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UNIVERSITY LIBRARY MANAGEMENT

AND

THE JOURNAL SELECTION PROBLEM

Dissertation submitted by

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in partial fulfilment of the requirements for the Degree of  
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in the Faculty of Engineering of the James Cook University  
of North Queensland.

ABSTRACT

The concept of a systems approach to the management of an academic library is discussed. The library system is defined in terms of its interaction with the wider system which it serves, the body of scholarly and research literature on which it draws, and the complex of subsystems whose activities are directed towards the achievement of an overall objective. Formulation of this objective, and of a measure of system performance, relies on the work of Hamburg et al., who selected the objective of maximizing the exposure of individuals to documents of recorded human experience. Document exposure time is employed as a measure of performance.

Schematic models of the library and its subsystems are developed. Firstly, the interaction of the library system with its environment is illustrated, in broad detail, as consisting of two major feedback loops: a positive loop, for the influence of library activity on the level of user demand; a negative loop, for the budgetary constraint on library activity.

This is followed by a series of diagrams illustrating the operations of the chief subsystems of the library, their interactions, and the key decisions and constraints involved in their control.

Attention is focussed on the subsystem for serials acquisition and, in particular, the problem of selecting an appropriate set of primary periodicals for subscription. The usage of serials literature is discussed briefly, and the potential value of the serials collection is defined in terms of the set of relevant articles it contains.

The journal selection problem is formulated with the objective of maximizing this potential, subject to the overall budget constraint. In addition, the requirement that resources are distributed equitably among university departments is met by including constraints which ensure that each department receives at least a certain minimum level of satisfaction.

Data requirements of the model are discussed in some detail, and methods of collection are proposed.

An heuristic algorithm is developed and employed to find feasible solutions to a sample problem involving 1320 journals and 8 departments, based on artificial data which are generated to reflect the main features of a real data set.

These solutions are demonstrated to be close to optimal, by comparing them with optimal solutions obtained for the simple knapsack problem which results when the equity constraints are relaxed.

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DECLARATION

I declare that this thesis is my own work and has not been submitted in any form for another degree or diploma in any university or other institute of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

(M. K. James, Ph.D)

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