

Improving the Physical Education Experience through Activity Based Learning: The Role of the Flipped Classroom in PE215: Foundations of Physical Fitness

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Abstract

The instruction of physical education comes with challenges not typically experienced in a class containing more traditional material e.g., Physics or History. While these academic courses place rigorous demands on the cognitive abilities of students, physical education and lifetime physical activity courses, as taught here at West Point, place a far greater demand on the biomotor capacities and abilities of students. With a flipped classroom, students can be assessed prior to initiating in-class activities to ensure comprehension of cognitive aspects of content. Utilizing a blended environment, or in the case of West Point, the Thayer Method, instructors provide cadets a brief opportunity for questions at the beginning of class prior to assessments [1]. Providing multiple points of review beyond a simple mid- and end-of-year assessment, retention and comprehension of course content will improve relative to a more traditional, lecture-style method [1,2]. The primary intent of this review is to discuss the role of varying pedagogical strategies in the post-secondary physical education setting, specifically as it pertains to a foundations of physical fitness course, at the United States Military Academy, West Point.

Keywords: Flipped Classroom; Personal Fitness; Physical Education

Introduction

With the advent and increased popularity of educational technology in academic settings, course content delivery has undergone dramatic changes over the past few decades [2]. No longer is the sole method of information sharing focused on lecture-based interventions; rather emphasis for content accountability has begun transferring to a more learner-centered model. The flipped classroom has become an extremely popular instructional strategy that emphasizes delivering content to students outside of the typical learning environment e.g., at home. With this model, students are responsible for reviewing and retaining the information presented in anticipation of an enhancement in practical application during the class period [2]. With a flipped classroom, students can be assessed prior to initiating in-class activities to ensure comprehension of cognitive aspects of content. Utilizing a blended environment, or in the case of West Point, the Thayer Method, instructors provide cadets a brief opportunity

for questions at the beginning of class prior to assessments [1]. Providing multiple points of review beyond a simple mid- and end-of-year assessment, retention and comprehension of course content will improve relative to a more traditional, lecture-style method [1,2]. Much of the research done in this realm of pedagogy emphasizes either traditional academic courses, or introductory physical education experiences, typically elementary or secondary education. Very few, if any research beyond anecdotal accounts [1], discuss the role of the flipped classroom in an upper-level personal fitness class, placing emphasis on both the theoretical, or cognitive, and physical, or biomotor, aspects. It is the intention of this review to discuss the role of varying pedagogical strategies in the post-secondary physical education setting, specifically as it pertains to a foundations of physical fitness course, at the United States Military Academy, West Point. The instruction of physical education comes with challenges not typically experienced in a class containing more traditional material e.g., Physics or History. While

these academic courses place rigorous demands on the cognitive abilities of students, physical education and lifetime physical activity courses, as taught here at West Point, place a far greater demand on the biomotor capacities and abilities of students. Skill-specific interventions and general physical fitness courses require significant concentration and effort on behalf of the student, along with continuous engagement on behalf of the instructor to ensure proper execution of the desired movement or knowledge acquisition outcome. This broad array of challenges requires instructors to be flexible in their teaching approach, requiring implementation of a variety of pedagogical techniques. Different courses with broadly varying populations of students will require varied approaches to optimize efficiency of content delivery and knowledge acquisition and retention on behalf of the cadets.

One of the greatest obstacles faced in this type of environment, especially in a setting where the students have numerous graded obligations and have a broad spectrum in both chronological and experiential age is attention and creativity, both markers of engagement. Memmert and colleagues sought to investigate the role that factors such as age and experience, specifically within the physical realm, had on creativity and assorted performance outcomes in a physical education setting [3]. The primary objective of this study was to examine and identify the influence of age and attention on creativity in both sport-specific, handball and basketball, and non-sport specific domains. The researchers utilized a population size (n) of 120, each recruited from one of six different groups. Each subsample was comprised of 15 males and six females. The three sport-specific population groups included: 7-year old with an average of 2 years of experience in handball; 10-year old with an average of 3 years of experience with handball; and, 13-year olds with an average of 6 years of experience with basketball. These three groups were matched with non-skilled participants, specifically those demonstrating no prior experience with handball or similar sports experience, of equal or comparable age [3]. Each group was assigned to complete four tasks to assess group differences in attention [3]. The first two tasks included both handball-specific and nonspecific tests of inattention blindness, also known as perceptual blindness. This is defined as the inability of an individual to perceive something that is within plain sight, often due to lack of attention or focus on specific item or task [3]. The second two tasks consisted of assessments of group creativity. These assessments included both handball-specific and nonspecific divergent thinking, specifically the thought process utilized to generate creative ideas by exploring a litany of potential solutions. The results from the study led the researchers to a few conclusions. First, the results suggested that 7-year old subjects demonstrating the greatest levels of specific and nonspecific attention performance, namely minimal amounts of attentional blindness, performed better on both the nonspecific and specific creative tasks than their attentionally blind counterparts [3]. Secondly, it was found that significant differences existed between age groups in demonstrated levels of specific and nonspecific creative thinking. Post hoc

analysis demonstrates a significantly lower score for the 7-year-old group in demonstrated creativity relative to their 10- and 13- year old counterparts. The researchers also noted that there was an expertise, or skilled versus non-skilled, interaction both across and within age groups indicative of nonspecific creative performance [3]. For example, the results demonstrated that the 7-year old skilled participants out-performed their non-skilled counterparts. However, it was also noted in this age bracket that the non-skilled participants outperformed the skilled participants in the sport-specific creative thinking task [3]. In conclusion, the researchers stated that the results support the notion that attention processes as well as expertise and experience, will influence the development of both nonspecific and specific creative thinking [3]. Though the findings demonstrate a bit of convergence with this conclusion, specifically for the 7-year old, these differences can more likely than not be attributed to the age and maturity of the subjects in question. With advancing age and experience, individuals are able to approach scenarios requiring creative thinking from a more educated standpoint, allowing them to arrive at successful conclusions more often and with more precision. To further this investigation, examining the influence of sport type, specifically team versus individual, or athletic participation on behalf of the individual, namely multi-sport versus single sport participation, on creative thought would be very interesting. One would think that a sport such as wrestling and gymnastics, which are rooted in improvisation, would require greater creative thinking than baseball or basketball, which includes team dynamic and scoring strategies laid out by the coach and captains [3,4].

Further exemplifying the importance of engagement on behalf of students through pedagogical flexibility by the instructor, Beacham and colleagues sought to examine the role of schema with regards to exercise in a predominantly community-based population [5]. Three hypotheses were formulated to identify the role of schema in exercise behaviors. First, the researchers hypothesized that differences would exist between exerciser "Schematics" when compared to "Aschematics" among demographics, exercise behavior, exercise goal attainment, and commonly studied predictors of exercise. Secondly, the researchers hypothesized that salient predictors of exercise schema group membership, namely schematics relative to aschematics, among commonly derived exercise predictors would emerge. Finally, the researchers sought to identify specific predictors of frequency of weekly exercise among common theoretically derived predictors of exercise and schema group membership [5]. The primary theory used by the researchers in an attempt to support the aforementioned hypotheses was the Schema theory [5]. According to the Schema theory, persons that actively process information through both observation and over time, form cognitive structures known as "schemas." These schemas serve as a means of directing attention to, and selection of, incoming information and perception, in addition to influencing how information is organized, accessed, and used in future situations [5]. The authors equate the schema to a "lens" through

which individuals selectively view, and draw focus towards, certain events, as well as establish the meaning of these events. Individuals are considered to be “schematic” regarding a specified attribute when the individual equates the aforementioned attribute with a self-descriptive context, important to self-image. Individuals are considered as “aschematic” with regards to a specified attributed when they consider a specific attribute as only moderately self-descriptive and unimportant to self-image [5]. For this particular study, the researchers selected 254 participants who participated in a large questionnaire study. Subjects were required to categorize themselves as either regular, intermittent, or non-exercisers, using an Exercise Self-Schema Measure. The 17 non-exerciser schematics were excluded from final analysis, with an additional 17 individuals being excluded from data analysis due to self-reported health factors, narrowing the final subject pool down to 210 participants. Over 89% of analyzed subjects perceived themselves as “healthy,” demonstrating an average body mass index (BMI) of 25.9 [5]. Using the Causal Attribution Scale, individual causes for successful, or unsuccessful, exercise participation were assessed using a nine-point bipolar scale reflecting four attributional dimensions. These dimensions were: locus of causality, stability, personal control, and external control [5]. The Outcomes Expectations for Exercise Scale was used as a means of assessing the desirable physical and psychological benefits of the participants. This scale was comprised of a nine-item inventory focused on the outcome expectations of exercise participation, including both physical and mental health benefits [5]. From the results, the researchers found that twice as many schematics, relative to aschematics, met the minimum exercise frequency of three times per week as presented by the American College of Sports Medicine (ACSM) guidelines. In addition, the researchers found that schematics had far more positive outcome expectancies for exercise than the aschematics, as well as demonstrated higher levels of self-efficacy. Finally, the researchers found that schematic orientation correlated highly with frequency of exercise participation [5].

To conclude, the research findings supported the initial hypothesis that “Schematics” would differ significantly from “Aschematics” across the spectrum. Schematics demonstrated higher levels of self-efficacy, and more positive outcome expectancies for exercise. Future research should take less of a retrospective, and more of a prospective approach with regards to assessing survey analysis [5]. Beyond simply understanding cognitive orientation of students as a means of dictating pedagogical approach, West Point affords a unique challenge in that the cadets come from a wide variety of cultural and socioeconomic backgrounds, an issue broached by Long et al., in their analysis of different teaching strategies in a medical setting vis a vis cultural competencies [6]. Across the spectrum medical professionals, have been given minimal training in assessing, evaluating, and adjusting care plans to meet the unique needs of both individuals and groups of individuals from different cultural and ethnic backgrounds [6]. The researchers in this investigation hypothesized that the primary

cause of these shortcomings was a lack of education regarding cultural competence experienced by the student-nurse. While most nursing programs are in compliance with the requirements outlined by both the Office of Minority Health and the United States Department of Health Resources and Services Administration, students demonstrated, through post-education survey analysis, competency below standards in regard to both knowledge and comfort levels. Incorporating teaching methodologies including group discussions, clinical experiences, simulation, guest lecturers, and immersion/study abroad programs into the curriculum have all demonstrated positive improvements regarding survey scores in cultural competency. Future research should focus on developing standardized definitions, model evaluation instrumentation, and curricula that support a more balanced program incorporating cultural competency into the standard nurse education program [6].

As with any content area, both subjective and objective assessments are essential to validate the chosen pedagogical methodology. Ronan, Plovsing and Damgaard [7] utilized a unique approach in evaluating efficacy of varied teaching methodologies pertaining to baroreflex physiology. Both quiz-based and collaborative teaching strategies have been utilized successfully in the lecture setting with regards to enhancing meaningful learning during physiology courses [7]. The researchers hypothesized that implementation of quizzes in a physiology-based laboratory setting would result in improved individual learning, and that collaborative quiz administration would foster the students’ ability to develop and imply meaning regarding the concepts presented, specifically pertaining to the baroreflex response. Dividing 155 students into three intervention groups, the researchers tested the potential influence that individual quizzes, group quizzes, or no assessment (control) would have regarding information retention via written examination. Following the intervention, groups were each assigned a six-question test and evaluation form pertaining to the information presented. Results from written examination and evaluation were assessed nonparametrically, using Fisher’s exact test for binary data and the Mann-Whitney U-test for ordinal data [7]. The propensity to retain knowledge regarding laboratory specifics was significantly greater with individual quizzes when compared to both the group-quiz administration group and the no-quiz, control group. Future research should focus on the influence of individual versus collaborative laboratory efforts on longitudinal retention schemes as compared to solely acute assessments [7]. Piggy-backing off of Ronan et al. [7], Le and colleagues investigated the efficacy of anonymous pop-quiz administration as a means of reinforcing learning [7]. Pop-quizzes are often used at the end of classes to: identify students understanding of the material, reinforce retention of important points, increase student engagement and participation, and assist the instructor with planning of future lectures. Ronan et al. [7] utilized the changes in scores on anonymous pop-quizzes administered at the cessation of daily lectures over the course of a single semester to track improvements

in understanding and application of research strategies during a graduate level health sciences research course.

The quizzes, created using Survey-Monkey, were administered online at the end of selected class meetings to assess retention of previously taught material by four separate librarians to each of the 3,222 first year students enrolled in this research course. Students participating in this study were attending the Colleges of Medicine, Nursing, Dentistry, Pharmacy and Nutrition, and Kinesiology and the Schools of Public Health and Physical Therapy. From the test results, which were collected throughout the course of the semester, each of the 319 professors stated that they were able to successfully modify course preparation and progression, emphasizing at the beginning of the subsequent lecture the material that appeared poorly understood from the previous lesson. In conclusion, a more quantifiable, longitudinal analysis was necessary to track potential changes in overall course performance across multiple semesters and years [7]. Implementation of these student evaluation and assessment techniques requires a more detailed understating of the various approaches that can be taken in the classroom setting. As discussed previously, course content and student motivations will greatly influence how courses are structured for optimal delivery. A broad spectrum of pedagogical techniques exists, each with various strengths and weaknesses, most often dependent upon the desired outcomes of the course, resource availability, and experience and motivation of the instructor [8]. These instructional approaches can be stratified into two separate and distinct styles: reproduction and production [9,10,11]. Under the umbrella of reproduction styles fall: command, practice, reciprocal, self-check, and inclusion; while divisions of production styles include: guided discovery, convergent discover, divergent discovery, learner designed individual program, learner initiated, and self-teaching [9,10,12].

Command style, the first method of reproduction learning, requires the greatest input on behalf of the instructor pertaining to the direction of learning [10]. The instructor is responsible for the majority of decisions and direction of the learning experience, to include subject content, pace and rhythm of information dissemination and duration of intervention or content delivery. The role of the student is, through rote rehearsal, to reproduce with optimal precision, the example set forth by the instructor. The primary goal of the Command style of learning is for the student to reproduce, or mimic, and demonstrate recognition of specific patterns in content as delivered by the teacher [10]. In a physical education setting, this style of instruction is most valuable when teaching foundational motor skills or dealing with underperforming individuals or groups [13]. A foundational physical fitness course, such as that offered at West Point, combines a mixture of theoretical and practical knowledge, affording the command style limited value in this setting. Guided discovery, unlike command style, falls under the umbrella of reproduction style of instruction. This pedagogical technique establishes a logical and sequential design of various questions that lead students to discover defined concepts,

principles, and relationships that were previously unknown [9,10]. The instructor is required to do the preparatory work pertaining to subject matter, including identification of the key concepts to be “discovered,” and the subsequent questions that lead the students to the desired answer. Juxtaposing the instructor, the role of the student is to “discover” the answers, allowing the student to make requisite cognitive connections between content to establish a logical progression of understanding. In essence, the instructor provides the puzzle pieces while the student has to put everything together to best understand the whole picture [9,10].

In a Physical Education setting, most specifically the offering of PE215: Foundations of Physical Fitness, application of Guided Discovery through the flipped classroom, has become an effective mechanisms for effective content delivery. Utilizing a cadet-directed model of instruction allows for slight variability in pacing, as dictated by both physical and cognitive capacities of the cadets. Additionally, less time dedicated to rote rehearsal and command briefings allows for greater application of theoretical concepts, as rehearsed prior to arrival to class, in a practical setting. Within the PE215 curriculum, a significant portion of the final assessment pertains to objective assessment of biomotor abilities. In a traditionally lecture-based course, minimal time-on-task all but ensures sub-par development and performance of students. However, utilization of the discovery model, specifically via application of a flipped classroom, enhances instructor and cadet interactions and progression of motor learning through the use of various types of feedback, an integral aspect of teaching a motor skill [14]. As with application of any extrinsic factor, the primary objective of feedback is to facilitate intrinsic adaptation on behalf of the cadet. Through use of augmented feedback, students are better able to synthesize, internalize, and reproduce biomotor demands and expectations of the course [14]. By flipping the classroom, the instructor is better postured to provide the cadets with valuable feedback, ultimately leading to enhanced performance. Within the realm of pedagogy, a plethora of options exist for content delivery. Each of these options, or methods, whether productive or reproductive, offer individual pros and cons. In the case of an introductory foundations of physical fitness course, it appears that application of the productive method, specifically a guided discovery approach as implemented via the flipped classroom, can prove extremely beneficial. Facilitating behavioral modification through intrinsic feedback (as enhanced through augmentation), ultimately achieves the departmental objectives of mastering basic biomotor skills and developing warrior leaders of character.

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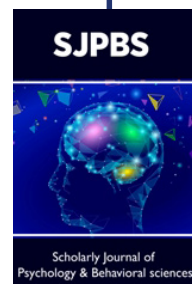


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