Advances in Cybernetics Provide a Foundation for the Future

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ABSTRACT

Interest in cybernetics declined in North America from the mid 1970s to 2010, as measured by the number of journal articles by North American authors, but increased in Europe and Asia. Since 2010 the number of books on cybernetics in English has increased significantly. Whereas the social science disciplines create descriptions based on either ideas, groups, events or variables, cybernetics provides a multi-disciplinary theory of social change that uses all four types of descriptions. Cyberneticians use models with three structures – regulation, self-organization and reflexivity. These models can be used to describe any systemic problem. Furthermore, cybernetics adds a third approach to philosophy of science. In addition to a normative or a sociological approach to knowledge, cybernetics adds a biological approach. One implication of the biological approach is additional emphasis on ethics.

KEYWORDS

Ethics, Regulation, Reflexivity, Self-Organization

BACKGROUND

The field of cybernetics attracted great attention in the 1950s and 1960s with its prediction of a Second Industrial Revolution due to computer technology (Wiener, 1948). In recent years, few people in the US have heard of cybernetics and the number of articles in cybernetics journals by authors in North America has declined dramatically (Umpleby, 2015a, see Figures 1 and 2). But a wave of recent books suggests that interest in cybernetics is returning (Umpleby and Hughes, 2016, see Figure 3). After describing the decline and rise of work in cybernetics in the U.S. this paper explains how cybernetics is different from traditional disciplines. Some people may claim that whatever was useful in systems and cybernetics has been incorporated in current work falling under the complexity label, but that is not the case. The three fields of systems science, complex systems and cybernetics have asked different questions and developed different theories and methods. Although there is some overlap, these are three largely independent fields with their own associations, journals and conferences (Umpleby, 2017).

Other papers in this special issue deal with systems theory and complex systems. This paper reviews some basic ideas in cybernetics. I recommend these and other ideas as a resource for better understanding and modeling of social systems.

TRENDS IN ACTIVITY REGARDING CYBERNETICS

What is the trend of research in cybernetics in the U.S.? Stuart Umpleby observed that since the 1980s there has been more interest in cybernetics in Europe than in the U.S. To test this observation articles from thirty years in three journals *Cybernetics and Systems*, *Kybernetes* and *Systems Research and Behavioral Science* were studied. Articles in all three journals were sampled in three year intervals from 1974 through 2010. If an article had authors from more than one country, the country of the first author was used. Figure 1 shows how the number of articles from various regions has changed in recent years. In all three journals the number of articles written by North American authors declined while the number of articles written by authors in Europe and particularly in Asia increased. To make more clear the rise and decline, the number of articles produced in specific countries in 1974 and 2010 is shown in Figure 2. Although in 1974 the U.S. produced more articles than all other countries combined, in 2010 the U.S. had declined to third place after the U.K. and China.

Recently Stuart Umpleby observed an increase in books being published about cybernetics. Elise Hughes used Google Books and Amazon.com to search using the keywords "cybernetic," "cybernetics," and "cybernetician." She used each of the keywords as a general search as well as restricting the search to the title and subject fields. For example, the keyword "cybernetic" was used as a search term three times in Google Books, once in the standard search bar, once in the advanced search function on "title" and once in the "subject" field. This process was repeated for each of the keywords and on Amazon. At the end of this process each keyword had been used six times, and overall a total of 18 searches were completed. She restricted the publishing date to 2000 and later. The list of books in Umpleby & Hughes, 2016, includes books that have been rereleased within this period of time.

In order to find the first author's country of origin Ms Hughes used the "About the Author" section of Amazon, book jacket biographies, and Google. Many of the authors of the rereleased books had Wikipedia pages. Figure 3 shows the results of this research, with the number of books released each year broken down by region – Asia, Europe, and North America. This research included only books in English. Even so, the number of books is greater in Europe than in the U.S. If other languages were included, e.g., French, German, Spanish, Italian, and Russian, the number of books published in Europe would be even greater.

Figure 1. Total articles per year by region over time in the three journals
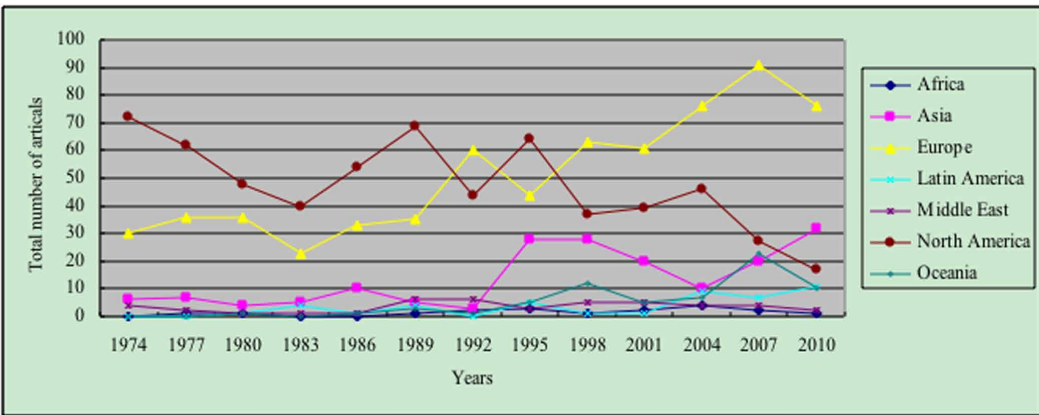
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