Available online at www.sciencedirect.com
ScienceDirect
Omega 36 (2008) 754–765
omega
The International Journal of Management Science
www.elsevier.com/locate/omega

An AHP-based evaluation procedure for Innovative Educational Projects: A face-to-face vs. computer-mediated case study☆

Mónica García Melón*, Pablo Aragonés Beltran, M. Carmen González Cruz

Department of Projects Engineering, Politechnical University of Valencia (Spain), Camino de Vera s/n, 46020 Valencia, Spain

Received 16 June 2004; accepted 13 January 2006
Available online 26 May 2006

Abstract

In this paper a procedure to evaluate proposals for Educational Innovation Projects is proposed. This methodology should help the Institute of Educational Sciences of the Politechnical University of Valencia to choose the best *Educational Project*, the final aim being to provide the Administration with a stringent evaluation methodology, since the current evaluation methodology was found to be neither sufficiently objective nor systematic.

Since in the definition and evaluation of these Educational Projects diverse stakeholders are involved, the process has been approached as a MCDA carried out by a group of experts. Although a whole methodology is proposed, the paper has been focused on the weight assignment of the different criteria chosen by the experts.

The experts have been asked to act in two different ways: *in face-to-face meetings* in which a consensus or compromise had to be reached, and *meetings at distance* where the experts have given their individual judgements, which have been next combined using the geometric mean with the software EC 2000 [Expert Choice 2000 Team. Pittsburgh: Expert Choice, Inc.; 2001]. This procedure has allowed the authors to analyse the possible scenarios that the IES board team might come up against in the future. The main difference between the two ways of work is the dimension of physical space or the distance between the members of the evaluating team. This distance has a significant effect on the way team members relate to each other.

Keywords: AHP; Group decisions; Decision process; Education

1. Introduction

As a result of reforms in Study Plans, the Politechnical University of Valencia (henceforth University) has been developing an Educational Innovation Projects (hence forth EIP) for the last five years. The aim of these projects is to initiate a process of methodological and organisational innovation in teaching that should improve the academic results of the students.

Every year the University calls for a tender of EIP, to which all the lecturers can apply. The projects should include a proposal explaining the objectives, as well as the methodological innovations proposed, resources required and expected results. These projects have to be evaluated. Therefore, a follow-up commission headed by the Institute of Educational Sciences of the University (henceforth IES) was created in order to select those to be supported, since the economic resources are limited and the IES board has to justify their distribution.

The method currently used to evaluate these proposals is the face-to-face meeting of five or six experts designated previously by the IES board who allocate a score

☆ This manuscript was processed by Area Editor Prof. B. Lev.
* Corresponding author.
E-mail address: mgarciam@dpi.upv.es (M.G. Melón).

0305-0483/$ - see front matter © 2006 Elsevier Ltd. All rights reserved.
doi:10.1016/j.omega.2006.01.005

to proposals on the basis of pre-established criteria. It is a simple and very subjective process and therefore difficult to justify. For this reason the IES board contacted the authors of the present work, to design a methodology that would help them to rank order the projects, the final aim being to provide the University with a stringent evaluation methodology that should allow the traceability of the whole process. Given the amount of University lecturers and departments involved in the proposals and the number of projects on offer, this evaluation would be accepted by the collective as a whole as long as the evaluation process were to instil sufficient confidence.

2. Aims of the work

The aim of the present work is to create a procedure that would allow evaluation of proposals for EIP, bearing in mind the multiple criteria and the opinion of different experts who were to advise the decision-making body, the Institute of Educational Sciences. The whole process could be understood as a problem of ordering the different proposals (alternatives) on the basis of a series of criteria established with the aid of experts. The process was therefore approached as a discrete multi-criteria multi-expert decision analysis (henceforth MCDA).*Multicriteria* because, as mentioned above, the conflicting interests involved are multiple: academic, economic, strategic, etc. and *multi-expert* since it was considered that the participation of independent experts would add gravity and rigour to the process. In this case, the selection process for experts was essential.

Two different ways of working for the experts will be analysed: (i) one based on face-to-face meetings and (ii) another one based on computer-mediated meetings since according to the authors experience in this field both may be useful for the evaluation of the proposals. The advantages and disadvantages of each of them will be analysed by means of a case study. After that the results of both ways of working, (i) and (ii), will be compared with the results of the current one used until now by the IES board. This comparison will be based on how the MCDA processes give more information, take more aspects into account, integrate the opinions of more people and therefore, can be used as a means for justifying the decisions better.

3. Multicriteria multi-expert evaluation

The use of MCDA makes the participation of different experts possible at different stages of the evaluation process, while taking multiple criteria and viewpoints into account. Different authors have proposed the use of MCDA as support in the decision-making process in different areas related to higher education. Mustafa and Goh [1] made an analysis of the techniques most used in the bibliography and the fields of application in the higher education area. Politis and Siskos [2] proposed their use in evaluating an Engineering Department in Greece with a view to enhancing its educational quality and internal organisation. Caballero et al. [3] proposed applying Goal Programming in assigning financial resources efficiently within a university system. Davey et al. [4] used it to analyse the selection process for a Ph.D. course.

The selection of the mathematical model based on MCDA is not easy. Among all the published methods the best known are: (i) the ones based on Multiple Attribute Utility Theory [5], (ii) the Analytic Hierarchy Process [6] and (iii) the outranking methods such as ELECTRE [7] and PROMETHEE [8]. A review of MCDA concepts and approaches can be found in [9,10]. According to Bouyssou et al. [11] there are several models that can be used in a decision-making process. There is no best model. To date, it has been impossible to demonstrate the domination of one MCDA technique over the rest. They all have advantages and drawbacks. Their use depends on the context.

In this process, the use of the Analytic Hierarchy Process (AHP) is proposed with multiple experts and, as support to this method, the software EC 2000 [12]. The reason this method is proposed is because it allows the decision maker to structure the problem of establishing priorities by means of hierarchic breake down of the problem, taking into account the consistencies of the emitted judgements. It is easy to explain to the experts who are to assess the EIPs and allows them to propose and gather the information generated individually in a simple and systematic way. The support software also enables the calculations and presentation of the results to be done easily and quickly. This favours its application in complex problems where the time of the participants in the process is rare and very expensive. The EC 2000 software has been used in a large variety of decision types, some related to the academic aspects of higher education [2] and other related to the decision-making support system journals [13]. Likewise, the program enables easy working with a group of experts via its group decision module. The operations research literature contains many applied and theoretical papers that describe the use of AHP in group decision-making setting. Early observations and suggestions for using AHP in group decision making are given in [14,15]. In