

Game playing and operations management education

Michael A. Lewis, Harvey R. Maylor*

Operations and Supply Group, University of Bath School of Management, Bath, UK

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Abstract

There is a well established tradition of teaching operations management (OM) via various kinds of production game: real players making real decisions in a practical, albeit simulated, situation. Surprisingly, there has been much less conceptual reflection on the process and content of this approach to OM education, something this paper aims to begin to rectify. The first section clarifies terminology and defines the game concept in terms of a transformation process. The second section reviews the extant population of teaching games and deploys the conceptual model to generate a number of specific observations that underpin a discussion about the content and process of OM-related game playing. In the conclusions, particular attention is drawn to (1) the predominant content of OM-related games has not developed with the same emphasis as the taught subject with manufacturing planning and control still dominating (2) the tendency to produce complex OM games requiring IT support, and (3) the removal of competition in gaming in favour of facilitating experimentation by players. The paper finishes with a discussion of potential further work.

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1. Introduction

Operations management (OM) education employs a wide variety of games (Riis and Mikkelsen, 1995), ranging from simple ‘tabletop’ (Robinson and Robinson, 1994) and ‘red bead’ experiments (Deming, 1986), to system simulations like the Beer (Forrester, 1961; Senge, 1990) and Cuppa Manufacturing games (Ammar and Wright, 1999), to much more complex interactive environments such as a ‘training factory’ (Haapsalo and Hyvönen, 2001). This interest in ‘playing’ can be explained in a number of ways. Games and simulations address

specific OM concerns that the “...interesting and challenging issues ... are difficult to convey effectively in a purely theoretical setting [because] students need some way to directly experience the issues involved in operating a production system” (Ammar and Wright, 1999, p. 183). This can be particularly important when the taught course represents a student’s first exposure to operations management practice but experienced students can also find their own knowledge a barrier to new concepts. More generally therefore, gaming promotes ‘experiential learning’ by providing a shared ‘concrete experience’ (Kolb, 1985) that many argue allows the student to explore theory and practice more critically and (hopefully) memorably (McKenney, 1962, 1967, McKenney and Dill, 1966; Haapasalo and Hyvönen, 2001). Additionally, some

*Corresponding author. Tel.: +44 1225 323886;
fax: +44 1225 323902.

E-mail address: h.maylor@bath.ac.uk (H.R. Maylor).

authors (e.g. [Smeds, 1997](#)) have argued that there is potential to use gaming as a form of ‘co-production’ of knowledge that might overcome traditional barriers to academic–practitioner knowledge transfer.

This paper was motivated in large part by the authors’ practical experiences of game playing in an educational context. Both felt that they had developed ‘experiential’ insight into a range of specific games but lacked (1) a conceptual schema for understanding the educational process involved and (2) a comprehensive guide to both the educational content and playing process of OM-specific games. The paper begins by discussing the general historical and conceptual antecedents of teaching with ‘organisation-themed’ games. Concepts are extracted from existing definitions of games and a generic transformation model of game playing in OM is proposed. Then using a range of secondary data, specifically a survey of 222 OM-specific and OM-related games derived from published gaming texts and references, two empirical research questions are tackled. Firstly, what is the content of OM games? This is an important question as the nature of OM has changed significantly in the recent past, and we need to establish whether the games’ content has kept pace with this change. Secondly, what is the process for the games? Specifically, how long do they take, how many people are involved and what is the level of complexity and the physical requirements? The paper concludes with recommendations for further work.

2. Conceptual Background

To think about playing a game is, for most people, to consider engaging in a diverting (i.e. not serious) mental and/or physical activity that might involve other people. At the same time, other participants can treat exactly the same set of activities very seriously indeed. Players of even the most apparently trivial games can be ‘professional’ and some earn huge salaries from participating. Moreover, the economics of these earnings are dependent upon large numbers of people (i.e. spectators, fans, etc.) deriving pleasure from simply watching their game play. In addition to various forms of entertainment, games are used in teaching (from primary to post-graduate level), training, therapy/diagnosis and experimentation ([Shubik, 1975a](#)). There are also many pejorative connotations to games—many managers for instance, will

assert that they have to ‘play the game’ if they want to get on in their organisation ([Weir, 1997](#)). In other words, although games and game playing are deeply ingrained in human nature (*Homo Ludens*: [Huizinga, 1971](#)), they remain complex and ambiguous phenomena.

2.1. The development of educational game playing

Although the precise origins of games designed to represent and thereby ‘educate’ players in aspects of organisational life are difficult to establish, three specific historical developments are worth highlighting.

First, most early writers on business gaming drew heavily on the notions of competitive conflict implicit in military and political games (e.g. [Shubik, 1975b](#); [Bowen, 1978](#)). The history of military gaming is particularly important, including chess-type games in prehistoric India, kriegspiel (German: krieg—war; spiel—game) in 19th century Prussia and modern US IT-integrated war planning ([Shubik, 1975a, b](#); [Allen, 1987](#)). Similarly, in the years following WWII a number of defence-related institutes (e.g. RAND Corporation) developed a range of strategic and operational ‘games’ based upon principles of operational research and game theory. How and whether these should be counted as ‘games’ is discussed in the next section.

Second, the proliferation of management ([Gordon and Howell, 1959](#)) and industrial engineering courses ([Emerson and Naehring, 1988](#)) created a context where games could create educational market value (e.g. “...with the increasing general recognition of the importance of the management profession has come insistence on better and shorter methods of acquiring management experience—at least vicariously”: [Graham and Gray, 1969, p.17](#)). This pressure on staff and timetables has not in any sense decreased in the intervening years. In an early example (1956) of a business game, the American Management Association created the “Top Management Decision Simulation”. Within ten years a survey revealed that two-thirds of US business schools had adopted related gaming techniques ([Klasson, 1964](#)).

Finally, the widespread adoption of gaming approaches was enabled by the emergence of affordable (micro-) computing power—albeit in the first instance affordable only to the large corporation and/or university. Today, ever greater processing power and network interactivity at lower

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