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MODELING EDUCATION THROUGH INTERDEPARTMENTAL COLLABORATION WITH DANCE AND EXERCISE SCIENCE MAJORS



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Synopsis:

At many colleges and universities, research in exercise science has transitioned to focus on how movement impacts human health and well-being. This poster provides an overview of how St. Olaf College integrated various public health strategies into their exercise science instruction, research, and outreach efforts. One particular area that emerged was the development of a program in dance education through the lens of exercise science students in a directed undergraduate research project.

Modeling Education Through Interdepartmental Collaboration with Dance and Exercise Science Majors

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Abstract

Systems of higher education tend to differentiate between the sciences and the humanities. There lies a seemingly insurmountable barrier between the two - left brain vs. right brain, data and numbers vs. images and words. Larger universities differentiate between an undergraduate training that occurs solely in the realm of science and one that incorporates other realms of knowledge. There is, however, a wealth of knowledge that lies in the overlap of these fields, and cannot be accessed without interdisciplinary collaboration. Some problems require the application of more than one type of knowledge in order to be solved. Small liberal arts colleges, such as St. Olaf College, provide an ideal environment for the promotion of an integrative academic approach, as the various fields of study exist relatively side by side. This paper discusses an interdisciplinary collaboration between the Exercise Science and Dance departments at St. Olaf College, and how this collaboration has affected student and faculty learning in both departments. The collaboration was initially inspired by multidisciplinary team-based approaches in healthcare, and sought to implement this type of teamwork in academic research. This paper will also discuss how interdepartmental collaboration might affect education and research in the future.

St. Olaf College: An Environment of Conversation and Collaboration

The mission of a small liberal arts college like St. Olaf College is to foster conversation and collaboration across disciplines with the goal of knowledge integration and problem solving. St. Olaf has an enrollment of 3000 and is located in southeastern Minnesota. The college boasts a robust and renowned music program while also ranking 11th among baccalaureate colleges in graduates who go on to earn doctoral degrees. The college strives to foster an environment of close collaboration and exploration of a variety of career fields. It does this through maintaining a campus that is 96% residential, the creation of large and dynamic common spaces where students may interact, and small discussion-based classrooms. The multifaceted nature of the campus, along with a focus on experiential learning and development of a well-rounded education results in an environment that lends itself well to the exploration of interdepartmental collaboration. In addition, one of the major goals of faculty and staff at a college like St. Olaf is to equip its students with the tools they will need to live fulfilling and successful lives. The ability to recognize the value of a team-based approach, and refine communication skills across diverse disciplines is one of those tools.

The Team-Based Approach and its Success in Healthcare

The United States healthcare system is currently experiencing a shift towards a team-based approach to medicine. This approach involves sectioning the healthcare staff into distinct multidisciplinary teams, each consisting of nurses, physicians, technicians, physical therapists,

social workers, and more. Multiple studies have documented that the integrative team-based approach results in fewer adverse events, improves outcomes, and results in higher patient and employee satisfaction. This in turn may contribute to a lower rate of burnout in physicians, more comprehensive and cohesive communication between different levels of the patient care pyramid, and reduced length of patient stays (Epstein, 2014).

A team-based approach to healthcare is enticing because it offers the opportunity for a variety of healthcare professionals to aggregate their various fields of knowledge, and then modify and apply this knowledge to the task at hand. This results in the ability to solve problems, make decisions, respond to ever-changing environments, and execute tasks with a greater effectiveness and efficiency than one professional could provide on their own. It also allows for a smoother and more efficient communication among staff who are responsible for different aspects of a single patient's care, resulting in a more comprehensive care model that incorporates the knowledge and skills of multiple providers (Mayo, 2016).

Faculty Developed Model: Interdepartmental Collaboration

The collaboration between the Exercise Science and Dance departments began when dance professor Anthony Roberts approached the Exercise Science department seeking assistance in developing a functional movement screen as well as a functional movement warm-up aimed specifically at the student dancer population. He was concerned that current dance-specific warm-up methods were inefficient, and wondered whether a functional movement warm-up that categorically and intentionally warmed up the specific muscles used by dancers in their rehearsals and performances would be more effective at preventing dance-related injury. Additionally, he felt that some muscular imbalances in his dancers were preventing them from reaching their full potential as well as predisposing them to injury. A functional movement screen coupled with specific exercises designed to target those muscular imbalances could perhaps remedy the situation. Acknowledging that the overlapping interests of the Exercise Science and Dance departments are uniquely positioned to investigate how to better prepare and care for the human body while participating in the stresses of athletics and dance, the two departments agreed to work together.

The Exercise Science department saw this as an opportunity continue to become more involved with movement assessment in novel populations - prior to the collaboration with the Dance department, research within the department had been slowly moving outward from a focus mainly on traditional athletes and non-athletes, to different populations such as musicians and the elderly. Appropriate warm-ups and movement screens originated in traditional athletes, and have been developed to maximize the benefits of strength and conditioning in traditional sport while preventing injury and impairment. Additionally, both departments saw the collaboration as an opportunity to build a foundation of developing functional screens, warm-ups, and other tools for performance and aesthetic athletes with the purpose of reducing their risk of injury or impairment. Finally, this study of functional assessment, education, and exercise prescription established ties among the departments of Exercise Science and Dance. Not only

would the collaboration create a novel opportunity for learning and research in general, but also the students of both departments would be exposed to interdisciplinary thought, creativity, and collaboration, which would in turn inform the way they approach problems in the rest of their lives.

The Approach

The specific functional movement warm-up and functional movement screen was developed with attention and care. The team which developed the warm-up and the screen included a physical therapist, an occupational therapist, and faculty members Anthony Roberts (Dance), and Jenny Holbein (Exercise Science).

Anthony Roberts informed the other members of the team of common dance-related injuries, common movement patterns in dancers, and briefly outlined the ways in which current dance-specific warm-ups are used and taught. Through integration of each team member's specific knowledge base and insight, the comprehensive functional movement warm-up was developed and fine-tuned. The warm-up moves intentionally from fine-motor movements to gross-motor movements, is tailored to dance specific movements, and targets all major muscle groups while increasing heart rate.

Once the warm-up had been developed, exercise science students were involved in experimental testing in order to validate the warmup. The study allowed the exercise science students to enter the dance studios and observe both the developed functional warm-up and the more traditional dance-specific warm-up in action. Throughout the examination of the functional warm-up, the dancers were also exposed to information regarding biomechanical principles and how these principles might be applied to dance.

The testing itself consisted of three different groups of dancers. Each group was tested in different physical modalities - explosive power, through a vertical jump test, balance, through a one-legged balance test, and flexibility, through measurement with goniometers. The first group was tested before and after performing a dance-specific warm-up, led by their instructor and tailored to the genre of dance they worked on in class. The second group was tested before and after performing the functional warm-up developed by the multidisciplinary team. The third group was a control, and was tested before and after performing a cardio-only warm-up which lasted about eight minutes.

In addition to the physical modality measurements, the dancers were asked to complete a short questionnaire that evaluated the dancers current state of health and mental readiness to perform before and after each warm-up. Each group was also tested at the beginning of the semester and at the end of the semester to investigate acute and chronic effects of each warm-up.

Outcomes

The exercise science majors who participated in the research were exposed to a new medium of athletic performance and kinesiology through dance. Many of them had not considered dance as an avenue for them to apply their exercise science knowledge. The

interaction with dance majors through the research allowed for a greater understanding of the specific demands which dancing places on the human body, as well as the way in which dancers interact, move, and perform in their practice space. As many students who major in exercise science do so with the hopes of working in the medical and performance science fields, whether it be as a physician, physical therapist, personal trainer, or occupational therapist, this exposure to a different type of athlete will be invaluable to them. It will give them a reference point when working with these types of athletes in the future, and will allow them to provide more comprehensive and tailored care to a larger range of athletes in the future.

The dance majors who participated in the research also benefited from the study. The exposure to exercise science concepts and biomechanical principles allowed the students and faculty to better understand the warm-up and modifications, as well as how they may better prepare their bodies for dance. The study of the efficacy of the functional warm-up itself provided some interesting outcomes. The primary outcome of interest was that dance majors reported feeling more mentally prepared after the functional warm-up than the dance-specific or cardio warm-up. This could be due to the actual movements performed by the dancers as they warmed up, or it could potentially be attributed to a greater understanding of the purpose behind the movements they were performing.

Faculty in the Dance department shared that they had reflected heavily on the outcomes obtained from the study, and that they were interested in further analyzing and modifying not only the warm-up but also other genre-specific warm-ups that are typically used in class and rehearsal environments. Faculty within the Exercise Science department were able to continue to explore novel applications of Exercise Science concepts and develop tailored warm-ups and screening protocols for new populations. Students and faculty in both departments were exposed to the advantages of multidisciplinary teams, and the opportunity they allow for the aggregation and integration of vast and different knowledge backgrounds. They were also given the opportunity to practice communicating with and learning from people of diverse backgrounds and disciplines, emphasizing just how much we all have to learn from one another.

Conclusion

The interdepartmental collaboration detailed in this paper provided an avenue for academics and professionals in diverse fields to come together and work on a common problem. This sort of teamwork allows everyone involved to be exposed to new ideas, to identify new applications and ideas for problem solving, and to explore a problem through many different lenses. This flexible, adaptable, and integrative approach to research offers the ability to tackle novel fields and applications with skill, allows for the development of comprehensive communication among different departments, faculty members, and students, and facilitates interdepartmental respect and understanding.

Future Directions

It is the hope of the departments involved that interdepartmental collaboration in this way will continue to inform and augment the ways in which departments approach and design research studies. For example, aesthetic and performance athletes do not have the same types of injuries as traditional athletes, and they require a different avenue of treatment as they attempt to return to competition or performance. Because these athletes feel that a physician may instruct them to abstain from their sport, they may avoid seeking treatment until the injury has become extremely severe. In addition, the existence of a functional movement screen aimed specifically at aesthetic and performance athletes will allow physicians to provide better and more comprehensive care for these athletes, perhaps allowing them to offer preventative measures and methods of correcting muscular imbalances before the injury becomes so severe as to remove the athlete from performance or competition entirely.

Through mutual discussion and understanding, this collaboration has opened novel research areas for both departments. It has illuminated areas where further research could become pertinent such as the movement differences between traditional athletes and aesthetic athletes. For example, traditional athletes tend to move with a focus on efficiency of movement, quickness, and agility, whereas performance and aesthetic athletes move with a focus on aesthetic appeal and fluidity. This results in differences in movement initiation, involvement of muscle groups, and potential overuse injuries.

Creating interdepartmental studies which lean heavily on the specific knowledge and experiences of different academic groups can only add to the information base available for physicians and other medical professionals to continue to treat their patients in the most effective and efficient way possible.

Interdepartmental collaboration has exciting implications for further application and study. The working relationship that has been developed between the Exercise Science and the Dance departments could easily be replicated in the form of a connection between the Exercise Science and the Music departments. This could allow the development of warm-ups for musicians in an attempt to reduce and alleviate the frequency and severity of playing related musculoskeletal disorders, which may be detrimental to the physical, emotional, and mental health of the musician. This type of collaboration could also be implemented with the Nursing department, in an effort to address nursing-related injuries, such as lower back pain and injury. Similarly, a functional movement screening and corrections for deficiencies, which would aim to decrease fall risk and increase daily movement capabilities in the elderly population.

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