

**THE CHANGING NATURE OF SIMULATION RESEARCH:
A BRIEF ABSEL HISTORY**

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ABSTRACT

ABSEL has recently passed its twenty-fifth birthday and a review of the twenty-five ABSEL proceedings starting with Oklahoma City in 1974 provides a good overview of the changing nature of simulation gaming research. This paper reviews the history of simulation gaming research through the eyes and papers of ABSEL members over the past twenty-five years. The review is limited to several areas of major research interest and examines research in the area of business gaming but not experiential learning.

too difficult for one paper. As such, this paper is limited to three important research areas of ABSEL members through the years: (1) correlates of simulation performance; (2) the effectiveness of business simulation games in strategic management courses; and (3) what business games teach. These topics were selected due to the large number of ABSEL papers in these three areas. Other topic areas are left to other papers and other researchers. As well, this paper deals with only research on simulation gaming and does not cover the many papers in the area of experiential exercises.

INTRODUCTION

Now that ABSEL has passed its twenty-fifth year and simulation games as we know them are approaching their forty-fifth birthday (Faria 1990), it might be time to examine some changes that have occurred through the years with regard to basic simulation gaming writing and research. While a review of business games themselves would be interesting, this is not the purpose of the current paper and has been adequately undertaken by Keys and Biggs (1990).

There are many sources that might be used to examine the changing nature of simulation gaming research over the years (e.g., one might examine all past issues of *Simulation & Gaming*). Certainly, though, one good source is the twenty-five conference proceedings of ABSEL dating back to the first ABSEL conference in Oklahoma City in 1974. This paper will explore the changing nature of simulation gaming research through the papers presented at ABSEL conferences. While it would be nice to examine all ABSEL research, that undertaking would be

THE BEGINNING

The first two ABSEL Conferences (1974 in Oklahoma City and 1975 in Bloomington, Indiana) were dominated by papers on how to effectively use simulations, how to administer simulation games, how to evaluate performance, descriptions of simulation games then in use, and discussions of the personal experiences of instructors with their classroom usage of business games. This was natural as business game usage in university classes was relatively new at that time and presenters were exchanging experiences during these early years of ABSEL.

In the first year of ABSEL, only four papers reporting research findings were presented. By the second year, this number had grown to fourteen. Years three and four carried ABSEL from mostly descriptive papers to research oriented papers. The following pages will examine research contributions to the field of simulation gaming and experiential learning through the papers of ABSEL members.

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CORRELATES OF SIMULATION PERFORMANCE

Many studies during the early years of ABSEL examined the relationship between performance in a simulation competition and participant characteristics or the manner in which the simulation was administered. These studies examined such variables as participant personality characteristics, grade point average, gender, ethnic origin, team size, simulation grade weighting, decision time pressure, the degree of simulation explanation provided, method of team formation, previous business experience, student major, previous business courses taken, degree of team organization and planning, cohesion, locus of control, leadership, attitude toward simulations, and instructor interest among other variables.

As evidence of the importance of this type of research in the early years of ABSEL, only four papers presented at the first ABSEL meeting in Oklahoma City were based on research findings and three of these dealt with participant characteristics and game success (Armenakis, Feild and Holley 1974; Napier 1974; Johnson and Landon 1974). Among other things, these studies concluded that simulation game success is related to dominant personality types, sociables, and teams that exercise democratic decision making. Simulation game performance was not found to be related to time spent on decisions, average team GPA or team size.

Factors related to simulation performance became one of the big research areas over the next three years among ABSEL members. Well over twenty papers presented at the 1975, 1976 and 1977 ABSEL conferences were devoted to this topic area. Among other things, it was reported that greater instructor involvement improved simulation performance (Biggs 1975; Schreier 1977; Nulsen and Faria 1977), more cohesive teams perform better (Biggs 1975; Etnyre and Wolf 1975), teams outperform individuals (Nielsen 1975), debriefing after each decision period improves

performance (Hodgetts and Kreitner 1975), teams under no time pressure outperformed teams under time pressure (Barone, Dauner and Rakich 1975), stress artificially introduced by the simulation administrator lowers performance (Parish 1975), using simulation game related outside assignments improves performance (Faria and Nulsen 1975), a positive attitude and commitment to the simulation improved performance (Brenenstuhl 1976; Schneier and Beatty 1977), smaller teams outperformed larger teams (Hoover 1976), AE and AC personality types performed better in simulations (Brenenstuhl and Catalanello 1977), and conflict among team members did not hamper performance (King 1977). As well, no relationship between locus of control and achievement motivation and simulation performance was reported in two studies (Brenenstuhl and Badgett 1977; Butler and Parasuraman 1977).

By 1977 and 1978, many replications of earlier studies on correlates of performance were being presented to corroborate or refute earlier findings. As might be expected, a number of contradictory findings were reported, but consensus was achieved on several issues through well conceived studies with large numbers of students. For example, Wolfe (1978, p. 321) concluded that "evidence has been produced that a student's performance in a business game conforms to past academic achievement." This relationship was further supported by Wolfe and Box (1986) and by Lynch and Michael (1989). Wolfe and Box (1986) further concluded that simulation performance is correlated with team cohesion (see also Wolfe and Box 1987) and strong team leadership. In a study involving over 300 student simulation game players, it was concluded by Faria (1986) that teams of three outperformed larger teams (see also Wolfe and Chacko 1982); greater instructor involvement resulted in better game performance; and teams in high simulation game grade weighted sections outperformed teams in lower grade weighted sections.

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While individual studies reporting on selected correlates of performance continued to appear, the focus of this type of research began to change from the late 1970s through the early 1980s. This change gradually took the form of attempting to utilize participant characteristics to predict simulation performance (e.g., 1987; Hornaday and Curran 1987; Hornaday and Curran 1988; Curran and Hornaday 1989; Wellington and Faria 1989). The studies attempting to predict simulation performance based on participant characteristics achieved mixed results. Gosenpud (1987) summarized the findings from many of these studies and attempted to explain the mixed findings.

According to Gosenpud (1987), the difficulty with using participant characteristics to predict team simulation performance was due to the mixture of characteristics that is to be found on teams of three to six or more members. As such, team characteristics (e.g., degree of planning, formal decision-making organization, cohesion) have proven to be slightly better predictors of performance than individual characteristics (e.g., GPA, major, personality type). Two studies can be cited in support of Gosenpud's (1987) conclusions.

Lynch and Michael (1989), using single player teams, found that they were able to successfully predict company earnings performance in the simulation based on individual player GPA. In the same fashion, using single player companies, Anderson and Lawton (1991) replicated a study undertaken by Patz (1990). When using five person teams, Patz (1990) was unable to predict company performance based on Myers-Briggs personality types. However, with single person teams, Anderson and Lawton (1991) were able to correctly predict that "thinker" personality types would outperform "feeler" personality types.

Several research findings using team-wide characteristics were quite clear. For example, Hornaday and Curran (1988), Curran and Hornaday (1989), and Wellington and Faria (1989) all report that team performance in a simulation competition is related to the team's degree of formal planning. Hornaday and Wheatley (1986) reported that teams with Conceptual decision

simulation performance (e.g., Brenenstuhl and Badgett 1978; Schneier and Beatty 1978) and from examining individual participant characteristics to team characteristics (e.g., Hornaday and Wheatley 1986; Curran and Hornaday

styles, as measured by the Rowe Decision Style Inventory, outperformed other decision styles. Hornaday and Curran (1987), when replicating this study, reported similar, although not statistically significant, results.

Ultimately, research in this area has culminated in a series of papers by Gosen and Washbush presented at ABSEL conferences from 1993 to 1998. These papers are based on five years of classroom experimentation involving 401 student simulation game participants. From a review of the ABSEL literature, Gosen and Washbush (1998) concluded that eight participant characteristics are most likely to be related to simulation game performance. These are academic ability, participant motivation, team cohesion, degree of team organization, team goal setting, degree of team competitiveness, perceptions toward the particular simulation, and perceptions about simulation games as a learning tool.

THE EFFECTIVENESS OF GAMES IN STRATEGIC MANAGEMENT COURSES

While ABSEL members have been major contributors to the study of the effectiveness of games in strategic management courses, significant research in this area predates the formation of ABSEL (see, for example, Raia 1966 and Greenlaw and Wyman 1973 for early reviews of studies in this field). The first study findings by an ABSEL member comparing the use of a simulation game with some other teaching approach were presented by Fritzsche (1974) at the first ABSEL meeting. Fritzsche examined common midterm and final exam scores in a game-centered introductory business course section versus a lecture-centered section. At a .01 level of significance, the game-centered section students outscored the lecture-centered students on both the midterm and final exams.

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The next three years of ABSEL produced nine papers comparing the effectiveness of business games to more traditional teaching approaches (Brenenstuhl 1975; Certo 1975; Fry, Kidron and Schriesheim 1975; Mancuso 1975; Roberts and Field 1975; Wolfe and Byrne 1976; Catalanello and Brenenstuhl 1977; Sampson and Sotiriou 1977; Scott 1977). In seven of these nine studies, students in the simulation section either scored higher on common exams or felt that they learned more than students in traditional lecture or lecture/case sections. No differences were found in the other two studies.

Keys (1976) was the first ABSEL member to present an overview of studies comparing the effectiveness of business games in strategic management courses to traditional teaching approaches. For his review, Keys (1976, p. 173) examined "Only articles which utilize definite criteria for the measurement of learning and professionally acceptable research techniques." Keys' review covered thirteen articles appearing between 1962 and 1975. Across the studies reviewed, simulation game sections of courses showed superior results (generally on course final exams) in nine of the studies, case sections were superior in two, and there were no differences in two.

While individual studies continued to appear comparing business games to traditional teaching methods in business strategy courses, Wolfe (1976) and Parasuraman (1978) presented papers providing guidelines and a framework that should be used for such comparative studies. As well, Wolfe (1985) updated the Greenlaw and Wyman (1973) overview by examining all comparative studies utilizing a rigorous research design published between 1973 and 1983 while Miles, Biggs, and Schubert (1986) reviewed studies examining student perceptions of learning. Across 39 studies reviewed by Wolfe (1985), nineteen showed simulations to be superior to other teaching approaches, ten showed traditional approaches to be superior to simulations, and no learning

differences were reported in the other ten studies. Miles, Biggs and Schubert (1986) reviewed sixteen studies and found that students perceived simulations to be a superior learning tool in ten of the studies, cases were perceived as being superior to simulations in four of the studies, and no differences were reported in two of the studies. Based on a detailed overview of the 61 studies covered in the Greenlaw and Wyman (1973) and Wolfe (1985) reviews, Hsu (1989, p. 428) concluded, "The message that the management game is a powerful tool for the learning of managerial skills is rather unequivocal."

The results of twenty-five years of ABSEL research and over thirty years of research overall on this topic have been most recently summarized by Wolfe (1997). Once again, Wolfe (1997) reviewed only studies that utilized a rigorous research design, an objective learning measure, and at least one treatment group and one control group. Further, Wolfe (1997) divided the research studies into two types: (1) substantive evaluations, and (2) procedural evaluations.

Substantive evaluations are those that concentrate on the results produced by the teaching method while procedural studies are those that examine what practices in a simulation game lead to the best performance results. Examined here will be Wolfe's conclusions with regard to the substantive studies. While conceding that there are many confounding variables that enter the picture, Wolfe (1997, p. 369) concluded that, "Ample evidence has been presented authenticating the effectiveness of computer-based general management games as vehicles for teaching strategic management. In every study cited, the particular business gaming application produced significant knowledge-level increases. When the business game method was pitted against the case approach, the game approach was superior to cases in producing knowledge gains."

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WHAT GAMES TEACH

From the very beginning, a concern among ABSEL members has been "What do games teach"? In the very first year of ABSEL, a paper appeared talking about the most obvious thing taught by business games, how to make decisions and develop strategies (Baldwin 1974). Baldwin (1974) related his experiences in using the *Harvard Business Game* and the *Carnegie-Mellon University Game* as alternatives to cases and lectures and the basic advantage that business games offered - participants are placed in a decision-making role. Papers presented in the second year of ABSEL reported that business games could teach ethics and social responsibility (Smith 1975) and the application of mathematical models (Beldt 1975). However, it was in the third year of ABSEL that this topic area hit its peak with fifteen papers devoted to the issue of what is taught or learned through the use of business games.

The many subjects/topics that are taught through business simulation games, as suggested by 1975 ABSEL papers, included entrepreneurial skills (Schreier and Komives 1975); inventory management (Ferguson 1975; Gentry and Reutzel 1975); specific job skills such as personnel administration, hiring, motivating, and leading (Schreier 1975); mathematical modelling (Sewall 1975); job hunting skills (Beatty and Schreier 1975); research and data analysis skills (Whatley 1975; Stanton 1975; Burns 1975); collective bargaining (Brenenstuhl and Blalack 1975); mail survey techniques (Burns 1975); recruiting and applicant evaluation skills (Schreier 1975); creating advertisements (Dube 1975); basic financial concepts (Jauch and Gentry 1975); and basic economic concepts (Cowles and Hauser 1975). Added to these in the next year were leadership skills (Hunsaker 1976); interpersonal skills (Certo and Newgren 1976); communication

skills (Connolly, Connolly, Pounds and Wiebe 1976); problem solving skills (Beatty and Kulisch 1976); economic forecasting (Napier, House and Paralkar 1976); conflict resolution (King 1976); and the relationship between distinct business decision-making areas (Fritzsche 1976).

Through the remainder of the 1970s and 1980s papers illustrating specific topics or issues taught through the use of business simulation games continued to appear. In a slightly different vein, Teach and Govahi (1988) surveyed business executives who had participated in business simulation games while students. The business executives rated simulation games a very effective approach to teaching communication skills, group behavior skills, decision-making skills, how to adapt to new tasks, how to organize, and how to assess new situations quickly. It should also be pointed out that several studies suggest that less skilled students learn more from simulations than do students with greater skills (e.g., Washbush and Gosenpud 1994; Wolfe and Chanin 1993). Further to the learning possibilities of business simulation games, studies reviewed by Malik and Howard (1996) indicate that students have more positive attitudes towards learning from business games than from other teaching approaches and 69 percent of the business policy teachers surveyed by Williams (1987) felt that business games are the best way to teach policy.

In one overview, Gosenpud (1990) reviewed eighteen rigorous studies measuring learning or behavior change through the use of a simulation exercise. In seventeen of the eighteen studies reviewed, the authors reported positive results in that certain skills were acquired or certain behavior was changed.

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As general agreement emerged that learning does occur through the use of simulation games, the questions raised by many ABSEL researchers changed from "what (specifically) is learned" to "what type of learning occurs" and "how does learning occur"? While learning is too broad an issue to be discussed in depth here, the interested reader can examine an excellent overview by Wolfe (1990).

With regard to the issue of "what type of learning occurs" through the use of business simulation games, in an early ABSEL paper, Hoover and Whitehead (1975, p. 25) stated that, "Experiential learning exists when a personally responsible participant cognitively, affectively, and behaviorally processes knowledge, skills, and/or attitudes in a learning situation characterized by a high level of active involvement." Borrowing from Hoover and Whitehead (1975), the type of learning that might occur through participation in a business simulation game can be categorized into cognitive learning, affective learning, and/or behavioral learning.

Cognitive learning might be viewed in several different ways but, from the perspective of business game users, cognitive learning might best be thought of as developing an understanding of basic facts and concepts so that sound decisions can be made (Wellington, Faria, Whiteley and Nulsen 1995). Much past research suggests, as the earlier discussion has shown, that basic facts of many types are learned through simulation games. In addition, reviews of past research by ABSEL members comparing business simulation game sections to traditional lecture or lecture/case sections of a class showed that simulation game section students scored better on course final exams in the great majority of cases reviewed (Keys 1976; Wolfe 1985; Faria and Whiteley 1990). Finally, a number of studies have shown that simulation participants do, over time, begin to understand the nature of the marketplace environment in which they are operating (Faria and Dickinson 1990; Whiteley, Faria and Dickinson 1990; Dickinson and Faria 1997; Wellington and Faria 1997). All of this would support the contention that simulation participants learn basic facts or concepts.

Affective learning might best be thought of as what

the simulation game participants perceive that they learn (Parasuraman 1980). Again, as described in numerous research studies cited earlier and in more recent research overviews (Gentry, Commuri, Burns and Dickinson 1998; Anderson and Lawton 1997; Gosen and Washbush 1997; Malik and Howard 1996; Gosenpud 1990), participants generally express a positive attitude toward simulation games and the perceived learning from simulation games. This positive feeling continues, as well, years after simulation game participants have finished their simulation exercises and moved into the business world (Teach and Govahi 1988).

Behavioral learning might be described as the simulation participant taking the facts or concepts that have been learned and formulating correct decisions or actions or exhibiting changes in behavior in light of the new information learned (Byrne and Wolfe 1974; Wellington, Faria, Whiteley and Nulsen 1995). Research results attempting to measure behavioral change have been mixed (Anderson and Lawton 1988; Armstrong 1978; Fry, Kidron and Schriesheim 1975; Gosenpud 1982; Kelley 1982; Savage 1979).

The most ambitious attempt to measure behavioral learning was undertaken by Wellington, Whiteley, Faria and Nulsen (1995). Using 68 students participating in a marketing simulation game, the researchers, through the use of questionnaires completed after each decision round, attempted to determine what game participants were learning (cognitive learning). Based on what participants were learning, the decisions of the game participants were closely monitored to see if what was being learned was translated into "correct" decisions (behavioral learning). The results of this study were only moderately successful. While game participants were able, over time, to correctly understand the marketplace environment in which they were operating (evidence of cognitive learning), they did not always translate their knowledge into the "right" decisions for their markets (only partial evidence of behavioral learning).

At the present time, Gosen, Washbush, Patz and Wolfe (1999) are attempting to construct a test

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bank, categorized according to pre-determined learning objectives, which will be designed to assess learning from business simulation games.

SUMMARY

The twenty-five years of ABSEL conference proceedings provide a rich history for viewing the changing nature of simulation gaming research. Three important areas of research for ABSEL members, as determined by number of papers presented, have been (1) correlates of simulation performance; (2) the effectiveness of business games; and (3) what games teach. This paper has demonstrated that ABSEL members have reasonably clearly determined a number of factors that are correlated with simulation game success, are able to use these factors to predict simulation game performance, have shown that business simulation games are a powerful teaching tool, and have identified many variables that can be taught/learned through the use of business simulation games.

REFERENCES

The ten page list of references will be made available at the conference or otherwise can be obtained by contacting the author.