



From Rhetoric to Reality: Business Games as Educational Tools

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Abstract

This paper discusses business games as teaching tools in Management Science (MS). The discipline's traditional teaching methods, while appropriate for the dissemination of foundational knowledge, cannot provide students with a platform to link abstract concepts and real-world problems. We suggest that business simulation games are an effective way to engage students in MS topics; that they compel students to understand and cope with the ambiguities associated with real-world organizations. Specifically, we discuss our experience with the International Operations Simulation Mark/2000 (INTOPIA), a game designed to channel students into a stream of entrepreneurial decision-making. We employed the game over 12 semesters with approximately 1000 advanced MBA candidates. Our findings indicate that business games represent a novel instructional approach: this pedagogy has a real potential to promote the exchange of new ideas on teaching and learning within and across courses in the MS discipline.

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1. Introduction

"You learn more about a person in an hour of play than in a year of conversation".

Plato's adage is particularly relevant to the ensuing discussion on games. From an educational perspective, games are important motivational and learning tools (Garris et al., 2002), a link between abstract concepts and real-world problems, a "learning by doing" or "hands-on" approach to learning (Martin, 2000; Kolodner et al., 2003). From a technical perspective, games help remedy education's long-standing struggle to maintain fluency in end-user computing, the world-wide-web, distance learning and cooperative learning (Erkut, 2000). Educators desire to work with technology to create more meaningful learning experiences (Souza e Silva and Delacruz, 2006). Therefore, exploring novel approaches to technology-friendly games for teaching and learning is eminently justifiable.

Our focus is games as teaching tools in higher education. Organized in five sections, the next section explores current challenges in MS education. Then, we define business games and their pedagogical efficacy. Next, we discuss business games and experiential learning. We also introduce a metric for report on a specific business game employed in an MS classroom. Finally, we present our conclusions and recommendations for future inquiry.

2. Challenges facing MS educators

The reexamination of MS education, prompted by concerns over a static, content-oriented pedagogy (Leitch and Harrison, 1999) reflects a broader problem facing the business disciplines. That is, the traditional education paradigm, content and knowledge transmission (Larréché, 1987), is insufficient. Today's business realities mandate a multidimensional teaching approach, where teachers (1) transmit core competencies and (2) provide a forum for students to think independently, to challenge assumptions and widely held be-

liefs (Prince and Steward, 2000). Aram and Noble (1999) argue that business schools do not adequately prepare students to understand and cope with the ambiguities they will inevitably face in real-world organizations. The authors suggest that the teaching and learning models that dominate current academic practice do not include the paradoxical and unpredictable characteristics of the contemporary business world. This is particularly problematic for graduate students to the extent that adult working students typically enroll in such programs as a direct result of their lived experience in organizations (Dehler, 2006, p. 637).

Another perennial problem in MS education is curriculum integration. Integration assumes that postsecondary learning is a complex social and cognitive process of mastery and discovery (Warren, 2002). Integration also mirrors the dominant management paradigm, the resource-based view of the firm (Stephen et al., 2002). Yet, despite the literature advocating curriculum integration, which is neither sparse nor new (Bruner, 1977; Collins, 1996; Dewey, 1966, Fogarty, 1999; Grubb, 2005; Huber and Hutchings, 2004; Lorents et al., 2003), business schools often operate as a loose amalgam of independent, miscellaneous units. Business curricula are poor at offering students the opportunity to develop integrated knowledge (Stephen et al., 2002). This arrangement fosters partitioned skill acquisition. As a result, students often graduate with excellent analytical skills but have no idea how to translate them into systems thinking or to put ideas into practice (Markulis et al., 2005). Walker and Black (2000) suggest that business studies should reflect a series of integrated activities instead of largely independent functions.

Static, content-oriented teaching methods obviate curriculum integration, and weak curriculum integration minimizes desired educational outcomes. If knowledge is not translatable or transferable, its relevancy to students and the practice of MS may be negligible. Knowledge in this field is a means to an end not an end in itself, and the acquisition of foundational factual knowledge is an early and important phase of the learning process but should not be the only one. Learning in the MS field is doing; it is performing empirical tasks (Dehler, 2006).

3. Learning and Business Games

3.1. The Nature of Business Games

Business simulation games address many of the challenges associated with MS education such as integration. They also present a promising alternative to the field's traditional methods of instruction. In fact, literature documents the educational effectiveness of simulations (Cox, 1999; Michaelson et al., 2001; Parker and Swatman, 1999; Scherpereel, 2005; Tomlinson and Masuhara, 2000; Yeo and Tan, 1999). And emerging technology renders simulation exercises more sophisticated and user friendly. Students are able to concentrate on content and learning through the gaming exercise without mastering the intricacies of the game apparatus. (Pillutla, 2003). A method of learning through games-forcing adrenaline rushes, active involvement, and motivation to their peak-may be employed to excite students and internalize subject matter. Games energize behavior (Harper et al., 2000; Rieber, 1996; Parker and Swatman, 1999; Rafaeli and Ravid, 2003; Kafai, 2006).

A general-purpose business game is a highly complex man-made environment. Business simulation games are occasionally described in the literature. *Simulation & Gaming* (Volume 32, No. 4, 2001) dedicated a special issue to the "state of the art and science of simulation and gaming" (p. 449). Wolfe and Crookall (1998) assessed the status of simulation and gaming as a scientific discipline.

The objective of a business game is to offer students the opportunity to learn by doing, engaging them in a simulated experience of the real-world, to immerse them in an authentic a management situation (e.g., Garris et al., 2002; Martin, 2000). Generally, this objective makes business games impractical for controlled experimentation. However, as a laboratory setting that mimics real life situations, observed behavior may be generalized to reality (e.g., Babb et al., 1966; Lainema and Makkonen, 2003).

3.2. The Model

To achieve our objective, we briefly discuss the transformative nature of experiential learning and its interplay with transactional nature of simulation games. In turn, this will lead us to a metric for learning,

teaching and assessing in the context of a specific business game course.

Experiential learning emphasizes the interaction between experience and learning by exploiting the subjective nature of the learning process (Kolb, 1984) and creating a transformation of experience that engenders knowledge (Mainemelis et al., 2002). Business simulation games relate directly to the nature of experiential learning. In fact, Garris et al. (2002) regard business games as a method that epitomizes experiential learning (see also Anderson and Lawton, 1988; Faria and Wellington, 2005; Ruben, 1977; 1999). Business games provide students the opportunity to (a) assume the roles and responsibilities of executives; (b) become intimately involved in decisions faced by real people in real organizations; (c) experience pressure; and (d) recognize risks. Moreover, this method is an excellent tool to test the understanding of theory, to connect theory with application, and to develop theoretical insights.

An assessment framework known as the Revised Taxonomy of Educational Objectives (Anderson and

Krathwohl, 2001) typifies the relationship between experiential learning and business games. The Revised Taxonomy is a modified version of Bloom's Taxonomy of Educational Objectives (1956). The Original Taxonomy represented an effort to standardize the language of intellectual (learning) behavior. This construct is a one dimensional continuum, a cumulative hierarchical system of learning classification that uses observed student behavior to infer the level of student achievement, where more complex behaviors subsume the simpler behaviors (Athanasios et al, 2003; Bloom, 1956; Krathwohl, 2002). The Revised Taxonomy augments this work. It is a two dimensional matrix that juxtaposes knowledge and cognitive processes. The knowledge dimension represents a continuum from concreteness to abstraction. The cognitive process dimension represents an assumed hierarchical continuum of cognitive complexity. Table 1 illustrates the structure of the Revised Taxonomy. Each cell in the taxonomy corresponds to an educational objective (Anderson and Krathwohl, 2001).

Table 1: *The Revised Taxonomy*

Knowledge Dimension	Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge						
Conceptual Knowledge						
Procedural Knowledge						
Meta-Cognitive Knowledge						

The knowledge dimension includes four knowledge types: *factual*, *conceptual*, *procedural*, and *meta-cognitive*. Concrete, *factual knowledge* includes the introductory concepts, skills and details of a specific discipline. *Conceptual knowledge* represents a synthesis of factual knowledge and movement towards an understanding of principles and theories associated with a given discipline. *Procedural knowledge* involves one's grasp of how to study something. This may include knowledge of subject-specific techniques and methods or informed judgments for determining when to use appropriate procedures. *Meta-cognitive knowledge* is summarizing knowledge; theoretical and conceptual knowledge that synthesizes the lesser dimensions. It is knowledge of cognition in general but also knowledge of one's own intellectual prowess (Anderson and Krathwohl, 2001).

The cognitive process dimension ranges from *remember*, a basic cognitive retrieval process to *create*, an advanced pattern matching and planning process. The categories between remember and create represent a transition from recognizing and recalling facts to theory generation and successful learning habits (Anderson and Krathwohl, 2001). These middle categories are *understand*, *apply*, *analyze* and *evaluate*. *Understand* relates to one's ability to determine the meaning of instructional messages through several modes of communication. *Apply* is the ability to execute or implement a procedure appropriate to a given situation and closely linked to procedural knowledge. *Analyze* relates to deconstruction: one's ability to break material into constituent parts and determine how those parts relate to one another. The *evaluate* category involves making judgments based on criteria and standards:

checking and critiquing. Those judgments lead to one's ability to create, to generate hypotheses, to engage in research planning and to effectively articulate research outcomes (Anderson and Krathwohl, 2001).

This framework represents a practical heuristic for exploring the interplay between teaching, learning, assessment and business games. Thus, we discuss a specific business game course in the context of the Revised Taxonomy.

4. The Business Game Course

4.1. Course Objectives

Because the business game course is one of the summarizing courses in the MBA program, the primary, explicit course objective is to improve students' management and thinking skills by practicing in "real conditions". We consider the game as a tool that allows for learning to occur at multiple levels of the Revised Taxonomy. Thus, we had to exploit the more implicit course objectives manifest in assessment and instructional activities to identify where exactly the principal objective fit into the taxonomic table. Implicit course goals relate to: (1) strategy in decision making, where (2) students implement lessons learned from previous coursework. We found that the first objective relates to *understanding conceptual knowledge* because strategy denotes a particular knowledge domain. Students must understand the basic elements of strategy and how those elements interact. The second objective involves *applying procedural knowledge*, as the summarizing nature of the course requires that students invoke skills and methods learned in other courses and integrate that knowledge.

4.2. The game

This course utilizes the international version of a business game developed in the United States, commonly known as the International Operations Simulation Mark/2000 (hereafter INTOPIA TM). The prime purpose of this business game reflects the course objectives. But the game is also meant to increase students' general understanding of strategic management of international operations, particularly the multinational corporation. Furthermore, the game is designed to yield substantial payoffs in management training. It forces participants into a stream of entrepreneurial

top management decisions, where they search for logic and synergy in the business objectives-strategy-implementation sequence (Thorelli et al., 1995).

The game is highly realistic, meant to simulate the total environment. Students participating in the game immerse themselves in an artificially created world. The simulated markets are similar to the markets in the United States (US), the European Union (EU) and Brazil, where each company can operate a local branch. "Operate" is a broad concept and may cover one or any combination of the manufacturing, marketing, distributing, exporting, importing, financing and licensing functions. Incoming participants enter a "going concern" with four periods of simulated history and play six to ten additional game periods. The task of the companies is to make decisions which will guide operations (simulated by a relatively easy computer interface) in the current period and which will affect operations in subsequent periods.

4.3. Participants

The study was conducted in a university accredited by the Association to Advance Collegiate Schools of Business (AACSB). The participants were senior MBA candidates. Approximately 1000 students participated in business game classes. The study was conducted each semester from fall 2002 through spring 2006. In each semester the students were divided into groups (corporations) that included five participants assuming executive roles. The formation of companies and the allocation of executive roles proceeded without external intervention or manipulation.

4.4. Instructional Activities

The game is played for a full semester and is operated by up to 25 competing companies. It commences after five weeks of lecture, at which point the instructor adopts a rather passive role. That is, the class is expected to apply classroom knowledge to the game with little direction. This approach is designed to challenge the students' ingenuity and creativity.

The game is conducted by three instructors, who emphasize the importance of teamwork. While each student becomes a specialist in his or her function, the game requires a collaborative effort to achieve the common goals of the company which the students themselves define. Teams make functional and

strategic decisions once a week. The decision data are then e-mailed to the game administrator for database entry. After the program runs the data, it generates company outputs that include financial reports (e.g., a balance sheet; an income statement), production reports and market research. These outputs are then e-mailed to the companies and are used for decision-making in subsequent periods. The length of the each simulated time period in our game is one year.

In each period, the game requires dozens of decisions, typical of any large firm. The decision-making process is based on (1) analysis of the company's history presented to players when the game commences; (2) interaction with other companies and external agents of the game (e.g., bankers; board of directors); and (3) constraints stated in the player's manual (e.g., procedures for production; types of marketing channels available).

The performance of a company in a given period is a result of past decisions and performance, current decisions, simulated customer behavior, and competition—other companies in the industry.

Instructional activities promote learning at several of levels of the taxonomy. Lectures, for example, first emphasize knowledge of terminology. Then, they progress to integration of factual knowledge from different disciplines. Thus, instructional activities promote *remember factual and conceptual knowledge*. However, when the instructors adopt passive roles and the students play the game, the students are required to engage in progressively more independent strategic decision making and therefore, learn at a higher level of the taxonomy. Students (teams) are forced to rely on self-knowledge. They have to analyze different management situations and evaluate their decisions based on their knowledge of procedures articulated in the lectures; to *analyze and evaluate procedural knowledge*. Further, at a more abstract level, the less invasive instructor role mandates that students understand how and why they make decisions. Such conditions make it important for students to understand their strengths and weaknesses; to *understand meta-cognitive knowledge*.

4.5. Assessment Activities

Grading is based on two quizzes, two written reports and two oral presentations. The first quiz measures

the students' command of rules and general information about the game. The second quiz assesses team-specific knowledge on periodic outputs and market research. The first oral presentation and written report include factual, baseline corporate information such as a description of mission and vision. They also include: (1) a description of corporate aims and positioning; (2) an initial strategic analysis; (3) a preliminary development of business and competitive strategy based on the strategic analysis; and (4) a preliminary projected profit and loss reports. The first presentation is presented only to the instructors who assume the role of board of directors. In the second presentation, before their classmates, the teams analyze their activities in the game, revealing their objectives and strategy. The second oral presentation and written report necessarily build upon the first. Teams must submit a fully strategic analysis (updated mission and vision statements), market analysis, operational analysis, and financial analysis based upon the game's results. The expectation is that each team will learn from one another, given the different backgrounds of students. The final grade also incorporates the company's performance (i.e., the decision making throughout the game).

The first quiz measures remembering information or facts (e.g., how much does it cost to build a plant in the United States?). So, we placed it at the intersection of *remember* and *factual knowledge*. The second quiz requires that students understand financial and market data (e.g., what was the average return on investment of European manufacturers?). As such, we classified the second quiz as *understand conceptual knowledge*.

The aim of the reports is to promote higher-order cognitive processes, such as strategic analysis and development. We classified both reports as applications of meta-cognitive knowledge because they are activities that require teams to articulate corporate aims and strategic knowledge. We categorized the first report as *analyze meta-cognitive knowledge*, as analysis is the highest level required for the first report. We also located the presentations at that cell. However, we suggest that the culminating final report requires learning to occur at the highest level of the taxonomy, based on two factors. First, teams were required to (1) hypothesize about subsequent business periods that are not actually played; (2) explain procedures on how to perpetuate their going concern; and (3) update their previous work based upon strategic knowledge. Sec-

ond, the final report was (1) a self (team) critique of previous work; and (2) a vehicle for team's to explain their command of the structure and function of the course. Thus, we classified the final report as *create meta-cognitive knowledge*.

4.6. The Taxonomy Revisited

Pursuant to business games, the Revised Taxonomy is an important tool. It allows educators to analyze the interaction of students with course materials. Simulta-

neously, it allows educators to analyze the ways in which an individual's knowledge is structured. These two activities are fundamentally important in education (Anderson and Krathwohl, 2001). We also found the Revised Taxonomy a useful analytic framework for assessing the degree business games foster alignment between pedagogy and student learning. Table 2 illustrates our understanding of how the knowledge and cognitive processes relate to the INTOPIA business game.

Table 2: *The Use of the Revised Taxonomy in INTOPIA*

Knowledge Dimension	Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual Knowledge	Quiz 1 Lectures					
Conceptual Knowledge	Lectures	Objective 1; Quiz 2				
Procedural Knowledge			Objective 2	Passive Instructor Role	Passive Instructor Role	
Meta-Cognitive Knowledge		Passive Instructor Role		First Report; Presentations		Final Report

Our integration of the Revised Taxonomy indicates that business games allow for learning to occur at multiple levels; but not all. We also found a modest degree of alignment between teaching, learning and assessment. This is acceptable given that instructors may include activities which are not directly related to either objectives or assessments. The intent of such activities is to provide students with information they need to master an objective (Anderson and Krathwohl, 2001). Each instructional and assessment activity, therefore, serves as a vehicle for students to improve their managerial and cognitive skills.

Even with a modest degree of alignment, our experience with the Revised Taxonomy suggests that business games satisfy a longstanding need in MS education: curriculum integration. Integration occurs because learning in business games spans from the lowest to highest levels of the taxonomy. First, students must remember, understand and apply their knowledge from previous coursework. Second, they must analyze their own strengths and weaknesses, relative to other teams. Last, they must create and simulate a corporate reality. These three factors, among others, underscore the importance and potential of business games for learning through integration. And more practically, the Revised Taxonomy confirms that business simulation games are an effective way to engage students in MS topics; that they compel students

to understand and cope with the ambiguities associated with real-world organizations.

5. Discussion and Conclusions

More generally, our experience suggests that the efficacy of business games as educational tools is three-fold. First, business games provide students an opportunity to immediately apply classroom concepts to real management problems. That is, business games enable students to apply scientific and mathematic methods to construct, solve, and analyze simulated management scenarios. The game also forces students to reason clearly and logically, as they must carefully sift through available data. Thus, an ancillary benefit is effective data handling skills. Second, business games afford students the chance to practice the art of decision-making in a laboratory setting, with little corporate and personal risk involved, an experience otherwise unattainable away from the real-world. This environment enables students to participate in actual management science training, rather than a generalized, sanitized explanation of reality. In essence, business games are to management students what cadavers are to medical students. They represent the opportunity to practice on the real thing. Third, the simulation forces students to think independently, where they are actually engaged in an experiential

process of learning how to learn. Therefore, we find that business games are an effective pedagogy and represent one of the most sophisticated and promising uses of technology in MS education. We also find that the marriage of technology and experiential learning offers students a quality experience. This is important because everything depends upon the quality of experience, not the experience itself (Dewey, 1938).

In terms of pedagogy, we find that business games provide an effective alternative to traditional teaching methods. The progressively passive instructor role, for example, creates a collegial, realistic managerial culture that exposes students to peculiarities of real-world organizations. It is relatively difficult, for example, to convey the importance of decision-making under uncertainty or the value of information. Furthermore, the realism and competitiveness of the game elicit excitement and motivation, where students strive to make better decisions. For example, several teams developed formal decision-making models and integrated them with information systems that they themselves built (Ben-Zvi, 2007).

When selecting a platform game for the course, we advise looking for a moderate degree of complexity in terms of: (1) long-range decisions (e.g., investment in plants and equipment); (2) short-range decisions (e.g., prices and production scheduling); and (3) decisions from various management functions such as marketing, finance, production, etc. These factors facilitate the application of MS topics over a broad range of decisions.

Our experience suggests that the INTOPIA game addresses these requirements and is an ideal platform for the gaming method because it enables students to understand information needs through participation in a real decision-making process. Moreover, student reaction to the game is favorable. Most report that they enjoy playing the game and the competitiveness and realism that it brings to the classroom. Over time, the course earned high ratings in teaching important skills and contributing to the learning experience in relation to other courses (6.23 and 6.32 out of 7.00, respectively, compared to 4.58 and 5.04 in other courses). One of the students even remarked, "The only thing that I will take from my program of studies is the game."

Future inquiry might investigate how to effectively integrate games and other MS curriculum offerings.

Given that the literature is wrought with curriculum integration concerns, the novelty of games may promote the exchange of new ideas on teaching and learning within and across courses in the MS discipline. Another line of research might explore how to quantify student experiences. The architecture of business simulation games places students in a role of both teacher and learner. Therefore, documenting and quantifying these experiences may yield new ideas that substantiate alternative and promising pedagogical approaches in MS.

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