

THOSE WHO DO AND THOSE THAT DON'T: A STUDY OF ENGAGED AND DISENGAGED BUSINESS GAME PLAYERS

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ABSTRACT

The “free rider” syndrome plagues many group efforts. This is an especially harmful phenomenon for those using business games as team-based learning experiences. Because of this lack of engagement naturally associated with players in groups, this paper tested a set of predictors of a player’s engagement or unengagement in the simulation being played. Engagement varied widely when measured by the proportion of online screen visits made by each team’s members. Of the study’s 76 subjects, 18.4% were highly engaged with 38.2% of them being almost completely unengaged. Those who actively participated had significantly higher pre-college aptitude scores and cumulative college grade-point-averages. Despite the group’s bi-modal nature, there were weak but significant predictive relationships between player aptitudes and collegiate grade-point-averages and engagement levels. These weak correlations indicate there are other more important factors associated with a player’s level of game engagement.

Educators, and especially those preparing students for business careers, have endorsed the use of active group learning environments (Becker & Dwyer, 1998). More importantly, there has been an increase in their use (Brooks & Ammons, 2003; Lejk & Wyvill, 2001) based on their supposed ability to deliver the benefits of high cognitive involvement and greater activation and motivational levels for the materials and tasks being presented (Peterson & Miller, 2004). For those being trained for the business world, whose practitioners must bring about instrumental effects, group-learning methods help the student to learn about group dynamics, develop their interpersonal skills, expose them to diverse perspectives and produces more well-rounded assignments and other task-related outputs (Mello, 1993).

Despite these often-documented benefits, there are still factors that make many group-learning efforts frustrating to their participants and sub-optimal in the results they produce (Ashraf, 2004; Gatfield, 1999; Kerr, 1983). One of these factors is the presence of “free riders” or those who engage in social loafing (Williams & Karau, 1991). These

individuals do not bear their fair share of the group’s work while obtaining all of its benefits (Albanese & Van Fleet, 1985; Jones, 1984). This imbalance frequently leads to dominance by a few and less learning for others, bitterness, claims of prejudice by those negatively evaluated and a lowering of the quantity and quality of the group’s output (Brooks & Ammons, 2003; McElhinney & Murk, 1994; Schoenecker, Martell & Michlitch, 1997).

The problem of getting the free rider to put forth a requisite level of effort is exacerbated in student-related projects. In the workplace, employees are more-directly rewarded for their efforts with paychecks, promotions and other entitlements such as employee benefits (Piezon & Donaldson, 2004). Students, however, do not have these rewards and punishments at their disposal other than by awarding group-dispensed grades and peer evaluations. These may not be meaningful given the rewards of free-ridership (Murphy, Wane, Liden & Erdogan, 2003).

Because of the presence of social loafing in all group projects, and possibly those associated with business games that depend on the joint efforts of their players, this paper attempts to quantitatively document its presence. It does so by not relying on anecdotal and post hoc player evaluations that may not capture the amount of free ridership manifested on their teams. In doing so, the paper will attempt to identify the degree a player’s pre-game scholastic aptitudes and academic achievement levels are associated with their degree of engagement in a business game learning environment.

LITERATURE REVIEW

This paper is concerned with documenting the actual presence of free riders on business game teams. Therefore, it does not cover the vast literature on why there are free riders and social loafers. For those topics the reader is referred to the pioneering work of Ringelmann (1913), the meta-analytic study by Karau & Williams (1993) that documents its pervasiveness and Latane, Williams and Harkins’ (1979) summary of the theories on its causes. In this case, the paper is interested in the degree to which a game

player pays attention to the institution's requirements for engaging in a particular game's online participation activities in preparation for their team's decision-making cycle.

Anderson & Lawton (2004) have characterized the playing of a business game as being a large, continuous problem-solving exercise. With this perspective, a business game is the application of McMaster University's problem-based approach to education (Koh, Khoo, Wong, & Koh (2008). In this vein, the requisites for finding a series of continuous solutions to the problems players face in a game are related to those associated with successful problem-solving activities simultaneously involving physical movement, navigating the game's interface, and cognitive/mental thought processes. The analogy used here is that of solving the Rubik's cube riddle. The task is to reassemble a scrambled set of six differently colored faces so that only one of those colors appears on each of the cube's six faces. The riddle's solution entails a number of moves of the faces, a sequential solving each of the cube's three layers without destroying any of the previously constructed layers, and also having the patience to make the number of

moves needed to reach the cube's solution. Many do not have the patience or endurance to go through this process as there are 519 quintillion possible arrangements of the cube's pieces.

Continuing the Rubik's analogy to the play of an internet-served business game, its decision makers must physically manifest the following actions:

1. Variety—Pursue a number of different screens (turn a number of cube faces).
2. Depth—Intensely examine the screen's information (drill down through the cube's three layers).
3. Endurance—See the task to its end (keep turning cube faces until the riddle has been solved).

Accordingly, this paper defines the general concept of game engagement as consisting of three attributes or activities. If a game's company is to be successful, it is believed players must vigorously pursue the information the game provides and they should maintain this pursuit on a long-term period-by-period basis. This would entail visiting

EXHIBIT 1 SUBJECT DEMOGRAPHICS

Descriptor	Value
Population size	76
Course drop rate	13.2%
Age	21.0
ACT/SAT Percentile	56.6
High School Grade-Point-Average	3.25
Gender:	
Male	64.5%
Female	35.5%
Ethnicity:	
White	72.4%
Black	7.9%
Hispanic	5.3%
Asian	2.6%
American Indian	2.6%
Foreign	3.9%
Unknown	3.9%
Other	1.3%

most, if not all the game's screens each quarter, even if some degree of functional specialization was being used by the company. In addition to visiting the game's screens, each player would study each screen's information and decision-making inputs with a high level of depth, i.e., devote in depth rather surface depth to the screen's task. Finally, each player should consistently pursue both depth and variety throughout the game's duration. If all these conditions have been met, such a player would be considered to be highly engaged in the game. A player could be considered unengaged with the game if few screens were visited, each visit was very short and there were many gaps in the number of visits made on a periodic basis.

METHODOLOGY

The study's subjects were introductory-level business students at a campus-based liberal-arts university. Its Fall 2009 enrollment was 4,262 full-time students. Its business administration major is granted by its College of Arts and

Sciences. The demographics associated with this study's participants (n=76) are presented in Exhibit 1.

They played *The Global Business Game, Business Basics Edition* (www.onlinebg.com) on self-selected three-member teams for its six rounds of play. The game (GBB) is an internet-delivered computer-based simulation designed for introductory-level business students.

One of the game's features is the instructor's ability to monitor and otherwise record the time, date, and duration of all internet activities engaged in by its players. The feature also divulges the screens viewed and how they were used such as scanning, editing or printing them. A review of all the screen activity logs revealed that no screens were printed. This was interpreted as being an indication that the only source of information a player was able to obtain for each decision-making session came from a viewing of the game's screens rather than viewing output printed by one player and distributed to the team's other players.

EXHIBIT 2 PLAYER PARTICIPATION BY ENGAGEMENT LEVEL

Engagement Level	Number	Percent
Disengaged—Free Riders	29	38.2%
Indifferent—Easy Riders	33	43.4%
Engaged—Hard Chargers	14	18.4%
Total	76	100.0%

EXHIBIT 3 PARTICIPANT CHARACTERISTICS BY GENERAL ENGAGEMENT

Participant Characteristic	Game Engagement		Significance
	Disengaged	Engaged	
Male	58.6%	57.1%	n.s.
Female	41.4%	42.9%	n.s.
White	43.8%	57.1%	n.s.
Black	26.9%	21.4%	n.s.
Hispanic	11.5%	14.3%	n.s.
Asian	3.8%	7.1%	n.s.
Aptitude	43.9	77.1	0.001
HSGPA	3.06	3.54	0.063
CGPA	2.69	3.31	0.016

Note: Tests conducted as one-tailed tests.

At the game's end, the subjects were asked via a five-minute, one-page questionnaire, to rank their teammates regarding their economic and social contributions to their company's results. Each player's engagement level was initially determined by the number of screens each player visited as a proportion of the team's total screen visits. The number of screen visits was considered a reasonable and objective measure of grossly defined game engagement as logging screen time was the only way a company's players could prepare themselves for any face-to-face meetings that might occur.

The log review found the student population fell into three engagement groups. Those classified as being engaged, termed "Hard Chargers", visited the game's website for at least five of the game's six required decision-making rounds. They also made at least 75.0% of their company's total visits. Those classified as being disengaged, termed "Free Riders", visited their game's website less than 15.0% of their company's total screen visits. In-between or indifferent groups termed "Easy Riders" were inconsistent in their number of visits, the times spent by screen and their participation throughout the game. Their inconsistencies across all the dimensions of engagement made them an amorphous entity lacking any identity or characteristics. Exhibit 2 indicates the number and proportions of players involved.

An examination of those who were either Disengaged or Engaged produced the bi-polar results presented in Exhibit 3. Each had unique aptitudes and academic achievement levels but similar demographics. Based on this information it would appear the engaged group brought superior aptitude levels and college achievement results, and almost significantly superior high school achievement levels, to the game and therefore might demonstrate different playing behaviors.

RESULTS

The results presented in Exhibit 4 indicate there were distinct differences in how each player type engaged in the game. Those in the Engaged group visited 218.0 or 42.1% more times than the Disengaged group. Those in the Engaged group also demonstrated more Depth by spending 61.1% more time during each screen visit. Most importantly, from a long-term participation perspective, those who were Disengaged did not visit their company's screens 81.0% of the time while the Engaged players rarely missed an opportunity to interact with the game's online system.

The lack of endurance, or "staying power" of the Disengaged group, is highlighted in Exhibit 5. The graph indicates that both groups fell in the number of times they visited their company's website toward the end of the game's final decision round. This is to be expected as players quickly narrow their search routines once their strategies have been put into place. They also become more selective as to what needs to be viewed. The differences between the two lies in the Engaged group's higher average starting position, which was 393.4 screens per player and a high degree of continuity with their visits. In the game's first period an average of only 20.2 visits were made by the Disengaged group, and they made hardly any visits between the game's third and fifth periods.

DISCUSSION

Based on these results it appears this study's students engaged in behaviors that did and did not maximize what they could learn from the game's learning environment. Many of the unengaged students did not attempt to prepare themselves for their decision-making sessions and did not examine their company's results. If they did so, it was done inconsistently at a very superficial level. The Engaged players did what game designers, instructors and gaming advocates hoped players would do. They conducted a wide

EXHIBIT 4 GAME ENGAGEMENT BY ENGAGEMENT DIMENSION

Engagement Dimension	Average Game Engagement Score		Significance
	Disengaged	Engaged	
Variety	5.3 screens	223.3 screens	p < 0.001
Depth	.18 minutes	.29 minutes	p = 0.015
Endurance	19.0%	97.0%	p < 0.001

Notes:

1. Variety = The number of screens viewed per decision period.
2. Depth = The average number of minutes spent per screen viewed.
3. Endurance = The number of sessions accessed as a percent of all sessions available.

search of the screens offered by the game, they spent a number of minutes per screen and they did this throughout the simulation's run. Given these associations Exhibit 6 indicates the degree a particular student's engagement level could be predicted based on measured scholastic aptitude scores and past and current academic achievements.

The player's aptitude, when measured by either SAT or ACT scores, explains between 17.0%-32.0% of the variances in the variety, depth and endurance that was exhibited. A player's high school grade-point-average was statistically significant only in accounting for 15.0% of the variance in the endurance they demonstrated over the game's run. Each player's current college grade-point-average fared better as a predictor of two engagement attributes. The coefficients of determination for variety and endurance ranged from 0.10-0.13.

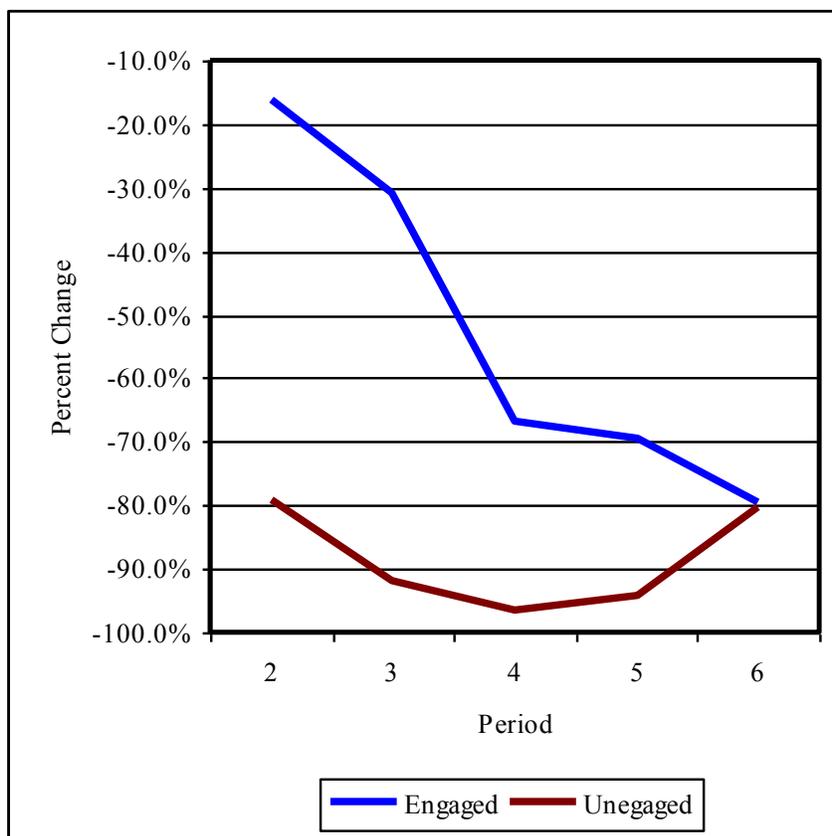
While this study found a degree of statistical significance there is the larger question of whether these correlations are strong enough to make a difference in either predicting a player's engagement level or their performance in the game. With r-squares ranging from 0.17-0.32, or averaging 0.23, about 0.77% of the variance in their engagement attributes were not explained. Based on this assess-

ment there appears to be other factors that determine a player's engagement level.

Because of either the actual or the possible lack of engagement in group projects, many have suggested the use of peer evaluations as a way to obtain additional measures of an individual's efforts and more accountability from all the team's members (Leijk & Wyvill, 2001; Magin, 2001; Ryan, Marshall, Porter & Jaia, 2007; Wen & Tsai, 2006). This study examined this aspect by asking each player to rank order the economic and social contributions their teammates made over the game's run and then comparing those rankings with each player's true within-team engagement rank. The results presented in Exhibit 7 indicates there is a weak but significant relationship between an individual's perceived value to attending to the team's social needs and the individual's level of engagement. Moreover, there is a fairly strong relationship between the individual's perceived value to attending to the team's economic needs and the individual's level of

engagement. Interestingly there is a nonsignificant relationship between a player's assessed economic versus social contribution. This result indicates the assessors were using different criteria to judge the value of social concerns

EXHIBIT 5
PERCENT CHANGE IN SCREENS VIEWED



with economic concerns. This finding also is in conflict with the findings of Wolfe & Roberts (1993) where there were strong correlations between a player's assessed social contribution and that player's economic contribution. In that study, however, the players were near-graduation business school seniors. Perhaps after four years of business schooling game players and business school students in general, may recognize that being "social" and "economic" are twin and not separate virtues.

CONCLUSION

Group-related business games are a popular pedagogy in business schools. They help initiate students into the dynamics of group relations and group decision-making skills while providing a realistic context for participants. Unfortunately, oftentimes there are "free riders" that afflict many group efforts. This serves to create imbalances between participants not only in terms of learning but also in the quality of the learning outcomes. This research sought to understand the contributing factors that created engaged versus non-engaged group participants. In general, it appears that some of the factors that contribute to an engaged participant are aptitude scores such as higher college GPA and SAT or ACT scores. However, this paper's research emphasis was not to advocate against using group-related projects as a business teaching methodology but to instead recognize the extent to which free-ridership can exist and that the instructor needs to be pro-active with measures to

insure that true collective learning is possible. The simulation and group project used in this study were intended to initiate an experiential learning exercise of managerial concepts. As with all team-based work in academia as well as the work-place, there will be members more engaged in the project than others. This research provides a starting point in which to identify the relationship between engaged and unengaged team members. Other factors beyond this research offer opportunities for further predictive group participant engagement research.

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EXHIBIT 6

PREDICTIVE POWER OF SCHOLASTIC APTITUDE AND ACADEMIC ACHIEVEMENT

Engagement Dimension	Predictor r ²		
	Aptitude	HSGPA	CGPA
Variety	0.19	0.01*	0.10
Depth	0.17	0.01*	0.00*
Endurance	0.32	0.15	0.13

Note: All significant p < 0.038.

*Non-significant.

EXHIBIT 7

ASSESSMENTS OF SOCIAL AND ECONOMIC CONTRIBUTIONS

Contribution	r ²	Significance
Social	0.09	p = 0.008
Economic	0.29	p < 0.000
Social/Economic	0.04	n.s.

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