Make Your Students Sweat: Fitness Integrated Learning in Business Education

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In this exploratory study, we propose a new pedagogy for teaching business courses—Fitness Integrated Learning (FIL). Our FIL modality of course instruction embeds physical education into an existing college-level business course curriculum for the purpose of enhancing students' cognitive performance and student experience. Drawing from research literature on fitness and education as well as our own exploratory study of applying three major FIL-modalities in four college campuses in the Northeast, we formulate a conceptual FIL model and offer a theoretical framework to test our propositions. We conclude by offering a research design to test a full FIL-structured course.

INTRODUCTION

For over a century the dominant model of formal learning has been thinking and sitting (Becker, 1997; Brown & Guilding 1993), yet research continues to show that this model alone does not work (Bonwell & Eison 1997; Billington & Billington 2010). The current state of affairs in higher education offers an opportunity to identify and implement innovative ways to improve student learning. Although research has shown that engaging students through active learning models is a necessity in the classroom (Presby, 2007), finding and implementing effective reliable ways to do so is still under study.

A growing body of health literature suggests that physical activity improves physical health and enhances brain function (Cotman, Berchtold, & Christie 2007) and frontal lobe-mediated cognitive processes (Jensen, 2000). Of particular interest is the discovery that exercise helps improve the mechanisms related to learning and memory. Berchtold, Chinn, Chou, Kesslak, and Cotman (2005) found wetdcv sgzxthat 1) exercise activates some of the same genes induced in learning and memory that are activated in the hippocampus, 2) exercise activates a series of adaptive responses that could translate to facilitated encoding and enhanced learning and memory, and 3) the effect of exercise on the hippocampus lasts after the exercise has stopped, suggesting that learning and memory may be primed by exercise.

Recognizing the importance of active learning, educators in elementary education are finding ways to integrate fitness into the classroom. Although an emerging research area, studies clearly demonstrate the

positive effects of physical activity and exercise on cognitive abilities, learning, and academic achievement (Bunce, Flens, & Neiles, 2010; Jensen 2000; Tomporowski & Ellis 1986; Tomporowski, Davis, Miller, & Naglieri, 2008). While research shows that exercise or bursts of physical activity during the school day (e.g., recess) boosts academic performance for elementary school children (Pellegrini & Bjorklund 1997; Jarrett et al., 1998), no research to our knowledge has explored integrating fitness into college students' school days, and in particular into their business school courses.

The current teaching modality for business school courses is still the traditional passive model of lecture based learning (Becker, 1997; Brown & Guilding, 1993). In these traditional settings, students' engagement, attention, and overall learning typically wane as class time progresses. Indeed, overall students' attention lapses occur at 10-18 minutes into a lecture, and then every 3-4 minutes toward the end of class (Johnstone & Percival, 1976). Although some courses increase students' involvement in the learning process through various active based learning strategies (e.g., problem-based learning, role play, discussion) research indicates that these tools alone are not enough or may have mixed results (Colliver, 2000; Martz & Shephard 2005).

Research has clearly shown that college students prefer and want to be co-producers in the learning process. Rather than listening passively, college students yearn to be actively involved in the education process (Bonwell & Eison 1991; Prince 2004). We seek to fill this gap by proposing an innovative active learning approach to increase college student's involvement and academic experience. We believe incorporating physical exercise into the classroom facilitates increased engagement in the learning process, which ultimately creates a means to make the learning part of the student. This methodology as an instructional tool for enhancing college-level education has been deeply overlooked, especially in the business school curriculum (Kenworthy & Hrivnak, 2012).

The objective of this paper is to introduce physical exercise; termed fitness integrated learning (FIL), as a pedagogical tool for learning and to promote the inquiry of its potential for enhancing college-level business education. By doing so, our study contributes to pedagogical research by exploring the effect of fitness on learning. Our framework of FIL offers a comprehensive understanding of the antecedents and outcomes of the learning process, with important theory and practice implications for educational services.

We first present a background regarding fitness and educational services. We then formulate our exploratory questions and offer a conceptual framework to examine FIL's impact on students' cognitive function and academic experience. Next, we draw from the authors' experience gained from exploratory FIL activities in business school classrooms in the Northeast. We conclude by offering a research design for a full FIL-structured course.

PRIMING COGNITION & ACADEMIC PERFORMANCE THROUGH EXERCISE

The health and wellness movement of the 1980s, along with academic programs based on exercise psychology, has led to an interest in evaluating the impact of exercise on psychological processes (Tomporowski, 2006). A growing body of literature has explored the effect of exercise on cognition (Tomporowski & Ellis 1986) and academic performance (Hillman, Erikson, & Kramer 2008). To better understand the effects of exercise as a pedagogical tool, we explore the literature on cognition and academic performance below.

Cognition

Several studies have examined the effect of exercise on cognition (Berchtold et al., 2005; Cotman, Berchtold, & Christie 2007; Jensen, 2000; Tomporowski & Ellis, 1986); where higher cognitive test results are found to be associated with being physically fit (Hillman, Buck, & Themanson, 2009; Khatri et al., 2001). Further, evidence suggests that exercise performed on a regular basis for several weeks alters brain functions that underlie cognition and behavior (Colcombe et al., 2004; Pereira et al., 2007).

Academic Performance

Incorporating physical activity into the school day has been linked to improved academic performance. Students who participate in physical fitness activities during the school day tend to have higher grade point averages, improved concentration and memory, and better classroom behavior (Trudeau & Shepard, 2008). For example, physical fitness scores, which were measured using the progressive aerobic cardiovascular endurance run (PACER) test (a 20-meter shuttle run that increases in difficulty and is considered a field test of aerobic capacity) were found to be positively associated with reading and math achievement in school-age children (California Department of Education, 2001). The positive associations between exercise and achievement suggests that physical activity improves general circulation, increases blood flow to the brain, and raises levels of norepinephrine and endorphins—all of which may decrease stress, improve mood, induce a calming effect, and lead to improved academic performance (Castelli, Hillman, Buck & Erwin, 2007; Sutton, 2009; Taras, 2005).

IMPLEMENTING PHYSICAL ACTIVITY IN THE CLASSROOM

Student' learning has been shown to be influenced by the timing of the activity, the duration of the activity, and the intensity of the activity (Winter et al., 2007). Each of these facets is discussed below.

Timing of Physical Activity

When a physical activity is administered has been shown to affect learning and memory. Physical activity during cognitive verbal encoding leads to enhanced recall of new information (Schmidt-Kassow et al., 2013); suggesting that learning while simultaneously exercising may help individuals retain information better. Simply stated, exercising while studying may be more beneficial to students' learning as compared to sitting and studying at a desk. Exercising immediately prior to learning and immediately after learning has also shown beneficial effects. When studying college students, Salis (2010) found that those who performed a moderately intense cardiovascular exercise before and after a learning activity significantly improved their comprehension of learned material in comparison to others with light or no exercise. These findings are not surprising as student's attention typically increases immediately following active-learning methods (Bunce, Flens, & Neiles, 2010).

Duration of Activity

The effect of the length of time to engage in a physical activity on cognitive/behavioral tasks is still under study. Based on their research on exercise and learning, Winter et al. (2007) suggests that short bouts of exercise immediately prior to study phases can boost learning. In addition, studies have also shown that various forms of physical activity ranging from structured cardiovascular exercises (e.g., relay activities, paced walks) in 20,30, 40, 50 increments helped boost cognitive performance (Tomporowski, 2003).

Intensity of Physical Activity

The degree to which one engages in a physical activity can affect learning and memory. Light to moderately intense physical activity (Salis , 2010; Schmgidt-Kassow et al., 2013), and even intense physical activity (Winter et al., 2007) has been shown to positively influence learning and memory. From these studies, it is evident that the timing, duration, and intensity of the physical activity play a role on how effective the physical activity is on learning.

Drawing from the literature, we build and study the FIL modality by incorporating fitness activities into a course curriculum and measure its effect on cognitive, mental and social experience. Our overarching research question, how does exercise influence college students' learning and an overall experience, drives our research endeavor.

EXPLORATORY STUDY

The authors have been conducting exploratory sessions using FIL in business courses at two public and two private colleges in the Northeast region over a six year period. 622 students were engaged in at least one class session with *integrated* physical activities during regular course instruction. Ten business courses with 25 sections were taught using FIL during this time period (with listed number of enrolled students in each course section): Business Organization and Management (35+35+35 students), Principles of Statistics (35+35+35), Organizational Behavior (35+35+35), Operations Management (30+30), Human Resource Management (10+20), Principles of Management (12+6+20+25+35+35), Principles of Marketing (10+12), Elements of Retailing (20), Elements of Marketing (15+15), and Business Strategy (12). The student body was highly diverse (e.g., 58% male; average age 21; 12% African American, 16% Asian, 14% Hispanic, 52% White, 6% Other) thereby representing urban college campuses in the Northeast.

FIL Modalities

Three types of FIL modalities emerged from the exploratory study. One modality of FIL enabled students to perform a range of physical activities during *intervals* interchanged with a discipline-driven instruction (i.e., FIL-interval). The academic course content was delivered in a typical classroom setting with timely intervals which allowed students to engage in a structured physical activity. Examples of physical interval exercises included, but not limited to, push-ups, jumping jacks, walking up and down the stairs, and stretch exercises that were performed in the classroom. To reduce students' cognitive attention to learning new fitness exercises, the instructor relied mainly on well-known exercises (i.e., jumping jacks and push-ups).

The second type of FIL allowed students to perform physical activities while *simultaneously* learning the course material (i.e., FIL-simultaneous). Students partook in various fitness activities while being lectured by the instructor. For example, as part of the FIL-simultaneous type, students from the four smaller marketing classes were taught material while walking outdoors. One management class was brought to a fitness center to utilize treadmills and elliptical machines while listening to a lecture on team effectiveness. Students from another management section were lectured while being able to stretch freely on the floor. One organizational behavior section conducted a dyad negotiation assignment while walking outdoors for 30 minutes.

The third type of FIL involved taking concepts from the discipline-learning material and *embedding* them into physical movement (i.e., FIL-embedded). Two management sections were taught motivation theories this way. For example, Maslow's hierarchy of needs was enacted through physical activities, such that for the social belonging need, a group of students performed a team exercise to reinforce the social aspect of the concept. Another example involved stretching exercises reflecting the pyramid shape of Maslow's hierarchy of needs. Further, a yoga-style balancing exercise was used to demonstrate equilibrium in Adam's equity theory. By embedding conceptual tenets into exercise, these students were

TABLE 1
FIL MODALITIES

	Description	Exercises related to discipline concepts
FIL-interval	Students take a break and engage in physical activity in between teaching segments.	NO
FIL-simultaneous	Students perform physical activity while instructor is teaching.	NO
FIL-embedded	Students perform physical activities designed to reflect the discipline-learning concepts.	YES

able to integrate the concept through both cognitive and spatial learning. Table 1 summarized the three types of FIL modalities developed and piloted during the exploratory studies.

Exploratory Findings

Although the preliminary FIL exploration was not a formalized research endeavor, students' written reflections, verbal communication, and test scores with the instructor provided an indication of its effectiveness on 1) increased cognition & academic performance, 2) enhanced psychological and affective states, and 3) improved social experience. During the FIL class sessions, students were typically attentive and engaged, which helped facilitate their comprehension of new concepts and recall of the material. Immediately following a FIL session, students expressed excitement, embraced an increased level of collegiality, and demonstrated a renewed energy; all of which aroused positive emotions (e.g., happiness and surprise). Interestingly, the positive effect of the FIL-interval modality was markedly observed in statistics classes, where students developed higher levels of confidence in learning and solving quantitative problems. Overall, 80% of participating students expressed their intent to register for a fully developed FIL class. The instructors' observations also showed an enduring effect of exercise on social processing during and long after the sessions. Following the FIL sessions students, participated more actively in class discussions, communicated more frequently with other students and the instructor, and formed more cohesive teams in subsequent group projects than following the traditionally chair-bound class instruction.

Introducing new teaching methods is not without its challenges. Since students did not register for a FIL-designated course, students were asked to participate in FIL activities on a voluntary basis for an extra credit. 95% of students actively and willingly engaged in FIL. However, when the interval exercises were considered highly strenuous, some students' attention drifted; especially for those who were not physically fit. Thus, we found that students' fitness level plays an important role in taking a full advantage of the FIL modality.

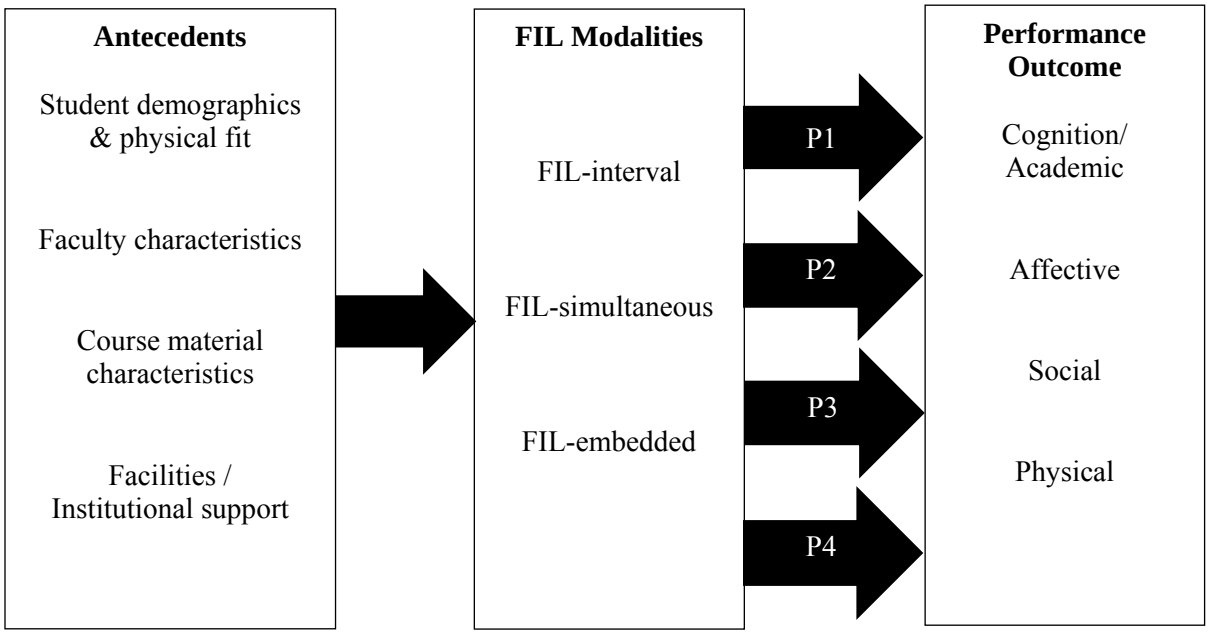
To increase comfortability, FIL sessions were generally scheduled near the end of a semester to give students more time to become familiar with each other. However, brief FIL-interval exercises were also conducted to ease and break the teaching norm prior to a full FIL-session. Although the FIL-interval sessions were conducted in typical college classrooms, the FIL-embedded and simultaneous sessions were conducted in other facilities, which required additional effort and resources from the institutions. The instructors' time and effort to prepare for FIL-embedded sessions was also more demanding than for the FIL-interval or FIL-simultaneous activities. For example, the instructor needed to encourage a fitness-orientated atmosphere by emulating some of the student's exercises. Interestingly, to run an effective FIL session the instructors were not required to be certified trainers or as physically active as the students.

These preliminary and anecdotal findings from over 600 students offers important insights for designing research and ultimately developing effective FIL courses. Prior to implementing FIL courses on a college level, the scholarly examination of FIL modalities requires strong design and statistical rigor. Therefore to spearhead the FIL stream of research, we provide a conceptual FIL model coupled with propositions and suggestions for future empirical studies of FIL.

CONCEPTUAL FIL MODEL

Based on our FIL experience we propose a conceptual model that will guide the exploration of the impact of FIL in academic education. Following a theoretical organizational behavior research model presented by Robbins and Judge (2014), the model consists of antecedents, FIL processes, and outcomes as shown in Figure 1.

FIGURE 1
CONCEPTUAL MODEL



The antecedents refer to factors that need to be analyzed prior to launching FIL-classes. Our experience suggests that the antecedents need to include the understanding of the composition of the student body, the ability and willingness of the instructors to embrace FIL, the characteristics of the course material, and the level of administrative and financial support by the academic institution. These, and other factors, should be addressed and controlled for in a future research design.

The FIL process incorporates the three modalities described above (see Table 1). Studies should test each modality separately before exploring a combination of the FIL modalities. We suggest exploring the effect of FIL on the four major FIL outcomes that were observed in the exploratory studies: cognitive and academic performance, affective, social, and physical outcomes. When accounting for the three modalities of each of the four categories of outcome, 12 relationships are identified for examination.

In conjunction with the conceptual model, we offer four propositions grounded in their respective literatures and theoretical frameworks that correspond to the four main outcomes. The propositions should first be tested for each of the FIL modalities separately. We predict each FIL modality has a direct effect on performance outcome and mediates the effect of student demographics, faculty characteristics, course material characteristics, and institutional support effect on performance outcome.

Propositions and Suggested Measures

In light of the evidence that physical activity improves cognitive function (Tomporowski, 2003) and academic achievement (Castelli, Hillman, Buck & Erwin, 2007; Taras, 2005; Sutton, 2009), the impact of FIL should be explored with regards to students' cognitive processes. Neuroscience provides a growing body of research confirming the role of exercise on brain health (Cotman, Berchtold, & Christie, 2007). We propose a number of research areas to explore in relation to cognitive function and learning and academic performance.

P1: In comparison to a traditional class, FIL students will demonstrate higher levels of:

a. attention and cognitive focus in class (e.g., class discussions)
b. comprehension of learned material (e.g., concept questions on tests)
c. information processing capability (e.g., problem solving and creativity questions on tests)

d. academic performance (e.g., grades in the course, GPA)

Next, we suggest measuring students' psychological and affective states in FIL classes. This is grounded in affective events theory (Weiss & Cropanzano, 1996), which proposes that events may trigger affective reactions, which then may influence other actions (e.g., affect-driven behaviors), attitudes, and cognitive-driven behaviors. The instructors in the exploratory FIL study observed that students experienced increased levels of affective reactions during and after FIL sessions. It is therefore expected that FIL will have an impact on a number of factors related to emotions and learning.

P2: In comparison to a traditional class, FIL students will report lower levels of:

a. stress (e.g., academic stress, Struthers, Perry, & Menec, 2000)
b. anxiety (e.g., social interaction anxiety, Mattick & Clarke, 1998)
c. and higher levels of:
d. positive and negative affect (e.g., PANAS, Watson, Clark, & Tellegen, 1988)
e. self-efficacy (e.g., Bandura, 1986; Schunk, 1991)
f. motivation (e.g., MLSQ, Pintrich, Simith, Garcia, & McKeachie, 1993)
g. satisfaction (e.g., institution's course evaluation form)
h. student engagement (e.g., National Survey of Student Engagement, 2015)
i. time spent on coursework (e.g., self-report on weekly basis)

Third, we recommend examining the influence of FIL on students' social behavior and organizational outcomes in accordance with social identity theory (Tajfel & Turner, 1986). This theory posits that individuals seek to develop own identifies through groups. Having participated in FIL activities, students will feel a stronger bond with the students and an increased sense of identity with the school community, therefore increasing their likelihood to engage in more pro-social behavior.

P3: In comparison to a traditional class, FIL students will report increased:

a. positive psychosocial environment in class (e.g., Fraser, Treagust, & Dennis, 2006)
b. student collaboration outside of class (e.g., self-report of extracurricular activities)
c. intention to graduate (e.g., self-report)

Lastly, we anticipate that active participation in FIL will benefit students' physical health. Although research on the role of exercise on health has been well documented (Taras, 2005), specific health outcomes need to be confirmed for FIL. We anticipate that there will be a positive relationship between FIL and health.

P4. In comparison to a traditional class, FIL students will report higher levels of:

d. Physical fitness
e. Physical health

FUTURE RESEARCH

To help scholars with future research in this area, we suggest an empirical research study with a quasi-experimental design over the course of a semester- with two FIL structured courses as the treatment group and two traditional business classes (non-FIL) as the control group. The FIL classes could be administered by simultaneous pairing an existing college-level course instruction (e.g., organizational behavior) with an existing physical education course (e.g., yoga).

Both groups should be similar in student composition and size. The FIL structure can include an introductory business course in conjunction with a credited physical education class. Selecting a moderately intense level for the physical activity is supported by Gao, Lee and Kosma's (2011) who found that intensity influences a person's motivation and effort. The fitness section can be taught by an instructor from a health and physical education discipline. Both instructors can interchangeably integrate students' physical activity within the business-content instruction incorporating any of the three FIL-modalities. For example, to accommodate course scheduling, in an FIL-interval course the class time can

be divided into two or more fitness intervals of 20 minutes in duration. The FIL classes can be administered in typical classrooms preferably near gym facilities with access to fitness equipment and sport resources.

Uniform teaching methods should be employed in both the FIL classes (i.e., treatment group) and the traditional classroom (i.e., control group) to help reduce bias. The variance of instruction in the treatment and control group can be controlled for by three approaches: 1) reliance on video instruction and quantitative assessments, 2) students' rating of instructor's level of engagement, and 3) videotaping class instruction to monitor the consistency of the instruction. Studies can also be designed to test the propositions on a longitudinal basis. The outcomes can then be measured for each class and at multiple time points over the whole semester.

CONCLUSION

Albeit primary educational establishments have embraced fitness as a means to enhance student's learning, this is the first study that has explored integrating fitness into college business courses. We hope that future research will propel this new stream of research and practice of FIL into business education college courses and beyond. The FIL-structured courses could be implemented in corporations and business organizations that conduct in-house management and business training for their employees. The implication of conducting research of this innovative approach is important for both secondary education and business-driven learning centers worldwide. Therefore, we encourage educators, scholars, and practitioners to implement and test the effects of FIL in their organizations. It is our hope, with further research, best practices emerge that can be shared across disciplines.**tyogl'**

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