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WHAT IS HAPPENING IN DSS RESEARCH?

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Abstract

This study extends previous studies, which examined the intellectual structure, major themes, and reference disciplines of decision support systems (DSS) over the last two decades (1970-1995). Factor analysis of an author cocitation matrix over the period of 1995 through 1999 extracted five major areas of DSS research (group support systems, design/foundations, model management, implementation, and user-interface) and two contributing disciplines (social psychology and cognitive science). The intellectual structure of the DSS area has undergone structural changes over the past five years (1995-1999). We will present several notable trends and developments in the DSS research areas.

Introduction

Several studies (Eom 1996, 1997, 1998) documented the intellectual development of the DSS area over the last two decades (1970-1995) in terms of two of the three main needs defined by Keen (Keen 1980)-- reference disciplines and a cumulative tradition. These studies convince us that DSS is in the active process of solidifying its domain and demarcating its reference disciplines. To extend the earlier studies, we conducted a follow-up study to assess the ongoing changes in the intellectual development and structure of DSS research, using factor analysis of an author cocitation matrix over the period of 1995 through 1999, with a particular emphasis on assessing the structural changes in the intellectual structures in the DSS area over the period of 1995 through 1999.

Description of Study

Data

The primary data for this study were gathered from a total of 537 articles in the DSS area over the past five years (1995-1999), based on the criteria used prior studies (Eom 1996). A citing article is selected if: (1) it discussed the development, implementation, operation, use, impact of DSS, or DSS components; or (2) for DSS articles related to contributing disciplines, they were explicitly related to the development, implementation, operation, use, impact of DSS, or DSS components.

Research Methodology

This research is based on author cocitation analysis (ACA). ACA is "a set of data gathering, analytical, and graphical display techniques that can be used to produce empirical maps of prominent authors in various areas of scholarship" (McCain 1990, p. 433). The analytical and graphical display tools include factor analysis, multidimensional scaling, and cluster Analysis.

ACA study assumes that cocitation is a measure of the perceived similarity, conceptual linkage, or cognitive relationship between two cocited items (documents or authors) and that the cocitation analysis of a field yields a valid representation of the intellectual structure of the field (McCain 1986). The term "author" in author cocitation analysis refers to a body of writings by a person. Researchers in any academic discipline tend to cluster into informal networks, or "invisible colleges," which focus on common problems in common ways (Price 1963).

The raw cocitation matrix of 84 authors is analyzed by the factor analysis program of SAS (statistical analysis systems) to ascertain the underlying structure of DSS research subspecialties. Principal component analysis (promax rotation) with the latent root criterion (eigenvalue 1 criterion) is applied to obtain the initial solution of 9 factors. The scree tail test indicates that only the first ten factors should be qualified. The scree test involves the plotting of the latent roots (eigenvalues) against the number of factors in their order of extraction. There is no exact quantitative basis for deciding the number of factors to extract as the final solution. Based on careful examinations and interpretation of these outputs, 9 factors resulted (Appendix).

Preliminary Results

Factor analysis extracted nine factors consisting of four major areas of DSS research (group support systems, DSS design/foundations, model management, and user interface) and two contributing disciplines (social psychology and cognitive science). The factor analysis output indicates that several DSS research fields/contributing disciplines are emerging. All these DSS research subfields were identified in the previous studies. In the reference discipline area, social psychology has emerged as the most important DSS reference disciplines. Social psychology is concerned with the study of causes, types, and consequences of human interaction including the effects of group pressure (i.e., conformity), the individual as part of a social group (social loafing tendency, brainstorming, groupthink, and prejudice and discrimination), the formation of impressions, and the development of attitudes.

What We Plan to Present at The Meeting

Based on the preliminary results, we will further analyze the DSS literature (537 articles used in this research) and plan to present the ongoing changes in the intellectual structure of DSS research fields (group support systems, DSS design area, model management, user interface, and implementation) through a comparison of the studies between the first two and half decades of DSS research (1970-1995) and the recent five years (1995-1999).

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