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The Impact of Anatomy Academy in Underserved Las Vegas Elementary Schools

Jean Angeles

University of Nevada, Las Vegas

Edgar Armengual

University of Nevada, Las Vegas

Katrina Myers

University of Nevada, Las Vegas

Perceval Vollmer

University of Nevada, Las Vegas

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THE IMPACT OF ANATOMY ACADEMY IN UNDERSERVED LAS VEGAS
ELEMENTARY SCHOOLS

By

Jean Angeles

Edgar Armengual

Katrina Myers

Perceval Vollmer

A doctoral project submitted in partial fulfillment
of the requirements for the

Doctor of Physical Therapy

Department of Physical Therapy
School of Integrated Health Sciences
The Graduate College

University of Nevada, Las Vegas
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This doctoral project prepared by

Jean Angeles

Edgar Armengual

Katrina Myers

Perceval Vollmer

entitled

The Impact of Anatomy Academy in Underserved Las Vegas Elementary Schools

is approved in partial fulfillment of the requirements for the degree of

Doctor of Physical Therapy
Department of Physical Therapy

Daniel Young, Ph.D.
Examination Committee Chair

Jason Ciccotelli, Ph.D.
Research Project Advisor

Merrill Landers, Ph.D.
Chair, Department of Physical Therapy

Alyssa Crittenden, Ph.D.
*Vice Provost for Graduate Education &
Dean of the Graduate College*

Abstract

Anatomy Academy is an interactive, service-learning experience that allows doctoral physical therapy students to pose as educators for elementary-aged adolescents. Through instructional and activity-based learning, mentors formulated the program to encase anatomical, physiological, nutritional, and general health and wellness topics that translate into overall healthy behaviors. The experiment enveloped 7 major sectors of anatomy, including the musculoskeletal system, cardiovascular system, pulmonary system, oral cavity/nutrition, gastrointestinal system, sensory system, and central nervous system. Throughout the length of the program, the doctoral candidates reviewed the quality of the content delivered, the engagement of the students and staff, and the effects this had on the children's interest in future health science professions. The students were anonymously assessed before and after the Anatomy Academy program, however, they did not show significant improvements when compared as a whole. Therefore, while the students did favor the program showing positive recognition, as noted through post-survey results, they did not show remarkable or retained educational gain.

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Section 1: Introduction

Childhood obesity is described as an epidemic in America.¹ The Centers for Disease Control (CDC) stated that the prevalence of obesity in children aged 2–19 years old was 19.3%¹ from data that was collected from 2017-2018. The Nevada Division of Public and Behavioral Health stated that 29.6% of children who were starting kindergarten in Nevada were overweight or obese.² In Clark County specifically, from 2008-2012, 26% of children aged 10–19 years old were found to be overweight or obese.³ Obesity in children can often be tied to disproportionate health education,⁴ often seen in low-income areas, which increases a child's risk of developing health conditions.⁴ Therefore, children who are exposed to educational programs that emphasize health sciences, engineering, and other non-traditional curricula tend to pursue higher education and report fewer health disparities, including a lower obesity rate.⁴

Education quality in Nevada may play a role in predisposing children to health disparities. Only 33% of those graduating from high school in the state of Nevada pursue higher education after completion.⁵ According to the 2020 Nevada's Children Report Card, in which education is graded on a scale from 1-51 (1 is best and 51 is worst), Nevada was ranked 47.⁵ This overall rank was influenced by other primary factors, such as a lack of funding for education and special programs, which could include nutrition classes and physical activities that are outside the standard school curriculum. Nevada's high rate of obesity, when paired with the low educational success scores, presents a discernible need for programs aimed at overcoming the substandard levels of health education for children in Nevada.

Higher scores on the education rank system are considered to be Title I schools. Therefore, due to the aforementioned obesity challenges and low educational success scores, children who attend Title I schools may benefit from programs that specialize more in education that consists of nutrition, and the importance of physical activity.⁶ To classify as a Title I school, 40% of the student population must come from low-income families, including but not limited to homeless, at-risk, or delinquent children.⁶ Students in these categories face additional obstacles when compared to average students, including increased financial burdens, educational challenges, and health complications.⁴ Unfortunately, many of the Title 1 schools lack funding for accessory programs that are known to diminish otherwise avoidable health disparities, such as obesity.

Anatomy Academy (AA) is a program originally designed by a professor at the University of California, Los Angeles (UCLA) to bridge this education gap. It is a service-learning project currently led by graduate students who mentor children in Title 1 elementary schools. Graduate students from various universities use the template designed by UCLA to formulate their activities which provide an evidence-based curriculum that includes anatomy and physiology, as well as general principles of health and wellness.

The goals of this program are to incorporate active learning strategies to educate children about health and wellness, inspire children for a potential future in healthcare, and allow graduate students the opportunity to practice pedagogy and outreach skills. Incorporating active learning methods of teaching by utilizing fun and interactive modalities such as group activities, role-playing, physical model demonstrations, and

practice assignments have been shown to promote higher participation and engagement during each lesson.⁷

Programs like AA have demonstrated lasting benefits.⁸ Professional students also reap the benefits of mastering their understanding of concepts, as well as increasing confidence and communication skills when allowed to act as a mentor.⁸ Enhanced critical thinking, interpersonal skills, and cultural competence amongst previous mentors have been reported after the implementation of the AA program.⁸ Therefore, AA provides positive and meaningful outcomes for both elementary-aged students and mentors alike.

The purpose of this service-learning project was to implement AA with 4th and 5th grade students in a Title I school in the Southern Nevada community. This service-learning project was administered by the University of Nevada, Las Vegas (UNLV) Doctor of Physical Therapy (DPT) graduate students. In addition to implementing AA to Title I, Southern Nevada schools, we also aimed to determine the effectiveness of the AA program in children's developing knowledge of health sciences, as well as their interest in pursuing health-related careers. The aim for the DPT students who conducted this service-learning project was to gain experience with pediatric learning needs and how to teach health-related information in a universally comprehensible way. These are skills that we can carry forward in our future careers as physical therapists.

Section 2: Methods

Participants and Community Partners:

Our participant population was 4th and 5th graders at a Title I elementary school, which included 40 students, one teacher, and one teacher aide. Two AA classes were administered, one being 4th grade and one being 5th grade. Our community partners, whom we will refer to as stakeholders, were the office staff and principal. These stakeholders were given an additional questionnaire at the end of AA to allow them to express their feedback on how AA had affected their school and their students. These questionnaires were provided via email. We chose elementary-aged school children because education on healthy habits and well-being in young children ultimately leads to better health management success in adulthood.⁸ The original AA project was designed and tested on 5th graders, making them an appropriate population for our AA program as well. This age group suggests that they are old enough to comprehend the information given, while still being young enough to potentially morph unhealthy behaviors that they may have or begin to develop.

Project Design:

AA was initially designed to meet once per week for 7 weeks. For each week a lesson was taught, there was a lesson plan for the day and the session always ended with a physical activity. Lessons were designed to take 50 minutes, except for the last lesson, which was designed to take only 30 minutes to accommodate for survey completion. In addition, an extra week was added to the program to create an introductory session allowing for elementary and graduate students to build rapport, and to accommodate survey completion. Due to school holidays and scheduled field trips,

the entire program lasted a total of 8 weeks, with the 7th week incorporating two lesson plans. Each of the 7 lessons had set objectives (see Table 1) with varying learning modalities. These lessons provided the flexibility necessary to accommodate time constraints and learning styles. Each lesson included tips for teaching varying student demographics, visual aids, and instructions for in-class experiments.

The subjects covered under these lesson plans included the sensory system, musculoskeletal system, cardiovascular system, respiratory system, gastrointestinal system, neuroanatomy, and nutrition grouped with the oral cavity. Each lesson incorporated elements of health education that were the primary take-home message for the students. For example, the cardiovascular lesson plan included education on how much exercise is necessary for maintaining heart health. Each weekly lesson plan had material that expanded on important concepts in the human body and highlighted each body system and its function to create and maintain a healthy lifestyle.

Table 1. Anatomy Academy Lesson Plan and Learning Objectives

Lesson Name	Learning Objectives
1. Musculoskeletal System	<ul style="list-style-type: none"> - Know the location of major muscle groups and how to exercise them - Know the basic parts of the skeleton - Understand why exercise is important - Understand why they [elementary students] should keep their muscles strong - Understand why they [elementary students] should keep their bones strong - Know how to prevent strained or torn muscles
2. The Heart	<ul style="list-style-type: none"> - Know the anatomy of the heart - Understand how blood circulates through the body - Understand how the exchange of oxygen in the bloodstream occurs - Know what kinds of exercise keep the heart healthy - Know what happens to the heart when we don't exercise or eat excess fat
3. The Lungs	<ul style="list-style-type: none"> - Know the anatomy of the lungs - Understand how oxygen exchange takes place in the lungs - Understand what happens when body tissue does not get the oxygen it needs - Understand how smoking damages the lungs - Know activities [exercise] that will keep the lungs healthy - Understand how asthma affects the lungs - Understand how our vocal cords work
4. Oral Cavity and Nutrition	<ul style="list-style-type: none"> - Know the anatomy of the oral cavity and physiology of the oral cavity to understand how food is broken down - Learn about the structure of teeth and how to take care of them - Learn the basics of proper nutrition and why it is important (Use guidelines from https://www.choosemyplate.gov) - Learn about the danger of sugar and why we get cavities - Learn how to read and compare food labels
5. Gastrointestinal System	<ul style="list-style-type: none"> - Know the purpose of the GI tract - Understand names and major functions of GI organs - Understand the pathway of food through the GI tract - Know how to keep GI tract healthy - Know what happens when your digestive

	system is sick and how to get better
6. The Senses	<ul style="list-style-type: none"> - Know the basic anatomy of the spinal cord and a neuron - Know the basic anatomy of the eye - Know the basic anatomy of the ear - Understand why the body feels pain (nociceptors)
7. The Brain	<ul style="list-style-type: none"> - Know the basic anatomy of the brain - Know what each lobe of the brain, the brainstem, and the cerebellum are responsible for - Understand that a healthy breakfast is vital for the brain to have energy to work during the day - Know what a healthy breakfast consists of

Survey Creation:

To assess and quantify the effectiveness of AA for the participating elementary students, pre- and post-surveys were designed and administered by UNLV DPT students, which focused on the elementary students' interest level and depth of knowledge in health and wellness. These surveys were administered as tests to the students, so the words "survey" and "test" were used interchangeably throughout the program. The first week of AA was designed to be introductory with no lesson plan and the administration of the pre-survey. The pre-survey was administered on the first day of AA and the second survey on the last day of AA. This is why the last session of AA was only designed to be 30 minutes to allow enough time for the post-survey. The surveys contained questions that referenced the AA content. The post-survey included the same questions as the pre-survey but also included subjective questions about the students' experience, their liking of the program, and whether it sparked an interest to pursue health-related careers in the future. Scores obtained from both the pre- and post-surveys were designed to determine the impact of the education provided.

New pre- and post-surveys were created due to concerns over the original AA survey containing questions that were too easy and could be answered correctly without additional education. For instance, a question would provide answer choices that had three answers that were clearly wrong and one obvious correct answer.⁸ UNLV graduate students felt that the survey also included difficult word choice, no questions regarding participants' healthy habits, and lacked questions regarding modern public health concerns, such as screen time and vaping. Additionally, there was an absence of questions regarding interest in healthcare and perception of the program.

The surveys were made by combining questions from the following resources: the After-School Student Questionnaire (ASSQ), developed by the CATCH Kids Club,⁹ and the Physical Literacy Knowledge Questionnaire (PLKQ), developed by the Children's Hospital of Eastern Ontario Research Institute.¹⁰ The healthcare interest segment of the AA survey was made utilizing the Carnegie Mellon Institute handbook,¹¹ and the UNICEF handbook that emphasized appropriate communication with children.¹²

The survey was reviewed by a panel of experts, which included a professional in each of the following: survey creation, nutritional sciences, athletic training, and anatomy. Modifications to the survey were made based on the feedback given by the panel of experts. The survey was tested by administering it to the elementary students who participated in this project. During the first week of the program, the students were asked about their initial interest in various career fields, including healthcare, to establish a baseline interest in different professions. These questions utilized a numerical rating scale that measured levels of excitement for each field. Numbers 1 to 5

were assigned as the options, where 1 is not very exciting and 5 is very exciting (see table 2).

Once completed, UNLV's DPT students who conducted this project in 2023 compared results to the existing AA survey that was used in 2022 by the previous cohort of UNLV DPT students. Feedback from the elementary school students and DPT students administering the survey was noted and applied in a live document given to the next cohort who will be running the AA program in the 2023-2024 semester. In addition, each graduate student who participated in AA provided a written self-reflection after the completion of the program, which included self-challenges, personal growth, and how the APTA core values were shown during the program.

Procedures:

Clarification was provided to students who did not understand the question, for example defining an unknown word. However, no additional information was provided to the students that may have alluded to the correct answers to the survey questions. Additionally, graduate students took note of which questions were causing increased and unintentional confusion, allowing for the surveys to be edited and improved upon in the future. Keeping consistency among the questions allowed us to measure any change in career interest and their take-away knowledge from the program. The surveys were administered on paper to the students, who were also provided with a writing utensil. The two surveys were administered 10 weeks apart after the completion of all the lesson plans.

Analysis:

Pre- and Post-survey data were analyzed using SPSS Statistics Version 27 (IBM Corp, Armonk, New York), including individual question analysis and total scores. Scores were obtained by grading each survey individually. Wilcoxon Matched Pairs Test was performed to analyze the significance between overall correct pre- and post-survey scores for the group. This test was chosen due to Shapiro-Wilk normality testing, which revealed that the data was not normally distributed. Wilcoxon tests were also utilized to determine whether there were differences between individual responses of job interests from before AA and after AA. Each job interest was analyzed independently. Chi-square analysis was then analyzed to determine whether there were differences in specific job interests between pre- and post-AA.

Table 2. Sample survey questions from pre- and post-survey questionnaire

Survey Title	Sample Question																																										
Healthcare Interest pre-survey	<p>You will be given a list of 10 jobs. Please rank them based on how exciting you find them from not exciting, to very exciting by marking whichever box best fits your opinion.</p> <table><tr><td></td><td>Not Exciting</td><td></td><td>Neutral</td><td></td><td>Very Exciting</td></tr><tr><td>1. Fire Fighter</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>2. Nurse</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>3. Pilot</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>4. Doctor</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>5. Police Officer</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>6. Physical Therapist</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr></table>		Not Exciting		Neutral		Very Exciting	1. Fire Fighter	1	2	3	4	5	2. Nurse	1	2	3	4	5	3. Pilot	1	2	3	4	5	4. Doctor	1	2	3	4	5	5. Police Officer	1	2	3	4	5	6. Physical Therapist	1	2	3	4	5
	Not Exciting		Neutral		Very Exciting																																						
1. Fire Fighter	1	2	3	4	5																																						
2. Nurse	1	2	3	4	5																																						
3. Pilot	1	2	3	4	5																																						
4. Doctor	1	2	3	4	5																																						
5. Police Officer	1	2	3	4	5																																						
6. Physical Therapist	1	2	3	4	5																																						
Healthcare Interest post-survey	<table><tr><td></td><td>Strongly Disagree</td><td></td><td>Neutral</td><td></td><td>Strongly Agree</td></tr><tr><td>1. Anatomy Academy was interesting</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>2. Anatomy Academy made me interested in health</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr></table>		Strongly Disagree		Neutral		Strongly Agree	1. Anatomy Academy was interesting	1	2	3	4	5	2. Anatomy Academy made me interested in health	1	2	3	4	5																								
	Strongly Disagree		Neutral		Strongly Agree																																						
1. Anatomy Academy was interesting	1	2	3	4	5																																						
2. Anatomy Academy made me interested in health	1	2	3	4	5																																						
ASSQ and PLKQ Combination Survey	<p>9. Do you ever read the nutrition labels on food packages?</p> <p>A. Almost always or always</p> <p>B. Sometimes</p> <p>C. Almost never</p> <p>D. Never</p> <p>10. How many total servings of fruits and vegetables should you eat each day?</p> <p>A. At least 2</p> <p>B. At least 5</p> <p>C. At least 9</p> <p>D. At least 10</p> <p>E. I don't know</p>																																										

Note. After-School Student Questionnaire (ASSQ), Physical Literacy Knowledge Questionnaire (PLKQ)

Section 3: Results

Stakeholders at Paradise Elementary School reported positive interactions with having AA in their school. They requested continued partnership with UNLVPT to offer AA to future 4th and 5th graders. The elementary school staff suggested expanding to three classes instead of two to cover a larger group of students.

The elementary students wrote positive comments on the post-test when asked what their favorite part of the AA program was (see appendix 2). Several students stated that they wanted more AA classes in the future. In addition, the elementary students expressed both in their qualitative comments on the surveys and verbally to students that they enjoyed the program and looked forward to their Fridays with the AA crew. The comments mentioned by the elementary students included statements such as “I really enjoyed all the fun activities” and “this was such a fun class.” When asked what they liked the least, there were no reported negative comments, as all kids left the question blank or wrote “none”.

We received 39 responses to both our pre- and post-survey, for a total of 78 responses. There were roughly 20–25 students in each class and two classes for a total of 40–50 students. This number varies based on attendance. Due to requesting that the students not identify themselves when completing the survey, we were unable to compare each student individually to themselves. As a result, we compared the students as a group with their before and after testing. This was done with a paired t-test using Wilcoxon due to the test of normality, as mentioned above. There was no statistically significant difference in average test scores (all p values >.05) or healthcare job interest pre- and post-AA ($t = -0.919$, $p = 0.359$).

Analyzing individual professions, frequencies of moderate and highest interest showed upward trends toward STEM professions. The significance of knowing that there was an upward trend is that potentially with a longer AA program, there may be a great impact on the students with more exposure. Although not significant, there was an increase in interest in the physical therapy profession with pre-AA at 33.3% which rose to 38.5% by the end of the program.

When examining the objective survey questions individually, only one had a statistically significant increase in correct answers ($Z = -2.736$, $p = 0.006$), which was the question asking students how much cardiovascular exercise they should be participating in daily. There were additional questions that showed an improvement trend; however, no statistically significant differences were noted. It is not feasible to compare to other AA programs at this time, as this was the first year that this survey was used to test the students' knowledge.

Limitations:

The problems encountered throughout this program were primarily due to scheduling. This included conflicting dates due to school holidays or sick days taken by the staff. Because of these hurdles, two AA lesson plans needed to be combined into one week. The original AA program at the University of California, Los Angeles called for a seven-week program. We had to modify this timeline to eight weeks to allow sufficient time for completion of the pre-survey. However, due to schedule conflicts, the program was completed in seven weeks. Another limitation encountered during the program was participant absence. Due to student absences for personal reasons unknown to the graduate students, not all students were able to participate in all AA

lessons, which may have impacted the post-survey results. One class was given at 08:00 at the start of the school day, and the second class was administered after lunch and recess at 12:30. The afternoon classes would often start 5–10 minutes later than scheduled and the elementary students seemed less attentive to the content provided due to potential factors such as energy levels throughout the school day and student dynamic within the class (i.e., groups of friends, morning class, and afternoon class). Lastly, the survey asked the students to rank certain professions based on their level of interest. The level of interest that each student answered may not be true to their actual interest if the students did not know exactly what each of those professions do. We did introduce the profession of physical therapy to the students at the beginning of the program, however, we did not monitor the retention of their knowledge about the physical therapy profession. Additionally, while objective questions were edited and approved by experts in fields, they were not then reassessed for congruence with AA lesson plans and target audience. Many questions were behavioral aligned with those used by the ASSQ, CATCH Kids Club, and PLKQ surveys. The addition of practical anatomical and knowledge application questions with a greater focus on specific AA content, diagrams, and demonstrations likely would have been beneficial. These observations can serve future graduate students when administering the program.

Section 4: Reflections

Jean Angeles:

I really enjoyed Anatomy Academy and believe it was such a beneficial experience for my classmates, the students of the elementary schools, and me. Participating in this program allowed me to experience what it was like educating our younger generations on a matter that we feel is essential to their upbringing and decisions about a healthier lifestyle. Not only were we allowed to apply our knowledge of anatomy as physical therapy students to them, but the students showed us what it would be like to provide education to my future patients. This will be useful in my future endeavors as a physical therapist because I now know better ways to deliver information that may be confusing in a universally comprehensible way. Once I got to know them, I was able to adapt to each student's learning styles, which I believe helped me get the point across. It was a great opportunity for my classmates and I to collaborate together on what we believed was the best way to engage our population where they would take the most away from it.

Some limitations that arose from conducting this project included scheduling issues from both myself, as well as the school. Personal situations and school field trips or holidays set our teaching schedule a little bit off, which ended in us needing to move around and combine some lesson plans. Lastly, working with kids takes a specific mindset and patience. A lot of the time I had to adjust what I was saying so the kids would understand it. We had to find ways to engage the kids so that they paid attention, and we mostly did this through interactive lectures and smaller group activities. Aside from these barriers, I believed that the program ran fairly smoothly. It enhanced my interest in working with kids as a physical therapist and I'll definitely keep my mind open

to the idea of being in pediatrics. We truly did our best with the program and I'm excited to see what the incoming students have in store for it.

Edgar Armengual:

Participating in AA has been one of the most fulfilling parts of the physical therapy program. Being able to take the knowledge that I learned over the last two years and pass it down to fourth and fifth graders, has been a personal highlight. There have been some barriers that I have personally encountered such as scheduling issues and family matters, however, this has not stopped me from being able to attend and provide AA to elementary school students.

I have personally found a lot of growth in this project because I would like to work with children as a physical therapist. AA challenged me to connect with the student at an academic level and a more personal level preparing for the future to come. This will be helpful because I will be able to teach my pediatric patients in a way that is fun but also educational in the same way that I was able to teach during AA.

AA was not only rewarding but it also reflected the American Physical Therapy Association's (APTA) core values which are: accountability, altruism, collaboration, compassion and caring, duty, excellence, inclusion, integrity, and social responsibility. We gave classes every Friday and we were always there and accepted this responsibility thus were accountable. We collaborated with not only our fellow peers, but also the teachers to provide this program. We had devotion for our students and I ensured to give my best every time I was there. I showed compassion when they talked to me and made it my duty to be a positive role model to the students and my fellow peers. I made sure that I was always welcoming and knew that every time that I stepped

into that class, I had a responsibility to promote trust and to teach them about healthy habits. I am extremely thankful for the school allowing us to conduct our program there. It was very important to me that we collaborated with the elementary school across from UNLV because of the proximity and the close ties to the university. I felt it was important to reach out and create this relationship that is sure to last for years to come.

Katrina Myers:

Although I was only able to participate in Anatomy Academy for one year, as I entered into the 2024 cohort from the 2023 cohort, I thought that it provided me with skills in communication as well as accommodation, both which I believe are beneficial to being a successful physical therapist. Anatomy Academy allowed for me to communicate with other physical therapy students that allowed for us to enhance our collaboration skills on a lesson plan. This collaboration allowed us to grow skills, in which I would say, that can be used in building a treatment plan for future patients with other parts of their care team. In addition, I think that it challenged me in my ability to effectively communicate information to those who I was trying to teach, because in physical therapy, we are in fact teaching our patients how to move better. Not every person is the same or learns in the same way, and that showed within the students that we were fortunate enough to teach. Being able to adapt and accommodate a way of teaching to another way in order to enhance the learning of the students was a meaningful opportunity for me. The goal that I have set for myself after being a physical therapy student is to transition to being a pediatric physical therapist. I have not yet decided whether I would want to work with outpatient or inpatient pediatrics or if I would rather do school-based physical therapy. Being able to work with these children was a great experience, and will help guide my decisions once I leave UNLV.

Although I had such a great time teaching and interacting with the children, it was sad to see that there was not much difference between the pre- and the post-survey scores. And yet, I think it is valuable to see this, even if it wasn't the intended outcome. I know in the future, my skills as a physical therapist are going to be ever changing and ever evolving in order to implement the best practice. So, knowing that something isn't working is great insight on where there needs to be an improvement in how I am treating a patient. Because this program really enhanced my communication skills, I also think this gave me confidence in asking questions about where I can improve and make things better. I would love to see this Anatomy Academy program run again in the future and look at aspects that we didn't necessarily look at in our project, such as time of day the students were learning, and finding different ways to achieve better recall of the material.

Perceval Vollmer:

Participation in Anatomy Academy had many ups and downs. Survey and program creation ran fairly smoothly. Researching data and best practice is something UNLV prepared us for well, I would argue. Once initial surveys were created and internally edited, I was in charge of contacting our panel of experts and implementing their edits. This process was straightforward, and looking back I could have been more efficient in completing the process. Additionally, despite the several edits, errors on the final documents slipped through. I didn't allow myself enough time between other projects, and it taught me a lot about time and project management. As well as about the importance of being more detail oriented. This will be valuable moving forward, as clinic life will only proceed to get busier and busier. Planning lessons was fun, and

reminded me a little of creating treatment sessions. Having to piece together all the work you need to do in your 45-minute session was a challenge, but a familiar one.

Once we actually started delivering lessons, we hit a snag. Scheduling. Scheduling classroom visits with other schools is challenging, as clearly outlined in our limitations, and there's only so much that can be done about this. I learned from this that starting this program a month or two earlier from your planned start date, while it seems excessive, might actually be the best option. We gave ourselves two weeks of spare time, and it wasn't enough. I think the lesson of starting things sooner, rather than later, can only lead to good things in our future. I found talking and teaching the kids was actually fairly easy. They tell you, very bluntly, when they don't understand something. This allowed me to quickly rephrase my education to something not only patient-friendly, but 5th-grader friendly. Learning how to simplify concepts will help in proper patient education during our future endeavors.

The last piece of the puzzle was looking at our outcomes. It was a little disheartening to see that, on paper, we had very little impact. Even so, this result didn't surprise me. Despite how excited the kids were to see us, and how frequently teachers at the school praised our work, it seems like they didn't learn very much. It honestly makes me sad that this is my last year, as now I'm curious to see what we can do better. I would love to run this with another class and see what a slightly different teaching style could improve, or see if we need to use a different outcome measure. While we postulate that a lot of the problem lies in scheduling errors, I wonder if that's true. This last lesson taught me that frequent monitoring of progress is important, make sure to set people up for success, and to have realistic expectations.

Section 5: Conclusion

Overall, the data did not show a significant increase in the students' understanding of human anatomy, nutrition, healthy habits, or an increase in their interest in healthcare occupations after implementing AA. This project had a positive impact on the children. Every week, the students showed excitement and engagement throughout the lesson. They frequently ended sessions by asking when we would come back to teach them again. This shows that while there may not have been a significant objective impact on the students, their interactions with us demonstrated that there was a positive subjective impact on them. As mentioned before, this is the first year that this survey was used, and results showed upward trending scores. Despite this lack of support in the data, other programs similar to AA have been shown to create lasting impacts on young children.⁴ This gives hope that future UNLVPT AA projects, with modifications based on survey feedback, will show better outcomes, such as improved survey scores and self-reported healthy habits.

The UNLV Students of Physical Therapy (SPT) who facilitated the AA program gained a better understanding of pediatric learning needs and became more comfortable teaching, which are critical skills in healthcare professions. Our results and experiences do indicate that further refinement of the program is needed before re-administration of AA. This can include alterations to the content, the administration of the lesson plan, and the survey itself. In addition, the SPTs felt they were running short on time with some lessons; therefore, revision of weekly content that is provided to the students is recommended to fit the time constraints better.

While this project meets UNLV's short-term vision for implementing an AA program at a single school, the long-term goal is to expand to other schools in the area that would include graduate and undergraduate students from other healthcare disciplines. For example, kinesiology, dental, nursing, and medical students. This will allow for more students to receive education and exposure to healthcare fields. It will additionally allow students to build crucial interpersonal communication skills in a "real-life" setting.

Section 6: Acknowledgments

This service-learning project was supervised by Jason Ciccotelli, PT, DPT, PhD, Board Certified Wound Specialist and Assistant Professor, Department of Physical Therapy the University of Nevada, Las Vegas. Funding was provided through the UNLVPT Student Opportunity Research Grant and the UNLV Graduate and Professional Student Association.

Appendices

Appendix 1:

Healthcare Interest Pre-Survey



Instructions: This is ***not*** a test! We are looking for your thoughts and opinions. All of your answers are completely anonymous, so please ***do not*** put your name anywhere on this survey.

You will be given a list of 10 jobs. Please rate them from 1-5 on how exciting you find them. 1 being not exciting at all, 5 being extremely exciting. Select your answer by checking the box that you agree with.

	Not Exciting	Slightly Not Exciting	Neutral	Slightly Exciting	Very Exciting
1. Fire Fighter					
2. Nurse					
3. Pilot					
4. Doctor					
5. Police Officer					
6. Physical Therapist					
7. Soldier					
8. Pharmacist					
9. Teacher					
10. Dentist					

Appendix 2:

Healthcare Interest Post-Survey



Instructions: This is **not** a test! We are looking for your thoughts and opinions. All of your answers are completely anonymous, so please **do not** put your name anywhere on this survey.

You will be given a list of 10 jobs. Please rank them from 1-5 on how exciting you find them. 1 being not exciting at all, 5 being extremely exciting. Select your answer by circling whichever number fits best.

	Not Exciting	Slightly Not Exciting	Neutral	Slightly Exciting	Very Exciting
1. Fire Fighter					
2. Nurse					
3. Pilot					
4. Doctor					
5. Police Officer					
6. Physical Therapist					
7. Soldier					
8. Pharmacist					
9. Teacher					
10. Dentist					

Instructions: These last few questions are for you to give feedback on how you think the Anatomy Academy program went. Answers will be used to improve the program for future classes, so please answer honestly. Remember, this is **completely anonymous**.

Please check the box that best describes your response to the statement, and use the spaces provided to write any comments.

	Strongly Disagree	Neutral	Strongly Agree
1. Anatomy Academy was interesting			
2. Anatomy Academy made me interested in health			
3. The guest teachers were prepared			
4. The teaching tools (models, pictures, activities) helped me understand things better			
5. The guest teachers made me feel comfortable and welcome to learn			
6. I know more about anatomy now than before the course started			

7. What did you like the **most** about Anatomy Academy?

8. What did you like the **least** about Anatomy Academy?

9. What would you like to see Anatomy Academy change?

10. Any final comments or suggestions?

Appendix 3:

After-School Student Questionnaire⁹ and Physical Literacy Knowledge Questionnaire
Combination Survey¹¹



Anatomy Academy Questionnaire

Please answer the following questions to the best of your ability. This is not a test. There is no right or wrong answer.

1. How old are you?

2. How do you describe yourself?

- A. White
- B. Black or African American
- C. Hispanic or Latino
- D. Asian or Pacific Islander
- E. Other - Please Specify: _____

3. How many days per week do you typically eat French fries or chips? (Chips are potato chips, Cheetos, Doritos, corn chips, etc.)

- A. 0-1 days per week
- B. 2-3 days per week
- C. 4-5 days per week
- D. More than 5 days per week

4. How many days per week do you eat vegetables?

- A. 0-1 days per week
- B. 2-3 days per week
- C. 4-5 days per week
- D. More than 5 days per week

5. How many days per week do you eat fruit?

- A. 0-1 days per week
- B. 2-3 days per week
- C. 4-5 days per week
- D. More than 5 days per week

6. How many days per week do you drink fruit juice? (Fruit juice is drinks with 100% juice, such as orange juice, apple juice, or grape juice.)

- A. 0-1 days per week**
- B. 2-3 days per week**
- C. 4-5 days per week**
- D. More than 5 days per week**

7. How many days per week do you eat sweet rolls, doughnuts, cookies, brownies, pies or cakes?

- A. 0-1 days per week**
- B. 2-3 days per week**
- C. 4-5 days per week**
- D. More than 5 days per week**

8. Yesterday, did you exercise or participate in sports activities that made your heart beat fast and made you breath hard for at least 20 mins?

- A. Yes**
- B. No**

9. Do you ever read the nutrition labels on food packages?

- A. Almost always or always**
- B. Sometimes**
- C. Almost never**
- D. Never**

10. How many total servings of fruits and vegetables should you eat each day?

- A. At least 2**
- B. At least 5**
- C. At least 9**
- D. At least 10**
- E. I don't know**

11. The foods that I eat and drink now are healthy.

- A. Yes, all of the time**
- B. Yes, sometimes**
- C. No**

12. Do you think it is important to be physically fit?

- A. Yes**
- B. No**

13. Which of the following are associated with tobacco product use? (Cigarettes, vaping, hookah, chewing tobacco, etc.)

- A. Faster healing times
- B. An increased risk of lung cancer
- C. Lower levels of stress and anxiety
- D. Lower heart rate

14. Muscle strength or muscular endurance means...

- A. How well the muscles can push, pull or stretch.
- B. How well the heart can pump blood and the lungs can provide oxygen.
- C. Having a healthy weight for our height.
- D. Our ability to do sports that we like.

15. There are many different kinds of fitness. One type is called endurance fitness or aerobic fitness or cardiorespiratory fitness. Cardiorespiratory fitness means...

- A. How well the muscles can push, pull or stretch.
- B. How well the heart can pump blood and the lungs can provide oxygen.
- C. Having a healthy weight for our height.
- D. Our ability to do sports that we like.

16. How many minutes each day should you and other children do physical activities that make your heart beat faster and make you breathe faster, like walking fast or running?

- A. 10 minutes
- B. 20 minutes
- C. 30 minutes
- D. 60 minutes or 1 hour

17. Draw a line to all the words you think describe what “healthy” is.



18. How much screen time (TV, phones, video games) do you get per day?

- A. Less than 1 hour

- B. 1 to 2 hours
- C. 3 to 4 hours
- D. More than 5 hours

19. If you wanted to get in better shape, what would be the best thing to do?

- A. Read a book about getting in shape
- B. Wait until you get older
- C. Try exercising or being active a lot more
- D. Watch a video, take a lesson or have a coach teach you how to get in shape

20. Please list the physical activities you like to do

I Like to do: _____

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Curriculum Vitae

Jean Roxanne Angeles, DPT

Las Vegas, NV

Email: jeanroxanneangeles@gmail.com

Education

University of Nevada Las Vegas, Las Vegas, NV

DPT., Physical Therapy, 2024

B.S., Kinesiology, 2021

Las Vegas, NV

Email: earmengual@yahoo.com

Education

University of Nevada Las Vegas, Las Vegas, NV
DPT., Physical Therapy, 2024

American Military University, Charles Town, WV
BS., Sport Health Science, 2020

National College of Technical Institution, Hercules, CA
EMT-P., Paramedic License, 2017

Roseville, CA

Email: katjmy3rs@gmail.com

Education

University of Nevada Las Vegas, Las Vegas, NV
DPT., Physical Therapy, 2024

California State University, Chico, Chico, CA
MA., Kinesiology – Exercise Physiology, 2020

California State University, Chico, Chico, CA
BS., Exercise Physiology 2018

Perceval Vollmer, DPT

Las Vegas, NV

Phone: (208) 716-3241

Email: percdvoll@gmail.com

Education

University of Nevada Las Vegas, Las Vegas, NV
DPT, Physical Therapy, 2024

Idaho State University, Pocatello, ID
B.S., Biology, 2020