AN EXAMINATION OF REFLECTIVE PRACTICES IN ATHLETIC TRAINING

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AN EXAMINATION OF REFLECTIVE PRACTICES IN ATHLETIC TRAINING

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TABLE OF CONTENTS

Page

LIST OF TABLES

Table **Page**

LIST OF FIGURES

Figure **Page**

LIST OF DOCUMENTS

Document **Page**

CHAPTER I

INTRODUCTION

Introduction

Jack Mezirow,[1] a prominent researcher in the area of critical reflection, posited that we must make an interpretation of an experience to impart meaning to the experience. Furthermore, he states that we learn from an experience when we use the interpretation to guide future decisions and actions.[1] This statement provides the powerful impact that reflection plays in learning and decision making.

Research investigating the field of reflection in professional development began several decades ago when pioneers in reflection research[1,3,4] developed various theories to describe reflective practices. Some notable pioneers in the field of reflection who proposed models of reflection are Schon,[4] Boud,[3] Mezirow,[1] and Dewey.[2] More recent researchers have developed reflection models from the pioneer's seminal works and have advanced the models to include additional themes and concepts related to reflection as they relate to specific professions. Some of these authors include Mamede and Schmidt,[5-7] Wainwright,[8,9] and Wong.[10]

In general, reflection models can be categorized as those that describe reflection as either an iterative process or as a series of levels of reflection.[2] Iterative models describe a reflection process that includes the repetition of a series of steps in order to make a clinical decision. For example, in the case of an injury evaluation the athletic

training clinician may visit and revisit developing hypotheses and experiment with the potential hypotheses until a decision is made. On the other hand, models that hypothesize that reflection occurs as levels are based on an idea that reflection is likened to stratum where it is common to observe superficial layers of reflection, such as habitual action during practice, but more difficult to reach the deeper layers, such as critical reflection. Therefore, in these models deeper levels of reflection are less often observed in practice.[2] David Boud, editor of *Reflection: Turning Experience into Learning*[3], suggested that reflection is an iterative process that also includes differing levels of reflection within each step, and a diagram of Boud's model can be seen in Figure 1. This model describes both the process and depth of reflection. Boud proposed that persons reflect upon learning with a process that requires the person to return to the experience, attend to their feelings regarding the experience, and re-evaluate the experience.[3] Furthermore, the process of "re-evaluating the experience" has four distinct elements that describe the depth of "re-evaluating the experience": 1.) association, 2.) integration, 3.) validation and 4.) appropriation.

Today's health care professionals must labor in multifaceted and challenging health care systems. Therefore, allied health care professionals often find themselves in an environment that can be positively influenced by reflective practices. These professionals must keep up with the changing environment that surrounds them and update their skills to solve complex patient and health care problems. Multiple studies have demonstrated that health care clinicians use some level of reflection to make clinical decisions,[5,7,8,10,11] and that the way in which a clinician arrives at a decision varies based on factors such as job setting and years of experience. Different professional settings are

designed to either promote or discourage reflection in several ways.[12] For example, a clinician's reflective practices may be influenced by the number of patients the clinician must manage in a day and the amount of attention the clinician is able to give each patient and situation.

The frequency of an individual's reflection could be related with an individual's engagement within their profession. Burnout has been identified in other professions as well as health care professions,[13] and some researchers have proposed that burnout decreases reflective practices.[4] A survey-based random sample of full-time athletic trainers identified a relatively low incidence of burnout in the field of athletic training, but differences between male and female athletic trainers and within certain occupational settings were noted.[14] Female athletic trainers in college or university settings display more signs of burnout than males, but compared to other health care providers, athletic trainers display less burn-out and exhibit higher levels of job engagement.[14] Job engagement has been identified as the antipode of burnout[13] and could provide insight into how often and how well a clinician uses reflection in athletic training. The phenomenon of burnout and its relationship to reflection has not been studied in athletic trainers but could prove to be a fruitful line of research in understanding the motivation to be a reflective practitioner.

Multiple studies have created or confirmed models of reflection in medicine,[5,7] nursing,[10] and physical therapy.[9] How athletic trainers use reflection to make clinical decisions has not been investigated since no published original research has ben completed in this area; however, research has shown that other health care professionals who use reflection in the decision-making process have the capacity to become more

competent clinicians.[2] The athletic training profession is similar to many other allied health fields but may prove to be unique based on the differences in how the profession is structured or how athletic trainers typically provide health care services. For example, athletic trainers typically have major differences in work flow patterns when compared to similar professions because they are usually required to treat a large number of patients in a short amount of time. This may affect the ability of athletic trainers to reflect due to time constraints. Another difference between athletic training and other professions is that athletic trainers often see the same patient population over the length of a sport season. For example, an athletic trainer can be assigned to work with 20 volleyball athletes over a season when compared to a nurse or physician that may interact with a patient for only one visit. Understanding the ways in which athletic trainers use reflection for learning and professional development can not only reveal the nature of their decision making, but may also guide ways to educate athletic trainers and athletic training students in the future. The first step in providing insight into reflective practices of athletic trainers at various levels of professional development is to examine and describe those practices.

Purposes

The purpose of this study was threefold: 1.) to describe the reflective practices of athletic training students, novice athletic trainers and experienced athletic trainers 2.) to use reflection characteristics to categorize the participants depth of reflection and 3.) to describe the relationship between job engagement and the reflective practices exhibited by the participants.

Significance of the Study

The study of reflection is critically important in advancing the education and professional development of athletic trainers. This study is significant because it examines reflective practices of athletic trainers at different stages of professional development, which has not been done specifically in athletic training. By gaining a better understanding of the reflective practices of students, educators may be able to develop educational interventions that directly target possible deficiencies in reflection and clinical decision-making. Similarly, by understanding the types of reflective practices that novice and experienced athletic trainers use, continuing education opportunities can be directed in aiding the professional development process. Finally, the description of reflection developed from this study could identify some key factors in reflective practices that can be used in future research.

Operational Definitions

1. Clinical reflection: Active mental processing with a purpose and/or anticipated outcome that is applied to relatively complex or unstructured ideas for which there is not an obvious solution in order to lead to a new understanding and appreciation.[3]
2. Clinical decision making: Providing a clinical "impression" or diagnosis, developing a treatment plan, or creating a rehabilitation protocol based on the patient's presentation.
3. Reflective practitioner: A professional who is able to identify essential professional problems, to challenge self-evident "truths," to seek feedback and to use it for personal development.[4]

4. Job engagement: A positively oriented human resource that can be measured, developed, and effectively managed for performance improvement in today's workplace; the opposite of burnout.[13]
5. Athletic training student: A college-level student in a CAATE accredited, entry-level athletic training program.
6. Novice athletic trainer: A BOC-certified athletic trainer with less than two years of certified experience.
7. Experienced athletic trainer: A BOC-certified athletic trainer with greater than eight years of certified clinical experience.

Delimitations

1. This study is delimited by the recruitment of athletic training students and athletic trainers in the high school and college or university setting who have the capability to make clinical decisions with patient care on a regular basis.
2. Because defining "expert" athletic training clinician is a complex task without a universally defined set of criteria, the term "experienced" athletic training professionals was used, which is defined by number of years of experience, as a comparison group.

Limitations

1. This study used a limited participant group, so the understanding of reflection gained from this one study is somewhat limited.
2. This study is limited to assessing reflection through a written account of the events.

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CHAPTER II

LITERATURE REVIEW

Introduction

Athletic trainers working clinically often find themselves in a reflectively stimulating environment. A reflectively stimulating environment consists of a profession that allows for several opportunities to reflect in order to make clinical decisions over the course of the clinician's career. Reflection is an important component of clinical reasoning and clinical decision-making process, and the professional who utilizes the element of reflection in the decision-making process can become a more competent clinician.[1] Research in reflection began in the field of education[1-3] where the first set of theoretical frameworks on reflection were developed to understand and objectify the complex mental processing involved in reflection. Since then, reflection has been investigated in a variety of fields including medicine and allied health.[4-7]

The study of reflection is important because reflection is an acquired skill that is considered to be a central part of teaching and learning in allied health care and essential to becoming a competent health care professional.[1] Becoming a competent health care provider requires the use of reflection for several reasons. First, learning effectively from an experience is critical in developing and in maintaining proficiency. Many times self-

reflection will enhance the awareness of learning necessities and areas of weakness. Second, the professional, over time, will develop an understanding for characteristics such as their own personal beliefs, attitudes and values. Third, building upon a knowledge base requires the ability to link previous knowledge to new experiences. Developing these capabilities motivates the development of a clinician who is self-aware and competent in their own practice.[2] This literature review will aim to define reflection, provide a historical perspective on reflection and elucidate the role of reflection and clinical reasoning in the decision making process. In addition to the theories of reflection, I will describe the factors that affect the clinical decision-making process, with special emphasis on the influence of experience in the reflective practice of professionals. I will also describe the similarities and differences in the reflection process of students, novices and experienced clinicians.

Pioneers in the Study of Reflection

The importance of reflection and reflective practice are frequently noted in the literature.[1-3, 8] From this research, reflective strategies and theories emerged and have been incorporated in all levels of teaching and learning in health care professions. Reflection and reflective practice are noted as components that are necessary for developing competent health care professionals because clinicians will often encounter challenges that can be aided with the use of reflective techniques.[3]

Some notable pioneers in the field of reflection who used descriptive manuscripts to propose models of reflection are Schon,[1] Boud,[9] Mezirow,[8] and Dewey.[2] The work of these researchers has been cited and identified as the most common frames of reference for theories of reflection. More recent researchers have developed reflection models

from the pioneer's seminal works and advanced the models to include additional themes and concepts related to reflection as they relate to specific professions. Some of these authors include Mamede and Schmidt,[6-7,10] Wainwright,[4-5] and Wong.[3] Recent research in reflection has used both qualitative research to explore reflection in clinical practice and experimental designs to confirm the proposed models.

The previously mentioned original researchers in reflection have described reflection in several different ways. We can classify these frameworks into one of two categories based on how they describe the reflection model: 1) as an iterative process or 2) as vertical levels of reflection.[2] Boud[9] and Schon[1] have both developed theories that model reflection as an iterative process. Boud defines reflection as "an important human activity in which people recapture their experience, think about it, mull it over and evaluate it".[9] On the other hand, reflection has been depicted as an event with varying levels by authors such as Boud,[9] Mezirow,[8] and Dewey.[2] In their models, reflection is linear and includes a collection of elements that do not require a sort of sequential or cyclical process. The elements, or levels, of reflection do not precede one another, nor are they dependent of one another, and there can be omission or compression of some levels.[9]

Schon's Model

One of the first reflection theories was proposed by Schon, where reflection is described as an iterative process.[1] Schon's theory also includes parameters that are conducive to reflection, such as the element of surprise, or facing a novel situation.[1] Schon identified steps of reflection (Figure 2) that represent the ideal setting for reflection as well as components of a capable reflector.[1] The process begins with the

knowledge and skills (knowing in action) that a clinician holds and utilizes when necessary or appropriate. Surprise occurs when an unexpected event is encountered. When the clinician faces this novel event, an explanation to the anomaly is usually attempted (experimentation). Within the model, we also note reflection-in-action (RIA) and reflection-on-action (ROA). RIA can be described as the ongoing metacognitive process during the interaction between the patient and clinician[3] that will internally guide decisions and experimentation. ROA occurs after the event has occurred, and is the step that is crucial in broadening a clinician's knowledge and skills, in addition to revising the clinical decisions. Progression through this model and revisiting certain steps is unique to each individual.[9]

For example, an athletic trainer may encounter a patient who appears to have a lateral ankle sprain, one of the most common athletic-related injuries. The athletic trainer has previous knowledge of this injury that has been learned in a classroom such as the typical presentation of the injury or the typical mechanism of injury (knowing in action). Surprise then occurs when the athletic trainer finds something that is atypical of a lateral ankle sprain, such as pain on the medial side of the foot. When faced which this anomaly, the athletic trainer must somehow explain the medial pain. In this case, the athletic trainer will experiment with different special test, palpations, or even investigate research that may explain the atypical presentation. During the evaluation, the athletic trainer may be mentally processing the biomechanics of the ankle or imagining the mechanism of injury to try to explain the reason for the medial pain, which would be the clinician reflecting-in-action. When the patient leaves and the athletic trainer continues to think about the event and further investigates other sources of information, it is

considered reflection-on-action. These two steps can take place as many or as few times until the athletic trainer makes a clinical decision. Some research had shown that novice practitioners are more likely than their more experienced counterparts to encounter the element of surprise and to revisit experimentation.[9] An experienced clinician's breadth of encounters with different situations may be a reason for why they are less likely to find the element of surprise and revisit experimentation in their clinical practice.

There is a name that can be given to a clinician who participates in self-growth through reflection. The term "reflective practitioner" was originally developed and defined by Schon[1] in his seminal work titled "The Reflective Practitioner." Schon's general definition identifies professionals in many fields as reflective practitioners, but recently the role of the reflective practitioner has become significant in the health care professions. He defined a reflective practitioner as a clinician who is able to identify essential professional problems, challenge self-evident "truths," seek feedback, and use reflection for personal development.[1] Being a reflective practitioner applies to athletic training practice as a clinician makes clinical decisions regarding a patient's diagnosis and treatment, challenges what they learned previously in coursework, and reflects upon patient cases for professional development. Furthermore, the element of surprise occurs often in athletic training practice each time an athletic trainer is confronted with a novel patient case, providing an athletic trainer numerous opportunities to reflect, mature, and improve as a clinician.

Dewey's Model

Dewey[2] provides a framework that is strictly linear and describes the strength of a clinician's reflection based on the depth of the level of reflection achieved. He defines

reflection as "active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusion to which it ends."[2] The definition portrays reflection as part of a larger process with a final conclusion, or learning experience. The premise of this theory is that original reflection is more descriptive in nature, whereas deeper levels of reflection, or critical reflection, are more analytical and difficult to reach, therefore less likely to be demonstrated.[2]

Similar to Schon, Dewey proposed that reflective thought is provoked by an event that induces a "state of doubt, perplexity or uncertainty".[4] Dewey's five ~~l~~evels of reflection begin with a state of doubt due to difficulty in understanding an event or solving a problem.[4] This is parallel to Schon's idea of surprise. The individual will then strive to understand the nature of the problem and attempt to explain or solve the issue through inductive reasoning or deliberate possible alternatives.[4] Next, the individual will elaborate on ideas formed from deductive thought and finally test the hypotheses through action.[4] The levels developed by Dewey are very similar to the process proposed by Schon. The main difference between the two models is that Schon believes that his stages are part of an iterative process whereas Dewey believes that the elements are components of reflection with levels of classification that don't necessarily have an order or repetition.

Boud's Model

Boud[9] describes reflection as "a generic term for those intellectual and affective activities in which individuals engage and explore their experiences in order to lead to a new understanding and appreciation." In this sense, "engagement and exploration" require repetition of steps that ultimately arrive at a new learning experience, or

resolution (Figure 1). Boud describes reflection as both an iterative process that also contains various vertical layers of reflection within the process. The reflector must first return to the experience and recollect the significant events or replay the initial experience.[8] This step could be considered the most basic form of reflection, but as the reflector moves through the process, he may or may not encounter steps that go more in depth and create the environment for learning or growth.

The next step is attending to feeling which includes two parts: the utilization of positive feelings and removing obstructive feelings.[8] Utilizing positive feelings occurs when the individual focuses on the positive events and learning about the experience to promote professional growth. Removing obstructing feelings is necessary for rational consideration of events[8] because if the individual becomes so frustrated or embarrassed by an event and cannot get past these negative feelings, he leaves no room for development.

Boud's third step is reevaluating the experience, which includes the vertical dimensions of reflections described as association, integration, validation, and appropriation. Association is the connecting of ideas and feelings which are part of the original experience and those which have occurred during reflection with what the individual already knows.[8] It is more beneficial to the reflector to have as many associations as possible, because this will allow for learning opportunities. The greater the number of associations, the greater the potential for another component of Boud's framework, integration. Integration occurs when associations are processed and examined.[8] While association is merely recognizing similarities or connections, integration happens when the individual draws conclusions about the associated events.

The final two components of Boud's framework are more likely to be observed in critical reflectors than normal reflectors due to the need for deep thought and thorough reflection. Validation requires the individual to test hypotheses that he or she has made through integration. This process allows for consistency and new appreciations for the event.[8] Certain tests are integrated into the process to validate any inconsistencies or contradictions. We may observe the reflector in this stage using mental imagery to imagine what may happen in different scenarios.[8] In order for the discovery to become new knowledge, the individual must appropriate the new information to make it their own.[8] The appropriated knowledge is less likely to be altered by the individual than the knowledge the reflector merely accepts and works with (such as information learned in the classroom) because it is a personal discovery in which understanding took place. Appropriating new ideas is a positive experience for an individual and encourages the use of reflection. After the professional has gone through any or all of these steps, he or she will create outcomes of reflection which could include a new way of doing something, clarifying an issue, or developing a new skill.[8]

Mezirow's Model

Mezirow uses a linear framework to describe reflection and varying levels which include habitual action, thoughtful action/understanding, reflection, and critical reflection.[2,11] Habitual action is that which has been learned before and is an activity that requires little to no conscious thought. An everyday example could be tying one's shoelaces or riding a bicycle.[11] Clinically, we would expect that experienced professionals encounter habitual action more often than novices due to their breadth of experience.[11] For this reason, experienced professionals may not reflect as often as their

novice counterparts. Understanding is Mezirow's cognitive aspect that describes thoughtful action and can be describes as "book learning"[11] in the classroom atmosphere. Reflection is the testing of certain beliefs,[11] or experimenting with assumptions. Challenging the established patterns of expectation and questioning the validity of an old perspective means one has become critically reflective.[2] If a clinician does not partake in challenging and questioning what he or she has always known to be true, no reflective growth can occur.

Recent Research in Reflection

More recently, research in reflection has expanded to include both qualitative and quantitative data in allied health professions. Several researchers have completed studies modeled from the pioneers' frameworks in reflective research.[4,5,7,9] This next section will include an overview of recent reflection research completed in health care fields.

Wainwright's Model

Wainwright[5] used Schon's framework to develop a model that explained the primary difference between novice and experienced physical therapists is in the depth that they reflect. The aim of the research was to determine types of reflection that guide clinical decision making, and also to compare the use of reflection by novice and experienced physical therapists. Wainwright developed her inquiry using grounded theory methods and collected data from the clinicians' perspective, specifically into participants knowing in action (KIA), RIA, and how the participants dealt with the elements of surprise and experimentation. Data collection was performed on novice and experienced physical therapists during a typical work day, and both field observations and in-depth interviews were analyzed. The participants in the study described and

engaged in 3 types of reflection (Figure 3): reflection-on-specific action (ROSA), reflection-on-professional experience (ROPE), and reflection-in-action (RIA). When a clinician participated in ROSA, it meant he or she reflected back upon interaction with a patient in order to confirm or change the plan of care. ROPE involved comments that the clinicians made about prior experiences that guided clinical decision making. Wainwright also found that all experienced participants and only one novice participant engaged in RIA, the ongoing metacognition about what is happening during patient-therapist interaction.[5] Her research confirmed the general thought proposed by many of the early researchers in reflections that RIA is an advanced reflection skill used most often experiences clinicians.

Mamede and Schmidt's Model

Mamede and Schmidt combined the works of Dewey and Schon to study the structure of reflective practice in physicians. Mamede and Schmidt proposed that reflective practice is "an effortful, deliberate attempt to learn from experience,"[6] and their ideas of deliberate practice were originally described by Ericsson and Charness.[12] There are 5 proposed dimensions of deliberate reflection. Deliberate induction occurs in response to an unfamiliar event[6] and during this time the individual will attempt to generate explanations of the event. After a number of hypotheses are formed, the professional may engage in deliberate deduction, or the logical deduction of what the individual already knows and how it relates to each hypothesis.[6] In this step the clinician may begin systematically ruling pathologies in or out based on what is presented. Next, testing the hypotheses take place in order to confirm or deny assumptions.[6] The need for openness to reflection and meta-reasoning are needed in this step, and these components

make up the final dimensions of reflection proposed by Ericsson and Charness.[12] The clinician must be willing to keep an open mind when it comes to accepting different ideas to explain the difficult or surprise event.[6] In addition, meta-reasoning refers to the ability to "think about one's own thinking processes"[6] and is essential to productive reflection.

They developed a questionnaire that consisted of 87 questions (65 referred to aspects of reflective thinking), and administered it to primary care physicians.[6] Data from the questionnaire were analyzed using a structural equation modeling program and they found that some doctors were more inclined than others to use reflection. Furthermore, the study provided a structure for reflection in medicine, identifying its related behaviors, attitudes, and reasoning strategies.[6] Mamede and Schmidt confirmed a 5-factor structure of their model using structural equation modeling. Their model presents a correlation between meta-reasoning and induction, and openness to reflection and deduction (x^2 = 642.07, p = 0.01, x^2/df = 1.49, CFI = 0.92, RMSEA = 0.05). They also showed acceptable alpha reliability of each factor (range = 0.68 to 0.86). This model, at face value, assessed reflection but it also included a description of clinician reasoning. Therefore, this model actually measures two related, but distinct constructs, and did not appear to be the most appropriate model to use to develop my research question.

Wong's Model

Wong et al.[3] identified the need for empirical research in the study of reflection and developed a theory combined from the works of Boud[9] and Mezirow.[8] Their study attempted to develop a coding system developed from Boud's framework to analyze written reflective journals using a content analysis. They used the journals to identify the presence or absence of reflective thinking of registered nurses enrolled in a Hong Kong

university. They analyzed 45 papers for the following reflective elements: returning to the experience (not coded), attending to feelings, association, integration, validation, appropriation, and outcome of reflection.[3] After coding for the categories in Boud's framework, the participants were then allocated to one of three groups using the work of Mezirow as a guide: non-reflector, reflector, or critical reflector.[3] They found that non-reflectors are very descriptive in reporting the clinical event, but they focus on what happened in an experience and not on revisiting and analyzing the situation.[3] This is similar to how an athletic training student or novice athletic trainer focuses on the facts of a patient evaluation rather than looking at the whole clinical picture. Students and novices can be skilled in regurgitating information when asked about a patient's history and measurements, but may not be able to put it all together to make sound decisions. Furthermore, the non-reflector may make a decision without testing possibilities or experimenting and weighing the options. Wong et al. also found that reflectors are able to relate their experiences and create new learning experiences.[3] This type of reflector can make connections between the classroom and clinical practice, or between different patient cases. An athletic training student who is a reflector, for example, is able to bridge the gap that Schein and Schon both refer to between theory and practice. What is learned in the lab setting can be transferred to a clinical situation, and the student is able to make associations and experiment different treatment methods or other clinical decisions. Critical reflectors have a tendency to continually examine and refer back to not only the experience, but also to themselves.[3] Similar to reflectors, critical reflectors also make associations and experiment with them, but critical reflectors go one step further and strive to validate assumptions they make based off of the associations using

various resources.[3] It can be hypothesized that professionals with all levels of experience could find themselves in any of the three mentioned groups of reflectors.[2-3]

Wong et al. found that experience in terms of number of years employed does not have an effect on the level of reflectivity in nurses,[3] which differs from what Wainwright found using Schon's model. This study suggests that reflective journals can be used to identify the presence or absence of reflective thinking.[3,11,13]

Research in Factors that Affect Reflection

The study of reflection is critically important and substantive research in reflection has been completed in medicine,[6-7,10] nursing[3] and physical therapy.[4,5] Studies have examined factors that affect decision-making and several characteristics have already been attributed to the quality of reflection including education and experience.[14-16] Differences between experts and novices are related to the clinician's ability to combine knowledge with experience and recognize what is important.[17-18]

Experience and Education

Experience is noted in the literature as one of the most influential factors in decision making.[15-16] Experience can be further subdivided into three categories: 1) a passage of time, 2) gaining skills or knowledge, and 3) exposure to an event.[16] It has been shown that experience level in nurses has an effect on the decision making process.[16] More experienced nurses are able to focus on the problem without considering unproductive options whereas novice nurses lack the ability to utilize previous experiences to make an accurate clinical decision.[16] This suggests that health care professionals can utilize previous experience and knowledge to make the decision making process more efficient and accurate.

Mamede and Schmidt performed follow-up research using the data collected in the previously mentioned study to examine factors correlated to reflective practice among physicians.[7] Mamede and Schmidt found that reflective practice is negatively related to a physician's number of years of practice[7] which conflicts previously performed research. This is explained by understanding that in routine situations expert physicians tend to use an automatic reasoning approach based on recognition of instances of previous experiences, thus decreasing the need for reflection and experimentation.[7] Furthermore, it is typical that reflection rarely occurs without the element of surprise and for this reason, it can be hypothesized that reflective practice may actually decrease with increased years of experience because the more a clinician experiences throughout his career, the less likely something will occur that he has not encountered.[1] However, even the most experienced physicians may use analytic reasoning or reflection when faced with a complex scenario.

Education also plays a role in a clinician's ability to make decisions. Previous research in nursing has discovered that graduates from different education levels (associate degree, diploma, baccalaureate, master's-prepared) have different cognitive abilities.[15] There is a clear difference in critical thinking and the ability to make clinical decisions depending on the clinician's level of education.

Job Engagement

An issue referred to as "burn-out" occurs when the practitioner misses out on opportunities to think about what he is doing.[1] He can be drawn to patterns of error and becomes inattentive to surprise, or events that do not fit what he knows.[1] This practitioner has a reluctance to reflect and has little to no openness to new ideas. In addition, this

clinician may also choose to ignore signs or symptoms that come as a surprise and only focus on the items that fit the diagnosis. Some clinicians facing burn-out choose the easiest diagnosis to treat or the one with the most promising outcome,[1] possibly because they are no longer engaged in their work. Contrary to those who suffer from burnout, engaged employees have a connection with their work activities, and see themselves as able to deal well with the demands of their jobs.[19] Job engagement has been identified as the antipode of burnout and has validated ways of measuring engagement.[19] Therefore, we can identify clinicians who score low on an engagement scale as people who may be burnt out with their line of practice.

The context of the clinician's work is also a key factor in the use of reflection based on how many patients the clinician may see in a day and how fast-paced of a work environment the clinician finds himself in. Mamede and Schmidt[7] investigated the role of the primary care physician in dealing with a wide range of problems. Because of the broad range of issues, primary care doctors are forced to sort through the notes from an examination notes to develop treatment interventions. Several rounds of experimentation with different plans are likely to occur here. This context motivates investigation into different solutions for problems and provides a good environment for reflecting. Similar to a primary care physician, athletic trainers deals with very different cases on a day-to-day basis. While athletic trainers may not see the same variety of patients, the scope of practice for an athletic trainer is very broad, dealing with issues from orthopedic injury to dermatologic issues and everything in between. With such a broad knowledge base, it is likely that an athletic trainer faces an unfamiliar issue several times during the course of

their career. In this seemingly stimulating environment, the opportunity to reflect could be limited by number of patients to be seen and limited time.[7]

A limitation of these studies is that the results may not apply to all health care fields. Previous research has not focused on the profession of athletic training, and research is needed in the field of athletic training due to the unique nature of the profession. Athletic trainers are similar to other health care professionals in that they need to form relationships with their patients and treat them on a case-by-case basis. Athletic trainers are unique because of their job setting and outcomes they strive to achieve for their patients. Because athletic trainers work with a physically active population, there can be a feeling of pressure to get the patient back on the playing field or returned to activity. An exhaustive literature review only resulted in 1 article on teaching reflection in athletic training literature,[13] however, no studies on reflection in athletic training have explored the reflective practices of athletic training students or clinicians.

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CHAPTER III

METHODS

Research Design

This project was a descriptive study in the nature of qualitative data analysis that described how athletic trainers of varying levels of professional development utilized reflection during a patient encounter that was novel or that had the element of surprise. A descriptive study is not highly interpretive because findings are presented using a previously developed conceptual framework and uses plain language to describe and provide a summary of a particular phenomenon of interest.[1-2] A qualitative descriptive study is the method of choice when straight description of phenomena are desired.[1-2] We used a descriptive approach to understand the experiences of athletic trainers and athletic training students when reflecting about a novel or surprise clinical encounter with a patient. These descriptions are from the point of view of the participants and use the participant's own words to describe their experiences.[2]

Reflection logs, demographic data and a self-report work engagement scale were all sources of data that were used to describe the reflective practices of the participants. Reflection was documented through a guided reflection log developed by the investigator and completed by the participants. No observation of the participants in their work

environment took place, but the reflection logs were based on real-world interactions that the participant had with patients.

In this study we provided a general description of reflective practices, of athletic training students and athletic trainers as conveyed through the completed reflection logs. We also performed a content analysis of the reflection logs using a reflection framework developed by Boud[3] to provide further description of the elements of reflection provided by the participants. The description of reflective practices was further enriched by categorizing the depth of participant's reflection using a method described by Wong.[4] Finally, we used the scores from a work engagement scale to provide context and to describe work engagement and reflective practices of the participants.

Context

"Athletic training is practiced by athletic trainers, health care professionals who collaborate with physicians to optimize activity and participation or patients and clients. Athletic training encompasses the prevention, diagnosis, and intervention of emergency acute, and chronic medical conditions involving impairment, functional limitation, and disabilities."[5] A person who wants to become a certified athletic trainer must earn a degree from an accredited entry-level athletic training education program. Athletic trainers can be found in a vast assortment of settings from secondary school/collegiate, hospital/clinic, military, performing arts, physician extender, professional sports, public safety, and more.[5]

The most common settings that employ athletic trainers are the secondary school (18.2%) and college or university setting (24%).[5] A typical athletic trainer in these settings would be available during the school day to complete treatment and

rehabilitation, in the afternoon to provide practice coverage, and at night or weekends for game coverage. There are similarities and differences between these 2 settings. Secondary school athletic trainers work as a head, assistant, or as the sole athletic trainer for all student-athletes from every athletic team at the school. Many school districts who hire athletic trainers at the high school will also require that the athletic trainer treats middle school students in the district, making the age of the athletes that the athletic trainer may come in contact within the range of 10-19 years old.

Collegiate athletic trainers are typically assigned to provide health care services to 2 or fewer sports teams and are responsible for all the athletes on that/those specific team(s). The age of these athletes typically ranges between 17-25 years old. Some schools have different health-care models than the one described, but this model is still the most commonly seen in these 2 settings. In both of these settings, the athletic trainer is likely to see, evaluate, and treat multiple patients in a short time frame (1-2 hours). For example, a collegiate athletic trainer for a softball team may treat approximately 10 athletes in the hour before a scheduled practice. It can be difficult for a sole athletic trainer to provide full attention to every single athlete in that short time frame, but there may be other times of the day, such as times set for rehabilitation, that the athletic trainer is able to work with athletes on an individual basis.

Participants

Thirty individuals were recruited to participate in this study using a criterion sampling strategy.[1] This strategy was used to sample and establish that each participant met a predetermined criterion of importance[1] (novice and experienced athletic trainers as well as athletic training students) in order to describe reflective practices of practitioners

at different stages of professional development. Thus, the participants were categorized as athletic training students (ATS), novice certified athletic trainers (NAT), and experienced certified athletic trainers (EAT) in order to account for differing levels of professional development. A description of the criteria for each group of participants is included in Table 1. Professional development was determined by the number of years of experience as a certified athletic trainer. NATs had less than 2 years of clinical practice while EATs had more than 8 years of clinical practice. Both of these time frames have been used in previous studies to establish a clinician's state of professional development.[6-7] In order to also account for the different roles of clinical settings in reflective practices, participants were sampled in the 2 most common athletic training settings: high school and collegiate. After obtaining IRB approval, all participants were recruited via email or phone calls. Participants were informed of the requirements of the study and were allowed to consent to participate in the study. The participants were informed that they were not required to write about anything that made them feel uncomfortable and that were able to withdraw from the study at any time without any negative consequences.

Twenty-nine of the 30 participants that were recruited to participate in the study consented to participate in the study (14 males, 15 females; n=10 ATS, n=10 NAT, n=9 EAT). The participants worked in 20 athletic training facilities in 3 states. The ATS participant group included senior-level students from one Commission on Accreditation of Athletic Training Education (CAATE) accredited athletic training education program in Central Texas (5 males, 5 females), The NAT group (6 males, 4 females) worked in 4 different facilities (n=5 high school, n=5 collegiate) located in Central Texas (n=9) or

Ohio (n=1) and had an average of 17.2 months of clinical experience practicing as a certified athletic trainer ranging from 10 to 22 months. All of the 10 NATs had earned their athletic training degree from an entry-level undergraduate education program. Nine of the 10 NATs were currently pursuing a graduate degree. The EAT group (4 males, 5 females) worked in 6 different facilities (n= 4 high school, n=5 collegiate) in Central Texas, Dallas Forth Worth Metroplex, and Eastern Pennsylvania. Eight of the 9 EATs had a Masters degree or greater. The total years of experience as an athletic trainer in the EAT group averaged 18.1 years, ranging from 11 to 37 years.

Of the 29 participants that agreed to participate in the study, 21 participants (11 male, 10 female) out of the 30 recruited submitted at least 1 reflection log for coding (2 EAT, 10 NAT, 9 ATS). A description of the individual participants who submitted logs can be found in Table 2.

Data Collection

Data used in this study was collected in 3 ways. First, reflection logs were used to describe the reflective practices of athletic trainers and athletic training students in response to a novel situation. Second, a demographic survey was used to gather information on each participant. Last, a self-report, psychometrically sound scale titled the Utrecht Work Engagement Scale – 9 (UWES-9) was used to understand the possible relationship between work engagement and the reflective practices of athletic trainers and athletic training students.

Reflection Log

The reflection log consisted of 3 questions that were meant to elicit reflection strategies used in clinical decision-making (Document 1). The questions were developed

from Boud's[3] framework for the reflective process. The intent of the questions was to guide the participants in their reflection without biasing or limiting their responses to the questions and with the goal of allowing the participant to reflect freely about the event.

The first question listed in the reflection log asked the participant to describe the event that occurred and identify any clinical decisions that were made. This question was asked to allow the participant to "return to the experience," the first step in Boud's[3] iterative process. Next, the participant was asked to share what she/he felt about the situation in order to determine how the participant "attends to his/her feelings", the second step in the iterative reflection process. Lastly, the participant was prompted to reflect on what they learned in detail. The purpose of this question was to elicit "re-evaluating the experience," the third step in the reflective process.

Pilot testing of the reflection log occurred prior to distributing the reflection log to participants. The primary investigator met with 9 pilot participants during pilot testing. During pilot testing 3 NATs, 3 EATs, and 3 ATSs described how they interpreted and would answer each question included in the reflection log. The pilot participants were not included in the latter portion of the study. The purpose of piloting the reflection log was to confirm that the questions were designed to prompt reflection without specifying a method of reflection.

Some pilot testing participants provided feedback during interviews with the primary investigator regarding the questions and subsequently 2 changes were made to the original reflection log. One of the changes was the formatting of the log. The original log had all 3 questions on one page, but this seemed to pose too many organizational issues, as the pilot participants had trouble focusing on what was exactly

being asked. The revised log had each question on separate pages. Another change made from the original log was to question number 3. Question number 3 asked the participant to reflect on what he/she experienced, and then gave 3 approaches of how to do this. Some of the pilot participants thought that all 3 approaches had to be used to answer the question. To clarify, specific language was written in the log that stated that the participant could consider using one of the 3 provided approaches to answer the question. Some of the pilot participants had a problem with question number 2. Question 2 asked the participant how he/she felt about the situation. Some pilot participants wanted an example of a feeling (i.e. frustration, confidence), however the researchers believed that this would place too much bias and force the participant to attend to feelings, so no changes were made to question 2. Document 1 includes the final format and questions included in the reflection log provided to the participants.

We distributed reflection logs to the participants via an online educational website called TRACS and asked the participants to complete the log within 24 hours of experiencing a novel or surprise event in a patient encounter. The participants were asked to complete the reflection log within 24 hours of an encounter with a novel or surprise event because we wanted the participant to be able to clearly recall the event. The reflection logs were available to all participants for a period of 6 weeks.

We requested that all participants complete as many journal reflections over the designated 6-week period when the participants were confronted with a novel/surprising event while making a clinical decision with a patient. We attempted to collect at least 2-3 reflection logs per participant. Only the final reflection log submitted by the participant was used for coding while any other completed reflection logs were used for investigator

training purposes. If a participant only submitted 1 journal entry over the 6 weeks, that entry was coded and not used for training purposes.

Demographic Survey

Two separate online demographic surveys were distributed to the athletic training students and the certified athletic trainers using the Snap Surveys program. The student demographics survey asked questions such as age, previous classroom instruction on the use of reflection, current clinical site, and primary sport assignment at the current clinical site. The certified athletic trainers' demographics survey asked questions such as age, place of employment, years of employment at their current location, highest degree of study, and if the participant had ever been formally instructed on reflection.

UWES-9 Scale

After the 6-week data collection period, the participants were asked to complete the UWES-9.[8] Previous research on reflective practices of other health care professionals has shown that burnout, the antipode of job engagement, can hinder the use of reflective strategies when making clinical decisions.[8] Therefore, a work engagement scale was used to assess the participants' engagement in their profession. The information gathered from this instrument was used to provide contextual information about the relationship between work engagement and reflection. The final scores on the scale were used to provide further description about the participant's work engagement when compared to norm scores, but were not quantitatively analyzed.

The UWES-9 is modified from the 17-item UWES-17. We chose to use the UWES-9 instead of the UWES-17 for the participant's ease of use. The UWES-9 is a 9-item instrument using a 6-point Likert scale to measure work engagement through three

constructs: vigor, dedication, and absorption in a work environment.[8] The short UWES is a psychometrically sound instrument displaying a 3 factor structure and with good internal consistency (Cronbach's apha = 0.60-0.88).[8] This scale has been shown to be inversely related to burnout.[9] No changes were made regarding the language used in the items, but participants were informed that when the scale says "work," they were to focus on their clinical work (for the NAT and EAT groups, as some of the participants also teach in an ATEP) or their clinical education experience (for the ATS group). The UWES-9 can be found in Appendix A. The UWES was scored using the method of scoring provided in the UWES manual.[10] The total score was calculated by totaling all of the items and dividing by 9 so that total values ranged from 0-6.[10] The higher the score on the UWES-9, the greater the levels of self-reported work engagement.

Data Analysis

In total, there were 34 reflection journals submitted over the 6-week period with 13 used by the 2 investigators for training and practice purposes. The remaining 21 reflection logs were coded according to Boud's model and classified according to Mezirow's model. Two researchers (AS and LV) separately analyzed the journals using a content analysis and met to discuss the findings. Prior to starting the content analysis the researchers used the extra reflection journals to practice the content analysis procedures. Within the training session, the investigators coded 3 journals together to practice using the coding scheme and to clarify any questions or conflicts. Then the investigators practiced independently on 10 more journals and discussed their findings.

Content analysis examines words or phrases inside of a larger body of writing. More specifically, pattern recognition[1] was utilized while evaluating the journals for

elements of the reflective process originally identified and defined by Boud.[3] Boud's model posits that reflection is an iterative process that also includes differing levels of reflection within each step. This model, therefore, assesses both the process and depth of reflection. Boud's model was chosen for this study because the coding scheme using this framework has already been tested and validated.[4]

We coded for aspects of reflection using the last reflection log submitted by the participants. Boud[3] proposed that persons reflect upon learning with a process that requires the person to return to the experience, attend to their feelings regarding the experience, and re-evaluate the experience. Furthermore, the process of "re-evaluating the experience" has four distinct elements that describe the depth of "re-evaluating the experience": 1) association, 2) integration, 3) validation and 4) appropriation. In all, we coded for 5 elements of the reflective process (Table 2). We also used the principles of coding developed by Wong et al.,[4] which included the following:

1. The initial stage of reflection termed "returning to the experience were not coded because this is a minimum requirement of the reflection journal. More specifically, participants were asked to "return to the experience" by completing question number one of the journal.
2. Statements that were repeated were only be coded once.
3. The coders had to demonstrate evidence within the log for coding a category in a reflective journal.
4. Text within the journal had to support the coding so that speculation was not allowed.

Once the content analysis was completed, the quality of the reflections in each journal was used to further classify the reflectors into three categories based on a model of reflection by Mezirow et al.[11] and procedures based on the work by Wong et al.[4] "Non-reflectors" were the participants who failed to demonstrate any of the elements of reflection in their log. "Reflectors" showed evidence of attending to feeling, association and/or integration. Finally, "critical reflectors" showed evidence of reflection at the level of validation and or appropriation.

Investigator triangulation was completed by having two investigators (AS, LV) separately perform a content analysis on each reflection journal. The two investigators then came together and discussed the trends that emerged and came to a consensus, a process known as peer debriefing. Investigator triangulation was used to reduce the potential bias that would have come from one person's analysis and provided ways to more directly assess the validity of the data that was obtained.[12]

Lastly, the UWES-9 scores were analyzed with simple descriptive statistics. In addition, norm values for health care professionals on the UWES-9 were used as a point of reference in understanding the participant's scores.[8] Total scores on the UWES-9 below 1.77 indicates very low work engagement, from 1.78-2.88 indicate low work engagement, 2.89-4.44 indicate average work engagement, 4.67-5.50 indicate high work engagement and scores greater than 5.51 indicate very high work engagement.

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CHAPTER IV

MANUSCRIPT

Introduction

Jack Mezirow,[1] a prominent researcher in the area of critical reflection, posited that we must make an interpretation of an experience to impart meaning to the experience. Furthermore, he states that we learn from an experience when we use the interpretation to guide future decisions and actions.[1] This statement provides the powerful impact that reflection plays in learning and decision making.

Research investigating the field of reflection in professional development began several decades ago when pioneers in reflection research[1,3,4] developed various theories to describe reflective practices. Some notable pioneers in the field of reflection who proposed models of reflection are Schon,[4] Boud,[3] Mezirow,[1] and Dewey.[2] More recent researchers have developed reflection models from the pioneer's seminal works and have advanced the models to include additional themes and concepts related to reflection as they relate to specific professions. Some of these authors include Mamede and Schmidt,[5-7] Wainwright,[8,9] and Wong.[10]

In general, reflection models can be categorized as those that describe reflection as either an iterative process or as a series of levels of reflection.[2] Iterative models describe a reflection process that includes the repetition of a series of steps in order to make a clinical decision. For example, in the case of an injury evaluation the athletic

training clinician may visit and revisit developing hypotheses and experiment with the potential hypotheses until a decision is made. On the other hand, models that hypothesize that reflection occurs as levels are based on an idea that reflection is likened to stratum where it is common to observe superficial layers of reflection, such as habitual action during practice, but more difficult to reach the deeper layers, such as critical reflection. Therefore, in these models deeper levels of reflection are less often observed in practice.[2] David Boud, editor of *Reflection: Turning Experience into Learning,*[3] suggested that reflection is an iterative process that also includes differing levels of reflection within each step, and a diagram of Boud's model can be seen in Figure 1. This model describes both the process and depth of reflection. Boud proposed that persons reflect upon learning with a process that requires the person to return to the experience, attend to their feelings regarding the experience, and re-evaluate the experience.[3] Furthermore, the process of "re-evaluating the experience" has four distinct elements that describe the depth of "re-evaluating the experience": 1.) association, 2.) integration, 3.) validation and 4.) appropriation.

Multiple studies have demonstrated that health care clinicians use some level of reflection to make clinical decisions,[5,7-11] and that the way in which a clinician arrives at a decision varies based on factors such as job setting and years of experience. Different professional settings are designed to either promote or discourage reflection in several ways.[12] For example, a clinician's reflective practices may be influenced by the number of patients the clinician must manage in a day and the amount of attention the clinician is able to provide each patient and situation.

The frequency of an individual's reflection could also be related with an individual's engagement within their profession. Burnout has been identified in other professions as well as health care professions,[13] and some researchers have proposed that burnout decreases reflective practices.[4] A survey-based random sample of full-time athletic trainers identified a relatively low incidence of burnout in the field of athletic training, but differences between male and female athletic trainers and within certain occupational settings were noted.[14] Female athletic trainers in college or university settings display more signs of burnout than males, but compared to other health care providers, athletic trainers display less burn-out and exhibit higher levels of job engagement.[14] Job engagement has been identified as the antipode of burnout[13] and could provide insight into how often and how well a clinician uses reflection in athletic training. The phenomenon of burnout and its relationship to reflection has not been studied in athletic trainers but could prove to be a fruitful line of research in understanding the motivation to be a reflective practitioner.

Multiple studies have created or confirmed models of reflection in medicine,[5-7] nursing,[10] and physical therapy.[8-9] How athletic trainers use reflection to make clinical decisions has not been investigated since no published original research has been completed in this area; however, research has shown that other health care professionals who use reflection in the decision-making process have the capacity to become more competent clinicians.[2] The athletic training profession is similar to many other allied health fields but may prove to be unique based on the differences in how the profession is structured or how athletic trainers typically provide health care services. For example, athletic trainers typically have major differences in work flow patterns when compared to

similar professions because they are usually required to treat a large number of patients in a short amount of time. This may affect the ability of athletic trainers to reflect due to time constraints. Another difference between athletic training and other professions is that athletic trainers often see the same patient population over the length of a sport season. For example, an athletic trainer can be assigned to work with 20 volleyball athletes over a season when compared to a nurse or physician that may interact with a patient for only one visit. Understanding the ways in which athletic trainers use reflection for learning and professional development can not only reveal the nature of their decision making, but may also guide ways to educate athletic trainers and athletic training students in the future. The first step in providing insight into reflective practices of athletic trainers at various levels of professional development is to examine and describe those practices.

Given the importance of reflection in advancing clinical practice and clinical education, research in athletic trainer's reflective practices is warranted. Therefore, there are three purposes of this study: 1.) to describe the reflective practices of athletic training students, novice athletic trainers and experienced athletic trainers, 2.) to use reflection characteristics to categorize the participants depth of reflection and 3.) to describe the relationship between job engagement and the reflective practices exhibited by the participants.

Research Design

This project was a descriptive study in the nature of qualitative data analysis that described how athletic trainers of varying levels of professional development utilized reflection during a patient encounter that was novel or that had the element of surprise.

A descriptive study is one in which information is collected without changing the environment.[15] A descriptive study is not highly interpretive because findings are presented using a previously developed conceptual framework and uses plain language to describe and provide a summary of a particular phenomenon of interest.[16] We used a descriptive approach to understand the experiences of athletic trainers and athletic training students when reflecting about a novel or surprise clinical encounter with a patient. These descriptions are from the point of view of the participants and use the participant's own words to describe their experiences.[16]

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Thirty individuals were recruited to participate in this study using a criterion sampling strategy.[15] This strategy was used to sample and establish that each participant met a predetermined criterion of importance[15] (novice and experienced athletic trainers as well as athletic training students) in order to describe reflective practices of practitioners at different stages of professional development. Thus, the participants were categorized as athletic training students (ATS), novice certified athletic trainers (NAT), and experienced certified athletic trainers (EAT) in order to account for differing levels of professional development. A description of the criteria for each group of participants is included in Table 1. Professional development was determined by the number of years of experience as a certified athletic trainer. NATs had less than 2 years of clinical practice while EATs had more than 8 years of clinical practice. Both of these time frames have been used in previous studies to establish a clinician's state of professional development.[6-7] In order to also account for the different roles of clinical settings in

reflective practices, participants were sampled in the 2 most common athletic training settings: high school and collegiate. After obtaining IRB approval, all participants were recruited via email or phone calls. Participants were informed of the requirements of the study and were allowed to consent to participate in the study. The participants were informed that they were not required to write about anything that made them feel uncomfortable and that were able to withdraw from the study at any time without any negative consequences.

Twenty-nine of the 30 participants that were recruited to participate in the study consented to participate in the study (14 males, 15 females; n=10 ATS, n=10 NAT, n=9 EAT). The participants worked in 20 athletic training facilities in 3 states. The ATS participant group included senior-level students from one Commission on Accreditation of Athletic Training Education (CAATE) accredited athletic training education program in Central Texas (5 males, 5 females), The NAT group (6 males, 4 females) worked in 4 different facilities (n=5 high school, n=5 collegiate) located in Central Texas (n=9) or Ohio (n=1) and had an average of 17.2 months of clinical experience practicing as a certified athletic trainer ranging from 10 to 22 months. All of the 10 NATs had earned their athletic training degree from an entry-level undergraduate education program. Nine of the 10 NATs were currently pursuing a graduate degree. The EAT group (4 males, 5 females) worked in 6 different facilities (n= 4 high school, n=5 collegiate) in Central Texas, Dallas Forth Worth Metroplex, and Eastern Pennsylvania. Eight of the 9 EATs had masters degree or greater. The total years of experience as an athletic trainer in the EAT group averaged 18.1 years, ranging from 11 to 37 years.

Of the 29 participants that agreed to participate in the study, 21 participants (11 male, 10 female) out of the 30 recruited submitted at least 1 reflection log for coding (2 EAT, 10 NAT, 9 ATS). A description of the individual participants who submitted logs can be found in Table 2.

Data Collection

Data used in this study were collected in 3 ways. First, reflection logs were used to describe the reflective practices of athletic trainers and athletic training students in response to a novel situation. Second, a demographic survey was used to gather information on each participant. Last, a self-report, psychometrically sound scale titled the Utrecht Work Engagement Scale – 9 (UWES-9) was used to understand the possible relationship between work engagement and the reflective practices of athletic trainers and athletic training students.

Reflection Log

The reflection log consisted of 3 questions that were meant to elicit reflection strategies used in clinical decision-making (Document 1). The questions were developed from Boud's[3] framework for the reflective process. The intent of the questions was to guide the participants in their reflection without biasing or limiting their responses to the questions and with the goal of allowing the participant to reflect freely about the event.

The first question listed in the reflection log asked the participant to describe the event that occurred and identify any clinical decisions that were made. This question was asked to allow the participant to "return to the experience," the first step in Boud's[3] iterative process. Next, the participant was asked to share what she/he felt about the situation in order to determine how the participant "attends to his/her feelings", the

second step in the iterative reflection process. Lastly, the participant was prompted to reflect on what they learned in detail. The purpose of this question was to elicit "re-evaluating the experience," the third step in the reflective process.

Pilot testing of the reflection log occurred prior to distributing the reflection log to participants. The primary investigator met with 9 pilot participants during pilot testing. During pilot testing 3 NATs, 3 EATs, and 3 ATSs described how they interpreted and would answer each question included in the reflection log. The pilot participants were not included in the latter portion of the study. The purpose of piloting the reflection log was to confirm that the questions were designed to prompt reflection without specifying a method of reflection.

Some pilot testing participants provided feedback during interviews with the primary investigator regarding the questions and subsequently 2 changes were made to the original reflection log. One of the changes was the formatting of the log. The original log had all 3 questions on one page, but this seemed to pose too many organizational issues, as the pilot participants had trouble focusing on what was exactly being asked. The revised log had each question on separate pages. Another change made from the original log was to question number 3. Question number 3 asked the participant to reflect on what he/she experienced, and then gave 3 approaches of how to do this. Some of the pilot participants thought that all 3 approaches had to be used to answer the question. To clarify, specific language was written in the log that stated that the participant could consider using one of the 3 provided approaches to answer the question. Some of the pilot participants had a problem with question number 2. Question 2 asked the participant how he/she felt about the situation. Some pilot participants wanted an

example of a feeling (i.e. frustration, confidence), however the researchers believed that this would place too much bias and force the participant to attend to feelings, so no changes were made to question 2. Document 1 includes the final format and questions included in the reflection log provided to the participants.

We distributed reflection logs to the participants via an online educational website called TRACS and asked the participants to complete the log within 24 hours of experiencing a novel or surprise event in a patient encounter. The participants were asked to complete the reflection log within 24 hours of an encounter with a novel or surprise event because we wanted the participant to be able to clearly recall the event. The reflection logs were available to all participants for a period of 6 weeks.

We requested that all participants complete as many journal reflections over the designated 6-week period when the participants were confronted with a novel/surprising event while making a clinical decision with a patient. We attempted to collect at least 2-3 reflection logs per participant. Only the final journal submitted by the participant was used for coding while any other completed reflection logs were used for investigator training purposes. If a participant only submitted 1 journal entry over the 6 weeks, that entry was coded and not used for training purposes.

Demographic Survey

Two separate demographic surveys were distributed to the athletic training students and the certified athletic trainers using a program called Snap Surveys. The student demographics survey asked questions such as age, previous classroom instruction on the use of reflection, current clinical site, and primary sport assignment at the current clinical site. The certified athletic trainers' demographics survey asked questions such as

age, place of employment, years of employment at their current location, highest degree of study, and if the participant had ever been formally instructed on reflection.

UWES-9 Scale

After the 6-week data collection period, the participants were asked to complete the UWES-9.[13] Previous research on reflective practices of other health care professionals has shown that burnout, the antipode of job engagement, can hinder the use of reflective strategies when making clinical decisions.[18] Therefore, a work engagement scale was used to assess the participants' engagement in their profession. The information gathered from this instrument was used to provide contextual information about the relationship between work engagement and reflection. The final scores on the scale were used to provide further description about the participant's work engagement when compared to norm scores, but were not quantitatively analyzed.

The UWES-9 is modified from the 17-item UWES-17. We chose to use the UWES-9 instead of the UWES-17 for the participant's ease of use. The UWES-9 is a 9-item instrument using a 6-point Likert scale to measure work engagement through three constructs: vigor, dedication, and absorption in a work environment.[19] The short UWES is a psychometrically sound instrument displaying a 3 factor structure and with good internal consistency (Cronbach's apha = 0.60-0.88).[13,19] This scale has been shown to be inversely related to burnout.[13,19] No changes were made regarding the language used in the items, but participants were informed that when the scale says "work," they were to focus on their clinical work (for the NAT and EAT groups, as some of the participants also teach in an ATEP) or their clinical education experience (for the ATS group). The UWES was scored using the method of scoring provided in the UWES manual.[19] The

total score was calculated by totaling all of the items and dividing by 9 so that total values ranged from 0-6.[19] The higher the score on the UWES-9, the greater the levels of self-reported work engagement.

Data Analysis

In total, there were 34 reflection journals submitted over the 6-week period with 13 used by the 2 investigators for training and practice purposes. The remaining 21 reflection logs were coded according to Boud's model and classified according to Mezirow's model. Two researchers (AS and LV) separately analyzed the journals using a content analysis and met to discuss the findings. Prior to starting the content analysis the researchers used the extra reflection journals to practice the content analysis procedures. Within the training session, the investigators coded 3 journals together to practice using the coding scheme and to clarify any questions or conflicts. Then the investigators practiced independently on 10 more journals and discussed their findings.

Content analysis examines words or phrases inside of a larger body of writing. More specifically, pattern recognition[1] was utilized while evaluating the journals for elements of the reflective process originally identified and defined by Boud.[3] Boud's model posits that reflection is an iterative process that also includes differing levels of reflection within each step. This model, therefore, assesses both the process and depth of reflection. Boud's model was chosen for this study because the coding scheme using this framework has already been tested and validated.[4]

We coded for aspects of reflection using the last reflection log submitted by the participants. Boud[3] proposed that persons reflect upon learning with a process that requires the person to return to the experience, attend to their feelings regarding the

experience, and re-evaluate the experience. Furthermore, the process of "re-evaluating the experience" has four distinct elements that describe the depth of "re-evaluating the experience": 1) association, 2) integration, 3) validation and 4) appropriation. In all, we coded for 5 elements of the reflective process (Table 2). We also used the principles of coding developed by Wong et al.,[4] which included the following:

1. The initial stage of reflection termed "returning to the experience were not coded because this is a minimum requirement of the reflection journal. More specifically, participants were asked to "return to the experience" by completing question number one of the journal.
2. Statements that were repeated were only be coded once.
3. The coders had to demonstrate evidence within the log for coding a category in a reflective journal.
4. Text within the journal had to support the coding so that speculation was not allowed.

Once the content analysis was completed, the quality of the reflections in each journal was used to further classify the reflectors into three categories based on a model of reflection by Mezirow et al.[1] and procedures based on the work by Wong et al.[4] "Non-reflectors" failed to show demonstrate and of the elements of reflection. "Reflectors" showed evidence of attending to feeling, association and/or integration. Finally, "critical reflectors" showed evidence of reflection at the level of validation and or appropriation.

Investigator triangulation was completed by having two investigators (AS, LV) separately perform a content analysis on each reflection journal. The two investigators then came together and discussed the trends that emerged and came to a consensus, a

process known as peer debriefing. Investigator triangulation was used to reduce the potential bias that would have come from one person's analysis and provided ways to more directly assess the validity of the data that was obtained.[20]

The UWES-9 scores were analyzed with simple descriptive statistics. In addition, norm values for health care professionals on the UWES-9 were used as a point of reference in understanding the participant's scores.[19] Total scores on the UWES-9 below 1.77 indicates very low work engagement, from 1.78-2.88 indicate low work engagement, 2.89-4.44 indicate average work engagement, 4.67-5.50 indicate high work engagement and scores greater than 5.51 indicate very high work engagement.

Results and Discussion

The following sections are intended to provide contextual and illustrative text to describe the reflective practices of the participants in this study, discuss the classification of the participants as reflectors, and provide the general findings regarding the UWES-9.

Description of Reflective Practices

This section is dedicated to providing contextual and illustrative text to describe the reflective practices of the participants in this study. We will describe 5 reflective practice trends: 1.) the role of emotions on reflection, 2.) how perspective transformation occurred in the participants, 3.) the importance of linking reflection to action, termed the benefits of action, 4.) the difference between procedural descriptions and reflection, and 5.) the roles of passivity and time-space in reflective practices.

The Role of Emotions on Reflection

We found that the participants who experienced a positive feeling were more likely to reach deeper elements of reflection whereas the participants who were unable to remove obstructing negative feelings were typically categorized as a non-reflector or reflector. Reflection is a complex process that involves emotion and cognition and therefore, negative feelings can form barriers to learning.[3] On the other hand, positive emotions can enhance the learning process, provide a stimulus for new learning, and facilitate new associations.[3] The learning experience can be dependent on the emotion that a novel event elicits. There were several examples of critical reflectors utilizing their positive feelings and non-reflectors being hindered by the inability to remove the negative emotions. Jessica is an example of a participant that utilized positive emotions when dealing with a patient in the stands of wrestling tournament with lightheadedness and tingling in his toes.

> *"I began to get a little nervous…however, as he started to improve it gave me more confidence…" –Jessica*

Jessica went through 4 of the 5 elements of reflection that were coded and was able to make an appropriation, or take-home message at the conclusion of the reflection log. On the other hand, Anna is an example of a participant who may have been distracted by her negative feelings toward the event and therefore did not reach the deeper levels of reflection.

> *"I was concerned that it was a possible grade 3 hamstring strain. However, I didn't want to make a decision without a physician's evaluation or MRI." –Anna*

This participant was classified as a reflector. It is possible that she could not get past the obstructing feelings in order to go on with the evaluation and reflective process.

The manner in which Tara attended to feelings is another example of a participant who may have been distracted by negative feelings of the experience. Tara felt as though her coaching staff was in the way of her making a sound clinical decision, and could not get past that distraction to continue reflecting. Tara was classified as a non-reflector.

> *"The pitcher was a little dizzy and the coaches were milking the situation, and were in my way. All I could think about was how nice it would have been to keep the patient calm without unneeded distractions." -Tara*

Future research on the role of emotions in reflection is important because it could help mold the way we instruct students to reflect on experiences, especially those they struggle with persisting in a reflective exercise. It is important especially for students to be able to remove obstructing feelings and continue reflecting or evaluating a patient no matter the circumstances to enhance the learning experience.

Perspective Transformation

We found that the end result of the reflection process could result in a transformation of the participant's perspective on clinical encounters. However, not all participants experienced a perspective transformation. The participants who reached the level of appropriation in reflection were the participants who also conveyed a perspective transformation within their reflection logs. In some cases, the transformation was described as a sudden insight, whereas in other cases the perspective transformation

occurred gradually. How the perspective transformation was differentiated was by the way the participant used and documented the reflection process in their logs.

Tommy demonstrated sudden insight in his log when he appropriated but failed to demonstrate any other element of reflection.

> *"What we are taught in college is to be a medical health care provider, but being in the high school setting, I feel we are more of a health care facilitator. We have to make the decisions that will help the kid in the long run." –Tommy*

Tommy developed a take-home message from his experience. However, he provided this sudden insight while failing to demonstrate any of the elements of reflection that led him to this statement. This transformation without context can be interpreted as a sudden insight or can be a limitation of the participant's ability to clearly script his reflection process. His sudden insight also emphasizes the fact that Boud's elements of reflection does not follow a stage model approach; they are not contingent upon one another, and the elements can come in any order or be omitted completely.

On the other hand, Brooke demonstrated a gradual arrival at her take-home or learning point. Brooke was able to display 4 out of 5 elements of reflection, only leaving out validation. She attended to feelings twice. First, Brooke says, *"I felt removed or disconnected from the situation…"* and then Brooke was able to remove that obstructing feeling and says, *"I was really proud of that,"* speaking about how all the athletic trainers present were working as a team. Throughout Brooke's reflection log, she demonstrates association when she says, *"We'd never even read about or heard of something like this in class. It was like the beginning of an episode of* House*."* Here, Brooke tries to relate what she is observing to any previous information she may have seen or heard in the

formal learning setting. Brooke integrates when she creates *"a mental list of things that would affect someone's speech: glucose levels, cranial nerve damage, dehydration, etc.,"* and reaches her learning moment when she says, *"the fact that an extra call needed to be made to speak with his parents, and wasted time made me realize the importance of documentation."*

Perspective transformation was coined by Mezirow[1] as an area of learning that frees the individual from their habitual patterns. Perspective transformation is the process of becoming critically aware of how and why our assumptions about the world in which we operate have come to constrain the way we see ourselves and our relationships.[3] Mezirow[1] suggests that there are 2 paths to perspective transformation. The transformation can occur as a sudden insight into the assumptions, which have limited their understanding, or as a slow series of transitions that leads to a perspective transformation. Both types of perspective transformation were demonstrated in the reflection logs that were coded.

Transformative learning theory is derived from the thought that adult learners need to become independent thinkers.[21] It is defined as the process of using a prior interpretation to construe a new or revised interpretation of the meaning of the experience in order to guide future action.[1] Previous research has found that transformative learning theory has the potential to assist students in altering their particular frames of reference and therefore become better critical reflectors.[22] In addition, with an understanding of transformative learning theory, educators can maximize the potential for students to become autonomous thinkers.

Recent studies on transformative learning theory confirm the importance of providing direct and active learning experiences by providing students with experiences that stimulate reflection,[23] but because research on transformative learning theory has been limited to nursing education, future research should focus on the athletic training education programs and profession. Research in this area may produce changes or progress in the athletic training curriculum.

Benefits of Action

Another prominent finding in this study was benefits of action. Boud[3] hypothesized that some benefits of reflection may be lost if they are not linked to action. Some of the participants who appropriated also linked their take-home message to an action or belief they wanted to change or improve upon. If one does not appropriate or express the outcome of reflection, they may have reflected on the event but their point of view did not change from the experience. Ian appropriated a take-home message and also provided an idea for a new approach to future experiences in a patient case where a soccer player who was disoriented after a collision with another player.

> *"Looking back, I wish that I would have developed a new approach to possible future scenarios." –Ian*

Developing a new approach is an example of engaging in an action as a result of the reflective process. This theme is important to reflection because even if an individual engages in reflection or even demonstrates all elements of reflection, it doesn't mean that the individual will act on what they learned from the experience in the future. Students

should be taught and encouraged to reflect on experiences in order to create life-long reflection.

One limitation in this study is that this phenomenon could not be further examined because none of the questions were specifically aimed at understanding how the reflective experience would change future actions of the participants. Reflection logs may not be the best way to study or measure how individuals act after creating a new perspective on a topic. Therefore, more research, using different methodology, should be done on this trend because very little previous research could be identified in an extensive search regarding the benefits of acting on reflection. One interesting area of future research may focus on providing intervention strategies that challenge students and clinicians to use reflection experiences to change future clinical decisions.

Procedural Descriptions Versus Reflection

Some participants provided procedural descriptions in their reflection logs rather than engaging in actual reflection. More specifically, lower level reflectors focused on describing procedures and patient findings rather than reflecting on the emotional and cognitive processes. Certain logs such as Max's were matter-of-fact records of the event with no supporting exploration. In Max's case it seemed like a usual mode of thinking with no real surprise occurring while he made a decision with a patient who presented with a subluxed shoulder.

> *"The decision process was relatively easy…I found out that he has subluxed his shoulder before."*

Josh was another participant who provided matter-of-fact statements. After returning to the experience, Josh states,

> *"…the athletic trainer made the right call by removing the patient from participation.*

It should be noted that both Max and Josh were classified as non-reflectors and did not demonstrate any elements of reflection. These 2 reflection logs were comparable to a medical note, and not adequate for reflective purposes. The participants who were matter-of-fact in their reflection did not seek to validate any hypotheses they developed, nor did they challenge their usual mode of thinking. These participants can be compared to single-loop learners. Double-loop learners, on the other hand, regularly question their assumptions,[10] which requires the deeper levels of reflection rather than what is demonstrated in the procedural logs. Wong[10] uses the terms single-loop and double-loop learning in his research to describe the difference in learning demonstrated by non-reflectors when compared to critical reflectors. Single-loop learning occurs within a self-confirming realm of knowledge,[10] meaning individuals who use single-loop learning develop no hypotheses or questions to validate their thoughts. These individuals do not change any methods or ways of thinking, nor do they appropriate any new knowledge. On the other hand, double-loop learners question the experience and are able to develop new ways of thinking once they start to challenge their habitual practice.[10] Double-loop learners are comparable to critical reflectors because these individuals will develop hypotheses and test them in order to eventually develop a new method of thinking.

Future research should aim to study the effect of guided reflection in clinical practice for athletic trainers. We hypothesize that without a course or guide to encourage

students and clinicians through reflection, it may not occur and therefore athletic trainers may be stuck in procedural or habitual ways of thinking rather than challenging previously known information.

Passive Participants and Time-Space

Several times, especially within the ATS group, we discovered what we called the "passive participant" where several ATS participants completed their logs using a passive voice. For example, Haley and Harry referred to any decision making as "we" (probably including their supervisor or other peers) instead of "I" throughout the reflection log. Most of these participants did not reach the deeper elements of reflection, possibly because they did not take ownership of patient care. This lack of ownership may have caused them to be a passive participant in patient care and in the reflection process. However, one participant, Brooke, stood out. While Brooke described the events of the situation passively, she was able to still reach all levels except appropriation and was classified as a critical reflector. The difference between Brooke and the other passive participants was that she attended to a positive feeling, and seemed to be given enough time and focus by her supervisor to process the cognitive aspect of the event. This leads to the related theory known as time space. The concept of time space was developed by Wong[10] and it refers to allowing time for reflection to enhance the process.[3] Within the reflection logs, those participants who fell into a passive seemed to not have been allowed enough time or autonomy with the experience to truly reflect on the event.

Previous research has found that the element of surprise and experimentation are most evident with novice learners and reflective practice may even decrease with greater

years of practice.[5,8] In this study, the group who overwhelmingly reached deeper levels of reflection and was most often classified as critical reflectors was the NAT group. Again, NATs are certified athletic trainers with less than two years of certified clinical experience; therefore, this group is typically encountering most of these experiences for the first time on their own where they are the primary decision-maker. Our theory on this phenomenon is that these participants no longer have a passive role, such as when they were students, and are too inexperienced to have already developed habitual patterns that they are unwilling to branch away from, such as what may be the case with experienced athletic trainers.

Time has been shown to be an important element in clinical reasoning processes of novices. Novices use a form of reasoning termed hypothetico-deductive or backward reasoning, a process by which calculated thinking occurs as opposed to contemplative thinking.[8] Novices have been known to start from the goal (differential diagnosis) and work backward to the information given in the case (evaluation). This form of reasoning is completed because novices have limited experiences with patient cases. At the most basic level, it is necessary for students and novices to have sufficient time to engage in reflective practices.[8] On the other hand, expert clinicians generate hypotheses using a form of pattern recognition by reasoning forward or comparing previous scenarios with the current situation.[6] The forward reasoning process used by experienced clinicians comes from a broad knowledge base.[8] Therefore, experienced clinicians may not encounter novel or surprise events as often as students and novice clinicians and may be less inclined to challenge their habitual mode of thinking.

Writing, independent thinking, and conversation are some strategies that individuals can utilize to promote reflective learning.[10] However, when an athletic training student is attempting to perform an evaluation on a patient with a limited amount of time, this leaves no room for reflection. The student may need to return to this experience later in order to completely comprehend and make sense of the event. Therefore, it may help the student if their teacher or supervisor promotes reflection by encouraging the student to return to the situation. This is particularly important when a supervisor takes control of a patient interaction but still wants the student to learn from the experience through reflection. It may be that once a student hands over the reins of patient care that they also stop actively engaging in the reflection process.

The potential importance of time-space also highlights a potential limitation of this study. We asked participants to complete the reflection log within 24 hours of experiencing a novel or surprise event. In long-term or chronic conditions such as with Sarah's experience, it would be difficult to adequately reflect after one encounter with the patient. Sarah reflected on her first encounter with a patient who had been completing post-surgery rehabilitation for several weeks before returning to complete rehabilitation with the athletic trainer. The participant proposed what she planned to do next at a subsequent treatment session when she says *"I will need to take baseline ROM, strength, girth and functional measures and develop a plan to proceed,"* but she didn't get a chance to perform these measurements nor does she reflect on them. If Sarah was afforded a greater amount of time to complete the evaluation and reflect she may have elicited deeper levels of reflection.

Our original goal was to have the participants complete the reflection logs within 24 hours of the initial encounter in order to clearly recall the event and the mental processes going through their mind during the actual scenario. However, we suggest that future research should allow a longer time frame for reflection, especially in student and novice participants in order to avoid the potential limitations that a 24-hour time frame may have caused.

Elements of Reflection According to Boud's Model

The content in each reflection log was coded for the presence of elements of reflection from Boud's model[3] (attending to feelings, association, integration, validation, appropriation) to describe the reflective practices of the participants. Each element is described below and illustrative text of each element of coding is provided.

Attending to feelings

Boud[3] stated that experiences can bring us to an awareness of emotions and an individual needs to either work with the feeling or find a way around the feeling in order to engage in reflection. Boud[3] describes attending to feelings as having two parts: utilizing positive feelings and removing obstructing feelings. Utilizing positive feelings is important because positive feelings can provide motivation to persist through a difficult situation. Removing obstructing feelings involves removing emotional obstacles in order to facilitate continued learning.

The second question in the reflection log was intended to guide the participant to attend to their feelings associated with the surprise or novel event. Fourteen of the 21 participants attended to feelings in their reflection log making this element in Boud's model[3] the second most commonly coded reflection element. Some participants ignored

the first part of the question that asked about their emotions and only answered the second half of the question that asked about their opinions while typically providing clinical responses that described the circumstances of the event rather than their responses to the event.

Jessica was able to remove the obstructing emotion (nervousness) and create a positive feeling (confidence) to continue with the experience of reflecting on the event.

> *"I began to get a little nervous when he started to feel worse… however, as he started to improve it gave me more confidence that I was making the right decisions." –Jessica*.

In contrast, Josh did not attend to feelings. Instead he simply stated an opinion.

> *"I felt that the athletic trainer made the right call by removing the patient from participation." –Josh*

If we were able to replace the word "feel" or "felt" with "believe" or "believed" in any log, it was not accepted as attending to feelings because it was stated as an opinion, not an emotion.

Association

Association is the process of connecting ideas and feelings which are part of the original experience with existing knowledge and attitudes.[3] Although association could have been completed by linking prior feelings or attitudes to the current experience, most participants used association to link prior knowledge to the current situation. Fifteen participants used some form of association within their logs making this element of reflection more common than attending to feelings.

Anna linked previously known knowledge about how an injury should have presented based on the expected mechanism of injury (MOI) and how the injury she encountered differed.

> *"After the MRI was performed a grade 2 strain was diagnosed. This was strange because of MOI [mechanism of injury]." –Anna*

Colin was able to identify connections between scapular movement and muscles that control scapular movement.

> *"I took a look at her scapular movement and realized her dominant (hitting) arm was not equal to her non-dominant arm in regards to scapular movement patterns. Her upward rotators on her dominant side were underactive and her downward rotators weren't allowing for complete upward rotation." -Colin*

A third example is Haley's association between a diagnosis that she suspects and the presentation of this specific injury.

> *"I think to myself that it could be tendonitis, but she is in too much pain for it to only be tendonitis." -Haley*

Integration

Participants used integration as a way to understanding the link between old and new knowledge, feelings or attitudes. This process is one step deeper than association because in this element of reflection, the participant makes an effort to understand the "why" in the situation. Thirteen participants used some form of integration in the reflective process. Most participants used integration as a part of the clinical reasoning process where they tried to understand why a patient presented in a particular manner. In these cases, the participants made hypothesis about the injury, treatment or situation.

Thirteen participants were able to show an element of integration in their reflection logs and below are some different examples.

Brooke recalled the patient's symptoms and then began hypothesizing about different reasons why the patient's speech would be affected showing that hypothesizing is a key element of integrating the learning experience.

> *"…started to make a mental list of things that would affect someone's speech: glucose levels, cranial nerve damage, dehydration, etc." –Brooke*

Colleen submitted a reflection log on a case where her patient's chief complaint was quadriceps tightness and soreness. What made this case novel for Colleen was the lack of support she was receiving from her coaching staff regarding what was appropriate patient care. The strength and conditioning coach wanted the patient to continue with normal workouts with a high work load in the weight room. Colleen, on the other hand, provided a hypothesis for her patient's rehabilitation needs when she integrated.

> *"There needs to be a change in her workload to give her muscle a chance to accommodate and adjust." - Colleen*

Haley also demonstrated the element of integration when she proposed an idea of what she could have done differently with her patient after the evaluation took place.

> *"Perhaps with further inquiry and manual muscle tests we would have been able to find the real muscle that was injured."-Haley*

Validation

After providing potential hypotheses to explain the novel event, a participant would have to demonstrate some form of investigation or testing of the hypothesis in order to demonstrate the element of validation in the reflection process. It is interesting

to note the steep decline in participants who were able to reach this element of reflection. Only five participants documented the element of validation in their reflective journals supporting Mezirow's and Wong's belief that only critical reflectors use validation in their reflective experiences.

After explaining that he finds it helpful if he bounces his thoughts off of other people, Ian stated, *"I think this may be a way for me to feel social support as well as a way to refine and evaluate my own thought process. It's easier to determine if my actions make sense when I can hear them stated out loud." –Ian.* Here, Ian seeks validation through discussion of the event with others. By doing this, there is evidence of his further investigation of the topic.

A different example of validation can be seen after Colin completed most of his initial evaluation of a patient with a novel case. *"…After noticing this I decided to put her on a SICK scapula rehabilitation program in order to retrain the force couples to work together for a more sound complete scapular movement." –Colin.* Colin is testing a rehabilitation protocol to see if the exercises will help the patient; he is describing the next step regarding patient care.

Appropriation

The outcomes of reflection may include development of new perspectives or changes in behavior.[10] This is considered the highest level of reflection because it results in a moment of realization, which can lead to positive changes in behavior. Interestingly, like all other elements in Boud's reflection model[3], it is possible for a participant to reach the level of appropriation without demonstrating lower levels of reflection (association, integration). This occurs because Boud's reflection elements do not proceed in stages,

which means that they do not occur in a linear fashion, nor are they dependent on each other.[10] Eight participants demonstrated appropriation in this study, and we found that those who demonstrated most or all of the elements of reflection were able to appropriate in a way that led to development of a new perspective or change in behavior, whereas the participants who demonstrated appropriation without associating or integrating only appropriated by creating a take-home message or summary of the event.

David describes his moment of realization when he realized that a patient's shoulder injury was related to her throwing mechanics when he stated, *"In the future, I might ask about changes in throwing much sooner in the history portion of the eval [evaluation], instead of waiting until strength testing to find out."* In this statement, David demonstrates that learning has taken place, and he also develops a change in perspective when he describes what he may do in future situations.

Jessica used appropriation in her reflection journal when she responded to the medical concerns of a parent in the stands of a wrestling tournament by stating *"I think that this was a reminder for me that I should always be prepared for any circumstance and that I may have to care for people other than the athletes participating"* Within this statement, Jessica articulates the "take home" message that she must always be prepared to provide medical care in any situation, but does not develop a new perspective or change in attitude or opinion.

Appropriation can also occur through a negative experience. Colleen demonstrates this when she says, *"what I learned is how difficult coaches can be to deal with."* This is a basic example of appropriation, but the participant ultimately takes something out of the experience and is able to summarize her findings in 1 sentence. It is

interesting to note that this participant was unable to remove obstructing feelings when she responded to question 2 in the reflection log.

Classification According to Mezirow's Model

After coding for the elements of reflection, the next level of analysis for this study was to place the participants into one of three categories of reflectors derived from Mezirow's model[1] and used by Wong.[10] In Wong's research, non-reflectors were those participants who did not demonstrate any of the elements of reflection. In this study, participants who stated an emotion without attending to that emotion by utilizing the feeling or removing the obstructing feeling were included in the non-reflectors group because the second question in the reflection log led the participants to attend to their emotions, similar to how "returning to the experience" was not coded because the participant was asked to return to the experience. Reflectors were able to demonstrate reflection at the more basic levels (association, integration), but did not attempt to validate their hypothesis nor did they create a take-home message or develop new perspectives or changes in behavior. Critical reflectors showed evidence of the deeper levels of reflection (validation, appropriation) by testing their assumptions or demonstrating a change in perspective.

Table 3 shows how the participants were categorized and the associated elements of reflection that were coded within their respective logs. Four participants were classified as non-reflectors, 7 as reflectors and 10 as critical reflectors. Novice athletic trainers (NAT) reached the deeper levels of reflection (validation, appropriation) more often than the athletic training students (ATS) and experienced athletic trainers (EAT). It

was interesting that so many of the participants would be categorized as critical reflectors. In a previous study completed by Wong,[10] only 11.1% of the participants were categorized as critical reflectors and the distribution of non-reflectors, reflectors and critical reflectors was more evenly distributed. One point of distinctions between the studies is that all participants in Wong's study were students while in this study the participants included certified health care professionals in addition to students.

General Findings Regarding UWES Scores

The UWES-9 values were all considered "average" or "high" when compared with the normative values given in the UWES manual[19] indicating that the athletic training students and certified athletic trainers in this study were engaged in their job. NATs scored highest (average = 4.58) on the UWES-9 when compared to the ATS (4.44) and EAT (4.28) groups, indicating a higher level of work engagement than the ATS and EAT groups. In a previous study[14] it was discovered that female athletic trainers working in the collegiate setting demonstrated more signs of burnout than their male and high school-setting counterparts. We found that the female participants in the high school setting who participated in this study scored the highest on the UWES-9 (average = 4.87), indicating that they are more engaged in their work and were experiencing less burn-out when compared to males in the high school setting (average = 3.96), males in the college setting (average = 4.42), and females in the college setting (average = 4.65).

Interestingly, the non-reflectors (n = 4) scored higher on the UWES-9 (average = 4.72) than reflectors (n = 7, average = 4.40) and critical reflectors (n = 11, average = 4.69). However, the difference in UWES-9 scores amongst the groups were small and

not likely significant. Table 3 includes the UWES-9 scores for each participant and the norm value for the score using normative scores from the UWES manual developed by Shaufeli.[19] A limitation to this may be that the different groups of reflectors were unevenly distributed.

Limitations

This study did have several limitations that could be improved upon in future research. We had a low response from the EAT group in this study, which made it difficult to compare EATs to the other 2 groups. The small number of logs and somewhat homogenous demographic group in regards to age could also be a limitation. In addition, reflection logs may not be the best method for attempting to describe reflection because some participants may be better at orally articulating emotions and thoughts rather than transcribing them. Guided interviews with the ability to probe into emotions and feelings or mock evaluations are other options that could be utilized in future research. Finally, time frame for reflection logs (6 weeks) may have been too short, especially for the EAT group, to experience a novel or surprise event thus possibly explaining the low response from this group. In addition, the future research may allow more time for reflection (greater than 24 hours post event) in order to accommodate for greater time needed to reflect on the experience.

Conclusions

The purpose of this study was to describe the reflective practices of athletic training students, novice athletic trainers and experienced athletic trainers after a novel

event, to use the reflection characteristics established in the content analysis to categorize the participants depth of reflection and to describe the relationship between job engagement and the reflective practices exhibited by the participants. We described 5 general trends in reflective practices of the participants: the role of emotions, perspective transformation, linking reflection to action, procedural descriptions versus reflection and the role of passivity and time-space on reflection. We also used a content analysis to describe the elements of reflection displayed in the reflective logs. The participants were classified based on the depth of reflection. Only 4 participants were classified as non-reflectors, 7 as reflectors, and 10 as critical reflectors with a majority of the critical reflectors coming from the NAT participant group. It is possible that the high numbers of participants categorized as critical reflectors is related to the average or high UWES-9 scores. This could indicate that novice athletic trainers are engaged in their work and thus are motivated to use deeper reflective practices.

Future research should aim to take the next steps in understanding the phenomenon of reflection in clinical practice across the developmental spectrum of athletic trainers and athletic training student. In addition, fruitful research could come from the understanding how educational practices could be used to enhance reflection. For example, research could measure or describe the benefits of reflection when formally instructed in the classroom. Finally, some research could be completed in understanding the relationship between critical reflection and the quality of patient care.

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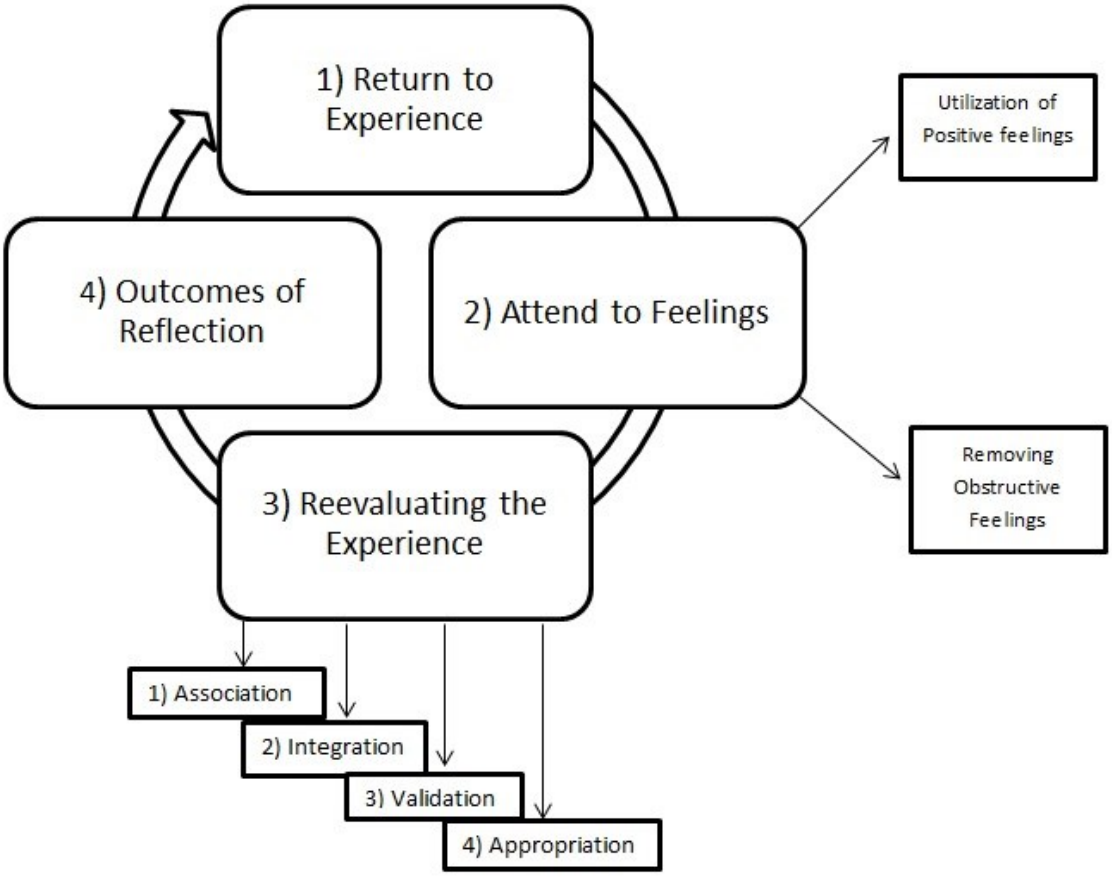

Figure 1. Framework of Reflection Developed by Boud.

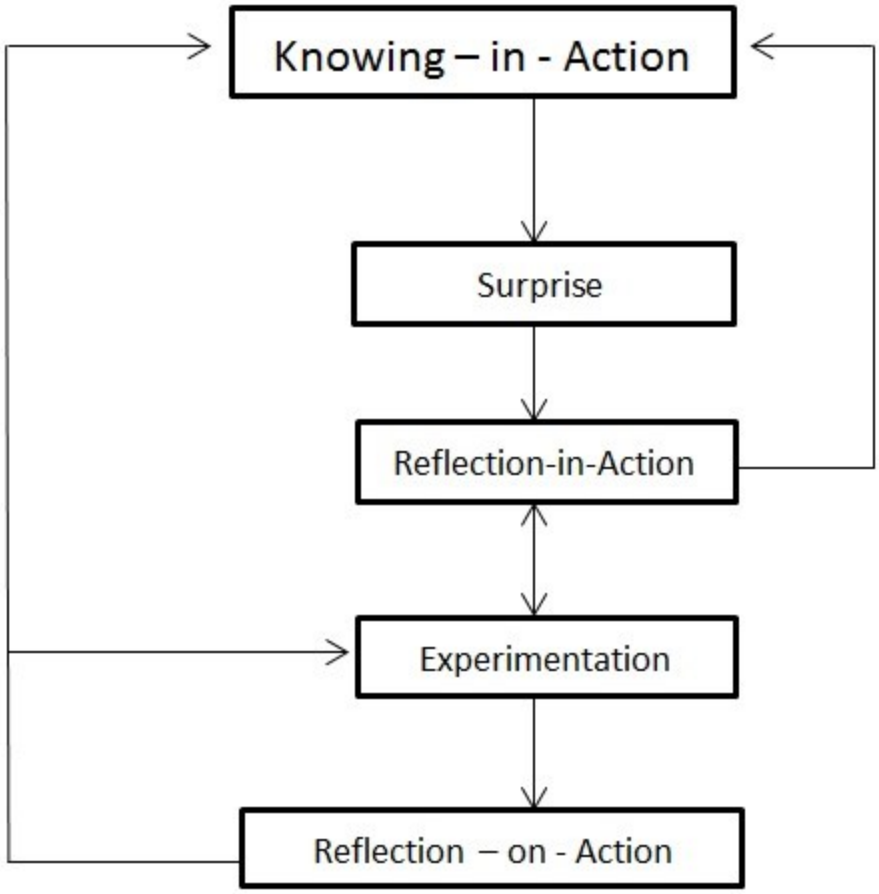

Figure 2. Framework of Reflection Developed by Schon.

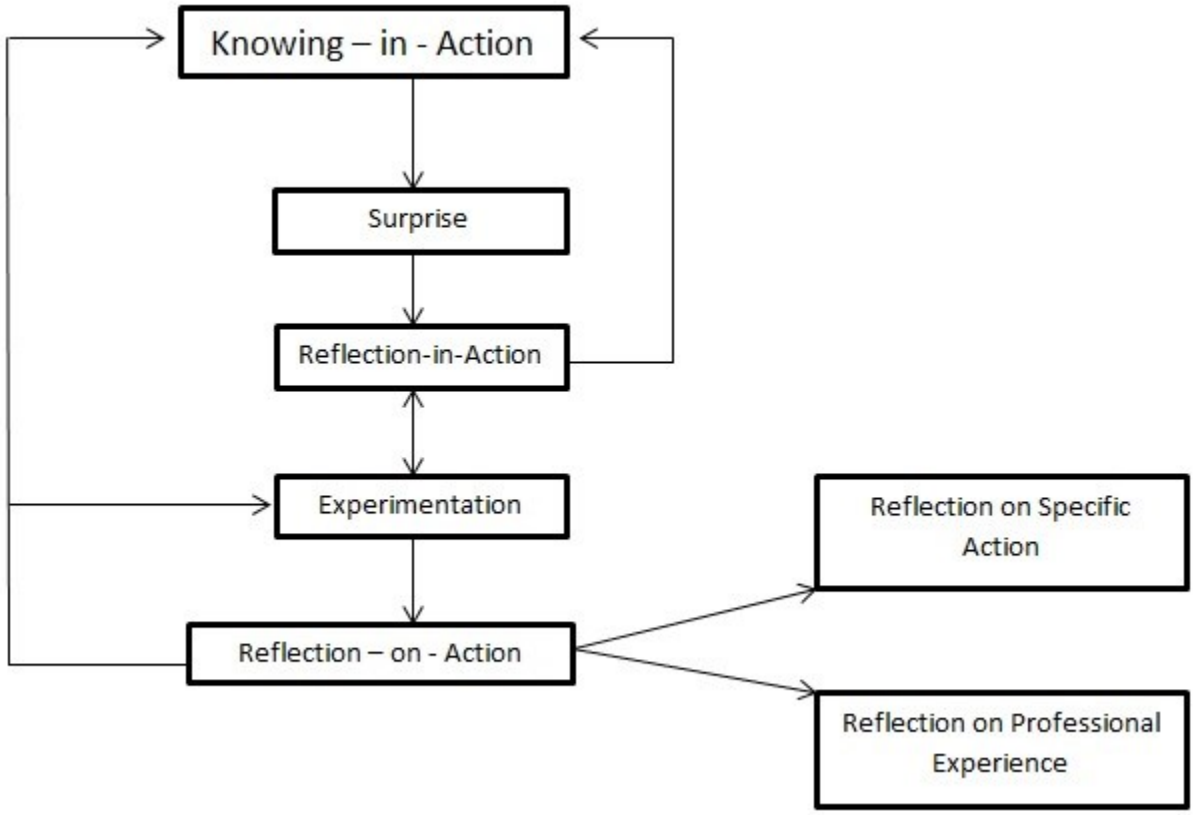

Figure 3. Framework of Reflection Developed by Schon and Modified by Wainwright

Table 1. Inclusion Criteria for Participants

Group	N	Criterion for Inclusion
ATS	10 total • 5 high school • 5 collegiate	1. Enrolled in CAATE-accredited ATEP 2. Good standing in ATEP* 3. Completed pathology and evaluation, therapeutic modalities, and therapeutic rehabilitation courses 4. Assigned to a clinical education rotation that allows for student participation in the clinical decision making process in patient care
NAT	10 total • 5 high school • 5 collegiate	1. Board of Certification athletic trainer (ATC) 2. Less than 2 years of clinical practice as a certified athletic trainer 3. Employed in a position where he/she can make decisions regarding patient care
EAT	10 total • 5 high school • 5 collegiate	1. Board of Certification athletic trainer (ATC) 2. More than 8 years of clinical practice as a certified athletic trainer 3. Employed in a position where he/she can make decisions regarding patient care

*Good standing is predefined by each ATEP and means that participants meets a pre-determined GPA (>2.75), receive a grade of "C" or higher in core athletic training courses, and progress through their clinical education sequence without suspension or probation.

Table 2. Coding Scheme of Boud's Reflective Process in Learning

Code	Element of Reflective Process	Criteria		Cheat Sheet	Examples
1	Attending to feelings	Utilizing positive feeling and/or removing obstructing feelings from the reflective/learning process		The participant recognizes an emotion toward the event. "I felt frustrated" is acceptable, "I feel like the athlete is progressing quickly" is not acceptable.	"Frankly it causes me to be both angry and disappointed at the same time."
2	Association	Linking/Discovering/Re-assessing prior knowledge, feelings or attitudes with new knowledge, feelings or attitudes	Recognizing/ relating/stating a relationship between the old and new knowledge/feelings	The participant makes the link between the event and previously known information or attitudes, but does not discriminate or make sense of the situation.	"This situation has unfortunately become very commonplace in recent years as we the staff athletic trainers to many of the student athletes' parents are looked upon as a bad guy who is trying to keep their child out of competition."
3	Integration	Seeking the nature of relationships of prior knowledge, feelings or attitudes with new knowledge, feelings or attitudes	Making sense of the old and new; hypothesizing	Understanding a feeling or link between old and new knowledge. WHY the clinician felt or acted the way s/he did. Discrimination occurs	"I am angry because I do not feel that I remove athletes from participation unless their health status is such that they cannot participate without further injuring themselves… I understand that non medical people do not understand the risks associated with this mindset."

Table 2 continued

4	Validation	Testing for internal consistency between new appreciations and prior knowledge or beliefs	Testing and reflecting	Evidence of further research or investigating the newly learned topic; Participant describes the next step	"I feel that I handled this situation appropriately as I did not accuse anyone of withholding information. I simply said that I heard from others that this occurred and I wanted the student athlete to be able to participate but only if they were fully healthy."
5	Appropriation	Making knowledge one's own; new knowledge feelings or attitude enter into own sense of identity; new knowledge, feelings or attitudes becoming a significant force in own life	Larger scale reflection that indicates the take away message	Linking; Proof of understanding of the event (includes feelings/attitudes); a brief summary of the situation and ultimate take home message; Transformative learning/new approaches	"…while I anticipate that [the student athlete] will make a full recovery from this injury I also anticipate that they will increase their efforts to hide any subsequent injury from me because of the amount of time and games that they will miss."

* modified from the work of Boud[3]

Document 1. Reflection Log

CODE:
This is to be completed by the investigator

The following questions are designed to guide you as you reflect on a novel or surprise event that occurred during clinical practice while making a clinical decision regarding patient care. A surprise event is defined as any new or unexpected event experienced during the course of patient care (ex. initial evaluation, follow-up evaluation, or while formulating or implementing a treatment/rehabilitation protocol). Please type freely and provide as much detail as you would like. You are not required to write about anything that makes you uncomfortable, but please be as truthful as possible. Please complete the following questions within 24 hours of experiencing the novel or surprise event.

1. Describe the circumstances of the event and any clinical decisions you made.

2. How did you feel about this situation? What are your opinions on this event and/or its circumstances?

3. Reflect on what you experienced in detail (i.e. provide details of what you thought about as you went through the process of making the clinical decision).

To complete this question you may consider taking one of the following three approaches.

- *Imagine that you are having a conversation with a peer or colleague in which you describe in detail what you experienced and learned*
- *Create a mental dialogue you may have had with yourself while you were experiencing the event*
- *Imagine that you are writing in a diary or journal about all the steps you took to reach a final decision*

When you have completed the log, please log onto your TRACS site titled "Athletic Training Reflection Logs" and post the log in the dropbox folder. Thank you for your participation.

Table 3. Demographics of Non-Reflectors, Reflectors, and Critical Reflectors

	Pseudonym	Participant Group*	Gender	Age	Years of Certification	Clinical Setting†, Size of Setting	Coded Elements of Reflection‡	UWES score (norm value[17])
Non-Reflector (NR)	Tara	ATS	Female	21	N/A	HS,	ATF	4.78 (high)
	Ashley	NAT	Female	23	0.83	HS,	ATF	5.11 (high)
	Josh	NAT	Male	24	1.92	CU, DI	NONE	4.78 (high)
	Max	NAT	Male	23	1.92	CU, DI	NONE	4.22 (average)
Reflector (R)	Haley	ATS	Female	22	N/A	CU, DI	ATF, ASO, INT	4.89 (high)
	Harry	ATS	Male	23	N/A	HS,	ATF, ASO, INT	3.78 (average)
	Anna	ATS	Female	22	N/A	CU, DI	ATF, ASO	4.33 (average)
	Drew	ATS	Male	21	N/A	CU, DI	ATF, ASO	5.22 (high)
	Jason	ATS	Male	24	N/A	CU, DI	ATF, ASO, INT	4.00 (average)
	Tim	EAT	Male	45	23	HS,	ASO, INT	4.00 (average)
	Sarah	EAT	Female	34	13	CU, DII	ATF, ASO, INT	4.56 (average)
Critical Reflector (CR)	Tommy	ATS	Male	25	N/A	HS,	APP	3.22 (average)
	Megan	ATS	Female	22	N/A	CU, DI	ASO, INT, VAL	4.78 (high)
	Brooke	ATS	Female	22	N/A	HS,	ATF, ASO, INT, APP	5.00 (high)
	Amber	NAT	Female	24	1.92	HS,	ATF, ASO, APP	5.33 (high)
	Ian	NAT	Male	27	1.92	HS, medium	ATF, ASO, INT, VAL, APP	4.11 (average)
	Jessica	NAT	Female	23	1.92	HS, small	ATF, INT, VAL, APP	4.11 (average)
	David	NAT	Male	23	0.83	HS,	ASO, INT, APP	4.67 (high)
	Joe	NAT	Male	23	0.83	CU, DI	ASO, INT, VAL	4.89 (high)
	Colleen	NAT	Female	24	1.92	CU, DI	ATF, ASO, INT, APP	4.67 (high)
	Colin	NAT	Male	24	0.83	CU, DI	ATF, ASO, INT, VAL, APP	3.89 (average)

APPENDIX A

UTRECHT WORK ENGAGEMENT SCALE (UWES-9)

Work and Well Being Survey (UWES)

The following 9 statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, cross the "0" (zero) in the space after the statement. If you have had this feeling, indicate how often you felt it by crossing the number (from 1 to 6) that best describes how frequently you feel that way.

Never	Almost Never	Rarely	Sometimes	Often	Very Often	Always
0	1	2	3	4	5	6
Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

---

1. At my work, I feel bursting with energy. (V)
2. At my job, I feel strong and vigorous. (V)
3. I am enthusiastic about my job. (D)
4. My job inspires me. (D)
5. When I get up in the morning, I feel like going to work. (V)
6. I feel happy when I am working intensely. (A)
7. I am proud of the work that I do. (D)
8. I am immersed in my work. (A)
9. I get carried away when I am working. (A)

Source: Schaufeli and Bakker (2003).
Note: V = vigor scale; D = dedication scale; A = absorption scale

VITA

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