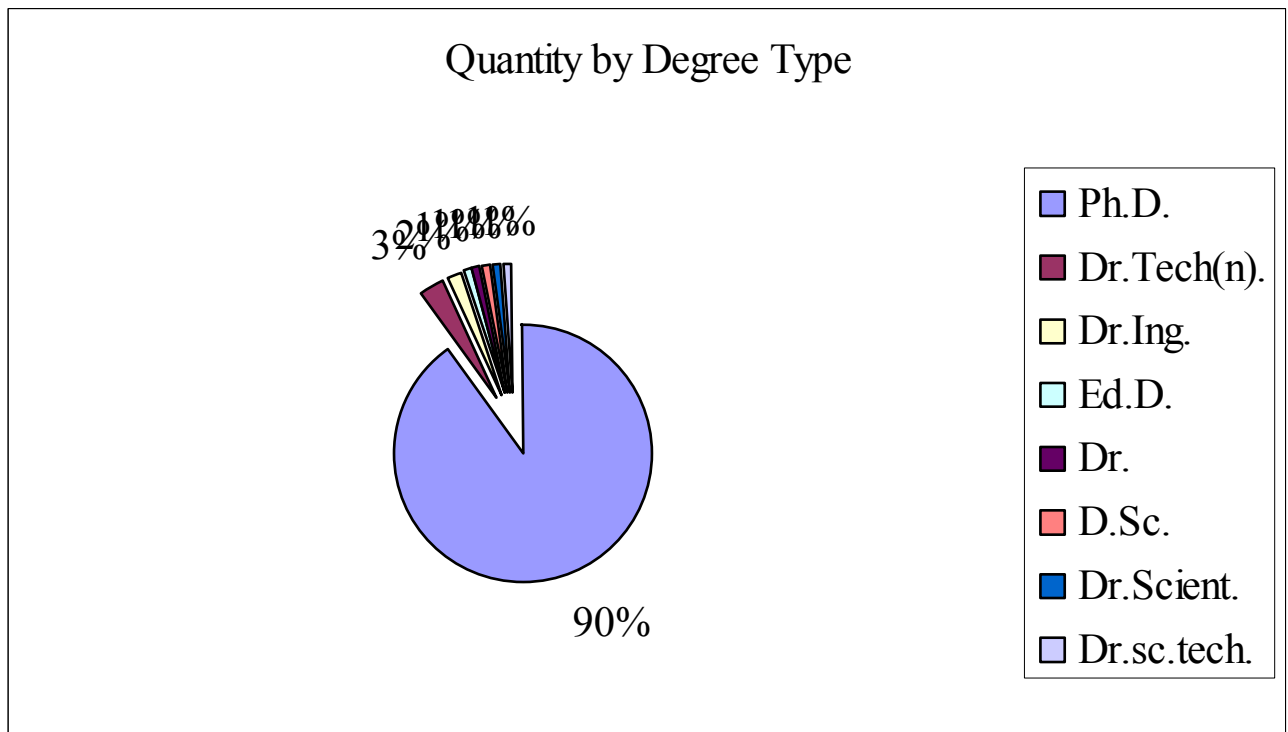


Figure 3. Quantity of Doctoral Graduates for this Study, by Degree Type

Blackburn & Lawrence (1995) state “early publication, including publication before the doctorate, predicts future production rate and total production” (pp. 79-80). This was emphasized by Nettles and Millett’s (2006) discussion of predoctoral publications: “the importance of early demonstration of research productivity cannot be overstated” (p. 112).

4.2 Publications in Journals and Conferences

Conference publication was much more popular than journal publication. Conference papers are accepted based on a review of the abstract, are generally more easily accepted, are more immediate (publication lag is a few months instead of one to more than two years for journals). Conferences give the author four immediate benefits: 1) sooner publishing time, 2) ability to present results and get immediate feedback, 3) opportunity to network (this is important for soon-to-be-graduated students), and 4) are usually held in interesting places.

There were 39 authors (39%) that published a total of 80 articles in peer-reviewed journals AND conferences. This is a publishing rate of 0.21 publications per author-year over the 10 year study period. There were publications as early as five years before graduation. The total number of (peer-reviewed and conference) publications by year is provided in Figure 8.

4.3 Publications by Gender

The 11 journal articles were published by 10 male doctoral students. Of the 80 journal and conference articles, 76 (95%) were published by male doctoral graduates, three (4%) by female doctoral graduates, and one by doctoral graduates with names that were either gender neutral or unidentifiable (Figure 9). An interesting note about the three publications by female doctoral graduates is that all three publications were published in the same year and by the same person.

4.4 Publication by University

There were 41 universities that had GPS related doctoral graduates as described above. However, only 16 of these universities had doctoral graduates that published. These universities and the number of published papers that emanated from those universities are identified in Table 2. Universities with the same number of published papers are listed alphabetically.

A review of Table 2 shows that the quantity of articles published by any given university ranges from a low of zero (the 25 that are not on the chart) to a high of 50, which is 67% of all published papers in this study.

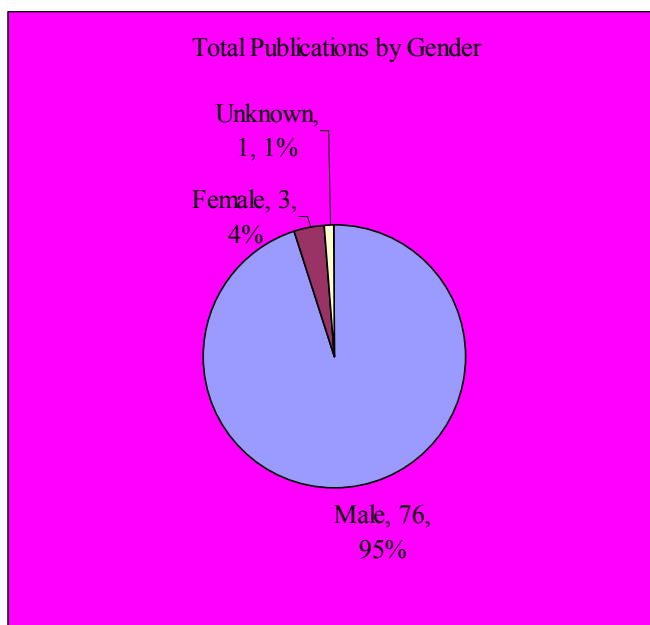


Figure 9. Total Journal and Conference Publications by Gender

Table 2. Quantity of Published Papers by University

University	Published Papers
Stanford	50
University of Rhode Island	5
University of California - Riverside	4
Chalmers Tekniska Hogskola	3
Ohio State	3
Technische Universiteit Delft	2
UCLA	2
University of Colorado - Boulder	2
Cornell	2
IIT	1
MIT	1
Norges Teknisk-naturvitenskapelige	1
Purdue	1
University of Maryland	1
University of California - Berkeley	1
University of Calgary	1

5. RECOMMENDATIONS

The research described in a dissertation should be publishable and it is recommended that all doctoral candidates be strongly urged (or possibly required) to publish the results of their doctoral dissertations in a peer reviewed journal.

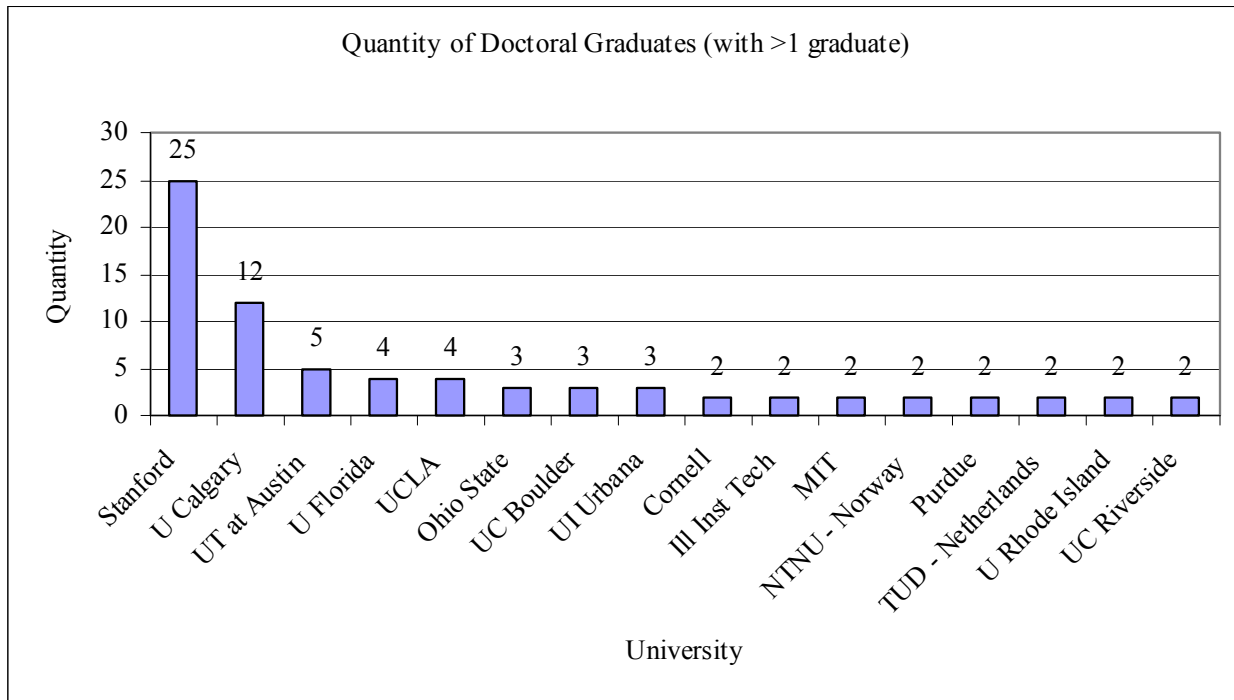


Figure 5. Quantity of Doctoral Graduates by Schools with More than One Graduate.

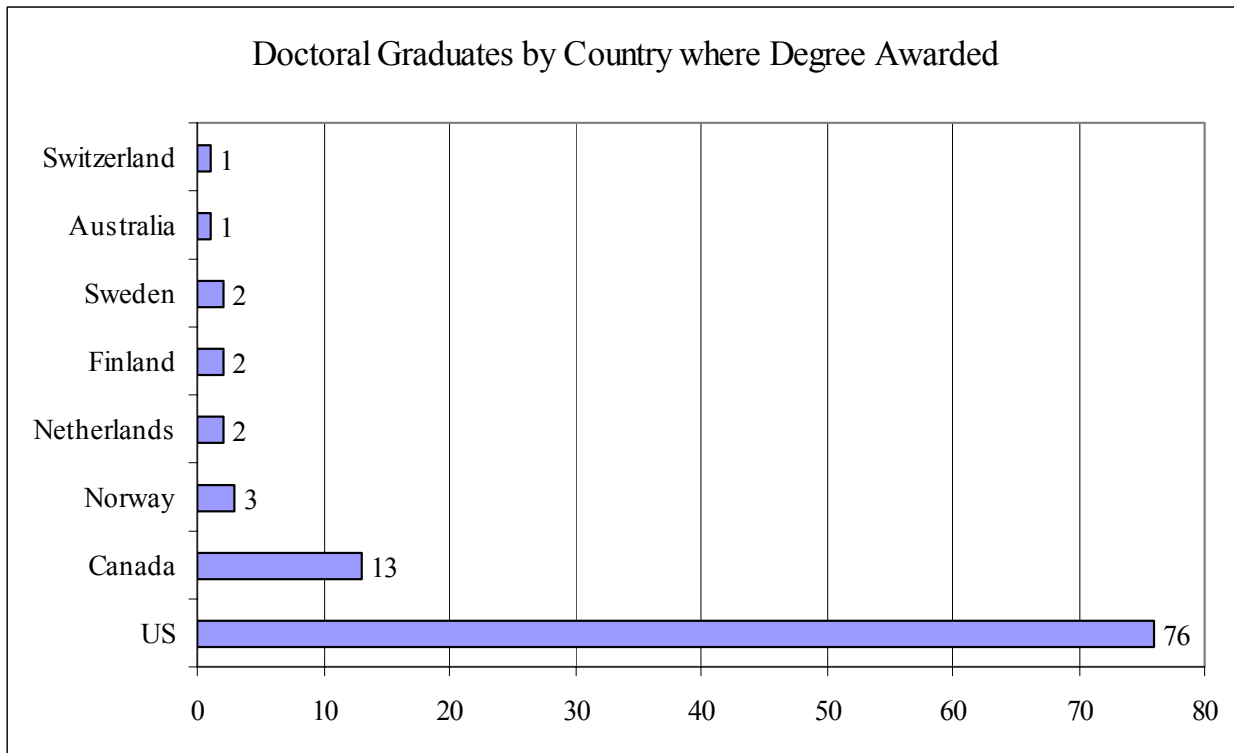


Figure 6. Quantity of Doctoral Graduates by Country.

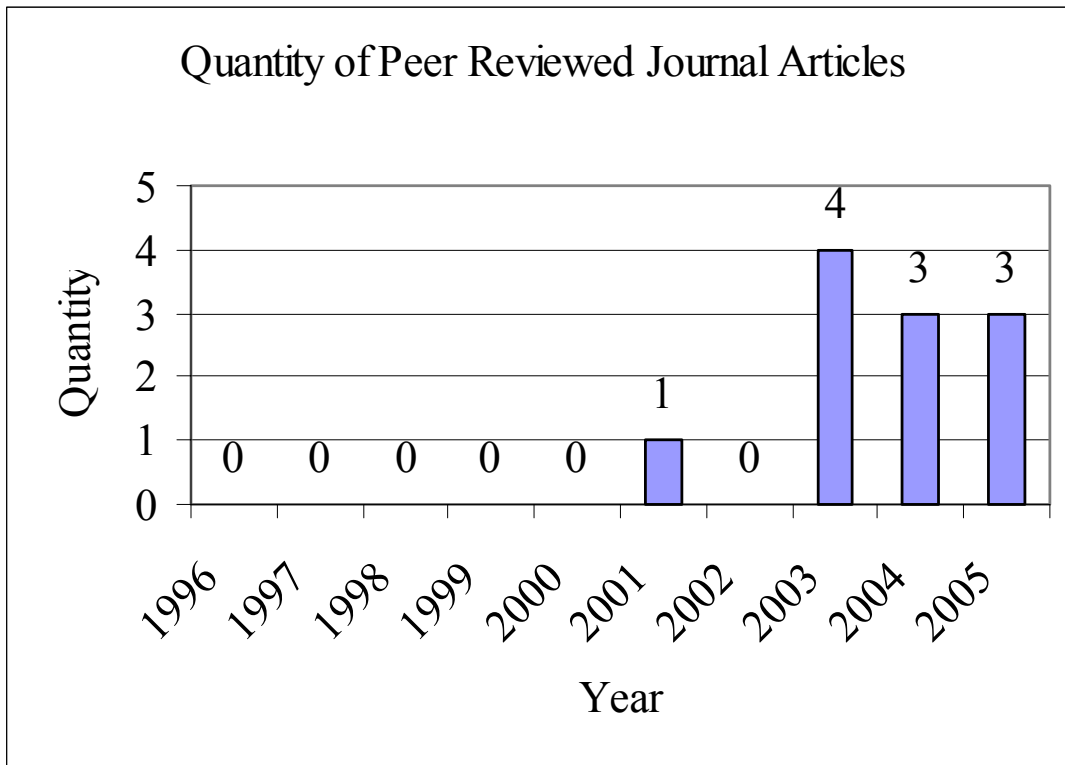


Figure 7. Quantity of Peer Reviewed Journal Articles Published by Year.

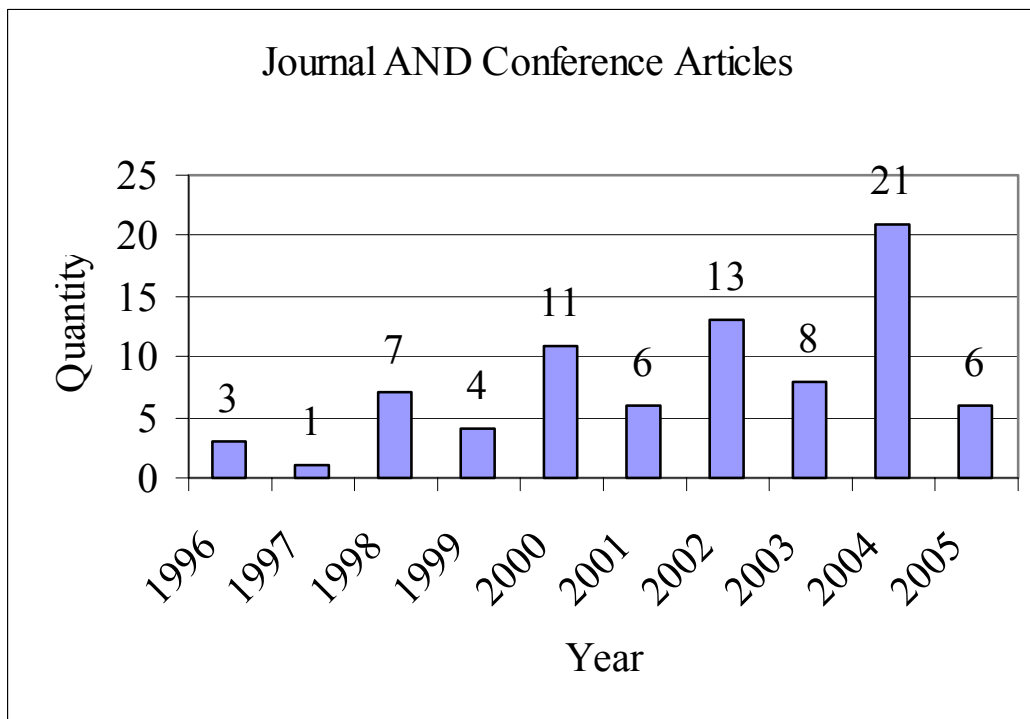


Figure 8. Quantity of (Peer Reviewed Journal and Conference) Articles Published by Year

6. CONCLUSIONS

The 100 doctoral graduates from 2000 to 2005 with both *GPS* and *navigation* in their abstract or citation graduated at the rate of about 17 per year, 90% were Ph.D.s, were 83% male, and were from 41 schools and eight countries.

It was found that 10% of all graduates published in IEEE peer reviewed journals. This percentage of graduates who publish is low, but within the publishing range of recent doctoral graduates as identified by the literature. It was also found that 40% published in both IEEE peer reviewed journals and conferences. The 39 authors published 80 articles in journals and conferences – 95% of the papers were written by male doctoral graduates, 4% by female doctoral graduates, and 1% by doctoral graduates with names of unknown gender. The mean number of publications per author (for the full 10 years, not per year) was 1.1 for journals only and 2.05 for journals and conferences.

The number of female doctoral graduates was low as was the number of publications by female doctoral graduates. The total number of publications by year and gender is depicted in Figure 10.

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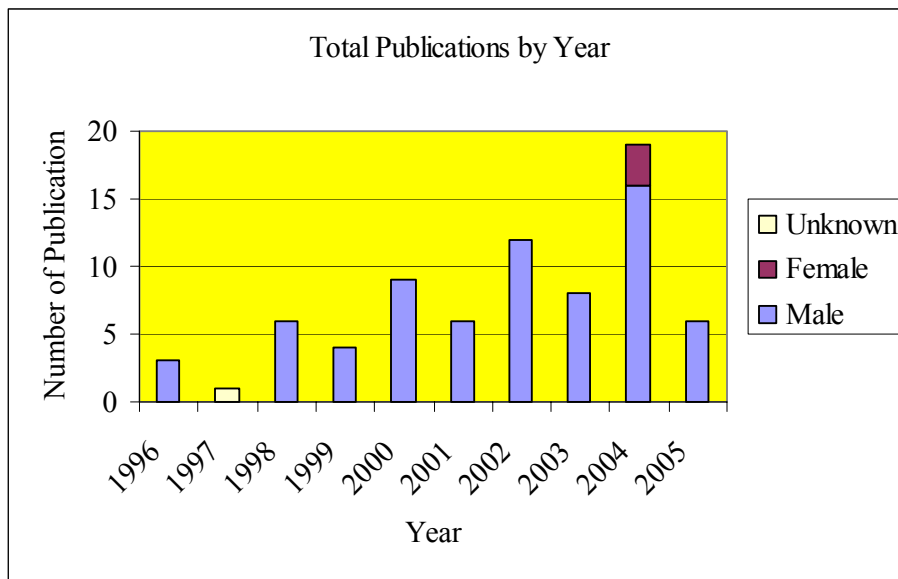


Figure 10. Quantity of (Peer Reviewed Journal and Conference) Articles Published by Gender and by Year