

# Bibliometrics: A Means of Visualizing Occupational Licensure Scholarship

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**Introduction:** Occupational licensure has recently been a focus of media and legislative attention, leading to debates regarding the value of and need for professional regulation. **Objective:** The aim of this study is to systematically identify, analyze, visualize, and interpret scholarship in this important domain. **Methods:** This study uses a bibliometric analysis of the articles published on occupational licensure in the peer-reviewed literature as indexed in bibliographic databases. **Results:** The occupational licensure research is focused around the emergence of a number of areas of inquiry: educational preparation, economic impact, labor market entry, benefits of occupational licensure, adverse impacts on minority groups, and scope of practice. A single researcher is central to the literature and views the topic through an economic and labor-market participation lens. **Conclusions:** The absence of scholarship relating to public protection must be urgently addressed if occupational licensure models that are proportionate to the level of risk posed by the practitioner are to be developed and enforced.

*Keywords:* Legislation, occupational licensure, professional regulation

From time to time, occupational licensure has been the focus of media and legislative attention, leading some to question the value of professional regulation. However, to our knowledge, no previous attempt has been made to systematically identify, analyze, visualize, and interpret scholarship in this important domain. This article addresses this gap through the use of bibliometrics.

Bibliometrics, sometimes referred to a *scientometrics* or *altmetrics*, is an analytical technique to quantify research articles that has grown in popularity. Figure 1 shows the number of published papers that used the bibliometric technique and were indexed in PubMed from 1958 to 2017. The rate of growth in papers started in the late 1980s and coincided with the development of technology that facilitates such analysis (Haustein & Lariviere, 2014).

Bibliometrics have been defined by Pritchard (1969) as “the application of mathematical and statistical methods to books and other media communication.” This study will not detail the wide range of techniques available to undertake such analyses, as this information can be found elsewhere (Shiffrin & Borner, 2003; Archambault & Gagne, 2004; De Bellis, 2009). Instead, only those techniques used in this study will be provided along with a short explanation of the primary purpose of the approach.

According to De Bellis (2009), bibliometrics examines a range of issues related to the state of scholarship pertaining to a domain of interest. It identifies the most dominant contributors to a field and how they draw upon the literature to develop their work. Examination of frequently occurring themes as well

as how they emerge and change over time provides insights into the evolution of thinking and a synopsis of the current state of the science. Furthermore, TUDelft (2017) produced a comprehensive toolkit that describes the wide range of bibliometric applications using illustrative case studies. Bibliometrics can be used to identify well-researched or under-researched areas and is ideally suited to provide a high-level analysis or wide-angle view of the current state of scholarship by topic of interest (Benton & Ferguson, 2017)

## Occupational Licensure

The media, legislators, think tanks, and foundations recently intensified their interest in occupational licensure (Cottle, 2017; Department of the Treasury of Economic Policy, Council of Economic Advisers, & Department of Labor, 2015; Shapiro, 2017). To examine occupational licensure, an operational definition is required. For the purposes of this paper, we broadly define occupational licensure as a form of government regulation that requires an individual to obtain a license to pursue a profession or vocation for compensation.

Originally, occupational licensure emerged from a realization that certain professions could place the public at significant risk of serious harm or even death if they included incompetent or fraudulent practitioners. Recently, there has been a rapid increase in the number of licensed disciplines in the United States. In their 2012 report, *License to Work*, the Institute for Justice noted

FIGURE 1

### Articles Using Bibliometrics and Indexed in PubMed

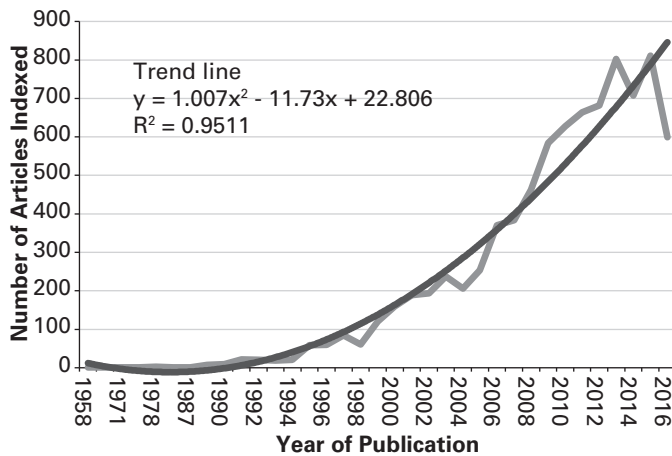
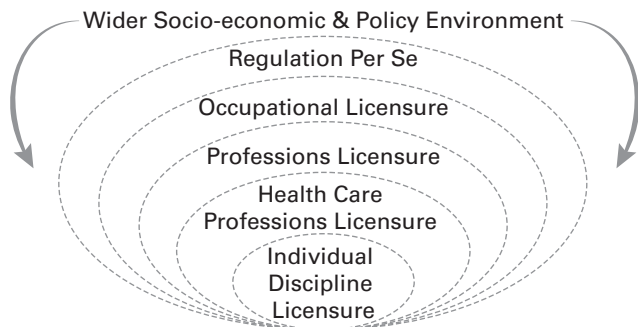


FIGURE 2

### Delineating the Licensure Landscape



Source: Modified from Benton et al, 2013.

that in the 1950s, only 1 in 20 Americans needed a license to work, but by 2012, nearly 1 in 3 needed a license to pursue their chosen career. Due to the rapid increase in the use of this regulatory tool, questions are being asked regarding the impact of occupational licensure on the professions, the services they offer, and the consequences that this has on the recipients of their services. Some authors, such as Kleiner (2006) referenced the fact that not all occupations have the same level of risk. Shimberg and Roederer (1994) formulated a set of questions to help differentiate such risk, but most writings fail to address this point in any detail. Although Benton, González-Jurado, and Beneit-Montesinos (2013), as part of wider work on comparing nurse regulatory bodies, sought to graphically delineate the regulatory landscape (Figure 2), the study ultimately focused on board performance rather than occupational licensure. Thus, to date, there has been no attempt to systematically examine and map research scholarship on occupational licensure.

The need for this study is urgent, especially as policy makers move from an emotive discourse on issues, where those who shout loudest or hold the ear of key opinion leaders influence outcomes, to an evidence-based discussion before transparent decisions are made.

### Aim

The aim of this study was to perform a bibliometric analysis of occupational licensure articles published in the peer-reviewed literature as indexed in bibliographic databases to identify, visualize, and analyze the themes, central actors, and their impact on scholarship in this domain.

### Methods

In this study, we systematically explored bibliographic databases to identify papers published on occupational accreditation, licensure, regulation, or certification. The following search criteria were used to identify materials:

TITLE-ABS-KEY («occupational licensure» OR «occupational license» OR “occupational accreditation” OR “occupational regulation” OR «occupational certification»)

The databases examined included Scopus (Elsevier), PubMed, and Web of Science (Clarivate Analytics). A structured search of these databases was performed on November 2, 2017. The titles and abstracts of the material, identified through the Boolean search, were examined individually to ensure that they complied with the focus of this study. Owing to limitations of the analysis and visualization software, only articles published in English were included.

Results from each of the searches were exported as an RIS (Research Information Systems) file and then imported into bibliographic management software Endnote version 8 (Clarivate Analytics). Duplicate items were deleted, and a consolidated single file was created for analysis.

### Data Analysis

Descriptive statistics from the data, which included a graph of the numbers of papers published per year, and frequency data on the most common sources in terms of countries, affiliated institutions, and subject areas were provided. In addition, author and source information on the most-cited articles extracted from the databases were identified.

To enable the visualization and analysis of the bibliometric data, VOSviewer, software developed by academics at the University of Leiden Centre for Science and Technology Studies, was used (van Eck & Waltman, 2014). This software imports and displays data from an increasing number of sources based on a

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