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Modeling, Virtual Environments and Simulations (MES)

Whitepaper: Study and Implementation of the VirtualED-MES Program for the Associate Degree in Physical Therapy

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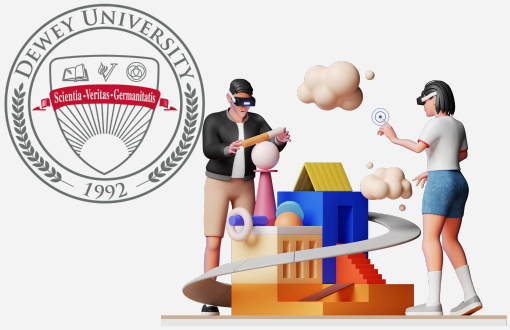

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Summary

This whitepaper analyzes the implementation of the VirtualED-MES program, which wish to integrate modeling, virtual environments, and simulation technologies into the Associate Degree in Physical Therapy at Dewey University. The initiative aims to enhance the quality of education through the use of simulations, promoting active and experiential learning to optimize the existing academic offerings. The objective is to strengthen student preparation in an innovative educational environment that reflects real clinical situations and can effectively adapt to remote learning modalities. This approach addresses the need to adapt physical therapy education to contemporary labor market challenges, equipping students with the necessary skills to excel in their professional field.

Introduction

The field of physical therapy education has evolved significantly since its inception in the late 19th century when it primarily focused on the rehabilitation of patients with polio and war veterans. Over time, the profession has expanded to address a variety of physical conditions in different clinical settings. Today, technology plays a fundamental role in this evolution, enabling the incorporation of advanced tools such as virtual reality, telemedicine, and wearable devices to enhance the treatment and education of future physical therapists. These innovations not only enrich the learning process by offering more immersive and practical experiences, but also facilitate access to treatment and the personalization of rehabilitation programs, thus responding to the demands of an ever-changing healthcare environment (Campbell, 2024; Lisowski, 2023).

The Associate Degree in Physical Therapy at Dewey University prepares students to practice in the field of physical therapy by providing a comprehensive understanding of theoretical frameworks, practical skills, and professional ethics. The program integrates theoretical perspectives and research-based experiences in designing and implementing evidence-based physical therapies. The ultimate goal is for students to pass the Puerto Rico Physical Therapy Assistant Examination successfully.

Given the contemporary educational challenges, the importance of incorporating cutting-edge technologies into the teaching-learning process is acknowledged. Therefore, the VirtualED-MES program, supported by a task force, aims to improve traditional teaching methods and strengthen student preparation in physical therapy, even in remote learning environments.

This initiative addresses one of the objectives of the VirtualED-MES program, funded by the U.S. Department of Education's P116S220005 award, which is to enhance the existing active offerings, including the Associate Degree in Physical Therapy within the School of Health at Dewey University, through the integration of advanced simulation laboratories. This will allow for more comprehensive and practical training for students, aligned with the demands of the professional field and contemporary educational standards. The proposal for improving the existing offerings includes:

- **Evaluating the current needs of the program** through a comprehensive investigation by the taskforce to identify gaps in practical and theoretical education in physical therapy.
- **Developing an advanced simulation laboratory** that complements existing physical laboratories and offers an integrated learning experience that combines virtual simulations and practical exercises in a controlled environment.
- **Providing flexible and adaptable educational experiences** that allow for the continuity of practical learning even in remote learning contexts, thereby enhancing the effectiveness of technology-mediated education.
- **Developing clinical competencies through simulated environments**, enabling students to practice and refine skills such as patient evaluation, treatment administration, and decision-making in a controlled and safe setting.
- **Facilitating students' adaptation to real clinical settings** by exposing them to simulated scenarios that reflect common situations in physical therapy practice, thus reducing the gap between theoretical education and professional practice.
- **Evaluating the impact of simulations on student learning and performance** through the collection of qualitative and quantitative data that will allow continuous adjustments and improvements in the use of simulations in the academic program.

- **Promoting the adoption of innovative educational practices based on simulation within the university**, establishing a model that can be replicated in other academic programs and contributing to positioning Dewey University as a leader in the implementation of advanced educational technologies.

This way, the initiative not only aims to improve the quality of learning in the field of physical therapy but also to position the program as a benchmark in the use of simulations for the training of highly skilled and competent professionals in their field.

Methodology

To achieve the project's objectives, the taskforce, led by Prof. Yosanalis Torres, will conduct research that ranges from a review of specialized literature to the evaluation of available simulations and their adaptation to the curriculum of the Associate Degree in Physical Therapy.

The team will conduct an exhaustive review of the research and existing evidence on the use of modeling and simulation in physical therapy education. Best practices and recommendations for the effective implementation of these technologies in the curriculum will be identified.

Additionally, a consultation will be carried out with faculty and students from the academic program to collect their perceptions and opinions on the needs and expectations regarding modeling and simulation. This feedback will be crucial to ensure that the proposed simulations are relevant, challenging, and adaptable to student needs.

To ensure effective implementation within the broader context of the health laboratory, a phased process will be carried out, including initial planning, pilot tests specific to physical therapy, and continuous evaluation in collaboration with other disciplines within the School of Health. This approach will ensure that the physical therapy simulation laboratory integrates harmoniously and effectively with the rest of the educational initiatives of the general laboratory.

Recommended Simulations

Based on the research analysis, a list of recommended simulations has been developed for the Associate Degree in Physical Therapy:

1. Assessment Simulations:

- **Patient Evaluation Simulation:** Practice patient evaluations, identify physical issues, and develop treatment plans. This simulation allows students to apply theoretical knowledge in a controlled simulated environment.
- **Gait Evaluation Simulation:** Evaluate patients' gait and learn to identify abnormal gait patterns using advanced technology to develop effective treatment plans.
- **Physical Assessment Simulation:** Enables students to practice comprehensive physical evaluation of patients, including medical history collection, range of motion assessment, and muscle strength measurement.

2. Treatment Simulations:

- **Therapeutic Exercise Simulation:** Practice administering therapeutic exercises to improve patient strength and flexibility. This includes simulations of aquatic rehabilitation and specific strengthening exercises.
- **Sports Injury Treatment Simulation:** Evaluate and treat common sports injuries such as ankle sprains and knee injuries. Techniques include massage, stretching, and strengthening.
- **Chronic Pain Treatment Simulation:** Develop personalized treatment plans for patients with chronic pain, using various physical therapy techniques and non-pharmacological modalities.
- **Physical Treatment Simulation:** Practice different physical treatment techniques such as electrotherapy, manual therapy, and therapeutic exercises.

3. Mobilization and Rehabilitation Simulations:

- **Patient Mobilization Simulation:** Practice patient mobilization in various positions and situations, focusing on safety and treatment effectiveness.
- **Postoperative Rehabilitation Simulation:** Rehabilitation techniques for patients undergoing orthopedic surgeries, such as hip or knee replacements. The simulation includes following rehabilitation protocols and adjusting them based on patient needs.
- **Rehabilitation for Patients with Disabilities Simulation:** Treatment and supervision of rehabilitation programs for patients with neurological disabilities or spinal cord injuries.

4. Patient Care and Communication Simulations:

- **Patient Care Simulation:** Practice effective communication with patients and manage their overall medical care, focusing on empathy and understanding of their needs.
- **Effective Communication with Patients Simulation:** Develop therapeutic communication skills, addressing complex situations and building strong therapeutic relationships.

5. Ethics and Teamwork Simulations:

- **Healthcare Ethics Simulation:** Engage in ethical decision-making and manage delicate situations in the clinical environment, respecting the ethical principles of the profession.
- **Leadership and Teamwork Simulation:** Manage multidisciplinary teams and coordinate patient care in collaborative simulation environments.

6. Planning and Management Simulations:

- **Hospital Discharge Planning Simulation:** Coordinate ongoing patient care after hospitalization, ensuring a smooth transition from hospital to outpatient care.
- **Home Care Simulation:** Provide physical therapy at home and adapt treatment to the patient's home environment conditions.

Conclusion

The implementation of the VirtualED-MES program in the Associate Degree in Physical Therapy at Dewey University aims to improve the quality of education and strengthen the training of future physical therapists through advanced simulations and virtual environments. By integrating these simulations into the academic curriculum, the goal is to bridge the gap between theory and clinical practice, providing students with enriching and effective learning experiences that meet contemporary educational needs. Furthermore, a collaborative and multidisciplinary approach within the School of Health will be promoted, maximizing resource use and fostering educational innovation in an integrated learning environment. As continuous evaluation and necessary adjustments are made, this project will help establish a reference educational model for training professionals in physical therapy.

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