



A NEW MATHEMATICAL PUBLIC BUDGETING MODEL FOR STUDENTS DEPUTY IN UNIVERSITIES AND HIGHER EDUCATION INSTITUTIONS

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Abstract:- Budget allocation is a common task carried in our daily life. As it seems to be necessary to perform this task in an ideal manner this paper mainly deals with budget allocation. In this paper explains ways to allocate the received amount of money. Because the amount allocated is usually less than what was estimated, it is important to distribute resources according to set priorities. Once the district receives its budget, the management team needs to allocate the budget to the various services. Institutions of higher education, both public and private, are among the most important institutions of a country.

The main goal of this paper is to presents a mathematical model for Cultural budget allocation for the student deputy. The budget allocation for cultural activities is not based on the scientific method and has not provided a model for it allocation. For this reason we offer this model for the first time.

Key Words: - Multiple-Criteria Decision, Cultural Budget, Weighting Methods, University.

INTRODUCTIONS

Many researches have been conducted on resource allocation in academic environments from 1960 onwards (Williams, 2005). The university budget constraint is the most important reason for this trend. Budget allocation among conflicting plans is principally a very arduous work.

As a result, designing quantitative models that aid managers to solve such a problem has become one of the most attractive interests of university strategists.

In 1987, using a survey of one hundred and forty six articles, White (1987) showed that the available models can be implemented in higher education administration. In a research conducted in 2001, Romero and Caballero emphasized the application of quantitative models for solving resource allocation problems of the universities.

These two researchers, in a study conducted in 2006, could design an interactive goal programming model. By this model, managers

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could overcome so many of the resource allocation challenges.

Hopkins (1971) developed a cost simulation model in which the budget was considered as an output of the model rather than input.

On the other hand, Schroeder designed a model in which the budget for planning future years was taken into account as an input (Schroeder, 1973). Basu and Pal used a goal programming model for allocating the budget within the existing academic units in a university in future planning period, their model was able to allocate the budget for attainment of the desired level of teaching staff, non-teaching staff and research fellows (Basu & Pal, 2006). Nopiah and associates developed a comprehensive model for university budget planning. The comprehensiveness of this model empowered planners to cover different parts of an educational system and track the resource allocation flow more precisely (Nopiah *et al.*, 2007). In a long-range research conducted about university resource allocation systems, Pal and Sen could develop an efficient goal programming model for right resource allocation. This model has considered the resource trade-off in the educational systems so well (Bijay Baran & Shymal, 2008). Dylan Jones (2011) also developed a new pattern for sensitivity analysis of resource allocation goal programming models in his studies.

The Proposed Model

A simple definition of Budgeting models is: Mathematical models that generate a profit planning budget. The models help managerial accountants and budget analysts answer a variety of what-if questions. The resultant calculations provide a basis for choice among alternatives under conditions of uncertainty. Budgeting models are usually quantitative and computer based.

The variables used in this study are all made of the activity. Each of them refers to costs that allocated to them in the model.

Now we describe the proposed model:

$$Max \quad Z = \omega \sum_{t=1}^p a_t + \rho \sum_{t=1}^q b_t + \lambda \sum_{t=1}^r c_t$$

Subjected to:

$$\sum_{t=1}^p a_t + \sum_{t=1}^q b_t + \sum_{t=1}^r c_t \leq \text{Total Budget}$$

$$\sum_{i=1}^m \sum_{j=1}^n L_{ij} \leq \sum_{t=1}^p a_t \leq \sum_{i=1}^m \sum_{j=1}^n U_{ij}$$

$$\sum_{i=1}^m \sum_{j=1}^n L_{ij} \leq \sum_{t=1}^q b_t \leq \sum_{i=1}^m \sum_{j=1}^n U_{ij}$$

$$\sum_{i=1}^m \sum_{j=1}^n L_{ij} \leq \sum_{t=1}^r c_t \leq \sum_{i=1}^m \sum_{j=1}^n U_{ij}$$

where

$$\omega = \alpha_t + 2\beta_t$$

$$\rho = \alpha_t + \beta_t$$

$$\lambda = \beta_t$$

and

i : Index of the cost of each holding period per activity

j : Index of number of each holding period of activity

t : Index of number of holding per activity

Model parameters are as follows:

L_{ij} : Minimum of the budget allocated for activities *i* with *j* replicates

U_{ij} : Maximum of the budget allocated for activities *i* with *j* replicates

The decision variables are defined as follows:

a : Budget allocation for cultural activities

b : Budget allocation for sports activities

c : Budget allocation for sports counseling

α : Weight desirability of students

β : Weight of expert opinion

The objective function:

The objective function that introduced, in order to maximize the Budget allocation. This Budget allocation, based on the degree of desirability of students and importance of expert opinion.

Structural constraints:

First-class restrictions: Shows the total budget allocated to three areas.

Second-class restrictions: This restrictions, indicates budget allocated to cultural sphere. This budget must be greater than the minimum total holding activity multiplied by the cost of the holding activities and less than the maximum total holding activity multiplied by the cost of the holding activities.

Third-class restrictions: This restrictions, indicates budget allocated to sport sphere. This budget must be greater than the minimum total holding activity multiplied by the cost of the holding activities and less than the maximum total holding activity multiplied by the cost of the holding activities.

Forth-class restrictions: This restrictions, indicates budget allocated to counseling sphere . This budget must be greater than the minimum total holding activity multiplied by the cost of the holding activities and less than the maximum total holding activity multiplied by the cost of the holding activities.

Conclusions

The model presented in this paper, can be implemented in the many universities and institutions of higher education. Since these model is used for budget allocation, so it can be used in other organizations that have cultural activities. Moreover this model is designed for a static situation, and by changing the data used for other research.

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