

Operations research education for forgotten populations

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Abstract

Typical OR education programmes are focused on those who should professionally act as “performers” (specialists, modellers, etc.) in the process of business problems solving through quantitative modelling and similar formalized procedures. The problem of unsatisfactory level of understanding between “specialists” and “generalists” (managers, e.g.) has been known for decades; yet we feel that at least the latter (“users” and “sponsors” as their subspecies) are still not adequately educated and this fact helps the gap to survive. We discuss different views of this problem and advocate for some approaches, mainly based upon our own pedagogical experiences. © 2002 Elsevier Science B.V. All rights reserved.

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1. Brutal facts

President of one of the most important professional OR organizations recently mentioned (see [7]) that close-to-extinction of operations research in some parts of the world was mainly caused by the academics who had paid too much emphasis on technicalities, thus allowing managers and other potential users to interpret OR as pure “mathematical masturbation”. Business student proverb “Magical Science is a waste of time”, cited in [11] as a negation of our faith in the usefulness of management science, somehow completes the picture.

Since Ackoff’s masterpiece [1], these are probably two of the most direct warnings to the OR/MS community that its main task should rather be co-operation with users on “grand plan” than

(merely) production of sophisticated mathematical models and algorithms, overloaded with details which can usually not be properly supported with reliable data.

During the last years, there have been many other calls for resurrection of the more traditional, i.e. integral, contents-oriented, on the whole less technical and in the first place strictly interdisciplinary approach to OR/MS. The revival of classical sources (like [5,15,23], and many others) is obvious too.

Yet there is probably a long way to go to bring OR/MS specialists and managers closer again. Some basic obstacles could be the following:

- (a) A crucial part of the problem is the fact that the roles each of the parts should play in efficient problem solving are often not precisely defined in advance; sometimes it is not even clear how different the roles and corresponding responsibilities actually are.

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- (b) Players are not properly trained for their roles, which is especially true if we consider the users' inability to participate as active members of interdisciplinary teams.
- (c) The current level of communication and mutual understanding between the two groups is generally rather low.

Discussing the evidence in detail could mean re-inventing hot water. Churchman and Schainblatt (compare [6]) were among the first to recognize the dichotomy between researchers and managers. Although more focused on the implementation phase, they have already unveiled the most important common reasons for confrontation between them (see [8,9,13,21]), and also initiated a more general discussion, which sometimes goes all the way down to the basic differences in cognitive characteristics of both groups [14].

One of the most striking differences, namely the “language problem”, has been evident in the OR literature for more than 40 years (and in OR practice, probably always), and some authors have systematically tried to overcome it. Vazsony's classical OR textbook [23] even exposes it in its “mission statement”: “It is the first attempt to develop a mathematical language which can be understood by businessmen using scientific techniques (OR, LP; statistical decision theory, etc.). The book is written for management personnel, with scientific techniques explained, *not in terms of mathematics, but in terms of business*”.

I believe that adequate – and in some sense more balanced – OR education for users could help a lot in achieving the necessary condition for success: enabling users to act as providers of an important part of the interdisciplinary knowledge. This does not mean that the education of OR (MS, IS, etc.) specialists is perfect, yet the users' side still seems to be the weakest link in the chain. Situation may be different from country to country, but recent publications in *INFORMS Transactions on Education* [10,11,17] and other sources confirm that there is a common core of problems connected with the education of non-specialists. The crucial part of such education takes place as OR/MS courses within (undergraduate) business school curricula, and in the first place in post-graduate MBA programmes. The importance of

OR/MS courses for technical professions and functional education for people from practice should also not be underestimated, but the main emphasis has always been on students of business.

This paper focuses on the question how to design and implement OR/MS education for all those we like to call *forgotten populations*, i.e. *users* as a whole and *sponsors* as their subspecies. To be on the safe side, let us say that we understand the word “sponsors” as it usually applies in the context of IT projects, mainly in information systems development. Sponsors can be general managers, CEOs, members of the board and other persons responsible in the first place for the strategic level of decision-making. Compared to the involvement of other users, sponsors' controls are more or less of indirect and strategic type. On the other hand, sponsors are directly involved in the formalized problem solving procedures at least at the very beginning (they have to pull the trigger and allow the process to start) and during their final phase, thus sharing the responsibility for the project. It was empirically shown that more than 90% of projects remained unaccomplished without active support of the top management in the firm. Last, but not least, sponsors must do what their name promises: pay.

Typically, potential “direct users” of OR in firms are either decision-makers at the operational level, or planners, controllers, accountants and other “cost-cutters” at the tactical level. They are usually the first to encounter the symptoms of a problem situation and are supposed to be able to define the problem in exact terms. If OR/MS methods are used in the firm, these people are generally directly involved in the modelling process, data providing and/or practical implementation of solutions.

We would not go that far to imply different cognitive characteristics for these groups, but there is another functional difference that makes us sometimes distinguish between sponsors and “direct users”. While the latter may also achieve instantaneous tangible direct profits from the application of OR/MS methods through increased productivity of their individual work and consequentially higher earnings, the former can only get enthusiastic if one can make them believe that the

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