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Developing Kinesthetic Classrooms to Promote Active Learning

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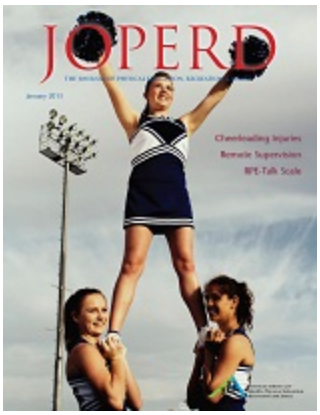

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Abstract:	In recent years, active learning has been touted as an integral part of the student learning experience (Kuh, Kinzie, Schuh, Whitt & Assoc., 2010). Trends, changes in student attitudes, along with research on active engagement and student learning have challenged institutions to reconsider how their classroom spaces are designed (Oblinger, 2006). A growing body of research across multiple levels of education suggest that traditional college classrooms are not optimally designed to promote active, participatory and experiential learning (Harvey & Kenyon, 2013). Inspired by this information, the Department of xxxxxxxx at xxxxxxxx University in 20xx, received support to create a kinesthetic classroom for active learning. This article will detail how faculty have utilized the kinesthetic classroom to help develop a community of learners focused on developing strategies to combat health disparities.

Introduction

In recent years, kinesthetic learning in the classroom with the goal of improving health and educational outcomes among youth has been a topic of discourse. It should come as no surprise that America is in the midst of an obesity epidemic. Yet, behaviors that encourage sedentary activity are plentiful, contributing to what Blaydes-Madigan (2010) terms as a culture of "sitness". School initiatives that have infused movement as part of the curriculum have shown increased efficiency in learning, while decreasing stress and contributing to a positive classroom climate (CDC, 2018). As efforts continue in this area, how future professionals can promote kinesthetic movement in schools is worthy of discussion. Inspired by current literature on active learning strategies, this article details how one department created a kinesthetic classroom for training future professionals and the possible ramifications of this endeavor for promoting health.

The purpose of Active Learning

Active learning is broadly defined as a set of instructional methods that engages students in the learning process. At the core, active learning is presented as a contrasts to the traditional lecture where students passively receive information from the teacher. Students involved in active learning are encouraged to think critically, construct knowledge and exploring their own attitudes and values (Handelsman, Miller & Pfund, 2007). The promotion of active learning strategies requires learners to assimilate new information into an existing framework, or modify that framework to accommodate new information that contradicts prior understanding. Theoretical basis for this strategy is rooted in constructivist learning and social learning theory (Piaget, 1971; Vygotsky, 1978). Example "active" activities include small group discussion, class discussion, think-pair-share activities, demonstrations, quick writes from prompts, polling, turn and talk, debates and concept mapping. Recently, the use of active learning has been

espoused in promoting the benefits of walking, community development, and managing large health classes (Becker, 2016; Elliot, Combs, Huelskamp and Hritz). Further, inclusive teaching is associated with active learning as it has been shown to improve class climate, interconnections between students and motivation for class activities (Handelsman et. al, 2007).

Over the past three decades, studies that active learning approaches have merit and lead to greater student outcomes have been analyzed in STEM disciplines. Freeman and colleagues' (2014) meta-analysis of 225 studies that compared "constructivist versus exposition-centered course designs" found that students in traditional lectures were 1.5 times more likely to fail than students in courses that incorporated active learning. In another review, Ruiz-Primo and colleagues (2011) examined 166 studies and reported an effect size (quantitative measure of the magnitude of a phenomenon) when comparing active learning approaches to traditional instructional approaches. While no substantive reviews exist for subject matter that is not STEM oriented, the evidence that active learning based approaches are effective across multiples disciplines is strong (Ambrose, Bridges, DiPietro, Lovett, Norman, and Mayer, 2010). Despite this, the question of how classroom spaces can be designed to best engage students in learning that can be beneficial is worthy of exploration. This "built pedagogy" is important to consider as the design of the classroom space as a physical manifestation of actions, interactions and values is more influential than we believe (Mohanan, 2002).

Action Based Learning and the kinesthetic classroom

Active Based Learning is rooted in active learning methods. The principles of ABL originated from brain research conducted by researchers that supports the link between the brain, movement and learning (Lengel & Kuczala, 2010; Kuczala & Lengel, 2018). In order for the learning environment to be successful using ABL, it must have a teacher who is caring, creative,

and knowledgeable of different styles of learning. Kinesthetic instructors using active based learning strategies listen to learner feedback on activities irrespective of the outcome of the presentation and constantly reflect for improvement.

Kinesthetic classrooms that utilize Action Based Learning place priority on eliminating passive activity in favor of a more novel, fun, and engaging learning experience (Milne, 2016). The environments where kinesthetic learning occur are intentionally designed to maximize success for each student. These settings are clean, comfortable, safe and attractive to allow for effective teaching. In addition to being physically and psychologically secure, they foster opportunities for social contact and collaboration to occur. The classroom aesthetic, symbolized by posters, pictures and symbols, promote active engagement with the material and are age-appropriate, diverse and culturally relevant. Tasks presented in a kinesthetic classroom are varied, challenging, representative of a wide-range of abilities and developmentally appropriate in order to foster growth.

Further, kinesthetic instructors use a variety of equipment (see Table 1) and other resources (i.e. books, activity trackers, graphic organizers) to enhance student learning. While kinesthetic approaches are a foundational component of physical education, the development of a kinesthetic classroom is not a means by which schools should replace physical education class. In fact, the physical educator or health and wellness coordinator of the school is recognized as the leader of these activities. The sum of these aforementioned actions creates a targeted approach to making learning more efficient through purposeful, health enhancing movement in the overall context of the school.

The kinesthetic learning lab at xxxxxxxxx

xxxxxxxx University is a public, coeducational, research-oriented institution located xxx minutes north of xxxxxxxx. The Department of xxxxxxxx , housed in the xxxxxxxxxxx , prepares future health and physical education professionals offering degrees in Public Health Education and P-12 Teacher Preparation in Health and Physical Education. The Department also offers minors in both xxxxx and xxxxxxx which are open to any degree-seeking undergraduate student at xxxx. The department serves the campus community through an extensive Physical Activities program and the WELL 1000: Foundations for Healthy Living course. One of the department's most recent initiatives focuses on active learning through movement in K-12 schools. Thus, the creation of a kinesthetic learning lab was in line with the department's mission of training future educators to be proactive in advancing student learning.

Initially, faculty were inspired to create the lab from small-scale movement initiatives in the department such as installing standing desks and the Minds in Motion Program based out of xxxxxxxxxx . Minds in Motion is an innovation academy developed for schools interested in designing active learning opportunities for students utilizing movement; promoting health, physical activity, social/emotional learning, and wellness. Eventually, discussion turned to how to get college aged-students to move in classrooms. From this idea, faculty suggested that pre-service teachers and selected majors could benefit from the creation of a kinesthetic learning lab devoted to applying strategies, testing the impact on student learning, and ultimately imparting what they learned to their future places of employment.

After obtaining internal funding and the permission to use a departmental classroom, equipment from the company KidsFit (www.youthfit.com/) was used to outfit the lab. Thirty-two stations were created from a combination of pedal desks, wobble chairs, strider desks, motion tables, charts, balls and ladders. While some classroom seats were lost (initially the class held 40

students), the cost to put kinesthetic equipment in the room were comparable to removing old desks and replacing them with new ones. Faculty who would be teaching classes in the lab attended trainings on how to use the equipment and contributed to designing the aesthetics of the room. In the Fall of 2017, the kinesthetic learning lab became the first known fully kinesthetic university classroom in the United States.

Teaching and learning in the kinesthetic lab

At the outset, many faculty saw the kinetic classroom as a means of engaging students in different styles of learning. For others, teaching in the kinesthetic lab required a significant adjustment in delivering content to students. One professor who had taught measurement and evaluation in a lecture-style format for the first few weeks quickly recognized that core concepts of each lecture were more likely to be retained if students utilized the lab stations as learning tools. Taking advantage of his students' propensity to engage in prosocial behaviors, the professor required students upon arrival to class to select a partner and a kinesthetic station for pre-lecture discussion. After a period of seven to ten minutes of activity at the station (or other designated area), students were required to develop an evaluation scenario that could be applicable for a physical education class (see Table 2). Another health education faculty member identified that a kinesthetic classroom lent itself to a flipped style of teaching. Rather than relying on lecture and large-group discussion to develop functional health knowledge, she incorporated weekly on-line quizzes to ensure student understanding of health content. This allowed the class to focus on more cooperative learning strategies that utilized the lab stations and led to a deeper understanding and application of the material.

As part of the kinesthetic lab's mission to train teachers, faculty felt that it was imperative to demonstrate activities that could be replicable in a classroom. One such activity involved the

use of "virtual nature breaks" in class. These occasional breaks during the semester involved playing YouTube videos on a screen in front of the class of hikes, walks, or bike rides filmed by individuals using GoPro cameras. Students at their motion stations took a few minutes from class to pedal, step or stride at their own pace. At the end of the semester, some students elected to informally monitor their personal activity trackers and speculate on potential benefits for the classroom (see Table 3).

Faculty conducted formal evaluations of the active learning themed lessons presented in the kinesthetic lab. The most prominent commentary by students invoked the feeling that they felt closer to their peers and instructors with many using words such as "community" "motivation", "supported" and "excited". Other students mentioned that they were more engaged with content and felt free to move with words such as "comfortable", "valued" and "connected" being noted. Further commentary by students described the kinesthetic lab as a worthwhile endeavor that helped them creating health-based lessons more effectively, while incorporating better siting posture.

Challenges and areas for growth

Notably, faculty and student reactions to the kinesthetic lab after the first year of use were not all positive, representing a wide range of concerns and opinions. Some of the more prominent concerns dealt with orientation, intrusion and utilization of space. One student on the first day of class was concerned that she entered the wrong room for lecture. Another student expressed the opinion that the department was intrusive in promoting physical activity by allowing a class to be designed in this manner without providing a previous course registration description. HPETE students in the department initially felt strained by having several classes in the kinesthetic lab on the same day.

A few faculty in the department felt that the lab did not fit in well with their particular class due to their propensity to be outdoors. Others felt that they should have had more training on how to better incorporate technology and teambuilding activities into the lab as well as more strategies on how to better adapt equipment for individuals with a disability or injury. In response to these comments, the department has involved majors from across campus in several class projects to envision how the room can be utilized for different populations. Further, several research ideas and community engagement projects are under design with a focus on acquiring funding to assist in the study of the benefits that individuals could garner from participation in the classroom.

Conclusion

Despite recent advocacy efforts across the United States, the amount of time devoted to physical education, exercise and recess still can be improved upon. While kinesthetic classrooms are not a substitute for well-designed and led physical education programs, the data is clear: *healthy students are ones who move*. Approaches to incorporating movement in the school day using kinesthetic classrooms could provide an avenue for student growth in the cognitive, affective and psychomotor domains. As promoters of active and healthy lifestyles, we believe that no stone should be unturned in the attempt to improve the health outcomes of our communities. Based on our experiences to date, we feel that active learning using a kinesthetic classroom as part of training future professionals has significant merit and can be modeled at other universities.

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Table one- Sample kinesthetic classroom equipment and uses (adapted from www.youthfit.com)

Pedal Desk	Individuals can pedal while participating in regular classroom activities (i.e. lecture).
Stepper Desk	Encourages resistance based movement allowing for the body weight of a student to shift from left to right.
Wobble Chairs	A flexible seating option that allows from the individual to try multiple positions for stability.
Strider Desk	Allows for an individual to use core and lower back muscles for stability with variable resistance.
Balance Desk	Engages students with purposeful movements to encourage flexion, extension and crossing the midline.
Standing Desk	Allows for students to stand and move while working on projects alone or in a group

Table two –Pre-lecture discussion using strider desks

Schwartz (2014) and colleagues in their research on walking and creativity noted research that identified a link between physical activity and cognition. One line in the discussion section is of particular mention: "While schools are cutting back on physical education in favor of seated academics, the neglect of the body in favor of the mind ignores their tight interdependence…"(p.1148).

Concept: Backwards by design

Description of the task(s): With a partner (s), select a strider desk and discuss the concept of backwards by design as described by Lund and Veal (2013) using a moderate stride pace. Identify two skills from the unit you will teach during your first practicum experience and brainstorm how you might evaluate your learners. Provide a reason why your evaluation could be flawed and another reason why it could be successful.

Time: 10 minutes

Application: 1) Provide a definition of backwards by design. 2) Identify two skills from the practical unit. 3) Brainstorm how you might evaluate learners. 4. Provide possible reasons for a flaw or successful outcome of your evaluation.

Evaluation: 4 points for all items completed, 3 points for all items completed, 0 points for less than three tasks completed.

Note: *Depending on class size and equipment this activity can be modified in terms of number of people, having students keep up with pre-post heart rate numbers over the time period via an activity trackers and changing stations daily. Pace can be determined in conjunction with the class or left to individual choice (which many prefer).*

Table three- Virtual Nature Breaks: Of possible merit?

Prensky (2001) in his article *Digital Natives, Digital Immigrants* suggests that the contemporary decline in American education can be attributed to educators' failure to understand the needs of today's students. The arrival and advancement of digital technology at the end of the 20th century in Prensky's estimation changed the way students think and process information. Teaching and how teachers are trained however, has remained relatively the same. Further, he argues that good and effective teaching in the digital age combines what is important from the past with the tools of the future.

Virtual Nature Breaks (VNBs) combine the use of technology with movement and are simple to incorporate using a strider desk or pedal desk. While they are undoubtedly not a substitute for active, natural, outdoor environments, perhaps VNBs used in conjunction with motion desks and health enhancing technologies could be better utilized in classrooms to help students:

- Combat stress
- Gain confidence in their bodies and movements
- Develop an appreciation for nature
- Compare and contrast different environments
- Serve as method of introduction to places outside of their community (in the case of youth who may be limited in travel opportunities due to socioeconomic challenges
- Allow for students to use technology to film their own VNBs for class use by peers

Used in conjunction with a dynamic PE program, could VNBs assist students in meeting many of the current National Standards for Physical Education?