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# Mentors' Experience in Teaching Basic Science Concepts in the Community Outreach Program, Anatomy Academy: A Phenomenological Study

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## Abstract

This paper analyzes the lived experience of Doctor of Physical Therapy (DPT) students participating in the service-learning program, Anatomy Academy. To understand this experience, we performed a phenomenological analysis using the reflections of 31 DPT students as they participated as Mentors to 5<sup>th</sup> grade elementary students. Mentors used active learning strategies to teach topics of anatomy, physiology, and nutrition in small groups. After each teaching experience, Mentors responded to writing prompts as a way to reflect upon these experiences. From these reflections, three overarching themes emerged in describing the Mentors' experience. Our results showed that the Mentors developed an understanding of the power in learning through real-world situations, grew in their ability to work with others, and developed an enhanced personal awareness of self and society. This study emphasizes the importance of service learning in the graduate education of DPT students as they progress to become competent health care professionals. <https://doi.org/10.21692/haps.2020.017>

**Key words:** basic sciences education, graduate students, mentors' perspective, phenomenology, preclinical service learning

## Introduction

Service learning can be described as an opportunity to apply knowledge and principles from formal education to benefit the members of a community and in turn, enhance the learning of the participant through hands-on experience and real-life situations (Valerius and Hamilton 2001; Munter 2002; Diaz et al. 2019). Service learning also provides an environment for the participant to develop interprofessional teamwork skills, self-awareness, social responsibility, professional skills, and career-related activities (Astin and Sax 1998; Eyler and Giles 1999; McKenna and Rizzo 1999; Primavera 1999; Gray et al. 2000; Valerius and Hamilton 2001; Moely et al. 2002; Bennett et al. 2003; Diaz et al. 2019). Service learning is unique from other types of learning or from volunteering, as participants and recipients in the program benefit symbiotically (Sigmon and Pelletier 1996).

Anatomy Academy is described as a service-learning experience for both undergraduate and graduate students participating as Mentors to elementary school children (Students) in interactive teaching and learning experiences (Diaz et al. 2019). Mentoring is an educational approach in developing a student's ability to work with others, resolve conflict, understand the value of community involvement,

and build leadership skills (Barton-Arwood et al. 2000; Wells and Grabert 2004). Mentoring is an experience that allows the participant to apply knowledge in a real-world setting, examine self and society, and grow in confidence (Schmidt et al. 2004). Mentoring benefits the participant in many different ways, including improvement in content delivery and professionalism (Diaz et al. 2019).

The small, private university in the Midwest where this research was conducted recently added a Doctor of Physical Therapy (DPT) program. One of the program's missions is to collaborate as community partners to work with underserved populations in Northwestern Iowa. The program's mission and values align with the American Physical Therapy Association (APTA) as the program seeks to develop DPT students as health care professionals that will contribute to their future community. The APTA has adopted a set of core values of professionalism related to physical therapy practice, education, and research (APTA 2003). These core values include accountability, altruism, compassion/caring, excellence, integrity, professional duty, and social responsibility (APTA 2003).

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The Anatomy Academy program was used with the idea that mentoring will begin to shape the graduate students' professionalism (Steed 2015) that would be beneficial to the DPT students' progression in becoming a competent physical therapist and to serve the elementary students at a multicultural, low income school. In addition, this experience gave the DPT students an uncommon opportunity to teach, as there are a lack of preclinical teaching opportunities for health care professionals (Diaz et al. 2019). Teaching is a vital skill for health care professionals that may be overlooked in preclinical education. However, it is a necessary component to their postgraduate profession as they continually perform this task with patients daily, and as such, preclinical teaching opportunities should be a focus for health care professionals. There are a number of documented benefits of being a mentor; however, this may be the first research addressing the lived experience of DPT students as Mentors in a service-learning program.

The purpose of this research was to describe the meaning of the Mentors' experience while participating in the outreach program, Anatomy Academy. Our goals for the research are to determine if DPT students developed core values of professionalism in physical therapy as determined by the APTA (APTA 2003). A secondary goal was to describe the "lived experience" of Mentors serving in this program to understand the impact it had on the educational progression of the Mentors.

## Materials and Methods

### *Mentee Participants and Location*

Between 2016 and 2018 five classes of 5<sup>th</sup> grade students at a public elementary school in the Midwest participated as mentees in the Anatomy Academy program. This elementary school is an English and Spanish Dual Language Specialty School with a student body demographic that has a high enrollment of minorities and of low-income families.

### *Mentor participants*

First and second-year graduate students in the DPT program at a small, private university in the Midwest were invited to participate in this study as Mentors. Thirty-one graduate students participated as Mentors; 16 females and 15 males.

### *Procedures*

Doctor of Physical Therapy students interested in participating in this program were asked to fill out an application, which was reviewed by the lead faculty member of the program. Students were selected from these applications and invited to attend an introductory training. During this training, expectations and responsibilities of being a Mentor were discussed and Mentors were asked to assign themselves into groups of two or three. These groups worked together throughout the program. A criminal background check form

was signed and submitted for review. Each Mentor had to pass the criminal background check to comply with school district policy about who can enter the school and interact with the elementary students.

This project was approved by the institutional review board of the university (IRB numbers: 0007-2017, 0003-2018), and informed consent was obtained from all Mentors during the introductory training.

The Anatomy Academy program consisted of a six-week schedule that included a weekly group meeting for all Mentors to review the upcoming curriculum and to delegate shared responsibilities. Individual mentoring groups were then asked to develop a lesson plan for the upcoming teaching session. Lesson plans focused on the following organ systems: musculoskeletal, cardiovascular, respiratory, digestive, and nervous. The six teaching sessions occurred in the classrooms, gym, and playground of the public elementary school. These weekly, one hour sessions included a five minute introduction to the new material with the entire class followed by a 25 minute active learning session in small groups. The small groups consisted of two Mentors and six to eight Mentees. The small groups participated in a 20-minute kinesthetic activity, followed by a ten-minute recap of the learning experience with the whole class. The training, curriculum, and assessment for the Anatomy Academy program is described by Diaz M et al. (2019) and this short online video demonstrates interactions between the Mentors and the Mentees during a teaching session (<https://education.byu.edu/cites/initiatives/anatomy.html>).

### *Data collection*

Mentors were asked after each teaching session to respond to prompts or questions and reflect on their experience. The reflective writings were submitted, confidentially, as a survey using the learning management system, Brightspace (D2L Corporation, Kitchener, ON, Canada). These responses were then downloaded and analyzed by the researchers. A table with the prompts and questions is found in Appendix 1.

### *Data Analysis*

Descriptive phenomenological methods were used. The written reflections provided descriptions of the lived experiences texts of the DPT students participating as Mentors. Reflections were analyzed by the whole-parts-whole method outlined by Giorgi (1975, 1997). Four researchers independently analyzed the written reflections for common themes. This analysis included taking on an attitude of phenomenological reduction as researchers independently sought for precise meaning in the Mentors' reflections. Researchers independently described the Mentors' experience as themes emerged through this analysis. This approach included collecting written data from

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the Mentors and then reading the data multiple times. The researchers then separated the data into meaningful parts using phenomenological reduction, which was followed by organizing and expressing the data within the researchers' disciplinary perspective. The data was summarized in various themes and significant quotations were assigned to these themes as evidence (Giorgi 1975, 1997). These themes were sent to the lead author who compiled the themes to create unified emerging themes. The researchers then collaborated as a group to analyze the data together uncovering a few overarching themes and the emerging themes.

## Results

It was apparent from this study that three central themes emerged from the data analysis. The overarching themes include: the ability to work with others, a personal awareness of self and society, and an understanding of the Mentors' experience with the power of learning through real-world situations. This phenomenological study identified a common description of the overarching lived experience of the Mentors which transcended each Mentors' individual experience. The following quotations were selected that provide evidence of these overarching themes.

### *The ability to work with others*

Participant #20: I feel my interpersonal skills have expanded as I am able to teach and interact with younger students. I am typically used to interacting with others my age or older adults. I have felt an increase in self-confidence by sharing the knowledge I have learned in PT school with the students. The challenge with this has been finding appropriate ways to explain concepts to the kids so it is not overwhelming for the students. I also feel I have been able to expand my skills of collaboration through mentoring.

### *A personal awareness of self and society*

Participant #24: Considering most of our student class was Hispanic, I would say my ability to recognize individual and cultural differences is increased. I notice differences most between the students and our mentors. We asked the students to try and complete some of the exercises we did in class with their siblings or parents at home, when one of them replied 'my mom isn't home at night, she works'. I don't know the personal history of all the mentors, but I can assume that most of us didn't grow up in a household where our parents worked overnight shifts. We had social engagement time with our parents, which might be why we are doctoral level students. We had drive and determination instilled in us from those experiences with our siblings and parents at home or on teams with our parents cheering us on. Not all of the students have that same sense in their homes.

### *An understanding of the power of learning in a real-world situation*

Participant #13: Mentoring has provided me the opportunity to apply scientific concepts learned and understood in the classroom to real world issues by teaching them to real people in real learning environments. For example, today we taught the anatomy and function of the lungs to the students. We were able to help the students connect the scientific concepts of the lungs, specifically the flow of air through its anatomical structures, with real world issues such as how people contribute to unhealthy lungs, specifically through first-hand and second-hand effects of smoking, and how some people have diseases that obstruct or restrict airflow, such as asthma. Explaining these things is one thing, but demonstrating them so that people can have some sort of connecting or empathetic experiences really drives home the connection. We had students breathe through straws during some aerobic exercises. This exercise physically and visually showed students how difficult breathing can become when airflow is restricted, regardless the reason why.

The three emerging themes from the data analysis that Mentors shared as a lived experience include: critical thinking, interpersonal skills, and rethinking teaching and learning. Quotations were selected that provide evidence of these emerging themes.

### *Critical thinking*

Participant #9: I've realized that everything isn't just black and white. For example, it's easy for us to say that smoking is bad for you. There's research behind that, and it can visually be seen in pictures of the lungs. On the other hand, most people, regardless of their education, know that smoking isn't good for them. One of the kids asked why people still smoked if they knew it was harmful. This brought up a good point that sometimes addiction is more powerful than science.

### *Interpersonal skills*

Participant #12: Mentoring gives me the opportunity to actively listen to the students when they are answering questions regarding the material we are teaching them. Understanding the material at hand and speaking about it is one thing, but having the ability to assess whether or not students are comprehending what is being taught to them, can be challenging. As a mentor, I try to phrase questions with the appropriate level vocabulary. I listen to their responses and make sure I'm understanding their responses by asking follow up questions or asking them to draw out what they are saying. So far, we have seen success with the students being able to understand and retain information we have taught them. I think this can be attributed to our ability to be concise communicators, explicit explainers, and active listeners.

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### *Rethinking teaching and learning*

Participant #27: However, I think that my ability to educate in these areas has improved, and I have learned how to teach these on a more basic level. For example, when teaching the students about the cardiopulmonary system it was more simple to discuss red and blue blood as a way to help them understand the difference between oxygenated vs non-oxygenated blood. Although the blood is not actually red and blue, this helped them to better visualize the flow of blood through the heart, lungs, and rest of the body.

## **Discussion**

Much of the past literature on service-learning programs has focused on the effect on the Mentee (Cox 2005; Evans 2005; Schmidt et al. 2004). This research project focused on the benefits to DPT students that were willing to be a Mentor to elementary students within the service-learning program, Anatomy Academy. Few research projects have focused on a graduate student population (Lu and Lambright 2010), nor has a study related the results of a service-learning experience to the core values of professionalism in physical therapy. There are also few teaching opportunities for preclinical health care professionals (Diaz et al. 2019), let alone research that has studied the effect of these teaching experiences.

A phenomenological analysis (Giorgi 1975, 1997; Spinelli 1989; Van Manen 1990; Moran 2000) was used to understand the experience the DPT students had in the Anatomy Academy program. This research technique has not been commonly used in the understanding of service-learning programs and brings a new perspective in understanding the impact a service-learning program has on the life of a graduate student. The phenomenological process provided thick, rich descriptions of the experience of engaging in Anatomy Academy.

The purpose of our research was to describe the meaning of the Mentors' experience with Anatomy Academy. This would lead to an understanding of the benefits in participating in this service-learning program as a DPT student and determine its value. A part of professional behavior is to self-reflect on one's abilities and skills to determine strengths and areas of improvement. In addition, it is important for professionals to analyze real-life situations in context to determine appropriate and meaningful ways to educate and to treat patients. Anatomy Academy provided the structure for DPT students to self-reflect and to analyze real-life situations that provided insight into the value of this service-learning experience.

As Mentors critically reflected on what they were doing in the program and the purpose, they recognized the importance their actions had in influencing the Students. Mentors also realized they needed to develop their interpersonal skills to work more effectively with other Mentors and the Students in

performing the tasks of this program. Teaching was also done in a classroom setting in small groups, which challenged the Mentors to learn and practice various teaching methods. As Mentors progressed through the program, they were able to reflect on their strengths and weaknesses. Many Mentors had their eyes opened to see themselves and the community that they were currently living in more clearly as displayed by their reflections.

These processes of learning by doing, learning by experience, and learning by self-reflection were all a part of the Mentors' lived experience of Anatomy Academy. All are highly impactful lessons learned from this service-learning experience. Participating in the Anatomy Academy program gave the Mentors opportunities they did not expect in developing critical thinking, interpersonal skills, and teaching and learning that have been reported in other studies (e.g. Schmidt et al. 2004; Reynolds 2005; Simons and Cleary 2006; Kafai et al. 2008; Diaz et al. 2019).

The lived experiences of the Mentors indicated that they benefited from being a Mentor as they enhanced their critical thinking, interpersonal skills, and rethought teaching and learning. A few important categories revealed evidence of critical thinking. The Mentor's progression as a learner was enhanced as they differentiated between important and true information, and what information may not be as critical to present. This process of distinguishing between types of information was applied to their weekly lesson preparation and teaching the Students.

Another category of critical thinking was developing the ability to infer their experience in the Anatomy Academy program to future clinical settings and to theorize that what they were doing in the program was helping them become better health care professionals. And lastly, Mentors experienced increased awareness of their own progression and of things that they did not anticipate was valuable to their personal growth. As future health care professionals, critical thinking is not only beneficial to their success in the profession but their ability to adapt to new situations and interact with patients.

Interpersonal skills are also crucial in developing a relationship and trust with patients. Active listening was a category under the theme of interpersonal skills that was identified by the Mentors as they needed to understand the thoughts of the Students in order to respond appropriately and meaningfully. Communication skills were enhanced as Mentors were able to understand the importance of interpreting nonverbal cues, teaching at an appropriate level of understanding for their audience, and remaining patient.

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Confidence in the Mentor's ability to communicate about health-related topics was developed, including the ability to answer the Student's questions about the human body and nutrition. Compassion and social awareness were enhanced as communication between Mentors and Students increased through a developed trust in their relationship. Mentors expressed their care and devotion to the Students, as if their sessions were not only about presenting information but more importantly about influencing the Students to make life-altering changes that would benefit themselves and their families. One challenge was for the Mentors to realize that each Student was living in different situations, and generally very different from the home life that the Mentor experienced. However, from this, Mentors were able to develop compassion and have a richer understanding of social injustice and how this awareness can help with current issues that we are facing within our country.

As future physical therapists, these Mentors will become teachers as they instruct and motivate future patients (APTA Academy of Education 2020). The emerging theme of rethinking teaching and learning appears to be a valuable awareness that the DPT students were able to experience and refine. A category that exemplified this development included the ability to manage the Student's attention and help them focus on the lesson being introduced during that session. These experiences caused Mentors to reflect on teaching methods that were most effective. This reflection by the Mentors, in a role as a teacher, may be valuable for them to determine what type of teaching they would use as a health care professional.

As mentioned previously, Mentors realized that these sessions were not only about sharing information. They came to understand that they were to benefit the Student's ability to make changes and that the process of learning could be fun and exciting. This development may have helped the Mentors to remember that through the many years of their own schooling, learning was enjoyable and that what they had learned could be applied to their professional development and be practiced in future clinical settings.

Regarding the core values of professionalism in physical therapy (APTA 2003), it appears that DPT students participating in the Anatomy Academy program developed these values. As Mentors, they took accountability of presenting weekly sessions to the Students and conducted themselves both with integrity and professionalism. Mentors did not receive course points or extra credit while participating in the program and they gave their time and talents willingly, which may have developed altruism. The core value of altruism may have made relationships with the Students more meaningful, which led to the development of compassion. Mentors developed excellence in critical thinking, interpersonal skills, and teaching. Developing these

skills enhanced social awareness which is a beginning step in demonstrating social responsibility.

To summarize the lived experience, Mentors initially described anxiety with regard to interacting with the Students, but gained greater confidence in their ability to communicate and develop relationships with the Students over time. Mentors benefited as their teaching abilities improved, and their understanding of anatomy, physiology, and wellness deepened. It may be that the Mentors needed an opportunity to view these subjects in a different way and determine what part of these subjects were really important to share at a more basic level to 5<sup>th</sup> grade students. Mentors articulated the importance of their role in developing compassion for the Students and in developing a richer relationship with them. This compassion led to greater awareness of individual differences and social injustices that may assist Mentors' involvement in their community to combat challenging issues faced by these Students regarding their health.

Limitations of this study include the following. The research project only focused on one DPT program situated in the Midwest, and only worked with elementary students from one school. Extending out to multiple programs and schools may give us a different or more robust understanding of a Mentors' experience participating in the Anatomy Academy program as a DPT student. However, this analysis may have reached saturation in the reflective responses and additional Anatomy Academy programs would not reveal differences in the Mentor's experience. In addition, we did not look at the perspective of the Students or the community partners (i.e. elementary teacher) in this study. A future study may note their reflections on the Mentors' performance and determine if they correspond with the Mentors' perspective.

The relevance of this study is that we are better able to understand the lived experiences DPT students had working with elementary students in a learning community setting, and how this experience may transfer in developing a more competent health care professional. In addition, DPT students may better understand how community educational programs may help personal growth, those they serve, and their local communities. These results may allow or encourage the establishment of early exposure to these programs in a DPT program or within other elementary school programs and communities.

## Conclusion

Anatomy Academy is a service-learning program that provides Mentors an educational experience in a real-world setting and the opportunity to engage in the practice of teaching. This phenomenological analysis found that the program gives graduate students the opportunity to reflect on their past and present life experiences and use this reflection to become increasingly aware of themselves, their growth, and their

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community. In addition, participating in this service-learning program prompts the graduate student to see themselves as a health care provider and visualize how this experience is helping them in their professional development.

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## APPENDIX 1: Prompts and questions for Mentors

### Week 1

#### Prompt 1

Please answer the following reflection based upon your experience with Anatomy Academy. Please take a few minutes and reflect upon your experience before writing.

#### Question 1

How has being a Mentor influenced your ability to discern whether a statement about science (i.e., through media, or other source) is accurate or inaccurate? Please provide an example.

#### Question 2

How has being a Mentor influenced your ability to recognize individual and cultural differences? Please provide an example.

### Week 2

#### Question 1

What methods did you employ to keep the attention of students while teaching Anatomy Academy principles?

#### Question 2

Has asking questions been an effective or ineffective tool for teaching children? Please explain your answer.

#### Question 3

How has mentoring influenced your ability to see the connection between scientific concepts and real world issues? Please provide an example.

#### Question 4

How has mentoring influenced your ability to actively listen to others? Please provide an example.

### Week 3

#### Question 1

How has your basic understanding of anatomy, physiology, and nutrition concepts changed as a result of participating in Anatomy Academy? Please provide an example.

#### Question 2

How has mentoring influenced your ability to implement strategies to prevent and/or resolve conflict? Please provide an example.

### Week 4

#### Question 1

How have your interpersonal skills changed as a result of participating in Anatomy Academy? Please provide an example.

#### Question 2

How has mentoring developed or enhanced your care and/or compassion for others? Please provide an example.



### Week 5

#### Prompt 1

Share some of the comments or attitudes demonstrated by the elementary students in regards to their own habits as you taught them about the effects of diet, exercise, anatomy, and physiology.

#### Question 1

What were your impressions as you discovered the elementary student's thoughts and attitudes about their own habits which influence diet, exercise, anatomy, and physiology?

### Week 6

#### Prompt 1

Compare and contrast your feelings about working with elementary age children before Anatomy Academy and now.

#### Question 1

How has mentoring influenced your ability to promote health in the community?



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