

THE ASSOCIATION BETWEEN LEARNING AND LEARNING STYLE IN INSTRUCTIONAL MARKETING GAMES

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To understand how learners of respective types respond to marketing games, a joint space generated by canonical correlation analysis is used to recreate Kolb's learning style-type plot and locate business students as points within it according to their learning style types. Two hundred twenty-three undergraduate students played *The Marketing Game!* and completed exit surveys soliciting their attitude toward the game experience and Kolb's learning styles inventory. Results indicate marketing games to be a positive experience for all learners. Such inclusiveness is afforded because students can frame the game experience to match their preferred learning styles. Pedagogical implications are discussed.

Faria et al. offer a concise description of what instructional business games do:

They allow for dynamic business decision making where players formulate a strategy and then carry out a series of decisions to implement the strategy. Game participants receive feedback that demonstrates the consequences of their decisions, and the participants are able to evaluate their strategies and, if necessary, reformulate their strategies. The experience gained from the repeated iterations of decision periods provides direct feedback to players, from which they are able to learn. (2009, p. 480)

But do students really learn from this experience? Many business faculty certainly must believe so because the use of instructional games has grown in the past decade (Wilson et al. 2009), such that instructional games have become commonplace in the classroom (Karns 2006; Young, Klemz, and Murphy 2003), to the point where 48 percent of faculty from AACSB (Association to Advance Collegiate Schools of Business)-accredited North American business schools recently reported using or having used them (Faria

and Wellington 2004). Nonetheless, the question remains open because the empirical evidence in support of learning through simulations and games, and experiential learning, is sparse and mixed (Chin, Dukes, and Gamson 2009; Gosen and Washbush 2004).

Empirical evidence is sparse because the number of scholars engaged in assessment research has never been large (Gosen and Washbush 2004), and no more than a couple dozen of the more than 2,000 instructional simulations have ever been assessed (Chin, Dukes, and Gamson 2009). Of those few business simulations that have been tested, the majority are "top management" simulations (Faria et al. 2009; Wolfe 1997), of the sort intended to integrate all business functions, and often used in capstone courses. Fewer still are "functional simulations," which isolate one of the business functions, marketing simulations among them.

Moreover, research concerning the efficacy of experiential learning, and of games, is not unequivocal (Laughlin and Hite 1993; Vaidyanathan and Rochford 1998; Wellington and Faria 1991). Most agree that students find games to be fun and motivating (Fortmüller 2009; Hromek and Roffey 2009; Wideman et al. 2007), and credit fun and humor as conditions that allow for creative problem solving (Prouty 2000). And there are those who also find that games to lead to improved learning and performance (see Wilson et al. 2009 and the references therein). In contrast, games' detractors argue that games are superficial activities that may not contribute to learning (Dickinson, Whiteley, and Faria 1990; Egenfeldt-Nielsen 2007; O'Neil, Wainress, and Baker 2005; Wellington and Faria 1991). Summarizing the mixed

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evidence for the learning performance of games, Gosen and Washbush conclude that, although “there is evidence suggesting simulations are valid . . . there does not exist enough consistent research from methodologically sound studies across multiple games to conclude simulations are valid” (2004, p. 276).

Gosen and Washbush do go on to temper their conclusions when it comes to evidence in support of business games, pointing out that “[o]ne could argue that there are enough methodologically sound studies to tentatively conclude simulations are a valid method to teach strategic management” (2004, p. 276). This conclusion remains tentative, however, and there remain those who are skeptical of the efficacy of business games (Anderson and Lawton 1997).

It is the purpose of this research, therefore, to add to and extend this sparse literature by testing *The Marketing Game!* (Mason and Perreault 2002), one of the functional business games that has rarely, if ever, been tested. *The Marketing Game* is selected because we use it for undergraduate marketing classes within AACSB-accredited programs, and because it is extant: *The Marketing Game*’s publisher, Irwin McGraw-Hill, reports having shipped 48,000 originals of the third edition since 2002, which they note may be a conservative estimate of the actual number of users because there are a number of used copies in the marketplace. Specifically, the present study (1) reviews the literatures on learning dimensions, experiential learning, instructional strategic business games, learning styles, and women versus men as learners; (2) replicates prior research that is primarily focused on the assessment of nonbusiness and top management games, and extend it to functional business games, marketing games, and *The Marketing Game*; (3) examines the effect of attitude toward the game on performance in the game and in the class; and (4) examines these outcomes by learning style.

Theoretical and pedagogical implications are discussed. These assessments should help to further develop an understanding of the educational value of simulations, identify aspects of the experience that are particularly noteworthy or that need improvement, and increase understanding of how to administer simulations more efficaciously, in general, and in a manner that is sure to be inclusive.

CONCEPTUAL DEVELOPMENT

Dimensions of Learning

Learning is a complex multidimensional construct (Gosen and Washbush 2004), and various kinds of learning have

been conjectured to be acquired by participation in instructional games (Fortmüller 2009; Garber and Clopton 2002). A number of instructional business simulation articles have listed the learning goals that their authors hope to achieve with instructional business games. Faria et al. (2009) reviewed 304 of these articles and cataloged a collective total of nine learning goals. There is a break after the top five goals, which are each mentioned in at least 20 percent of the articles reviewed. These five goals map rather well onto the four a priori learning goals that we seek to achieve with our marketing game: (1) the learning experience and learning outcomes from applying marketing principles in context (henceforth referred to as “verisimilitude”), (2) the strategy aspects of business games (analysis and problem solving), (3) the decision-making experience gained through business games (competition), and (4) the teamwork experience provided through business games (collaborative learning).

Verisimilitude

An essential component of the efficacy of verisimilitude is that student participants consciously perceive the game as such. Students are motivated by finding the experience to be credible (McHaney, White, and Heilman 2002) because they prefer instructional technologies that are stimulating and real-world oriented (Karns 2006). Verisimilitude is also a quality that differentiates between successful and unsuccessful games (Chin, Dukes, and Gamson 2009). We therefore also utilize verisimilitude to test the efficacy of *The Marketing Game* in particular, and therefore predict:

Hypothesis 1a: Students find The Marketing Game to be a true and faithful representation of the actual marketplace.

Analysis and Problem Solving

A second dimension of learning that some believe that games aid in the learning of complex material (Garris and Ahlers 2001; Ricci, Salas, and Cannon-Bowers 1996). By providing complex and dynamic environments for competition in business-like situations, simulations can be expected to enable and invite participants to analyze, synthesize, evaluate, and apply knowledge, thereby exercising higher-order cognitive skills (Bloom et al. 1956). According to Wideman et al., “Higher order learning accomplished through the interactive, trial-and-error process of instructional gaming is supportive of the development of logical thinking and problem solving skills” (2007, p. 12; see also Fortmüller

2009; Higgins 2000; Inkpen et al. 1995; Prensky 2001; Whitebread 1997).

Although there is clearly a strong belief by some, if not many, in the efficacy of games for teaching higher-order learning, empirical support is again mixed. For example, Hsu (1989) found that simulations are not as efficient for delivering factual information for conceptual principles, and are best for problem solving, whereas Anderson and Lawton (1997) found support for cognitive learning on lower levels of Bloom et al.'s (1956) taxonomy, but no support for the games affecting the higher levels, which would include analytical and problem solving. We therefore extend the test for the effect of games on higher-order learning to functional marketing games, and thus propose:

Hypothesis 1b: Students find that functional marketing games support the development of logical thinking and problem-solving skills.

Competition

A third dimension of learning via instructional games is that firms (teams) compete against others within industries, and that performance in the game is judged relative to other teams' performance. Competition serves two purposes in business games. The first is that it plays a part in the realistic portrayal of the competitive marketplace. That the game faithfully portrays those key aspects of the real world that it seeks to emulate is considered by some to be crucial for instructional purposes (Adobor and Daneshfar 2006; Livingston et al. 1973; Wideman et al. 2007). This is considered important conceptually because it "is generally accepted that useful knowledge is contextualized knowledge—the learner must know when and where to use it" (Bransford, Brown, and Cocking 2000). Games can provide experiences across multiple situated contexts that enable learners to understand complex concepts "without losing the connections between abstract ideas and the real problems they can be used to solve" (Shaffer et al. 2004, p. 5).

The second purpose competition serves in business games is as a goal to learning. Some students' chosen goal in playing, one among several that they could choose to motivate their performance, is to win (Fortmüller 2009). However, as Hromek and Roffey point out: "There is an argument that competition increases motivation but research indicates that although competing for high grades can increase the academic performance of some students, many young people are less motivated under these conditions (Meese, Anderman, and Anderman 2006)" (2009,

p. 634). Thus, competition in games is a double-edged sword, motivating for some, but not others. Because games as experiential learning are intended to be inclusive, this variance in student response to competition within games is problematical.

However, we reason that the multifaceted nature of games as learning may provide a solution. Those who are motivated by competition may treat games as competition, and those who are not may choose to treat the game according to some other of its aspects, such as learning experience or analytical exercise, or since the game is a group exercise, they can seek the support of one of their more competitive colleagues when dealing with the competitive aspects of the game. This latter effect may account for the fact that Kratwohl, Bloom, and Masia (1964) found that competition in games creates positive affect, involvement, and positive attitudes in general. We seek to update this result and extend it to functional marketing games:

Hypothesis 1c: Students find the game to be a competitive.

Collaborative Learning

The Marketing Game, as with many instructional business games, is designed to be a group project. A class is divided into firms, each consisting of several students who must form decisions as part of their participation in the game. Therefore, the game involves teamwork, one intended outcome of which is collaborative learning.

The reasons for incorporating group activities into the business classroom are threefold: (1) teamwork is prevalent in the workplace, (2) teams do not always work effectively, and (3) teamwork skills and team development can be learned from experience (Kayes, Kayes, and Kolb 2005; Livingstone and Lynch 2002). Hromek and Roffey report that "more than a thousand research studies have documented the many benefits of cooperative learning" (2009, p. 634; see also Bernard 2004; Marzano 1998). Researchers have identified that cooperative learning leads to increases in academic outcomes, social skills, empathy, motivation, acceptance of diversity (racial, ethnic, physical), conflict resolution, self-esteem, self-control, positive attitudes toward school, and critical thinking (Johnson, Johnson, and Stanne 2000; Slavin 1995). Cooperative learning and group work have also been associated with lower levels of bullying, increased ability to tolerate different perspectives on the same issue, and increased levels of assertive problem-solving skills (Johnson, Johnson, and Stanne 2000).

Evidence indicates that students prefer learning with other students (Matthews 1994), and that teamwork in

games can be a way of developing social and emotional learning (Faria 2001; Hromek and Roffey 2009). However, for team learning to take place, the pursuits that the teams undertake must provide the proper context for such learning. Research and theory suggest that such a context should include common tasks and objectives (e.g., maximize contribution margin, win the game), built on available but limited resources (e.g., a budget) provided within constraints that pose barriers to success (e.g., competition, the underlying economic models that determine business game outcomes, the need for a working knowledge of marketing principles). It is clear that marketing games are designed to provide all of this, nominally. The question is, do they do so effectively? Games may provide a task or objective to pursue, but do games succeed in cultivating a sense of shared purpose within a team, encourage the participation of all its members, and achieve actions that are reasonable responses to the environment in which they are placed (Kayes, Kayes, and Kolb 2005)? We predict that:

Hypothesis 1d: Students find that functional marketing games provide effective collaborative learning opportunities.

Learning Styles

A major movement in education in the past 25 years has been an increased interest in individual student learning styles (Kolb and Kolb 2009; Lemire 2000), and a concomitant effort to match learning activities with student learning styles in the belief that such matching will improve learning outcomes (Bacon 2004; Dunn et al. 1990; Frontczak 1990; Karns 2006; Kolb 1984, 1988; Young, Klemz, and Murphy 2003). The effort to accommodate learners of differing styles may be particularly pronounced in complex disciplines such as business, where educators are more intensively seeking pedagogies in the form of in-class and out-of-class activities that will aid their students in linking the theory of their courses to that evermore complex real world (Brown, David, and Randles 2005).

However, there appear to be two problems hampering the adoption of experiential learning theory (ELT) and activities that may accommodate learners of different styles to the classroom. The first is that the considerable research seeking empirically to link learning styles to academic outcomes is mixed. For example, Hickox (1991; as cited in Mainemelis, Boyatzis, and Kolb 2002), reviewed 81 studies in accounting and business education along with some medical disciplines and education, and found that 61.7 percent supported ELT, 16.1 percent showed mixed support, and 22.1 percent did

not support ELT. McHaney, White, and Heilman (2002) found that simulations contribute to all phases of Kolb's (1984) learning cycle more so than traditional learning forms. However, Vaidyanathan and Rochford (1998) question whether simulations are equally beneficial to all students, while Frontczak (1990) and Karns (2006) argue that experiential learning accommodates learners of all styles, and describes simulations to be learning activities to which accommodators respond (Kolb 1984).

The second problem is that typical (marketing) classrooms are diverse, containing learners of all styles (e.g., see Frontczak and Rivale 1991; Karns 2006; Loo 2002; Young, Klemz, and Murphy 2003). How can one apply some activity known to accommodate learners of some particular style when it excludes those exhibiting other learning styles?

One approach could be to introduce instructional tools that accommodate all learners at once. In theory, a simulation game should accommodate a wide range of learners (O'Neil, Wainress, and Baker 2005) because, as previously described, it is a multifaceted and comprehensive learning activity that "touches all bases" (Kolb and Kolb 2009, p. 298) such that students can approach from a number of perspectives depending on their preferred learning styles (Bartlett 1996). Students may choose to see and treat the game as a learning experience, a source of marketing knowledge, a competition, or an analytical exercise, depending on their own learning proclivities. Learning activities that are thought to accommodate certain learning styles are typically predicated on the principle of actively engaging students in their own learning (Brown, David, and Randles 2005); therefore, students can choose for themselves what a game is, which in turn will dictate what sort of experience the game playing will be and how the learning will transpire from it for each individual.

Kolb's Model of the Learning Process

Kolb's (1984) model of the learning process is conceived of as a four-stage model of effective experiential learning. "It is how children learn outside of the school context, and forms the basis for many types of expert practice (Gee 2003)" (Wideman et al. 2007, p. 12). Kolb's four-stage learning modes are (1) from their concrete experience (CE) people generate (2) reflections and observations (RO), which lead to (3) the formation of abstract concepts, rules, and principles (AC), which in turn lead to (4) hypotheses to be tested with future action and new experiences, known as active experimentation (AE). This learning cycle is continuously recurring and is directed by individual needs and goals (Kolb and Kolb 2009). The learning styles inventory (LSI) is de-

signed to measure individuals' strengths and weaknesses in relying on and using the four different learning modes. Individual's scores on these modes equate to specific learning style profiles for each person. If instructional games should accommodate learners of all types, then learners evincing disparate learning profiles across these four learning modes should find *The Marketing Game!* to be a positive learning experience. In other words, learners of different types will experience the game differently, according to how it is that each of them chooses to frame the experience, and the game will accommodate each of those experiences in that each of them can be positive. For example, those who prefer in their own learning to emphasize the modes of reflective observation and abstract conceptualization (making them) may prefer to approach the game as an analytical exercise, whereas those who emphasize concrete experience and reflective observation may prefer to approach the game as experiential learning. We therefore propose:

Hypothesis 2: Game participants of differing learning styles will find functional marketing games to be a positive learning experience, but will differ according to the type of learning experience they find it to be.

AN EXAMINATION OF ATTITUDE TOWARD PLAYING MARKETING GAMES

Two hundred twenty-three undergraduate business students in eight sections of principles of marketing at a public university in the southeastern United States participated in *The Marketing Game!* (Mason and Perreault 2002) as an in-class and out-of-class exercise. All class sections were taught by the same instructor who administered the game in an equivalent manner across all the sections. Teams were generally four or five members in size and were self-selected. A number of exercises in the first or second class session allowed students to meet and get to know one another prior to self-selection.

Cossé, Ashworth, and Weisengerger offer a concise description of *The Marketing Game!*

The Marketing Game! simulates a personal computer software industry consisting of four firms, with a student team acting as each firm's marketing department. The market consists of six [consumer] segments served by two channels of distribution. . . . Student teams must allocate funds to various activities, including advertising, sales promotion, product development, and marketing research. They also must make decisions regarding the sales force (size, commission rate, proportion of non-selling time, and allocation to channels), the intensity of distribution, type of

advertising, the price, and production order quantities. Teams were given the objective of maximizing net contribution to profits. (1999, p. 98).

The Survey

The participants completed a three-part pencil-and-paper exit survey soliciting their beliefs and attitudes toward the four learning dimensions of the game experience upon completion of the game. Part A consists of 46 statements designed to solicit student attitudes toward the game on all a priori conceived learning dimensions shown in Table 1. Part B consists of Kolb's (1984) learning style inventory. Part C consists of personal information including gender, class year, major, and grade point average (GPA).

Although students find simulations to be fun and motivating, critics argue that these qualities do not in themselves constitute learning (Chin, Dukes, and Gamson 2009). However, it may be further argued that these qualities are in the least an inducement to learning, and necessary preconditions for higher-order learning (Bloom et al. 1956) and self-learning, primary goals of experiential learning, and may therefore serve as reasonable proxies for learning in the eyes of some (e.g., Boyatzis and Kolb 1991; Comer and Nicholls 1996; Hergert and Hergert 1990; Herz and Merz 1998; Leonard and Leonard 1995; McHaney, White, and Heilman 2002; Thompson and Dass 2000; Washbush and Gosenpud 1991; White and Von Riesen 1992; Zalatan and Mayer 1999). In that vein, a number of studies have used perceptions of learning to assess simulation effectiveness (Washbush and Gosenpud 1991). Attitude toward learning was solicited using a series of statements about the game experience that are directed toward those learning goals that marketing games are intended to achieve. Specifically, using a seven-point valence scale, the students report their level of agreement or disagreement with each of the statements according to how well each statement describes the game experience in some particular way.

RESULTS

Respondent Profile

Of the 223 game participants, 73 (33.2 percent) were female and 147 (66.8 percent) were male. All of the participants were traditional undergraduates, of whom 101 (46.5 percent) were college seniors and 116 (53.5 percent) were college juniors. Concerning college major, 103 (46.2 percent) were undeclared or were from outside the business school, 50 (22.4 percent) were in management, 32 (14.3 percent)

Table 1
Response Means for Attitudinal Statements

Postattitudinal Statements ¹	Mean Ratings ²
The Game as Learning Experience (Mean Response 0.80**)	
My understanding of the game got a lot better as the game went along.	1.77** ^d
I thought that the game was not too challenging and difficult to be useful.	1.52**
It is important that the game be fun to play in order for it to be a valuable educational experience.	1.40**
I feel that the game provided a really valuable educational experience.	1.06**
I always had great confidence in my ability to do well in the game.	1.00**
I feel as if I really understood how the game worked.	0.93**
I had a lot of fun playing the game.	0.62**
I think that those who struggled at some point in the game learned a lot more than those who never struggled.	0.61**
I thought that playing the game was a lot of fun.	0.52**
I feel that I am now much better able to cope with ambiguity and uncertainty in business, having played the game.	0.44**
I did not think the game was really easy.	0.30**
The uncertainty of the game did not make me feel uncomfortable.	0.18*
I feel that game is a very true representation of how business actually works.	0.04
The Game as Analytical Exercise (Mean Response 0.77**)	
I feel it was crucial to buy the marketing research reports to do well in the game.	1.34**
I believe that I got a good sense of how all the marketing mix decisions must work together for an overall marketing strategy to be effective.	1.30**
I think that differentiating your product is important to doing well in the game.	1.17**
My experience in the game leads me to believe that the various principles taught in basic marketing are entirely correct in practice.	0.92**
I think that total net contribution is the very best measure of financial performance in the game.	0.83**
I feel that the game does a great job of integrating all the concepts presented in the class.	0.78**
I feel that the game experience gave me a much better sense of how product design affects marketing outcomes in the real world.	0.78**
Market share is the very best indicator of financial performance in the game.	0.69**
I feel that the game gave me a much better sense of how pricing actually works in the real world.	0.76**
I feel that the game gave me a much better sense of how promotion actually works in the real world.	0.64**
The game gave me a great sense of how channels of distribution actually work.	0.48**
Sales volume is the best indicator of game performance.	0.48**
I think that performance within target segments, and not overall performance, is the very best indicator of game performance.	0.38**
I don't think that you have to be a very analytical person to play the game well.	0.02
The Game as Competition (Mean Response 1.41**)	
In our strategy, we took careful account of competitor activity.	1.77**
My experience in the game leads me to believe that target segmentation is an absolutely essential competitive strategy.	1.71**
I am an extremely competitive person.	1.50**
I think that those who lost the game learned no less than those who won.	1.31**
It was very important to me to finish first in our industry.	1.23**
I feel that the game experience gave me a much better sense of how competition affects marketing outcomes in the real world.	0.95**
The Game as Collaborative Learning (Mean Response 1.98**)	
Everyone in my group got along really well.	2.57**
I felt included by other group members.	2.42**
I felt really comfortable in my group.	2.29**
I do think that everyone had a chance to have their say and contribute to my firm's decisions.	2.26**
My group was not too large to be really effective.	2.24**
My group was not too small to be really effective.	2.05**
My group had no trouble coming to agreement about our decisions.	2.03**

(continues)

Post Attitudinal Statements ¹	Mean Ratings ²
It wasn't very hard for my group to get down to business whenever we met.	1.82**
My group was really great at getting down to business.	1.75**
My group had very strong leadership.	1.37**
I think we worked very hard on the game.	1.31**
I feel that I learned a lot about how to function effectively within a group by playing the game.	0.85**
I don't think I could have done a lot better in the game if I had done it on my own.	0.74**

Notes: Attitudinal statements are grouped according to a priori learning dimensions. ¹ Attitudinal statements are rank ordered in descending order by response mean. ² As measured on a seven-point scale, where +3 means "strongly agree," -3 means "strongly disagree," and 0 means "indifferent" or "don't know." ** $p < 0.001$; * $p < 0.1$ (significance of the mean is relative to a 0 rating).

were in production and computer information systems, 27 (12.1 percent) were in marketing, 19 (8.5 percent) were in finance, 14 (6.3 percent) were in accounting, and 9 (4.0 percent) were in economics. Some respondents reported multiple majors, accounting for a larger number of majors reported than there are respondents in the study. Regarding GPA, 32 (14.6 percent) reported a GPA between 3.50 and 4.00 on a four-point scale, 92 (42.0 percent) a GPA between 3.00 and 3.49, 78 (35.6 percent) between 2.50 and 2.99, and 17 (7.8 percent) between 2.00 and 2.49; none reported a GPA lower than 2.0.

Data Reduction for Subsequent Analysis

The SAS FACTOR procedure (SAS Institute 2004) was applied to the 46 attitudinal statements to reduce the complexity of the data and to derive orthogonal factors for use in subsequent analyses (Hair et al. 1992, pp. 223–264). Varimax rotation was used to derive four orthogonal factors that collectively account for 44 percent of the explained variance, selected for interpretability with the aid of a scree plot. Factor loadings are shown in Table 2. The first three of the four factors are similar to the first three a priori learning dimensions shown in Table 2, each composed of most all the same attitudinal statements as its counterpart in the other set: Factor 1: "The Game as Learning Experience"; Factor 2: "The Game as Collaborative Learning"; and Factor 3: "The Game as Competition." The fourth factor contains fewer statements than its a priori counterpart, but those that it retains are interpreted to be "The Game as Analytical and Problem Solving."

Factor 1 is interpreted to be "The Game as Experiential Learning" because it combines responses indicating that students came away with a sense of how marketing principles apply in context, that is, in a broader or "real-world" or applied context, in support of Hypothesis 1a. Statements that measure gains in perceived ability to cope with the

various performance aspects of the game are also included here. Factor 2 is interpreted to be "The Game as Collaborative Learning" because it includes most of those attitudinal statements that cause students to respond to the game as a group project. Collectively, these statements were the most positive, indicating that the game is a particularly good vehicle for group activity. Perhaps the students found that the demands of the game, intellectual and otherwise, were best shared, and the need to rely on each other to cope with the game's demands bred a certain congeniality. If so, that in itself is an important lesson to carry into business, whose activities are carried out jointly for the most part. Factor 3 is interpreted to be "The Game as Competition" because its component statements are expressions of the personal importance of winning and confidence in one's ability to perform under competitive circumstances. This factor reflects an understanding of the strategic implications of the fact of competition, and an awareness of target segmentation as the means by which competitive threats may be countered. Factor 4 is interpreted to be "Analysis and Problem Solving" because the statements that comprise it have largely to do with different measures of performance, which taken together suggest that when students experience the effects of competition and its uncertainty in the simulation, they better understand that marketing is about more than sales, and that marketing performance is not as straightforward as texts (and lectures) lead them to believe. In addition, the statement "I think that you have to be a very analytical person to play the game well" was heavily loaded on Factor 4.

All the statements included in each factor loaded cleanly. Factor scores were created by taking the simple mean of all the component attitudinal statements. The five attitudinal statements listed at the end of Table 2 were not highly loaded on any of the four factors (i.e., all the loadings were less than 30) or were doubly loaded on two factors, and therefore excluded from all subsequent analyses.

Table 2
Factor Analysis of 46 Attitudinal Statements and Their Loadings into a Four-Factor Solution

Postattitudinal Statements¹	Factor 1 Learning Experience	Factor 2 Collaborative Learning	Factor 3 Competition	Factor 4 Analytical Exercise
I feel that the game experience gave me a much better sense how product design affects marketing outcomes in the real world.	81	3	14	2
I feel that the game experience gave me a much better sense of how competition affects marketing outcomes in the real world.	78	4	9	2
I feel that the game gave me a much better sense of how pricing actually works in the real world.	77	10	-4	-5
I believe that I got a good sense of how all the marketing mix decisions must work together for an overall marketing strategy to be effective.	74	15	20	0
I feel that the game gave me a much better sense of how promotion actually works in the real world.	73	10	-4	5
I feel that the game provided a really valuable educational experience.	72	26	32	10
I feel that the game does a great job of integrating all the concepts presented in the class.	70	22	3	-4
I feel that I am now much better able to cope with ambiguity and uncertainty in business, having played the game.	69	16	12	16
I think we worked very hard on the game.	68	10	13	2
My understanding of the game got a lot better as the game went along.	67	7	37	3
My experience in the game leads me to believe that the various principles taught in basic marketing are entirely correct in practice.	66	26	23	6
I had a lot of fun playing the game.	64	15	40	-8
The game gave me a great sense of how channels of distribution actually work.	64	14	12	23
I thought that playing the game was a lot of fun.	64	18	41	-8
I feel that I learned a lot about how to function effectively within a group by playing the game.	57	46	14	9
I think that those who struggled at some point in the game learned a lot more than those who never struggled.	36	-12	14	7
I did not feel completely ignored by other group members.	8	76	9	-8
My group was really great at getting down to business.	28	75	16	7
I felt really comfortable in my group.	29	72	9	5
Everyone in my group got along really well.	23	72	1	5
I think that everyone had a chance to have their say and contribute to my firm's decisions.	4	68	7	9
It wasn't very hard for my group to get down to business whenever we met.	12	64	2	-2
I don't think I could have done a lot better in the game if I had done it on my own.	21	54	-1	-31
I think we worked very hard on the game.	2	52	-4	1
My group did not vehemently disagree a great deal on what our strategy should be, and we had great difficulty in coming to consensus.	1	50	-11	5
My group was not much too large to be really effective.	3	45	11	-16
My group wasn't too small to be really effective.	25	41	24	-11
I always had great confidence in my ability to do well in the game.	25	1	79	1
It was very important to me to finish first in our industry.	11	20	62	26
I am an extremely competitive person.	4	8	55	25
I do not think that the game was too challenging and difficult to be useful.	36	24	56	-13

(continues)

Postattitudinal Statements ¹	Factor 1 Learning Experience	Factor 2 Collaborative Learning	Factor 3 Competition	Factor 4 Analysis Exercise
My group had very strong leadership.	30	32	54	9
I feel as if I really understood how the game worked.	30	32	54	0
I don't think the game was really easy. ²	-23	18	-61	0
Sales volume is the best indicator of game performance.	14	7	9	61
I think that you have to be a very analytical person to play the game well.	-7	-22	-34	54
I think that total net contribution is the very best measure of financial performance in the game.	11	-5	15	52
Market share is the very best indicator of financial performance in the game.	19	16	-3	46
In our strategy, we took careful account of competitor activity.	-1	31	31	35
I think that those who won the game learned no more than those who lost. ²	4	11	-12	-37
The uncertainty of the game did not make me feel uncomfortable.	6	-5	39	-40
My experience in the game leads me to believe that target segmentation is an absolutely essential competitive strategy.	30	24	32	10
I feel it was crucial to buy the marketing research reports, to do well in the game.	23	16	-5	4
I think that differentiating your product is important to doing well in the game.	5	26	10	1
It is important that the game be fun to play in order for it to be a valuable educational experience.	20	21	-9	15
I think that performance within target segments, and not overall performance, is the very best indicator of game performance.	-1	-6	14	11

Notes: Boldface type indicates the factor on which a given attitudinal statement is most highly loads. ¹ Attitudinal statements are rank ordered by their loading on the factor with which they are most highly associated. ² For subsequent analyses, attitude statements that are negatively loaded on the factors to which they are assigned are reverse scored, and restated as the converse of their original statement.

Results for Attitude Toward the Game

The mean responses to each of the attitudinal statements shown in Table 1 are grouped within the a priori learning dimensions that each is designed to measure. Mean responses for all four learning dimensions, and for each of the statements within them, are positive, indicating that the students found the game to be a valuable educational experience on all the dimensions.

The Game as Learning Experience

The mean response for those attitudinal statements intended to evaluate the game as experiential learning is 0.80, indicating that most participants felt that the game is a highly interactive and involving learning experience that caused them to work hard. For example, the highest average ratings came from statements directed at performance aspects, such as "My understanding of the game got a lot better as the game went along" (mean = 1.77).

The Game as Analytical Exercise

The mean response for those attitudinal statements intended to evaluate the game as analytical exercise is positive at 0.77, indicating that the game experience successfully provides the students with a sense of how the individual aspects of the marketing mix must blend within a fully realized strategic plan, as well as a deeper understanding of how each of the individual elements of a marketing plan operate. These results indicate that the game experience is a good teacher and integrator of marketing principles as they apply to the effective solution of demanding marketing problems, and as such is an effective analytical exercise. For example, the most highly rated attitudinal statements pertaining to analytics and strategy are "I feel it was crucial to buy the marketing research reports to do well in the game" (mean = 1.34) and "I believe that I got a good sense of how all the marketing mix decisions must work together for an overall marketing strategy to be effective" (mean = 1.30). These results support Hypothesis 1b.

The Game as Competition

The mean response for those attitudinal statements intended to measure the game as competition was the second highest of the four a priori learning dimensions tested (1.41), indicating that the students came to realize the importance of monitoring and anticipating competitor activity to have success with one's own strategies, in support of Hypothesis 1c. For example, selected attitudinal statements concerning competition with a positive average rating included "In our strategy, we took careful account of competitor activity" (mean = 1.77) and "My experience in the game leads me to believe that target segmentation is an absolutely essential competitive activity" (mean = 1.71). Interestingly, positive student response to other statements probing the game as competition revealed something about how the students came to view themselves as competitors (e.g., "I am an extremely competitive person," mean = 1.50; "It was very important to me to finish first in our industry," mean = 1.23) and how the game itself can effectively be both an instructional game and competitive exercise (e.g., "I think that those who lost the game learned no less than those who won," mean = 1.31). These results support Hypothesis 1c.

The Game as Collaborative Learning

The set of statements designed to evaluate the game as collaborative learning had the highest mean response rating at 1.98, and the mean responses to all the attitudinal statements were positive, indicating that the students most appreciated the collaborative aspects of the game experience of all the learning dimensions tested. The students indicated by their responses that they felt comfortable in their groups (e.g., "Everyone in my group got along really well," mean = 2.57) and that the groups worked together effectively to achieve their objectives (e.g., "My group had no trouble coming to agreement about decisions," mean = 2.03). These results support Hypothesis 1d.

The Relationship Between Learning Dimensions and Learning Style

To examine the relationship between attitude toward the game and learning style, a canonical correlation model is fitted to the data using the SAS CANCORR procedure (SAS Institute 2004), examining the relationship between a linear combination of the set of four attitudinal factors derived in the previous section and, following Kolb (1984), a set of two learning style variables that Kolb refers to as

"combination scores." Kolb defines combination scores and explains his reasons for operationalizing learning style in terms of them in the following:

It is unlikely that your learning style will be described accurately by just one [learning mode]. This is because each person's learning style is a combination of the four learning modes. It is therefore useful to describe your learning style by a single data point that combines your scores on the four basic modes. This is accomplished by using the two combination scores, AC-CE and AE-RO. These scales indicate the degree to which you emphasize abstractness over concreteness and action over reflection, respectively. (1984, p. 62)

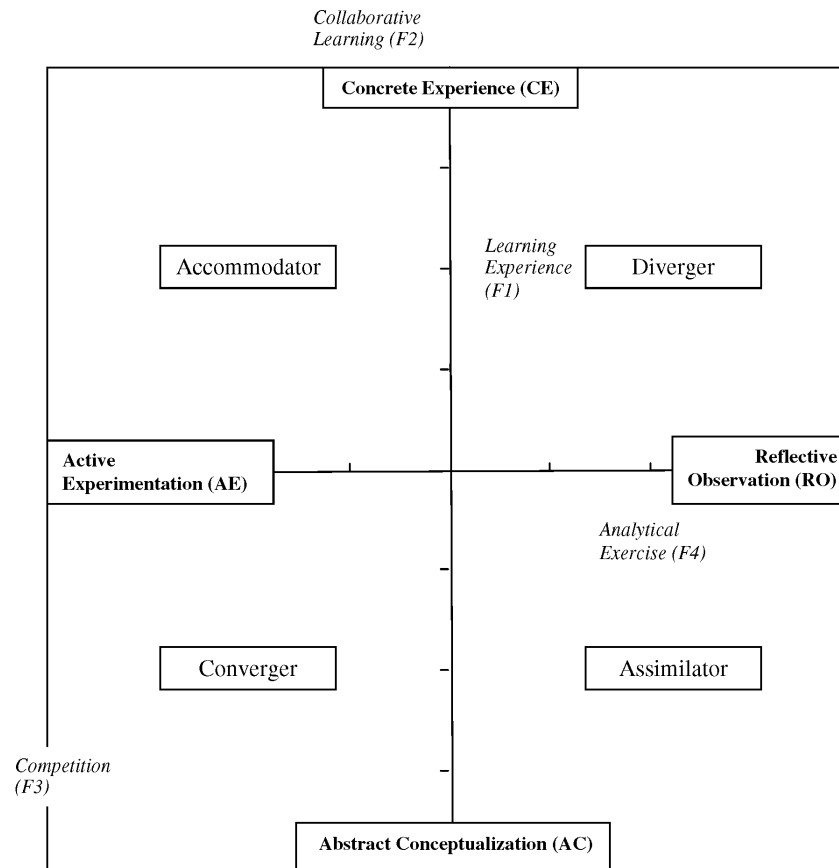
Due to his use of combination scores, Kolb (1984) was able to portray students according to their learning styles as points in two-dimensional learning style space constructed according to his learning cycle. Called a "learning style type grid," the end points of its two primary axes are each of the four learning modes, AC (abstract conceptualization) and CE (concrete experience) for the vertical axis, and AE (active experimentation) and RO (reflective observation) for the horizontal axis, as shown in Figure 1. Such a display facilitates interpretation of the learning styles of each individual student by placing his or her learning profile in the context of all other students according to their learning profiles, and thereby has the additional merit of being able to summarize a great deal of information in a single display.

For these reasons, following Kolb (1984), learning style is operationalized for the canonical correlation using combination scores in the analyses, and a plot is generated from the standardized canonical coefficients that it generates, shown in Table 3. Kolb's (1984) learning style type grid is thus created from the canonical plot, as shown in Figure 1, and each of the attitudinal factors are created as points in that space, analogous to the manner in which Kolb represents individual students. The attitudinal factors in the plot are interpreted to reveal the respective learning profiles of the student cohorts that comprise each attitudinal factor; those being the students who treat the game primarily as a learning experience, or as collaborative learning, or as competition, or as analytical exercise. Those learning profiles are interpreted according to their relative positions on the map of Figure 1 as follows.

Results for the Game as Collaborative Learning

Let us first examine Factor 2, The Game as Collaborative Learning, positioned in the canonical plot of Figure 1 beyond and adjacent to the upper anchor of the vertical

Figure 1
Canonical Plot Showing Learning Factors as Points in Kolb's (1984) Learning Style Type Grid



dimension, concrete experience (CE), indicating that The Game as Collaborative Learning is strongly associated with this single learning mode. This position indicates that the learning style of those game participants who rated the game highly as a collaborative learning experience may be described accurately as using just this one learning mode, meaning that these participants emphasize concrete experience in their learning. According to Kolb (1984), an orientation toward concrete experience means that such learners tend to focus on direct experience, and deal with immediate human situations in a personal manner. They emphasize emotion over cognition, and prefer to experience the complexity of some present reality directly rather than construct theories about it at some remove. Concrete experiencers tend to intuit solutions to problems based on their direct experience, rather than reflecting on the experience and constructing a response in a systematic or scientific manner. Such a learner profile would seem to explain why concrete experiencers would prefer to view the game as collaborative learning.

Results for the Game as Competition

The Game as Competition is located toward the lower left-hand corner of the canonical plot of Figure 1, indicating that those who saw the game as competition emphasized both abstract conceptualization and active experimentation in effecting their learning style, and are, in Kolb's vernacular, "convergers." Convergers are by nature problem solvers and decision makers, and adept at the practical application of ideas. Such types would appear well suited to the rigors posed by competition in business and the marketplace, finding it bracing to have the opportunity to "mix it up," as it were, wanting the forthright action that response to competition requires. It would appear to us natural that such types would view the game as a competitive exercise.

Results for the Game as Learning Experience

The Game as Learning Experience is located in the upper right-hand quadrant of Figure 1, between concrete experi-

Table 3
Standardized Canonical Coefficients for the Two
Variable Sets Derived by the CANGORR Procedure

	V1	V2
Variable Set 1: Attitudinal Factors		
Factor 1: experiential learning (F1)	-0.65	-0.02
Factor 2: collaborative learning (F2)	-0.70	0.57
Factor 3: competition (F3)	1.10	0.61
Factor 4: analytical exercise (F4)	-0.03	-0.52
Variable Set 2: Kolb's (1984) Combination Scores		
Combination score AC-CE (abstract conceptualization minus concrete observation)	0.91	-0.42
Combination score AE-RO (active experimentation minus reflective observation)	0.43	0.90

Note: Wilkes's lambda shows the overall model to be significant with $F = 4.46$ and $pr > F = < 0.0001$.

ence and reflective observation, making them “divergers.” The greatest strengths of divergers are imagination, and an ability to discern the meanings and implications of things. They like to view situations from many perspectives and to organize those disparate views into a coherent and unified whole. Divergers tend to favor observation over action, and are better at conceiving of multiple solutions to problems rather than selecting and acting on any one of them. Divergers tend to be interested in people and can be emotional. Therefore, divergers would be drawn to seeing the game as a complex, ill-formed problem with many facets, presented in context as it is.

Results for the Game as Analytical Exercise

The Game as Analytical Exercise, located in the lower right-hand quadrant of Figure 1, includes those who combine an emphasis on reflective observation and abstract conceptualization, called “assimilators.” Assimilators' strengths are inductive reasoning, the ability to create theoretical models, and pulling together disparate information (thus the connection to reflective observation) into a unified argument (abstract conceptualization). Assimilators are focused less on people than objects and ideas, judged less for their practicality than their elegance and precision. It makes sense, then, that assimilators are drawn to the game as analytical exercise.

In summary, respective learning profiles are developed for student cohorts who viewed the game principally as experiential learning, collaborative learning, competition, or as analytical exercise. These results taken together indicate that learners of different styles tend to form characteristic attitudes about what the game experience is and what types of learning it yields, in support of Hypothesis 2.

DISCUSSION

Summary

Overall, the students in this sample view The Marketing Game! as a very positive experience: they had fun, found it challenging in a constructive manner, and had a valuable learning experience. In contrast to previous research (Wellington and Faria 1991), the students in this sample did not feel that the amount of learning was related to winning or losing. More specifically, the students reported that the marketing game helped them to learn to deal with ambiguity and uncertainty, and gave them a better understanding of the effects of competition on marketing strategy. The game also helped to reinforce the importance of target marketing, how the elements of the marketing mix work individually, and how those elements must be integrated to have a successful plan. Finally, the results particularly indicate that the collaborative nature of the game was viewed as a positive. The students believe that they gained new insight into how to be effective in groups, and they report few group-related problems.

Given that the results also show that the participants comprised a range of learners by style, the generally positive response to the experience indicates that the game as a learning tool is inclusive, accommodating learners of all styles. This is accomplished because the game invites participants to frame the experience as they so choose, so that students are able to respond to an exercise that is congruent with each of their learning styles regardless of what that style may be.

Pedagogical Implications

Being Inclusive

These results suggest that instructional marketing games are inclusive of all students regardless of learning style, indicating that instructors may employ such games in lieu of cobbling together a series of learning tools in order to be inclusive, and recommend them as such. Functional marketing games reinforce in-class learning by integrating

the principles taught in a competitive, real-world context. Functional marketing games connect the abstract to the practical and applied; it engages the participant in strategic analysis; it is fun, involving, and confidence building; and it lends itself to group activities. All of these objectives are becoming increasingly important in business education, with a call for more actionable learning and technology-based pedagogy by accrediting bodies (AACSB International 2002).

In particular, students seem to particularly appreciate the opportunities provided by functional marketing games for collaborative learning, which raises the issue of team composition as a factor in maximizing opportunities for collaborative learning. There is prior research examining the effects that various group attributes may have on performance and learning, with some concluding that diverse groups comprised of students exhibiting a range of learning styles perform better (e.g., Kolb and Kolb 2009). With these results, it can certainly be seen why this is so with respect to games, because they draw heavily on all learning modes to achieve the objectives of the game. Therefore, a case can be made that firms ought to be selected based on putting together participants of disparate learning styles, so that each team would have someone predisposed to addressing each of the diverse tasks that marketing games impose on them. This would suggest that it would be efficacious when administering an instructional game that the instructor first ascertain the learning styles of the students, and then assign them to teams to assure their diverse composition.

Although a diverse approach is certainly found to have merit, accepting the notion that learning-style-diverse teams have the potential to augment game performance, it cannot be certain that they offer equal ability to augment learning, should the firm members divide their labors on the basis of their relative strengths, each then able to dispense with those activities that they find more challenging and less comfortable. It can be speculated that it could be better from a pedagogical standpoint to do the opposite, to deliberately compose homogeneous groups by learning style, so that at least some of each team would be prevailed upon to exercise themselves at tasks to which they are not predisposed. Kolb and Kolb (2009) argue that a goal of any classroom should not only be to teach the material of the subject at hand but also to teach students how to be better learners—to become more “balanced” in their learning style. Perhaps the composition of homogeneous groups encouraging the imposition of less desirable tasks on at least some of each team’s members would be advantageous in teaching such balance to at least some students.

Although we recommend functional marketing games as “wild cards” that encompass students of all learning styles, knowing the learning styles of the students is still useful for optimizing the experience, not just for the purpose of selecting firms, as described above, but also for providing tailored feedback to the students during the course of the game’s administration. Just as all students may have disparate learning styles, they may also have disparate abilities to receive and process certain kinds of information, and information frames in certain manners.

Optimizing Feedback

A by-product of ascertaining the learning styles of game players for firm selection is that it also enables tailored feedback to students throughout the game’s administration, thus enhancing the game’s efficacy as a learning tool. By “tailored feedback,” we mean the tailoring of commentary and criticism to students in a manner that better conforms to their ways of learning, thus heightening the likelihood that it is received as intended, and processed fully so as to be instructive. For example, the provision of quantitative or qualitative feedback may be received differently by students of disparate learning styles, so tailoring the means by which you convey that information according to how comfortable those particular students are with numbers, in the case of quantitative data, or with qualified or conditional information, in the case of qualitative data, may aid the successful reception of didactic information.

In ELT, the effort to match mode of communication with learning style may be viewed as a process that can further leverage the effort to match learning activities with student learning styles (Bacon 2004; Dunn et al. 1990; Frontczak 1990; Karns 2006; Kolb 1984, 1988; Young, Klemz, and Murphy 2003). Thus, these joint efforts at matching could further improve learning outcomes via games.

In the case of speaking with groups rather than individuals, such as participating firms exhibiting divergent learning styles, it may aid instruction if the litany of explanation were to pan across all learning modes. For example, suppose that a firm playing a functional marketing game has repositioned a brand by lowering prices only to have demand go down. The firm, seeking help to understand this outcome, has sought the counsel of the instructor. Seeking in this discussion to be consciously inclusive of all students regardless of favored (Kolbian) learning modes, the instructor might begin by reviewing the immediate circumstances (e.g., price up, demand down, a review of competitor actions, and the general movement of the mar-

ketplace), which should orient the concrete experiencers in particular. The instructor might then seek to engage the reflective observers by asking which of these activities could explain this outcome—for example, did any competitors also change their prices, improve their products, change any other aspects of their marketing mixes? Did consumer preferences shift? The instructor might then seek to draw in the abstract conceptualizers by asking how these events relate to known principles, such as the well-known inverse relationship that is thought to exist between price and quantity demanded for normal goods. A discussion might then ensue in which the point is made that this inverse relationship between price and quantity demanded is sure to be apparent only under conditions of *ceteris paribus*. So, once the circumstances have been thoroughly defined, reflected upon, and placed in a more general perspective based on marketing and economic principles, the instructor might then ask what the firm thinks they might do next. What they might do next could be a particular appeal to the active experimenters in the group. The firm might discuss possible initiatives, such as raising price, or some other change to the marketing mix might be contemplated. Thus, learners of all modes have been engaged in a manner that could aid in the individual understanding of the problems immediately at hand, and what actions are to be taken, in a communal frame by which each of the participants, as witnesses the learning processes of others, might also learn to learn in a more balanced manner.

Instructor feedback is an essential part of formal learning, and experiential learning, and, stated in the language of learning outcomes assessment, can serve as a means of closing the loop. As such, solicitation of student attitudes toward the game in a decompositional manner—that is, on the basis of all learning dimensions pertinent to functional marketing games—is a good means of assessing learning in functional marketing games, in a manner that allows the instructor to constantly review performance of the game itself, and its administration, and constantly be improving them.

Limitations and Future Research Directions

A strength of this study is also one of its limitations. A relatively homogeneous set of students enrolled in one university taught by one instructor were examined, selected into groups in an identical manner, participating in the same marketing game; a uniformity naturally affording a number of experimental controls for a great many potentially confounding effects. It would be useful if future

research could take this examination past these limits, extending this study's findings to other campuses, to schools and classes of other sorts, to students of types beyond the traditional, to other instructors, other geographic regions, other countries, and so on.

In particular, there is a need to replicate this study using other games, and test the outcome of this study using other learning models. Given the potential implications of group composition as a mediating variable on the group experience, it would be most beneficial to test the effects of group composition in the context of these findings. Although there has, of course, been considerable research on the effects of various aspects of group composition in games, there has been relatively little empirical research investigating the interrelationship among attitude toward functional marketing games, learning style, and group effects in the manner that they were studied here.

Another limitation is that game learning styles are studied according to one particular learning model—Kolb (1984). Although Kolb's model is well known and well regarded, there are others (for a review of three other models vis-à-vis Kolb, see Felder 1996). Therefore, another useful extension of this research would be to interpret game players as learners according to these other models, and, as well, compare outcomes across learning models.

An additional research opportunity concerns the measurement of the effects of learning style and attitude to the game on performance, or conversely, the use of game performance to assess learning. This study employs attitude to the game as dependent variables, which some would consider to be limiting in the sense that student self-reports of learning constitute mere perceptions of learning, not learning itself (Gentry et al. 1998; Gosen and Washbush 1999). Although it has been argued here that, particularly with respect to an active classroom, learning does not take place without the complicity of the student, so their perceptions of learning are not without merit, and in the least constitute a necessary precondition for learning itself. Nonetheless, self-reports of learning as a dependent variable are limiting, and a following study that examines the effects of attitude to games and learning styles as independent variables interacting to affect performance in the game, and in the course, among other possible performance measures could be valuable.

Much has been written in recent years about the particular needs of women as learners in the classroom, a particular concern for marketing educators given the steady growth in female enrollment in marketing education over recent decades (e.g., Kaenzig, Hyatt, and Anderson 2007). From this literature has come interview research that yields

a relatively well-formed learner profile for women, and a less-well-formed profile for men. In spite of this recent interest in gender-based learning styles, it is interesting that there has been little empirical research to confirm whether gender-based learning differences in fact exist, and whether they conform to those gender-based profiles that have been developed (Loo 2002). However, this exploratory research is based on qualitative interview data from small samples, and thus may not translate well to educational activities such as computer-based marketing simulations. A useful future avenue would therefore be to extend the scant empirical research on gender-based learning styles to instructional games, functional marketing games.

A collateral set of investigations would concern the development of independent measures to assess learning in the game. This is a particularly thorny research area, given the current great interest in higher education and among accrediting agencies in assessing learning outcomes within programs, and the difficulty in measuring as complex a construct as learning (Chin et al. 2009; Gosen and Washbush 2004). Any studies unequivocally demonstrating the robust measurement of learning would be of great general interest.

A final area of interest for future research would be the effects of group composition on learning in the game. In this study, all of the groups were self-selected, therefore not manipulated, and an effort was made to control out any within-group effects, rather than to study them in a systematic manner. However, it would stand to reason that such effects would in fact be an important mediator of learning, particularly so since it was indicated in this research that collaborative learning was such an important contributor to positive student attitudes toward participation in the game. It would be interesting to test, for example, whether diverse groups in terms of the learning styles of its members provide a better learning experience than do homogeneous groups, or whether learning is augmented by groups comprised of a single gender, or groups that are mixed.

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