SHOULD BUSINESS GAME PLAYERS CHOOSE THEIR TEAMMATES: A STUDY WITH PEDAGOGICAL IMPLICATIONS

Joseph Wolfe
Experiential Adventures LLC
Jwolfe8125@aol.com

Robin McCoy
University of San Diego
rmurphy@sandiego.edu

ABSTRACT

Most top management business games have been designed to be team experiences. Despite the ramifications of this mandate, little research has been conducted on how the team's members should be selected. The company staffing method may have severe ramifications as a major part of the learning anticipated by this experiential approach comes from the team's interpersonal relations as they relate to the game's model. An examination of two diametrically opposed methods for creating game teams was conducted. Randomly staffed versus self-staffed teams played a relatively complex computer-driven game for eight decision rounds. It was found self-selected teams were not more cohesive than randomly staffed firms were and their ending-state cohesion levels were no better than those of the randomly staffed firms. They were, however, more profitable and less anxious about playing the game. Both groups were favorably disposed regarding this teaching technique after the simulation had ended.

INTRODUCTION

Schrieber (1958a; 1958b) announced the use of the first collegiate business game at the University of Washington in 1957. Since that time much and little has changed regarding their use, their structure and the environments within which they are played. At that time the game's participants were "businessmen" and eight operating decisions per round in a five-firm industry was considered a challenging experience. The game was also hand-scored and the paradigm-setting business school report by Gordon and Howell (1959) had yet to be published. Today and fifty years later, much of this has changed. Female undergraduate business students are now in the majority (Digest, 2005). Many top management games require 40-200 or more decisions per round (Klein, Fleck and Wolfe, 1993) and most American business students will have played at least one computer-driven game during their college years (Faria, 1998). The reports by Pierson (1959) and Porter and McKibbon (1988) have further broadened and liberalized business school curricula while most-recently the AACSB (2006) has reiterated its endorsement of the primacy of active learning methods in all coursework. More importantly many games are distributed, processed and played via the internet that has added an entirely new dynamic to the business gaming method.

These have been monumental transformations. Nonetheless, many elements associated with a business game have remained the same and therefore continue to be problematical. In a positive sense, this constancy can be attributed to the wisdom and soundness of the design principles on which they were based. Their thorny aspects, however, are more associated with the demands of the teaching method they employ. It has been almost axiomatic that those who play a business game be grouped into teams. In this regard business gaming was at the vanguard as it anticipated the AACSB's (2006) recommendations regarding active learning environments and the real-world's needs for collaborative decision-making skills due to flatter organizational pyramids and operations within self-directed work groups (Antonioni, 1996; Blanchard, Carew and Parisi-Carew, 1996; Gordon, 1992; Lawler, Mohrman and Ledford, 1995). When the elements of group dynamics enter into the educational equation, a host of virtues and vices ensue, just as is the case when working with real-world work groups as revealed in the management field's classic literature (Coch and French, 1948; Roethlisberger and Dickson, 1939).

When a business game is used for instructional purposes the instructor can make many choices as to how the game's teams will be formed (Connerly and Mael, 2002; Hamlyn-Harris, Hurst, von Baggo, and Bayley, 2006). Unfortunately, there has been much anecdotal but relatively little empirical research on the pros and cons of alternative staffing methods (Bacon, Stewart and Anderson, 2001; Imel and Tisdell, 1996). There is much agreement that players should be put onto teams because of the benefits of group-based learning (Feichtner, and Davis, 1985; Hernandez, 2002; Johnson, Johnson and Smith, 1991; Michaelsen, 1994; Michaelsen, Bauman, Knight and Fink, 2004; Muller, 1989; Proll, 1972). There is also agreement that students should be put on teams for practice of the team decision-making skills required by employers in today's workplace (Alexander and Stone, 1997; Antonioni, 1996; Blanchard, Carew and Parisi-Carew, 1996). The problem then is one of how to assign players to a group that possesses the range of attitudes and skills that allows its members to learn from

each other in a task-oriented situation while manifesting the cohesion required of an effective decision-making unit.

The value of learning groups, and the need for group decision-making skills in the real world, has been firmly established. Accordingly, many recommend using self-guided groups as often as possible so students can learn how to work in a collaborative fashion (Ely and Thomas, 2001; Jehn, Northcraft and Neale, 1999; Katzenbach and Smith, 1993; Watson, Kumar and Michaelsen, 1993). Because a group's cohesion has been found to be the most important mediator of its structure, morale and productivity (Chang and Bordia, 2001; Golembiewski, 1962; Katz and Kahn, 1978; Lott and Lott, 1965; O'Reilly, Caldwell and Barnett, 1989; Seashore, 1954) many instructors allow their players to self-select their teammates assuming that self-selection is the most-likely way to assemble learning teams that will be cohesive, highly socialized, motivated and in possession a high sense of ownership of the results produced (Bacon, Stewart and Stewart-Belle, 1998; De Vita, 1999; McCain, 1996; Mello, 1993; Payne and Monk-Turner, 2006). Other instructors randomly assign players to teams after observing that self-selection results in teams with high cohesion but low diversity (McCain, 1996; Tonn and Milledge, 2002). More importantly, the self-selection criteria players use may not be the criteria necessary for successful group work, optimal learning and high game performance (Connerley and Mael, 2001; Muller, 1989). Given the lack of a sense of what is necessary for a group's success in a business game from a personnel selection perspective, many students choose their teammates based on previous social relationships (Levine and Moreland, 1990). Even more importantly, from a class-conduct standpoint and the need to create teams with an equal ability to compete in the simulation, the result of the self-selection process can produce a leftover pool of marginalized individuals who are forced to create teams based on no prior affiliations or sentiments.

Nonetheless using self-selection as a way to form business game teams seems to be a safe method for the instructor. Most students like higher education's trend towards group learning methods (Deeter-Schmeltz and Ramsey, 1998; Ford and Morice, 2003; McCorkle, et. al., 1999; McKinney and Graham-Buxton, 1993) and they are suspicious of instructor-controlled team assignment methods (Connerley and Mael, 2001). Those who have used learning groups have noted, however, that not all in the group learn equally, assigning individual grades to group results is difficult to achieve and there can be "free riders" and social loafers who reap the benefits of the team's results without expending any effort (Joyce, 1999; Latane, Williams and Harkins, 1979).The presence of non or low-participating team members can lead to a sense of inequity or a belief that it is inherently unfair for the instructor to use a team approach to learning where the group as a whole is graded although not all members participated equally in earning or being responsible for the award given. Moreover, real-world managers do not get to pick their peers, which is what is done when using self-selection as a basis for creating a business game team. In the real world, peers are chosen more for their potential economic contributions to the group's purpose rather than for purely social comfort.

Because an instructor can greatly influence the amount of learning that comes from a group-oriented business game by how the group is initially formed (Bandura, 1986; Chapman and Van Auken, 2001) a study was undertaken of how two diametrically opposed team staffing methods affected (1) the firm's cohesiveness, (2) an individual's motivation to play and be involved in the learning experience, (3) player attitudes towards the group experience and (4) economic performance outcomes.

LITERATURE REVIEW

The literature relevant to this study is vast and deep given the pervasiveness of groups in all their guises and situations. The essential nature of many of the conundrums associated with groups, however, was captured by Spinoza in the mid-1600s in his observation that "Man is a social animal". Because of this social nature, man on the one hand is sustained and given life by the group. On the other hand, man is a captive of the group, must obey its dictates, and therefore loses personal freedom. Therefore, man is not "free" but instead must balance personal needs for free expression with the needs for sustenance and socially-derived self-worth. When Frederick Taylor conducted his pig-loading efficiency studies at Midvale Steel in 1899, the rate-busting "Schmidt" had to be protected from his fellow workers because he was a "rate buster" (Wrege and Perroni, 1974). Thirty years later the intricacies of the group's power was discovered during the productivity studies conducted at Western Electric's Hawthorne Works in the late-1920s (Mayo, 1933).

When dealing with the group literature one must differentiate that which is concerned with purely social groups versus task group situations such as those found at Midvale and the Hawthorne Works. In the case of social groups, its members come together for self-pleasure. Task groups, however, are formed purposively to accomplish either immediate or long-term ends. This literature review will restrict itself to the group task side of the literature because business game players are put onto teams that exist in task oriented situations— they create or take over simulated companies and run them to achieve measurable, economic outcomes. In the process of doing this individual learning is supposed to occur. The review will deal first with the nature of the group formation process as it relates to the creation and maintenance of effective task-oriented learning groups. It then deals with the group's cohesion as the major variable related to the group's sustenance and the group's ability to perform and learn within the experiential environment created by a business game.

GROUP FORMATION, COHESION, TEAMWORK AND TASK ACCOMPLISHMENT

In the now-classic presentation Tuckman (1965) outlined a typical group's developmental stages. A

reasonable accomplishment of each stage's needs is required if the group is to progress onto its next stage.

1. Forming—In this stage the group's members first come together. They are more-or-less strangers to each other as applied to what the group will have to accomplish in both a social and task sense if it is to be successful.
2. Storming—All groups enter this stage but many never leave it. Here the group's members seek to set an agenda that embraces their personal issues. This can impede real progress as these agenda may be contradictory or self-cancelling. To be successful the group needs to determine mutually agreeable ends as well as the means for accomplishing those ends. The healthy group addresses each member's needs, brings to light hidden agenda and agrees upon an acceptable leadership model.
3. Norming—If successful at the group's Storming stage the workgroup moves onto its Norming stage. Here the team's members accommodate each other's actual behavior and routinize their work habits so that operations and decisions flow smoothly. Trust begins to build between the group's members and motivation increases as it becomes apparent this new-shared experience will be personally and professionally fulfilling.
4. Performing—Once the group has established its personal and performance norms it can begin to accomplish its agreed-upon tasks. High-performing teams experience minimal conflict and operate in an almost automated fashion. Any dissent is handled routinely within the norms set by the group.
5. Adjourning—Tuckman (1977) later added this stage to the process, which is especially appropriate to classroom associated business games as they have been designed to end at a particular time and the learning group's existence is no longer necessary. Some have called this stage as being one calling for Mourning as with the group's expiration its members will no longer receive the rewards it has grown accustomed to receiving.

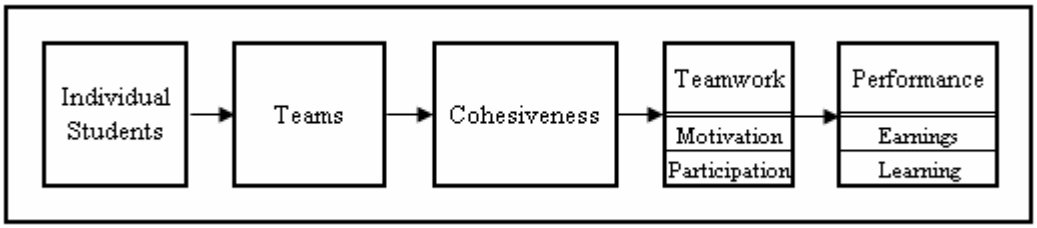
How the above steps play out, however, is necessarily circumscribed by the school's geographic setting because the instructor can only deal with the students available at the time the groups are formed. These students may be diverse or relatively homogenous regarding their ages, ethnicity, work histories and gender. It has been noted, however, that diversity based on such typical criteria as age, ethnicity and gender is merely a superficial or surface-level diversity that ignores the deep-level diversity present in the group (Harrison, Price and Bell, 1998). This deep-level diversity embraces the true divisions and value orientations possessed by each person. For educational purposes, however, it has been found in real-world business situations deep-level diversity can be modified within systems possessing strong values and meaningful reward systems (Westphal and Milton, 2000).

The value of diversity for both educational purposes and real-world group productivity has been firmly established because diversity brings alternative perspectives and talents to the workgroup (Ely and Thomas, 2001; Jehn, Northcraft and Neale, 1999; Watson, Kumar and Michaelsen, 1993; Williams and O'Reilly, 1998). Diversity, however, is a two-edged sword. It necessity is actually a function of the nature of the group's tasks. If its tasks are routine, do not require creative responses and have low interdependencies between its members one mind-set is all that is needed (Barrick, Bradley and Colbert, 2007; Van de Ven, Delbecq and Koenig, 1976). Thus for a relatively simple game such as *The Executive Game* (Henshaw and Jackson, 1989) which has only one, easily-calculated decision for each of the simulated company's functions, the presence of number of different perspectives could be self-defeating.

In a typical classroom situation the instructor has a group of students who are placed by some method onto teams. It is then up to these newly formed individuals to make themselves into an effective, task-oriented work group. In many cases a good workgroup comes about through the natural social psychological factors found in the situation. If all comes together well the group becomes energized, individual needs become subordinate to the group's needs and all contribute equally to the team's results. While this happy result often happens, just the opposite can occur to the detriment of a valuable learning experience. If the chemistry is wrong a malaise falls across the group. Some individuals mentally and physically dropout and others try to take up the slack in the pursuit of their own self-interests. More importantly, little of the exercise's intended learning results do not occur and those results are unequally and inconsistently spread across the group's members. For better or worse Exhibit 1 indicates the business gaming process involved as it is related to the chemistry and results that accompany staffing teams for learning.

TEAM STAFFING AND COHESION-RELATED STUDIES

EXHIBIT 1
THE BUSINESS GAMING PROCESS



This review will necessarily be brief although it will emphasize the designs and instruments used to examine how an instructor's company staffing method affects player attitudes towards their group and business games as teaching devices, the team's cohesiveness and player participation rates, the degree of motivation demonstrated and company performance outcomes. Because the business gaming movement's founders always placed their players on teams the group effect was noted early. Using data collected in 1961 Dill and Doppelt (1963) reported that within their groups playing The Carnegie Tech Management Game (Cohen, Dill, Kuehn and Winters, 1964) the amount of reported satisfaction with the gaming experience was associated with the player's position in their simulated companies. As they reported (Cohen, Dill, Kuehn and Winters, 1964, p. 41)

> After the game, presidents and marketing managers—the men with the most difficult and time-consuming jobs—have consistently been happiest about their experiences. The finance, production, and research and development managers were next most satisfied. The controllers, operations research specialists, and executive vice-presidents were least satisfied. The least-satisfying jobs are so in part because within the context of the game, they are regarded as routine and unchallenging—they offer the fewest opportunities to learn or to take actions that will affect the fortunes of the team.

It was not divulged as to how the study's teams were staffed or how individuals were placed within their companies even though these choices had a great effect on what was learned and satisfaction with their company's efforts. This satisfaction, which varied with the player's centrality to the firm's vital processes, was also associated with the reported learning sources where 76.0% of the learning was attributed to interactions within the team itself rather than from the game's model.

Over the next three decades the business gaming field saw a number of studies on the role team cohesion plays on learning, satisfaction with or attitudes about the game experience and player motivation. It has been found that high cohesion is in most cases associated with the team's productivity (Gentry, 1980; Gosenpud and Miesing, 1992; Gosenpud, Miesing, and Milton, 1984; Gosenpud, Milton and Larson, 1985; Hornaday and Ensley, 2000; Hsu, 1984; Miesing and Prebel, 1985; Neal, 1997; Norris and Niebuhr, 1980; Wolfe and Box, 1988), it can be created or manipulated (Deep, Bass and Vaughan, 1967; Wolfe, Bowen and Roberts, 1989) and may change (Neal, 1997; Wolfe and Box, 1988; Wolfe, Bowen and Roberts, 1989) or remain relatively constant regardless over the game's duration (Wellington and Faria, 1996). Cohesion has been measured both via observation, interviews, essays, and most-often when an instrument is used, by some version of the scales created by Seashore (1954). Along the way the role of a strong but integrative leader (Wolfe and Box, 1988) has been noted as well as there being a need for teamwork or consensus amongst the players (Gosenpud, Miesing, and Milton, 1984; Hornaday and Ensley, 2000).

Few studies have been conducted on the effects of opposing team-staffing methods in business course work although it has been confidentially assumed that self-selected teams are more cohesive and therefore have the best chance of being productive (Hergert and Hergert, 1990). Unfortunately, what literature that *has* been produced suffers from the lack of true experimental designs and is often anecdotal in nature (Bacon, Stewart and Silver, 1999; Muller, 1989). Most-often, one team staffing method is examined and then an opposing staffing method's effects are subjected to a speculative interpretation (Chapman, et al., 2006).

Regarding direct, true experimental alternative staffing method studies only one controlled research design has been used in the business gaming field. Hsu (1984) split 63 students between self-selected and instructor-assigned groups for a computer-based business game in a senior-level business policy course. It was presumed the self-selected companies would be more cohesive and therefore would obtain for themselves the many benefits associated with self-selection such as openness, flexibility, participation and motivation. In reality, neither staffing method had an effect on player attitudes or behavior. One other study that is rigorous and experimental in nature compared the attitudes and group dynamics associated with self-assigned teams versus randomly assigned teams. In this case, however, the students were engaged in various projects rather than a business game. Chapman, et al. (2006) collected survey instruments from 583 mostly-senior students enrolled in four different marketing courses spread across 16 sections. A semester long group project was part of each course's grade requirement. Groups ranged in size from 2-6 with a modal size of four. Regarding the study's outcome measures, no differences in self-assessed goal achievement, the effectiveness of using groups as learning environments, the amount of within-group conflict and self-assessed grades were found. On the affirmative side, the self-selected groups expressed more-positive group dynamics and attitudes towards the group experience.

HYPOTHESES TESTED

Based on the literature's classic, unanswered questions, the following hypotheses were tested. They have been posited using self-selection as the basis of comparison as this study's literature review has indicated this assignment method generally produced the most-positive results regarding motivation and attitude levels. It is the assignment method preferred by players.

1. Self-assigned teams will manifest higher pre-game cohesion levels than random-assigned teams.
2. Self-assigned teams will manifest higher post-game cohesion levels than random-assigned teams.
3. Self-assigned teams will express higher pre-game teamwork expectations than random-assigned teams.
4. Self-assigned teams will express higher post-game teamwork beliefs than random-assigned teams.

5. Self-assigned teams will express higher pre-game fairness expectations than random-assigned teams.
6. Self-assigned teams will express higher post-game fairness beliefs than random-assigned teams.
7. Self-assigned teams will express higher pre-game performance expectations than random-assigned teams.
8. Self-assigned teams will express higher post-game appraisals of their performance than random-assigned teams.
9. Self-assigned individuals and teams will be more motivated than will random-assigned individuals and teams during the game's entire course.
10. Members of self-assigned teams will be more-equally participative than will be members of random-assigned teams.
11. Self-assigned companies will be associated with higher economic outcomes than will be random-assigned companies.

The first two hypotheses test the degree that self-assignment creates highly cohesive teams and the degree to which this cohesion is enduring over the game's course. The next two hypotheses test for the existence of good teamwork that accompanies highly cohesive workgroups. Hypotheses 5-6 test whether a sense of fairness is associated with a team's staffing method. The next two hypotheses deal with each player's performance expectations both before and after the fact. Hypothesis 9 determines whether self-selection results in more-highly motivated players while hypothesis 10 looks to see whether the team's actual workload was evenly distributed and there was a minimum amount of "free riding". Finally, the last hypothesis tests whether self-assigned teams are more productive in an economic sense.

METHOD

The study's subjects (n=30) were seniors enrolled at a large mid-western state university. The subjects came from two separate back-to-back semester-long sections of a capstone-type strategic management course. Table 1 describes the characteristics of the subjects where statistical tests indicated there were no significant between-section differences in their composition. The same instructor taught both sections, was an experienced user of the game and pursued the same learning objectives for both sections. Performance in the simulation directly counted for 10.0% of the course's final grade with another 20.0% associated with team write-ups and presentations related to its economic performance. The participants played eight weekly rounds, or two simulated business years of *The Global Business Game* (www.onlinegbg.com) at the rate of two decision sets per week. The game itself is a flexible and relatively complex computer-based online game. It allows players, at the instructor's discretion, to implement a wide variety of strategic and tactical decisions in the television set industry for the world's three major trading communities. In this case, the instructor chose the game's stable NAFTA version. In this form, players could make up to 130 individual decisions per round with business conducted in Mexico and the United States in a nonfluctuating economic environment. As an indication of how team diversity could be an asset in the game Table 2 indicates the decision area coverage a successful team must accomplish by functional area and country.

Game play began in the course's 7th week after the students had been assigned to learning groups and had been presented the course-related concepts believed to be necessary for successful game play. As determined by a coin-flip before class time one section's students were randomly assigned (RAND) to companies. The other section's students were allowed to self-select (SELF) their teammates. Class time was devoted to assembling these groups. Two industries with identical economic parameters and playing conditions were then created with each having an approximately equal number of companies. Table 3 shows the two industries created and the sizes of their firms.

Each player's expectations and realizations regarding the elements that lead to the fulfillment of a successful workgroup's task and social elements, attitudes towards the gaming experience and performance outcomes were collected. A "Before" version of an instrument based on that created by Chapman, et al. (2006) was applied immediately after the teams had been formed. The subjects' post-game cohesion levels, attitudes and beliefs were collected via an "After" version of the same instrument one day before the competition had ended. The instrument itself is a collection of measures used in past group dynamics research. This study's Teamwork scales came from work originally done by Berry (1995) as adapted for the classroom by Deeter-Schmelz and Ramsey (1998). The Price and Mueller (1986) scales were used to measure Cohesion as adapted for classroom use by Chapman, et al. (2006) following the work of Seashore (1954). The Fairness scale, or a team member's sense of equity, was taken directly from the Chapman, et al. (2006) instrument. Cronbach alpha values indicate instrument reliability (Teamwork alpha = .96, Cohesion alpha = .90, Fairness alpha = .93; Nunnally, 1978; Peterson, 1994).

Motivation levels were measured by how often the game's interface was used within and across all members of each management team. The measuring technique used here is considered to be superior to either student self-reports or visits to the instructor's office (Schriesheim and Yaney, 1975) as have been used in the past. *The Global Business Game*, as an online simulation, keeps a record of each player's activities for the instructor's use. Over the game's course players can access its interface to view and print-out past results, seek online help, make new decisions and submit their company's quarterly decision set. They can also interact online within their teams as they make their decisions and they can negotiate between companies in the attempt to strike strategic alliances. This game feature was used to record each action taken by a player as an episode that indicates an interest in the company's progress and being able to actively contribute to any team decision-making session. Although each episode's duration could be determined, the degree to which each player actually used the interface during the episode could not be established. Therefore, only the nature of each episode was noted and categorized as follows as

it might be related to individual motivation, teamwork and decision-making centrality:

TABLE 1
SUBJECT DEMOGRAPHIC CHARACTERISTICS

Demographic Characteristic	Proportion/ Average
Female	48.3%
Male	51.7%
Age	22.4
Major:	
Accounting	40.0%
Finance	20.0%
HR/Management	13.3%
Marketing	13.3%
Business Administration	3.3%
Not reported	10.0%
Grade-point-average	3.2

TABLE 2
POSSIBLE DECISIONS BY FUNCTION AND COUNTRY

Functional Area	Country	
	U.S.	Mexico
Channel Management	8	8
Construction	11	12
Finance	8	5
Logistics	4	4
Marketing	10	6
Market Research	12	0
Personnel Administration	14	14
Production	7	7
Strategic Alliances	7	6
Supply Chain Management	6	6
Total	87	68

TABLE 3
INDUSTRIES, COMPANIES AND TEAM SIZES

Assignment Method	
RAND	SELF
Industry A	Industry B
Firm 1— 4 players	Firm 1— 3 players
Firm 2— 3 players	Firm 2— 3 players
Firm 3— 4 Players	Firm 3— 3 players
Firm 4— 3 Players	Firm 4— 4 players
	Firm 5— 3 players

1. The number of episodes engaged in by player—A behavioral measure of the individual player's motivation, enthusiasm or willingness to engage in the firm's activities.
2. Individual Participation Index—A measure of the degree to which the player engaged in a fair-share of the total number of episodes engaged in by all the team's members.
3. Company Participation Index—The average of all individual within-company Participation Indexes.
4. Company Activity—The per-player average number of episodes by company.
5. Centrality—The proportion of all episodes recorded by the firm's dominant participant.

Regarding the calculation of the Participation Index if a player engaged in one-third of the episodes on a three-member team, that player would generate a Participation Index value of 1.00. Engaging in either more or fewer episodes of the total episodes engaged in would result in index values proportionally lower than the ideal index value of 1.00. Regarding the Centrality Index, the number of episodes engaged in by each quarter's dominant player was noted over the game's entire run and averaged by team staffing method. As a result, a high value indicates that one player consistently engaged in the most episodes for his/her company and simultaneously that the team's between-player participation rate was low.

The firm's economic performance was based on the firm's profitability. The simulation itself generates five individual penultimate performance measures that produce a final within-industry ranked index that is a weighted combination of the five previous measures. Profits were chosen as the firm's only success indicator in this study, as opposed to the simulation's other available measures of earnings per share, stock price and rates-of-return on assets and equity. This measure was chosen because the firm's profits are the least susceptible to financial reporting manipulation as well as being the engine for calculating the game's other economic performance measures.

RESULTS

Table 4 indicates the results associated with the tests of Hypotheses 1-2. It can be seen these hypotheses were rejected as there were no significant differences in the players' cohesion scores both before and after the game. Thus it appears that allowing players to choose their teammates creates a relatively high cohesion level on a scale of 1-7 but these cohesion levels are not superior to those associated with random assignment. The table shows that at the game's end both assignment methods were associated with statistically equal cohesion scores. Table 5, which tracks within team-assignment method cohesion, indicates each group's cohesion scores did not change from their initial levels. More importantly, based on their experience with the game, the randomly assigned players found their teammates were more trustworthy and the group was more enjoyable to work with than originally thought. The self-selected teams found their teammates were less personally interested in them than they originally believed would be the case given they had chosen them as partners.

TABLE 4
PRE-GAME AND POST-GAME MEASURES
BY TEAM ASSIGNMENT METHOD

Measures and Scales	Pre-Game	Post-Game		
Cohesion	RAND	SELF	RAND	SELF
Friendly	6.07	6.13	6.36	6.44
Helpful	5.93	6.27	6.21	6.25
Personally interested	4.57	4.93	3.86	4.13
Trustworthy	5.29	5.93	6.14	5.94
Enjoyable group	5.36	5.80	6.00	6.13
Teamwork	RAND	SELF	RAND	SELF
Open lines of communication	5.71	5.80	6.00	6.25
Enthusiastic about working together	4.86	5.40	6.00	5.56
Follow through on commitments	5.79	6.07	5.79	6.25
Pride in work	5.79	5.87	**6.57**[b]	5.88
Stay focused on tasks	5.71	6.00	6.21	5.87
Resolve conflict effectively	5.57	6.00	6.36	6.13
Fairness	RAND	SELF	RAND	SELF
A group leader	5.36	5.07	5.36	**4.00**[a]
Fair share of the work	6.07	6.07	5.64	5.88
Not worry about grade	3.29	4.14	4.50	4.38
Work divided evenly	5.57	**6.47**[b]	5.36	5.56

Ratings based on a 7-point scale with 1 = Strongly disagree and 7 = Strongly agree.
[a]Significance $p < .01$.
[b]Significance $p < .02$.

A return to Table 4 shows self-selection results in higher teamwork feelings than for those who were randomly assigned to their companies. The table also indicates Hypothesis 4, which stated the self-selected teams would manifest more expressions of teamwork, must be rejected. In fact, the randomly assigned group's feelings about pride in their company's work were superior to those of the self-selected teams. After playing the game, it turned out in Table 5 the RAND-group's pessimism about working together, being proud of their work and being able to resolve conflict was not warranted.

Hypotheses 5-6 stated there would be a superior level of fairness and equitable effort associated with being on a self-selected team both before and after the game. Neither of these hypotheses were supported. There were no superior feelings before the game and in fact, Table 4 indicates there were superior feelings for the RAND-group on the workload being evenly divided and inferior feelings for the SELF-group on there being a group leader.

The next two hypotheses stated the SELF-group would have higher expected outcomes and that after the game they would state higher than actual performance results for themselves (Neal, 1997; Wellington and Faria, 1996). Table 6 shows the expected outcomes hypothesis was rejected. Before the game began both groups were the same regarding the belief they would achieve their company's goals and would be proud of the results they would obtain. They also assigned themselves the same grade for their work. After the game, the hypothesis operated in the opposite fashion for the RAND-group as its companies were more proud of their results than were the SELF-companies. Regarding the self-assessed post-game grade, both groups were somewhat delusional. Table 7 presents the actual cumulative profit results posted by each company by team assignment method along with the grades each company would receive assuming the first-place company received a grade of 100.00 and the base line for a grade was a possible 65.00 if a negative profit condition was found. On this basis, RAND's average game grade might have been estimated to be 75.5 rather than its 90.86 and SELF's grade could have been estimated to be 82.8 rather than its estimated 88.07. Certainly wishful thinking is involved in these estimates but the players were well-aware that their respective industries featured a leading company that far outpaced the others which would necessarily place the remaining firms far behind in their grades.

It was hypothesized self-selection would result in more-highly motivated teams as indicated by the number of episodes engaged in by each player. The long-term average number of episodes by quarter in the game by each assignment group shown in Table 8 was nonsignificantly different. Thus Hypothesis 9 is rejected.

Hypothesis 10 stated self-selected players would more-equally participate within the teams they created. Table 9 indicates this was not the case as the average participation rates were statistically equal on both a quarterly and total game basis. It should be noted the average Participation In

TABLE 5
PRE-GAME VS. POST-GAME MEASURES
BY TEAM ASSIGNMENT METHOD

Measures and Scales	RAND	SELF		
Cohesion	Pre-game	Post-game	Pre-game	Post-game
Friendly	6.07	6.36	6.13	6.44
Helpful	5.93	6.21	6.27	6.25
Personally interested	4.57	3.86	4.93	**4.13**[b]
Trustworthy	5.29	**6.14**[b]	5.93	5.94
Enjoyable group	5.36	**6.00**[c]	5.80	6.13
Teamwork	Pre-game	Post-game	Pre-game	Post-game
Open lines of communication	5.71	6.00	5.80	6.25
Enthusiastic about working together	4.86	**6.00**[a]	5.40	5.56
Follow through on commitments	5.79	5.79	6.07	6.25
Pride in work	5.79	**6.57**[b]	5.87	5.88
Stay focused on tasks	5.71	6.21	6.00	5.87
Resolve conflict effectively	5.57	**6.36**[a]	6.00	6.13
Fairness	Pre-game	Post-game	Pre-game	Post-game
A group leader	5.36	5.36	5.07	**4.00**[b]
Fair share of the work	6.07	5.64	6.07	5.88
Not worry about grade	3.29	4.50	4.14	4.38
Work divided evenly	5.57	5.36	6.47	**5.56**[a]

Ratings based on a 7-point scale with 1 = Strongly disagree and 7 = Strongly agree.
[a]Significance $p < .01$.
[b]Significance $p < .02$.
[c]Significance $p < .05$.

TABLE 6
PRE-GAME AND POST-GAME PERFORMANCE EXPECTATIONS AND RESULTS BY TEAM ASSIGNMENT METHOD

Performance Measures	Pre-Game		Post-Game	
	RAND	SELF	RAND	SELF
Achieve goals	5.93	6.00	5.43	5.50
Proud of results	6.00	6.07	**6.15**[a]	5.31
Game grade	91.64	90.84	90.86	88.07

[a] Significance $p<.03$.

TABLE 7
PROFIT PERFORMANCE-BASED GRADES

RAND	Profit	Grade
Firm 1	$22,228,278	100.00
Firm 2	-$3,002,735	65.00
Firm 3	-$336,255	68.00
Firm 4	-$89,155	69.00
SELF	Profit	Grade
Firm 1	$3,204,289	75.00
Firm 2	$5,733,926	77.30
Firm 3	$5,400,039	77.30
Firm 4	$28,847,642	100.00
Firm 5	$12,992,993	84.40

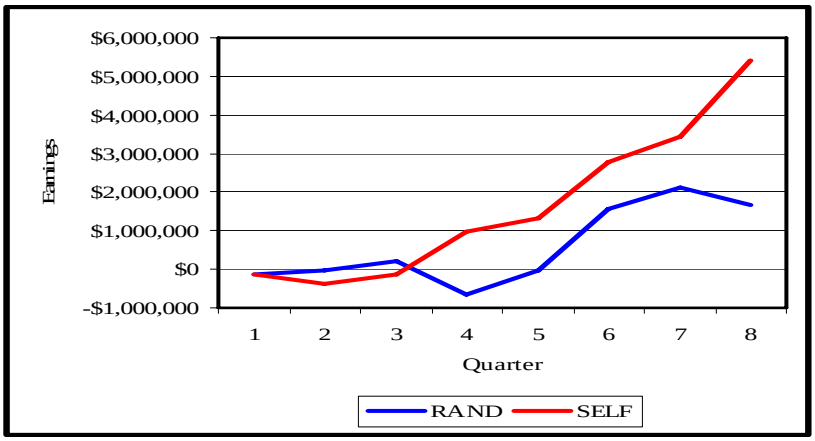
TABLE 8
AVERAGE NUMBER OF EPISODES PER PLAYER BY QUARTER

Assignment Method	Decision Quarter								Average
	1	2	3	4	5	6	7	8	
RAND	104.9	84.8	112.0	119.2	104.2	95.6	89.0	66.9	97.1
SELF	150.9	82.3	59.4	144.9	111.1	92.9	108.7	114.1	114.1

TABLE 9
AVERAGE COMPANY PARTICIPATION INDICES BY QUARTER

Assignment Method	Decision Quarter								Average
	1	2	3	4	5	6	7	8	
RAND	0.50	0.37	0.49	0.41	0.41	0.40	0.48	0.43	0.44
SELF	0.65	0.54	0.32	0.46	0.44	0.39	0.40	0.40	0.45

EXHIBIT 2
AVERAGE COMPANY EARNINGS BY STAFFING METHOD



dices of 0.44 and 0.45 indicates there was much "free riding" or low participation in many teams with one individualoften-recording most of each quarter's episodes (Strong and Anderson, 1990). A review of each firm's episode logs indicated that 10 of 30 players rarely or never accessed the game's website or otherwise prepared themselves for the quarter's decision-making session as the game's interface records whether the screen's output was printed, or was otherwise made available for viewing. The teaching/learning implications of this phenomenon will be discussed later as a decision-maker centrality issue.

The profit results by companies within their respective industries have been graphed in Exhibit 2. As indicated, there were no significant performance differences in an industry's firms for the game's first three quarters. Thereafter the self-selected companies outperformed the randomly assigned companies as measured by a Mann-Whitney test of ranked performance differences ($z = 2.71$, $p < 0.01$). This latter-game superiority led to significantly higher total profit outcomes for the self-selected companies ($z = 1.92$, $p = 0.028$). Thus Hypothesis 11 is supported. Self-selection in a business game is associated with higher economic performance.

DISCUSSION

This study's results give rise to a number of issues that deal with the teaching power of a self-guided and group-run business game team, attitudinal predispositions towards group learning experiences, and the instructor's role in creating a viable learning environment. The results also indicate the instructor would be justified in using either method for assigning players to a game. This is because different affects were associated with each method. It was found for those who were randomly assigned to their groups, attitudes and beliefs about team cohesion and teamwork improved significantly. No changes occurred in the self-assigned groups. Thus the random assignment method should be chosen if the instructor wants to emphasize the nature of pre and post perceptions on a group's attitudes and beliefs. This same lesson, however, could be taught via self-selection but in a negative fashion. The self-assigned players found a number of their pre-game beliefs were not true as their teammates were less personally interested in them, the presence of a group leader often did not occur and the workload was often not divided evenly.

A striking feature of this study's results is how similar each group actually was despite the diametrically opposed team staffing method employed. Part of this lack of

TABLE 10
PRE-GAME KNOWLEDGE OF COMPANY MEMBERS

Staffing Method	Knowledge Score
Random assignment	2.10
Self selection	2.59

Knowledge based on a 7-point scale with 1 = Knew Nothing and 7 = Knew a Lot

TABLE 11
ATTITUDE TOWARD GROUP LEARNING METHOD BY TEAM ASSIGNMENT METHOD

Group Learning Attitude Measure*	RAND		SELF	
	Pre-Game	Post-Game	Pre-Game	Post-Game
Bad or good experience	4.29	**5.08**[c]	4.87	4.81
Waste or good use of time	3.79	4.38	4.67	4.44
Valueless vs. valuable	4.64	**5.92**[a]	5.87	5.38
Unsatisfactory or satisfactory	4.14	4.54	4.80	4.44
Unenjoyable vs. enjoyable	4.64	5.31	5.20	5.25
Useless or useful	5.14	5.62	5.80	5.19
Undesireable vs. desirable	3.36	4.23	4.33	4.06
Ineffective vs. effective	5.21	5.77	5.67	5.31

*Descriptors and scores cited from negative to positive for reporting purposes.
[a]Significance $p < .01$.
[c]Significance $p < .05$.

difference could be traced to the homogeneity of the university's student population. This fact could also be highlighted by viewing Table 10. It shows there was a non-significant difference in the SELF-teams' knowledge about each other than the RAND players. Because of this, something other than knowing about the person was the criterion for choosing teammates but also that the pool of players to choose from was limited in breadth.

It has been stated earlier that group work is both useful and necessary if today's business student is to be adequately prepared for the workplace. Their attitudes toward group projects, however, are often negative (Pfaff and Huddleston, 2003). Table 11 indicates this study's players had mixed feelings about the value of business game they were about to play. Both groups were somewhat neutral rather than positive regarding all aspects of the experience. The RAND-group, however, expressed a higher opinion of the experience in Table 12 while there was no change in the opinions of the SELF-students.

Interestingly, despite somewhat neutral pre-game opinions about the value of group learning experiences, the SELF-group was more optimistic on four out of eight measures. Afterwards both groups were equal in their assessments of the experience. Based on this table there seems to be a "halo" attached to having players choose their own teammates as it appears self-choice enables them to feel more positive, or more in control of the situation. This preference for self-selection can be seen in Table 13 both between and within groups by staffing method. Thus, this evidence bodes well for using games as group learning experiences and that having players select their own teammates goes a long way towards lessening any initial fears about the technique.

Based on this study's findings it appears neither staffing method generates distinctly different groups. In their initial state they were equally cohesive, the teams were no more or less familiar with their partners, there were no differences in their behaviorally-demonstrated motivation and participation levels, equal in their performance expectations, sensing fair play from their partners and feelings of teamwork on three of four measures. Despite these before-game similarities, something *was* different. As Exhibit 2 demonstrated, the groups experienced intermingled profits during the game's first three quarters. After this important, strategy-implementing period, the groups diverged dramatically in their earnings. For the entire game the RAND-group's average quarterly earnings were $587,505 per quarter while they were $1,404,492 for the SELF group.

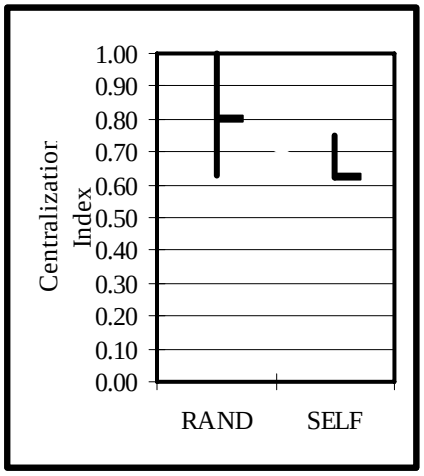
Insight into why this divergence occurred might be gleaned by examining each team's degree of decision-making centrality. As noted before by Dill and Doppelt (1963) learning and satisfaction with the gaming experience was tied to the individual decision-maker's centrality or having a key role in the firm's success. An examination of each firm's centrality, or the degree to which one player dominated the number of episodes engaged in on a quarterly basis, was undertaken. A highly centralized firm would be one where the same person made the majority of the firm's decisions. Under this condition it could be presumed the team's other members played marginal roles and had low power within their company. Firms with low Centralization Indexes were more-or-less decentralized with different

TABLE 12
ATTITUDE CHANGES TOWARD GROUP LEARNING METHOD BY TEAM ASSIGNMENT METHOD

Group Learning Attitude Measure*	Pre-Game		Post-Game	
	RAND	SELF	RAND	SELF
Bad or good experience	4.29	4.87	5.08	4.81
Waste or good use of time	3.79	**4.67**	4.38	4.44
Valueless vs. valuable	4.64	**5.87**	5.92	5.38
Unsatisfactory or satisfactory	4.14	**4.80**	4.54	4.44
Unenjoyable vs. enjoyable	4.64	5.20	5.31	5.25
Useless or useful	5.14	5.80	5.62	5.19
Undesireable vs. desirable	3.36	**4.33**	4.23	4.06
Ineffective vs. effective	5.21	5.67	5.77	5.31

*Descriptors and scores cited from negative to positive for reporting purposes.
[a]Significance p < .01.
[c]Significance p < .05.

EXHIBIT 3
COMPANY CENTRALITY BY STAFFING METHOD



individuals engaged in the majority of the firm's decisions and episodes on a quarterly basis. Under this condition the knowledge of the firm's strategy and its implementation was shared. Exhibit 3 shows the range of each group's centrali-
group was 0.80 with one firm having one player consistently engaged in 78.0% of each quarter's episodes while also submitting and retrieving all its decisions and outputs. The Centralization Index was 0.62 for the SELF-group with no single player dominating all decision quarters. This observation regarding the company's degree of centralization merits further research.

CONCLUSIONS AND RECOMMENDATIONS

This study's results suggest numerous areas of further research and improvements in its methodology. Research should be conducted using other games of greater and lesser complexity. A more-complex game, or a more-complex version of the study's game that would require higher levels of zation indexes. The RAND-group companies were more centralized than the SELF-group which indicates they were less flexible and more autocratic in their decision-making operations. The mean centralization index for the RAND-
coordination and interpersonal relationships which would require higher levels of cohesion , teamwork may result in different appraisals of the value of a business game experience. Additionally this study's instructor used the game in its static mode where economic conditions were frozen. Players facing the game's dynamic environment would be facing a turbulent situation and this situation may have an effect on the firm's needs for cohesion and decentralized decision-makers. This study should also be repeated at sites where the student population is more diverse. Drawing on this more-diverse population might place greater strains on each team's ability to create an effective workgroup. Relatively homogenous groups may have naturally occurred due to a lack of a natural diversity in the pool of student available for company staffing purposes.

This study also made extensive use of player online logs to determine player motivation, centralization and participation. These logs are only a partial measure of the group-centered activities player can engage in. The logs only indicated that a player had logged onto the game's website but not how the website was used or how many players might have been viewing the monitor being used. The study also did not determine if players worked together face-to-face although it *did* know that teams did not printout their results so they could be used during joint decision-making sessions. Additionally class time was not devoted to player decision-making sessions so any face-to-face or phone-call-to-phone call meetings had to be conducted at the players' volition. These meetings may or may not have occurred.

Based on this study's results, however, it is believed the instructor should allow students to choose their own teammates. Given them this choice provides a sense of power at the experience's stage fraught with much apprehension about what is to occur. Self-selection, while it does not instantly create cohesive teams, or ones that are more motivated, creates teams that appear to be more flexible and more decentralized in their decision-making operations. This may be associated with higher profits and certainly with more positive feedback about the experience.

REFERENCES

AACSB (2006). *Eligibility procedures and accreditation standards for business accreditation.* Tampa FL: The Association to Advance Collegiate Schools of Business.

Alexander, M.W., & Stone, S.F. (1997). Student perceptions of teamwork in the classroom: an analysis by gender. *Business Education Forum,* 51, 3, 7-10.

Antonioni, D. (1996). How to lead and facilitate teams. *Industrial Management,* 38, 6, 22-25.

Bacon, D.R., Stewart, K.A., & Silver, W.S. (1999). Lessons from the best and worst student team experiences: How a teacher can make a difference. *Journal of Management Education,* 23, 5, 467-488.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs NJ: Prentice-Hall.

Barrick, M.R., Bradley, B.H., & Colbert, A.E. (2007). The moderating role of top management team interdependence: Implications for real teams and working groups. *Academy of Management Journal,* 50, 3, 544-557.

Berry, L.L. (1995). *On Great Service: A Framework for Action.* NY: Free Press.

Blanchard, K., Carew, D., & Parisi-Carew, E. (1996). How to get your group to perform like a team. *Training and Development,* 50, 9, 34-38.

Chapman, K.J., Meuter, M., Toy, D., & Wright, L. (2006). Can't we pick our own groups? The influence of group selection method on group dynamics and outcomes. *Journal of Management Education,* 30, 4, 557-569.

Chapman, K.J., & Van Auken, S. (2001). Creating positive group project experiences: An examination of the role of the instructor on students' perceptions of group projects. *Journal of Marketing Education,* 22, 2, 117-127.

Chang, A., & Bordia, P. (2001). A multidimensional approach to the group cohesion-group performance relationship. *Small Group Research,* 32, 379-405.

Coch, L., & French, Jr., J.R.P. (948). Overcoming resistance to change. *Human Relations,* 1, 512-532.

Cohen, K.J., Dill, W.R., Kuehn, A.A., & Winters, P.R. (1964). *The Carnegie Tech management game.* Homewood IL: Irwin.

Connerly, M.L., & Mael, F.A. (2001). The importance of invasiveness of student team selection criteria. *Journal of Management Education,* 25, 5, 471-494.

Deep, S.D., Bass, B.M., & Vaughan, J.A. (1986). Some effects on business gaming of previous quasi-T group affiliations. *Journal of Applied Psychology,* 51, 426-431.

Deeter-Schmelz, D.R., Kennedy, K.N., & Ramsey, R.P. (2002). Enriching our understanding of student team effectiveness. *Journal of Marketing Education,* 24, 2, 114-124.

De Vita, G. (1999). Cross-cultural work groups: A business and management perspective, *New Academic,* 8, 3, 13-15.

Digest of Education Statistics, 2005. Washington DC: Institute of Education Sciences, U.S. Department of Education. (Accessed July 13, (2007) at http://nces.ed.gov/programs/digest).

Dill, W.R., & Doppelt, N. (1963). The acquisition of experience in a complex management game. *Management Science,* 10, 30-46.

Ely, R.J., & Thomas, D.A. (2001). Cultural diversity at work: The effects of diversity perspectives on work group processes and outcomes. *Administrative Science Quarterly,* 46, 229-273.

Faria, A. J. (1996). Business simulation games: Current usage levels: An update. *Simulation & Gaming,* 29, 3, 295-308.

Feichtner, S.B., & Davis, E.A. (1985). Why some groups fail: A survey of students' experiences with learning groups. *Organizational Behavior Teaching Review,* 9, 4, 75-88.

Ford, M., & Morice, J. (2003). How fair are group assignments? A survey of students and faculty and a modest proposal. *Journal of information Technology Education,* 2, 367-378.

Gentry, J.W. (1980). The effects of group size on attitudes toward the simulation. *Experiential Learning Enters the Eighties,* Vol. 7, 165-168. (Reprinted in the Bernie Keys Library, available from http://www.absel.org).

Golembiewski, R.T. (1962). *The small group.* Chicago: University of Chicago Press.

Gordon, J. (1992). Work teams: How far have they come? *Training,* 29, 59-65.

Gordon, R. A., & Howell, J. E. (1959). *Higher education for business*. NY: Columbia University Press.

Gosenpud, J., & Miesing, P. (1992). The relative influence of several factors on simulation performance. *Simulation & Gaming, 23, 3,* 311-325.

Gosenpud, J., Miesing, P., & Milton, C.J. (1984). A research study on strategic decisions in a business simulation. In *Developments in Business Simulation & Experiential Learning,* Vol. 11, 161-165. (Reprinted in the Bernie Keys Library available from http://www.absel.org).

Gosenpud, J., Milton, C, & Larson, A. (1985). Predicting Performance over the Course of the Simulation. In *Developments in Business Simulation & Experiential Exercises,* Vol. 12, 5-10. (Reprinted in the Bernie Keys Library available from http://www.absel.org).

Hamlyn-Harris, J.H., Hurst, B.J., von Baggo, K., & Bayley, A.J. (2006). Predictors of team work satisfaction. *Journal of Information Technology Education.* 5, 299-315.

Harrison, D.A., Price, K.H., & Bell, M.P. (1998). Beyond Relational Demography: Time and Effects of Surface- and Deep-Level Diversity on Work Group Cohesion. *Academy of Management Journal*, 41, 1, 96-107.

Henshaw, R. C., Jr., & Jackson, J.R. (1989). *The Executive Game.* Homewood IL: Irwin.

Hergert, M., & Hergert, R. (1990). Factors affecting student perceptions of learning in a business policy game. In *Developments in Business Simulation & Experiential Exercises,* Vol. 17, 92-96. (Reprinted in the Bernie Keys Library available from http://www.absel.org).

Hernandez, S. (2003). Team learning in a marketing principles course: Cooperative structures that facilitate active learning and higher level thinking. *Journal of Marketing Education,* 24, 1, 73-85.

Hornaday, R.W., & Ensley, M. (2000). Teamwork attributes in a classroom simulation. In *Developments in Business Simulation & Experiential Learning,* Vol. 27, 195-200. (Reprinted in the Bernie Keys Library, available from http://www.absel.org).

Hsu, T. (1984). A further test of the group formation and its impacts in a simulated business environment. *Developments in business simulation and experiential exercises.* Vol. 11, 6-9. (Reprinted in the Bernie Keys Library, available from http://www.absel.org).

Imel, S., & Tisdell, E.J. (1996). The relationship between theories about groups and adult learning groups. *New Directions for Adult and Continuing Education,* 71, 15-24.

Jehn, K.A., Northcraft, G.B., & Neale, M.A. (1999). Why some differences make a difference: A field study of diversity, conflict, and performance in workgroups. *Administrative Science Quarterly,* 44, 741-763.

Johnson, D.W., Johnson, R.T., & Smith, K.A. (1991). *Cooperative Learning: Increasing College Faculty Instructional Productivity.* ASHE-FRIC Higher Education Report No.4. Washington, D.C.: School of Education and Human Development, George Washington University.

Joyce, W.B. (1999). On the free-rider problem in cooperative learning. *Journal of Education for Business,* 74, 5, 271-274.

Katz, D., & Kahn, R.L. (1978). *The social psychology of organizations.* NY: Wiley.

Katzenbach, J. & Smith, D. (1993). *The wisdom of teams. Creating the high performing organization*. NY: McGraw-Hill.

Klein, R.D., Fleck, Jr., R.A., & Wolfe, J. (1993). A role for management games in internationalizing the business school curriculum. *Journal of Management Education.* 17, 2, 159-173.

Latane, B., Williams, K.D., & Harkins, S.G. 1979. Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology,* 37, 822-832.

Lawler, E.E., Mohrman, S.A., & Ledford, Jr., G.E. (1995). *Creating high performance organizations.* San Francisco: Jossey-Bass.

Levine, J.M., & Moreland, R.L. (1990). Progress in small group research. *Annual Review of Psychology,* 41, 585-634.

Lott, A.J., & Lott, B.E. (1965). Group cohesiveness as interpersonal attraction: A review of relationships with antecedents and consequent variable. *Psychological Bulletin,* 64, 259-309.

Mayo, E. (1933). *The human problems of an industrial civilization*. NY: Macmillan.

McCain, B. (1996). Multicultural team learning: An approach towards communication competency, *Management Decision,* 34, 6, 65-68.

McCorkle, D.E., Reardon, J., Alexander, J.F., Kling, N.D., Harris, R.C., & Iyer, R.V. (1999). Undergraduate marketing students, group projects, and teamwork: The good, the bad, and the ugly? *Journal of Marketing Education,* 21, 2, 106-117.

McKinney, K., & Graham-Buxton, M. (1993). The use of collaborative learning groups in the large class: Is it possible? *Teaching Sociology,* 21, 403-408.

Mello, J.A. (1993). Improving individual member accountability in small work group settings. *Journal of Management Education,* 17, 2, 253-259.

Michaelsen, L.K. (1994). Classroom organization and management: Making a case for the small-group option. In K.W. Prichard and R.M. Sawyers (Eds.) *Handbook of college teaching: Theory and applications.* Westport CT: Greenwood.

Michaelsen, L.K., Bauman, K.A., & Fink, L.D. (2004). *Team-based learning: A transformative use of small groups in college teaching.* Sterling VA: Stylus.

Miesing, P., & Prebel, J.F. (1985). Group processes and performance in a complex business simulation. *Small Group Behavior,* 16, 3, 325-338.

Muller, T.E. (1989). Assigning students to groups for class projects: An exploratory test of two methods. *Decision Sciences Journal,* 4, 623-634.

Neal, D.J., (1997). Group competitiveness and cohesion in a business simulation. *Simulation & Gaming,* 28, 4, 460-476.

Norris, D.R., & Niebuhr, R.E. (1980). Group variables and gaming success. *Simulation & Games,* 11, 3, 301-312.

Nunnally, J.C. (1978). *Psychometric theory.* NY: McGraw-Hill.

O'Reilly, C.A., Caldwell, D.F., & Barnett, W.P. (1989). Work group demography, social integration, and turnover. *Administrative Science Quarterly,* 34, 21-37

Payne, B.K., & Monk-Turner, E. (2006). Students' perceptions of group projects: the role of race, age, and slacking. *College Student Journal,* 40, 1, 132-139.

Peterson, R.A. (1994). A meta-analysis of Cronbach's coefficient alpha. *Journal of Consumer Research,* 21, 381-391.

Pfaff, E., & Huddleston, P. (2003). Does it matter if I hate teamwork? What impacts attitudes toward teamwork. *Journal of marketing education,* 25, 1, 37-45.

Pierson, F.C. (1959). *The education of American businessmen.* NY: McGraw-Hill Book Company.

Porter, L.W., & McKibbon, L.E. (1988). *Management education and development: Drift or thrust into the 21st century?* NY: McGraw-Hill.

Price, J.L., & Mueller, C.W. (1986). *Handbook of organizational measurement.* Marshfield MA: Pitman Publishing Inc.

Proll, L.G. (1972). A simple method of assigning project to students. *Operational Research Quarterly,* 23, 195-201.

Roethlishberger, F.J., & Dickson, W.J. (1939). *Management and the worker: Social versus technical organization in industry.* Cambridge: Harvard University Press.

Schrieber, A.N. (1958a). Gaming—A way to teach business decision-making. *University of Washington Business Review,* 17, 7, 18-29.

Schrieber, A.N. (1958b). The theory and application of the management game approach to teaching business policy. *Academy of Management Journal,* 1, 51-57.

Schriesheim, C.A., & Yaney, J.P. (1975). The motivation of business game participants. *Training and Development Journal,* 29, 11-15.

Seashore, S. (1954). *Group cohesiveness in the industrial work group.* Ann Arbor: Institute for Social Research, University of Michigan.

Strong, T., & Anderson, R.E. (1990). Free-riding in group projects: Control mechanisms and preliminary data. *Journal of Marketing Education,* 12, 2, 61-67.

Tonn, J.C., & Milledge, V. (2002). Team building in an MBA "gateway" course: Lessons learned. *Journal of management education,* 26, 4, 415-428.

Tuckman, B.W. (1965). Developmental sequence in small groups. *Psychological bulletin, 63,* 384-399.

Tuckman, B.W., & Jensen, M.C. (1977). Stages of small-group development revisited. *Group and Organization studies,* 2, 419-427

Van de Ven, A.H., Delbecq, A.L., & Koenig, R. (1976). Determinants of coordination modes within organizations. *American Sociological Review,* 41, *322-328.*

Watson, W.E., Kumar, K., & Michaelsen, L.K. (1993). Cultural diversity's impact on interaction process and performance: Comparing homogeneous and diverse task groups. *Academy of management Journal,* 36, 590-602.

Wellington, W., & Faria, A.J. (1996). Team cohesion, player attitude, and performance expectations in simulation. *Simulation &Gaming,* 27, 1, 23-40.

Westphal, J.D., & Milton, L.P. (2000). How experience and network ties affect the influence of demographic minorities on corporate boards. *Administration Science Quarterly,* 45, 366-398.

Williams, K.Y., & O'Reilly, C.A. (1998). Demography and diversity in organizations: A review of 40 years of research. In B.M. Staw and L.L. Cummings (Eds.), *Research in organizational behavior,* 20: 77-140. Greenwich CT: JAI Press.

Wolfe, J., Bowen, D.D., & Roberts, C.R. (1989). Team-building effects on company performance: A business game-based study. *Simulation & Games,* 20, 4, 388-408.

Wolfe, J., & Box, T.M. (1988). Team cohesion effects on business game performance. *Simulation & Games,* 19, 1, 82-98.

Wrege, C.D., & Perroni, A.G. (1974). Taylor's Pig Tale: A Historical Analysis of Frederick W. Taylor's Pig-Iron experiments. *Academy of Management Journal,* 17, 6-27.