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Benefits of Video Feedback on Low Performing Female Cadets in Physical Education: An Action Research Study

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BENEFITS OF VIDEO FEEDBACK ON LOW PERFORMING FEMALE CADETS IN PHYSICAL EDUCATION: AN ACTION RESEARCH STUDY

by

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ABSTRACT

Learning novel physical motor skills can be frustrating for some students. A lack of clear feedback further exacerbates the problem for students' skill development. This study examined the benefits of using video recording as augmented feedback to inform motor skill development in an applied gymnastics course at a service academy. The primary aim was to identify the effects of video feedback on the instructor/student process for skill evaluation and skill improvement. The secondary aim was to examine at what degree does giving video feedback promote female student motivation to learn, use of deliberate practice, autonomy, and competence. This action research study sought a more efficient method of providing female students individualized feedback with the goal of decreasing the physical skill gap between the males and females at the academy.

Data from instructor observations, pre/post-test questionnaires, semi-structured interviews, video recordings, and student self-assessments were analyzed. The low performing female students (N=10) within the gymnastics course were provided video feedback on their graded attempts at three gymnastic skills. After each graded attempt, the instructor replayed video of the attempt with the student to identify performance deficiencies. All participants completed three attempts at three separate skills: cartwheel, vertical rope climb, and shelf mount. Each attempt was scored on a five-point scale. Prior to each attempt, students provided an estimate of their projected score on the attempt. Participants also completed a pre/post-task questionnaire to measure demographics, motivation, perceived competence, and autonomy.

Data analysis revealed skill improvement in the participants. Overall, all the participants improved their task score on at least one event. Furthermore, half of the participants increased their task score on all three events. All the participants identified the video feedback as helpful for improving at least one of their skills. Within the group, 70% of students reported an increase in perceived competence, 90% reported an increase in autonomy, and 80% of the students reported an increase in motivation. Overall, 90% of the participants recommended the future use of the video feedback in the performance of each of the performance skills.

Findings demonstrated that students perceived video feedback as an effective method for enhancing skill improvement in gymnastics class. These findings indicate video feedback can be used to improve motivation, deliberate practice, competence, and autonomy. The ability to visualize performance cues for the students may also result in faster motor skill acquisition. The study suggests video feedback is an effective method of augmented feedback for students struggling with novel physical motor skill progression.

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CHAPTER 1

INTRODUCTION

Anna hates her military movement class at the academy. The class is a physically demanding course that incorporates gymnastic movements and requires balance, agility, coordination, and a great strength to weight ratio. All the cadets enroll in military movement during their first year at the academy and must pass the course to graduate and obtain a commission in the United States Army. Anna is in her second week of the class and has been struggling to score any points on the skills. Today's lesson includes a vertical rope climb and the cartwheel. She is familiar with the cartwheel but dreads climbing the rope. As with every class, the instructors give a flawless master demonstration of the vertical rope climb and the cartwheel. The class splits in half to work on the skills prior to testing. Anna starts out with the vertical rope climb. She does not want to fail in front of her peers so instead of practicing the skills she hides out on the edges of the class. She makes a single attempt at the vertical rope climb and is unable to obtain a basic lock to start climbing. Anna spends the next ten minutes avoiding the attention of the instructors.

The groups rotate, Anna is supposed to be practicing the cartwheel. She feels confident about the cartwheel since she took tumbling when she was younger. Anna does a couple of practice cartwheels and is ready to test for points. She thinks she lands a perfect cartwheel and is shocked when the instructor tells her she only scored one point out of a possible five. The instructor provides such vague feedback. *What does it mean*

that my legs were bent? Anna is frustrated and a little embarrassed; she does not want to ask for clarification. She is not sure what she needs to work on and does not want to keep trying to score points on her cartwheel. Anna spends the rest of the class coping and avoiding the attention of the instructors again. She has decided that she will just fail this round of military movement and retake the course next semester.

The low performing male cadets in the class seem to have no qualms about failing their attempts multiple times during class. Anna is a little jealous at how ready the men are to fail in front of their peers. *The men fail the cartwheel repeatedly but still believe they can achieve a perfect score on the skill. Where do they get their confidence? Who cares if I can climb a rope or do a perfect cartwheel? I will not need to use these skills in combat. These instructors are not interested in helping me succeed in this class.* Anna thinks the instructors do not care about her success and that they only give useless verbal cues for feedback.

Problem of Practice

Within the Physical Education Department at the academy, instructors are constantly seeking improvements and efficiencies within the curriculum and program of instruction. As leaders, we are responsible for giving purpose, direction, and motivation to our students (Baghurst et al., 2015). One of our biggest challenges is motivating our lowest performers to effectively use their practice time to improve their physical skills. Our core physical education classes are a graduation requirement. This means that every cadet at the academy must pass our classes to obtain a commission as an officer in the United States Army (Gist, 2016). Failing core classes can result in the removal of cadets from the academy.

The two largest factors for inability to perform gross motor skills are a lack of physical abilities (Evans, 2013) or the lack of productive feedback (Roure et al., 2019). The ability to give clear and concise feedback (Turner & West, 2013) will help students properly practice and develop the physical skills (Hatzipanagos & Warburton, 2009) and efficiency will generate more time to spend on skill mastery (Smith, 2011). Instructors need to seek efficient teaching methods to achieve course goals and to provide their students with correct information to enhance learning, behavior, knowledge, and positive student attitudes (So-Chen et al., 2016). Erturan (2014) found the nature of teaching styles, type of feedback, time spent on the task, size of the class, and the nature of learning content are the most crucial factors that are related to teaching effectiveness. In addition, instructors need to foster an effective teacher-student interaction that provides a participatory environment for all students (Griffin et al., 2013).

Prior research (Van Acker et al., 2010; Vanderhasselt et al., 2018) suggests that gender effects the prevalence of confidence and coping skills. Kamas and Preston (2012) found that gender differences account for achievement beliefs as well as the preferred method of coping. Furthermore, current research suggests female students are less achievement motivated compared to male students in physical education (So-Chen et al., 2016; Tan & Pang, 2012; Ulstad et al., 2019). Consequently, female students may respond by lowering their expectations for success in challenging tasks and avoiding the stressor (Yeung, 2011). Yeung found that female students may be inclined to try harder to overcome the difficulties they encounter in the classroom. Outcomes from traditional gender stereotypes have contradictory findings. Vanderhasselt et al. (2018) found female students are more likely to engage in coping and avoidance strategies in the presence of

stressors. Yeung (2011) reported that female students displayed greater degree of effort in challenging tasks. Kamas and Preston (2012) found that emotional based coping, avoidance of problems brought about by stressful situations, predicted higher levels of anxiety and depression. Research suggests that some females appear more apt to cope and avoid due to a fear of failure (Baghurst et al., 2015).

One of the greatest limiting factors to skill acquisition for students is the lack of quality feedback during instruction (Turner & West, 2013). Finding a better method of feedback for the students in the military movement class should increase their ability to perform the required physical skills and thus improve the passing rate for the class. The problem of practice is that our current method of instruction and feedback is insufficient at developing our less skilled students within the physical program.

Theoretical Framework

The theoretical framework for this study gives the focus for using effective feedback to effect change in motivation levels and aid in skill development. The foundation of my theoretical framework aligns with social learning theory (Bandura, 1977). Bandura (1977) found the use of demonstrations and proper practice are vital to skill development. Students are not able to learn a physical skill effectively without practice (Badets & Blandin, 2005). In physical education, motivation is also a key element of skill development. Students need motivation to learn and have a willingness to practice developing their skills. The self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000) addresses several types of motivation individuals use to engage in challenges. A common method for increasing motivation in physical education is the use of effective feedback (Hattie & Timperley, 2007). The motor learning theory (Schmidt,

1975) highlights the importance of augmented feedback for skill development. The theoretical framework concludes with the overarching theory of feminism (Corey, 2009). All students deserve the best instruction to allow for success.

Social Learning Theory

Instructors enhance learning through effective modeling and efficient feedback. Bandura (1977) suggests in social learning theory that observational learning through modeling, demonstrations, and practice can have a powerful impact on learning. Within the physical program, instructors heavily rely on social learning theory for the development of physical skills. The conditions for effective modeling require student attention, mental retention, reproduction, and motivation (Chng & Lund, 2018). Modeling and observational learning play a significant role in Bandura's social cognitive learning theory. “Virtually all learning phenomena resulting from direct experience occur on a vicarious basis by observing other people's behavior" (Bandura, 1977, p. 12). This observational learning process is useful in physical education. According to Bandura (1986), observational learning describes a process where the observers transform visually modeled events into coded memories, which the students then use for later retrieval during practice. The coded memories formed guides the motor reproduction phase. In theory, the use of repeated exposures to a model will aid in the development of the modeled performance (Bandura, 1986). This theory shows the need for repeated views of a model or demonstration of a skill for the individual to effectively learn a motor skill.

The student’s level of attention to the demonstrations is also a key element of Bandura’s social learning theory (Badets & Blandin, 2005). Students need to see modeling to develop mental cues that will serve as a reference point for the required

actions to perform a task (Chng & Lund, 2018). Research has shown that learning models can be just as useful as expert models and, in some cases, more beneficial for learning (Chng & Lund, 2018; Chatoupis & Vagenas, 2018; Domville et al., 2019; Flintoff, 2008), suggesting observation as a powerful learning tool.

When watching a demonstration, the observer is actively involved in the problem-solving process (Chatoupis & Vagenas, 2018). While actively watching a learning model, the observer is not just trying to repeat the form but is also finding what works and what does not work (Chng & Lund, 2018). In fact, mental visualizations and practice have shown similar learning benefits as observational practice, indicating the role of students' cognitive processes at facilitating these benefits (Smith, 2011).

Self-Determination Theory

To address motivation, this study draws from self-determination theory. The theory centers on the premise that interpersonal and environmental contexts can either cultivate or obstruct a person's behavioral regulation (Deci & Ryan, 1985). According to Ryan and Deci (2000), students actively seek out challenges and experiences in their environments to master. Whether the social environment supports or thwarts, the satisfaction of basic psychological needs influences future attempts to master a new experience (Black & Deci, 2000). Seeking out challenges within the environment fosters intrinsic motivation through the satisfaction of three basic psychological needs: autonomy, competence, and relatedness (Ryan & Deci, 2000). The degree to which we meet these needs, influences the type of motivation: intrinsic, extrinsic, or amotivation, which account for several reasons why individuals choose to engage or avoid certain challenges or activities (Badets & Blandin, 2005). Hattie and Timperley (2007) found

effective feedback methods help increase the students' motivation to practice and actively participate in class activities.

If a student perceives feedback as controlling, the result is a reduction in motivation (Drost et al., 2018). However, if a student perceives feedback as informational, the result is an increase in motivation (Baghurst et al., 2015). Drost et al. (2018) found that negative feedback will lower motivation, regardless of whether the student views the feedback as controlling, because of its detrimental effects on perceived ability. Research shows that males' motivation tends to increase after receiving positive competence feedback, while females' motivation sometimes decreases (Baghurst et al., 2015). Kamas and Preston (2012) suggest that female students may be more sensitive to a teacher's efforts to control their behavior.

Motor Learning Theory

The theory of framing feedback for this study aligns with Schmidt's (1975) schema theory of motor learning. Motor skill development is a dynamic process that has both quantitative and qualitative changes in behavior due to practice time and experience (Chng & Lund, 2018). Research surrounding motor learning examines the nature of change (Light, 2011), what type of practice helps this change (Lage et al., 2007), and the time periods over which change occurs (Smith, 2011). Motor learning development occurs when the student refines the skills, and the physical motor patterns are locked into memory, based on feedback through the knowledge of performance or knowledge of results (Sharma et.al., 2016).

A key part of Schmidt's (1975) schema theory is the use of augmented feedback. He indicated that augmented feedback consists of two aspects: knowledge of

performance and knowledge of results. Previous research has shown that augmented feedback is a vital component to learning (Constantinou & Ioannou, 2016). According to Smith (2011), instructors must present augmented feedback to the learner as often and as soon as possible after an attempt to enhance the evaluation of movement and reinforce the memory representation.

Feminist Theory

> According to Corey (2009), feminist theory is based on the following principles: (a) problems originate in political and social contexts; (b) commitment to social change is necessary; (c) acknowledging different ways of knowing gives voice to women; (d) an egalitarian relationship is central to the therapeutic relationship; and (e) political and social inequity negatively affect all people. (p. 27)

Avci (2016) noted that feminist theory also focuses on empowerment and helping consciousness raising. Avci also found that since women have different sensory skills than men the research suggests that female students prefer to gain knowledge and deal with others through verbal communication. Avci suggests that instructors should be prepared to account for gender differences.

Research also shows there are differences in the reception of feedback across genders (Van Acker et al., 2010). Instructors tend to provide male and female students distinct types of feedback (Valley & Graber, 2017). Gender differences in the receipt of feedback influence students' motivation and relations with teachers (Tang & Pang, 2012; Vanderhasselt et al., 2018). Gender differences in teacher-student relations appear in elementary school and appear consistent by high school (Van Acker et al 2010; Valley & Graber, 2017; Vanderhasselt et al., 2018). Some researchers suggest that positive female

student-teacher interactions in elementary school leads to higher risk-aversion and equates to a greater need for adult feedback compared to male students (Vanderhasselt et al., 2018; Voelker, 2016; Walton-Fisette & Sutherland, 2018). Extrinsically motivated females are less likely to engage in a challenging task after receiving constructive feedback from an adult (Weaver et al., 2018).

Implications

A review of the theoretical framework suggests that students who are motivated to take part in class will display more effort while seeking out challenges that will result in skill mastery (Bandura, 1977; Deci &Ryan, 1987; Schmidt, 1991). Self-determination theory suggests that feedback can influence students' motivation to engage or avoid challenges (Deci & Ryan, 1987; Kast & Connor, 1988; Ryan & Deci, 2000). Schema theory highlights the advantages of using augmented feedback to influence learning of motor skills (Schmidt, 1991). Accounting for the differences in gender, the feminist theory suggests there are many ways of learning. This study looks to find a method of feedback that is effective for female students.

Purpose of the Study

The purpose of this study was to determine how video feedback effects skill performance in physical education classes. Specifically, the researcher was interested in the perceived benefits of video feedback for the low performing females in an applied gymnastics class. Additionally, the study examined the effect of video feedback on product and process performance and the effect of student performance on student motivation. The overall goal of the study was to find a better method of feedback to help female cadets improve their performance.

Research Questions

This action research study sought a more efficient method of providing female students individualized feedback with the goal of decreasing the physical skill gap between the males and females at the military academy. The research questions guiding this study were as follows:

1. What are female cadets' perceptions of video feedback for skill evaluation and skill improvement?
2. How do female cadets perceive video as an additional method of feedback?
3. How do female cadets perceive video feedback as a method to promote motivation for deliberate practice?
4. How do female cadets' perceptions of their skills change when video is added as an additional method of instructor feedback?

Rationale

While female cadets only make up about 24% of the students at the academy (PAO, 2019), females account for about 40% of the low performers and failures in the military movement class. According to the end of year report (Goetz, 2020), there were 68 course failures in the academic year 2019-2020. Goetz found that female students accounted for 27 of the course failures and failed the course at twice the rate of the enrolled males. The lower performing female students struggle to score points on many of the physically demanding tasks in the course. It is speculated that the low performing students lack intrinsic motivation and are therefore less likely to use their free time to work on their skills. Given the minimal time for classroom instruction and modeling, instructors should look for efficiencies (Coelho, 2019). To aid in student participation and

buy-in, the students should perceive a benefit from the feedback provided by instructors (Chatoupis & Vagenas, 2018). Effective feedback will increase student motivation (Cecchini et al., 2019) while giving positive reinforcement of goals (Baghurst et al., 2015) and showing the correct and incorrect actions in the execution of a skill (Hattie & Timperley, 2007). Instructor feedback enhances student learning (Sharma et.al., 2016) through an evaluation of their contributions, discrepancies, and how to fix their errors (Berlin & Dargnies, 2016).

Researcher Positionality

The positionality of the researcher can influence the methodology and the process of the study. Herr and Anderson (2005) found that action research is "inquiry that is done by or with insiders to an organization or community, but never to or on them" (p. 3). "Positionality is a latent force and becomes apparent to self and others when an outward action is expressed to show the political stance of an individual or group" (Teo, 2015, p. 385). As an assistant instructor in the military movement class, I am working as an insider (Herr & Anderson, 2015). To maintain objectivity throughout the study, I functioned as a participant as observer. Mertler (2014) suggests that the more active role in the setting allows the researcher to observe and take notes while also interacting with the participants.

The primary instructors and the course director aided me in the execution of the study. Dana and Yendol-Hoppey (2014) suggest collaboration in research is important for teacher-inquirers due to the benefits of shared inquiry as well as the safety and strength in numbers. As an assistant instructor, I am aware of my role to motivate and instruct the cadets in the best method to generate skill improvements (Coelho, 2019). Collaboration

with the additional instructors helped provide adequate data collection during the study. Building a team of teacher-inquirers from within the committee helped generate interest in potential changes to the curriculum according to Dana and Yendol-Hoppey (2014). Collaborating instructors stayed within established parameters for giving feedback and assessment for the class as outlined in the course manual (Coelho, 2019).

As an Army officer, I was also in a superior role to the cadets. To minimize undue influence, the study was completely voluntary. I offered the study only to students who were not enrolled in my primary classes. I protected their identities with the use of coded identification numbers throughout the study. The participants grades were not negatively affected if they chose to not take part or quit prior to the completion of the study. Students added any skill points earned during the study to their score in the course regardless of completion or participation in the study in accordance with the course manual (Coelho, 2019). As a male studying the female population, I relied on the assistance of two female instructors to record the videos and provide the verbal feedback. The female instructors also served as a safe person for the participants to discuss their feelings during the intervention if they did not feel comfortable speaking with a male instructor. The video recordings were taken on each participants' personal cell phone and the participants could save or delete the videos after the instructor review of the attempt was complete. No videos were saved for future viewing by the instructors.

"Teachers embody and enact their positionality when creating learning opportunities for students in and outside the classroom" (Teo, 2015, p. 401). As a former student of military movement, I understand the difficulties of mastering new gymnastic skills with minimal verbal feedback. As a parent of two school-aged children, I truly want

to see every child succeed. As the father of a teenage daughter, I wanted to explore feedback methods to help females have the confidence to close the physical skills gap with the males. Examining positionality addresses the problems of the fixed nature of identity and allows others to abandon binary thinking in feminism and multiculturalism debates (Anthias, 2002).

Methodology

Design of the Study

To answer the research questions, this study's research design was a mixed methods action research study. Action research connects theory to practice and has a connection to school improvement (Mertler, 2014). Furthermore, "Action research can also be used to find solutions to problems you have identified and ultimately test their effectiveness" (Mertler, 2014, p. 25). Selection of an action research design allowed me to use "problem-solving strategies to arrive at a possible solution" (Johnson, 2008 as cited in Mertler, p. 25).

This study examined a unique subject, low-performing female cadets, in a single setting, military movement class. In this study, the researcher was an active participant in the study and aimed to enhance school improvement (Efron & Ravid, 2013, p. 48). Efron and Ravid (2013) found the role of the researcher within a mixed methods approach "assumes both objective and subjective stances" (p. 48). The design of the military movement class offered a unique opportunity to collect data while also allowing the researcher to actively seek improvement in the classroom.

The major theme of the study was qualitative in nature. I sought to understand "how people interpret their experiences" (Merriam & Tisdell, 2016, p. 30) within the

context of the class. Capturing the perception of the students is qualitative. According to Leedy and Ormrod (2005), a qualitative approach is appropriate if there are "multiple realities constructed by different individuals" (as cited in Mertler, 2014, p. 88). The qualitative design of the study permitted the researcher to capture the unique perspectives of each participant regarding the effects of the intervention.

Setting

The research site is a four-year military service academy. The school enrollment is 4,400 with 24% being women (PAO, 2019). The study will occur during the military movement course.

> The military movement course is a 19-lesson course designed to expose cadets to a variety of basic movement skills. The course serves as a basis for many other athletic and military activities that cadets will encounter during their time at [the academy] as well as in their Army career. [C]adets are required to learn a variety of relevant skills from within the general themes of rolling, hanging, climbing, crawling, jumping, vaulting, landing, mounting, supporting, and swinging. In addition, the environment where a skill is performed is changed or modified to challenge the cadet and broaden the movement experience. Movement environments are designed around specific events such as tumbling, vaulting, vertical ropes, horizontal ropes, and the indoor obstacle course (IOCT). (Gist, 2016)

According to the course manual (Coelho, 2019), the student to teacher ratio in the class was 10:1. Each class had between 40-45 students. The average class consisted of

about 30-35 males and 5-10 females. The study took place over the course of four weeks during the additional instruction time outside of the regularly schedule class time.

Participants

There were 64 females enrolled in the course during the study. Out of the 64 females enrolled, there were 35 females who had earned less than 50% of the available points in the course at the time of recruitment. The recruitment email (Appendix A) was sent out to the 35 females that represented the lowest-performing females in the class. For this study, I selected 10 volunteers from the lowest performing female students currently enrolled in the military movement class. The class is a mandatory graduation requirement at the academy, and students take the course during their freshman year. I used extreme case sampling to select the lowest performing females, which is supported by Maxwell (as cited in Efron & Ravid, 2013) who states that extreme case sampling is appropriate for selecting participants who "are judged to be the most outstanding examples of a characteristic or behavior studied" (p. 62). I focused the selection on the females who actively display avoidance and coping techniques during skill practice time in class because females disproportionately make up most of the low performers and failures in military movement class. I theorized that the low performing females lack intrinsic motivation (Deci & Ryan, 1987) and are therefore less likely to use their free-practice time to work on their skills. None of the females had limiting physical profiles that would have inhibited their ability to complete the requirements of the course.

Student participation in the study was completely voluntary. The participants were able to quit the study at any time with no repercussions. Skill points earned during the study counted towards regular class points in the same manner as additional

instruction time scoring. There was no extra incentive to take part in the study beyond the potential benefits of the intervention. To avoid perceived pressure to take part in the study, the recruitment flyer for participants in the study did not include my rank or position. A colleague sent out the recruitment email on my behalf. I did not want my students to feel the need to take part just because I was the one running the study. A signed informed consent form was collected from each participant authorizing the use of video recording (Appendix B). Student data were confidential and anonymous. Each participant received a unique participant number for use on all surveys, interviews, videos, and assessments. No identifiable information was collected or used in the study. The data collection tools did not hold any identifiable participant information.

Data Collection Methods

The study used the earlier work of Standage et al. (2005) and their assessment of self-determination theory in school physical education for the questionnaire measures of motivation. This study used multiple methods of data collection to address the research questions. The data were collected using instructor observations, student questionnaires, interviews, video recording of graded attempts, and assessments.

Observations

The participants were observed throughout the intervention session to assess their use of deliberate practice time. Before and after each graded attempt of a skill, the students were provided approximately three minutes of free time to use at their discretion. The number of practice attempts was recorded for each participant. The students were not provided any information on how to use their free time between graded attempts. The instructors also recorded whether the student watched the video recording an additional

time between graded attempts. The participant was given credit for active use of deliberate practice time if they actively tried performing the skill or were seen viewing the recording.

Questionnaires

The cadets responded to pre/post-test questionnaires that included measures of autonomy, competence, and motivation. The same questions were used for pre- and post-tests to find any changes in autonomy, competence, or motivation. The pre-test questionnaire also included demographic questions for age, race, and gender. The questionnaire contained several questions to determine the participants' perception of their physical fitness, motivation levels, skill acquisition, and confidence. The questionnaire included reverse coding for some of the items to increase the reliability of the tool (Standage et al., 2005). The questionnaire was comprised of statements to which the participant indicated a level of agreement with the statement based on a 5-point Likert scale (*strongly agree, agree, neutral, disagree, strongly disagree*). Examples of questions include the following:

- I feel like this class is a waste of time.
- The current method of instruction is sufficient to teach me the new physical skills.
- I understand the value of this course.
- Verbal cues are effective form of feedback to change my motor patterns.

Interviews

Semi-structured interviews were conducted with the participants before and after the intervention. Open-ended questions were used to measure the benefits the cadets

identified during the intervention. I also used the interviews to assess how giving video feedback would affect the instructor/cadet process for skill evaluation and skills improvement. I recorded the interviews and transcribed the interviews along with any notes taken.

Video Recording

The instructor recorded each graded attempt of the skills using standard video recording settings on the participant's phone. The participant then viewed the recording of their attempt with the instructor to identify the key areas for skill improvement. The instructor then visually showed the student what elements of the skill were performed correctly, incorrectly, as well as gave the participant a grade for the attempt. Each student received three attempts per skill. The purpose of the video recording and associated feedback was to inform the student about their quality of movement during the execution of the physical task. Video evidence and augmented feedback informs the learner (Turner & West, 2013). The instructor focused the feedback on the visual depiction of the verbal cues of the skill being tested. For example, in the cartwheel skills test, the instructor may have addressed the need for straight legs and pointed toes throughout the execution of the skill. The instructor could use the video recording to highlight the portions of the skill attempt where the student's legs bend or where the student maintained proper form and execution.

Assessments

Cadets provided an estimate of the score they felt they would get when they performed the skill for a grade prior to each attempt at execution. The students also provided a rating level to address their previous experience and comfort level with each

task prior to the first attempt. The experience level was based on a 5-point Likert scale (1= *I have never heard of the exercise* to 5 = *I am an expert*). The attempt score was also collected based on the performance scores of the participants. Data for each participant was collected at the end of each session for performance of the task.

Much of the information sought from the data collection methods was intended to provide a clear picture of the effects of the intervention on skill improvement as well as the effects on motivation to attempt the skills. I relied heavily on qualitative data to reflect perceptions, feelings, attitudes, and opinions of the intervention.

Data Analysis

Quantitative data assessed the rate of student skill improvement as well as the student's self-awareness of their skill level. I reviewed videos of each student's attempt at the graded task, focusing on the participant's form and the proper execution of the skill. I used the 5-point assessment tool based on the elements of the physical skill cues introduced during the skill instruction as provided in the course manual (Coelho, 2019) (see Appendix C). Each graded attempt by the student resulted in a score ranging from 0 to 5. Each student attempted each of the three skills three times for a possible total task score of 0 to 45. The quantitative data were used to illustrate rate of skill acquisition and improvement. Analysis of the predicted scores and earned scores illustrated whether the students' perception of their skills aligned closely with their performance after receiving video feedback.

Qualitative data from each stage were analyzed based on emergent codes that were developed inductively from the text data collected throughout the study (Ivankova, 2015). The qualitative data on the performance of the graded tasks were analyzed through

content analysis (Creswell, 2005). The qualitative feedback was collected by pre and post-tests to analyze changes in the ratings. In turn, this data helped illustrate perceived benefits of video feedback. The qualitative data illustrated the autonomy and expectation levels of the cadets prior to each graded attempt.

Significance of the Study

This study aimed to improve the feedback process used in the military movement class at the service academy. The study also aimed to generate data concerning the efficiencies and effectiveness of video feedback. Instructors attempted to utilize video feedback throughout the physical education curriculum to enhance instruction for lower performers within the program. The action research study allowed immediate and direct implementation of findings into practices (Efron & Ravid, 2013) at the academy.

Limitations of the Study

This study was subject to a few potential limitations. The study relied on self-reported ratings for perception of feedback effectiveness. There was concern the students might not credit the method of feedback provided with their skill improvement. The study also included only the lowest performing female members of the class. High performing students may not see as much benefit from video feedback regarding their skill development or as a source of motivation. Another limitation of the study was that the participants had to feel a certain level of comfort working with a male instructor and being able to be open and honest in their answers and attitudes about the class.

Additionally, the study examined a unique population and unique set of skills as the sample population of low performing students is not representative of the student population at large. The selected skills are unique to the requirements of the military

academy and are not a common skill found in many physical education courses. The selected skills reflect two of the most failed obstacles during the Indoor Obstacle Course Test (IOCT). The IOCT is a unique test to the academy. The study also relied on specialized equipment, the shelf, which is not found in a typical gym setting.

Organization of the Dissertation

Chapter 1provides the background information and research questions for the study. Chapter 2 presents a review of literature in the following areas: (a) motor skill learning, (b) feedback, (c) motivation, (d) practice and instruction, and (e) video feedback. Chapter 3 details the setting and methodology used in this action research study. Chapter 4 presents the data collected and the findings from the study. Chapter 5 provides recommendations for future research projects.

Definition of Terms

The following terms appear throughout this study:

Academy: The four-year military service university.

Additional instruction: Additional scheduled time outside of regularly scheduled class periods for students struggling with skill mastery to get more practice and feedback from the instructors.

Cadet: A student enrolled at the academy.

Cue: “Any stimulus from outside or from within the body that helps a person recognize the correct movement or action” (Cronbach, p. 356)

Deliberate practice: Students trying to improve their skills through trial and error without verbal cues or feedback provided by the instructor.

Free time: Practice time allocated during class for the students to practice physical skills on their own.

General feedback: Non-specific feedback provided after an attempt to encourage the students.

Gross motor skill: Neuromuscular coordination involving large muscle contractions usually resulting in the movement of the whole body.

Informational feedback: Task specific feedback provided to the student to inform either correct performance or deficiencies.

Instructor: A teacher in the Department of Physical Education at the military service academy.

Skill: The ability of a performer to do a physical skill with a small amount of effort.

CHAPTER 2

LITERATURE REVIEW

One of the greatest limiting factors to skill acquisition for students is the lack of quality feedback provided during instruction (Turner & West, 2013). Our low performing cadets struggle with time on task and actively using the verbal cues provided by the instructors to practice the skills. The low performing students in class appear more apt to cope and avoid due to a fear of failure (Berlin & Dargnies, 2016). Finding a better delivery method of feedback for the female students in the military movement class should increase their ability to perform the required physical skills and thus improve the passing rate for the class. The problem of practice is that our current method of giving verbal cues as the only source of informational feedback is insufficient at developing our low-skilled female students within the physical program.

Rationale

Female cadets have historically struggled in the military movement class. The low performing females struggle to score points on many of the physically demanding tasks in the course. I hypothesized that the low performing females lack intrinsic motivation towards the class and are therefore less likely to use their deliberate practice time in class to work on their skills. Given the minimal time for classroom instruction and modeling, instructors should look for efficiencies (Coelho, 2019). Chatoupis and Vagenas (2018) suggests that students should perceive a benefit from the feedback provided by

instructors. These perceived benefits of effective performance feedback should aid in female student participation and buy-in. Effective performance feedback within motor development should answer three questions for the student: (1) How was my performance of the task? (2) What were my deficiencies in the execution of the task? (3) How do I correct my deficiencies? (Hattie & Timperly, 2007). Overall, effective feedback should increase student motivation (Cecchini et al., 2019) while giving positive reinforcement of goals (Baghurst et al., 2015) and showing the correct and incorrect actions in the execution of a skill (Hattie & Timperley, 2007). Instructor feedback enhances student learning (Sharma et.al., 2016) through an evaluation of their contributions, discrepancies, and how to fix their errors (Berlin & Dargnies, 2016).

Research Questions

This action research study sought a more efficient method of providing female students individualized feedback with the goal of decreasing the physical skill gap between the males and females at the military academy. The research questions guiding this study are as follows:

1. What are female cadets' perceptions of video feedback for skill evaluation and skill improvement?
2. How do female cadets perceive video as an additional method of feedback?
3. How do female cadets perceive video feedback as a method to promote motivation for deliberate practice?
4. How do female cadets' perceptions of their skills change when video is added as an additional method of instructor feedback?

Purpose of the Literature Review

The literature review serves as the foundation of the study. Action research looks to add to the existing literature (Efron & Ravid, 2013). The literature review places the study within the confines of the relevant literature (Herr & Anderson, 2015). "A good action research dissertation proposal will provide sufficient literature to frame the initial research question" (Herr & Anderson, 2015, p. 88). Machi and McEvoy (2016) suggest the literature review should help identify the research topic, specify and frame the research questions, and discover and advocate the research thesis. "The simple literature review documents, analyzes, and draws conclusions about what is known about a particular topic" (Machi & McEvoy, 2016, p. 3). The literature helps create support for a thesis position by "building a case from credible evidence obtained from previous research" (Machi & McEvoy, 2016, p. 5).

A review of the literature related to the problem of practice found a gender gap between males and females within physical education (Gerdin et al., 2019; Kamas & Preston, 2012; Scraton, 2018; Walton-Fisette & Sutherland, 2018). The theoretical framework gives evidence that effective teaching behaviors, strategies, and feedback methods are necessary to help motor skill development. Current studies suggest alternative methods of providing feedback may be more beneficial for female students in physical education (Scraton, 2018; Voelker, 2016). The literature suggests numerous benefits of using video to inform learning.

The literature review focuses on peer reviewed articles from trusted sources (Machi & McEvoy, 2016). When looking for sources of literature to frame the study and research questions, the researcher should seek primary sources (Efron & Ravid, 2013).

Efron and Ravid suggest using educational electronic databases as well as seminal articles whenever possible. For this research, I used primary resources found online through the University of South Carolina database search. For the current research articles, I primarily searched ERIC and EBSCOhost with a focus on journal articles published in physical education journals and used only peer-reviewed scholarly articles. For my theoretical framework, I used seminal articles as well as some current sources to help build the framework.

Organization of the Chapter

The design of this study was to add to the existing sports and physical education literature on the benefits of using video feedback to inform motor skill development and improve student motivation. The intervention examined the relationships between video feedback and female cadet motivation to practice a skill as well as the student's graded performance of the skill. The study employed the theoretical framework of three unique pedagogies: social learning theory (Bandura, 1977), self-determination theory (Deci & Ryan, 1985), and schema theory (Schmidt, 1975) with an overarching feminist theory (Corey, 2009). This chapter presents a brief review of these theories and the constructs. After the theoretical framework, there is a summary of the literature supporting the unique role of the teacher within the physical education classroom. Next, I present an examination of the role of feedback as well as the special considerations for gender differences in physical education. This chapter closes with a review of scholarly articles reporting results of video feedback and its relation to the effects on student motivation as well as student performance in physical education.

Theoretical Framework

Social learning theory (Bandura, 1977), self-determination theory (Deci & Ryan, 1985), motor learning theory (Schmidt, 1975) and feminist theory (Corey, 2009) serve as the theoretical framework of the study. The theoretical framework serves to ground the context of the study within the existing literature. Efron and Ravid (2013) suggests the action researcher links their findings to existing theories. The researcher should then interpret their assertions within the context of the theoretical framework.

Social Learning Theory

Hattie & Timperley (2007) found effective instructors enhance social learning through modeling and efficient feedback. Modeling is an instructional strategy in which the teacher demonstrates a new skill and students learn by observing (Bandura, 1977). Task modeling is a dominant teaching strategy in physical education. Bandura (1977) suggests that through social learning theory observational learning through modeling, demonstrations, and practice can have a powerful impact on learning. Light (2011) theorized that social learning was the predominant method of learning within primary schools' physical education classes. Within the physical program, instructors heavily rely on social learning theory for the development of physical skills (Light, 2011).

Teachers need students' attention, mental retention, reproduction, and motivation to set the conditions for effective modeling (Bandura, 1977). Modeling and observational learning play a significant role in Bandura's social cognitive learning theory.

Self-Determination Theory

Self-determination theory addresses the importance of motivation within the learning environment (Deci & Ryan, 2000). "Motivation can manifest in many ways and

influence participation, effort, performance, and wellbeing" (Ulstad et al., 2019, p. 1086). Teachers can influence the level of motivation occurring within the classroom and across activities (Warburton & Spray, 2008). Intrinsic motivation is characterized by autonomy, interest, enjoyment, and need satisfaction and is the highest form of self-regulated behavior, with an internal perceived locus of causality (Deci & Ryan, 2000).

If a person participates in an activity purely because they want to, that individual has an internal locus of causality. However, if that same person only participates in the activity due to a perception of pressure from others, then that person may have an external locus of causality (Ulstad et al., 2019). An individual's locus of causality can be influenced by their environment and it can affect perceptions of choice and autonomy (Nation-Grainger, 2017). Ulstad et al. (2019) found that people who are intrinsically motivated pursue exercise for interest, enjoyment, and satisfaction. Intrinsically motivated people feel in control of their physical activity. Baghurst et al. (2015) found that intrinsic motivation has been shown to be an important characteristic of people who continue to be physically active.

On the other end of the motivational spectrum are unmotivated individuals. When it comes to physical fitness, an unmotivated person lacks a desire to work out (Baghurst et al., 2015). According to self-determination theory, a person who is lacking intrinsic and extrinsic motivation will not feel any pressure to perform and thus will show little effort in a classroom environment (Badets & Blandin, 2005). The need for autonomy is influenced by the perceived locus of causality (Ulstad et al., 2019). Nation-Grainger (2017) used technology to motivate adolescents to participate in physical activity. His

study suggests that increasing motivation levels of physical education students results increased levels of physical activity in class.

Motor Learning Theory

The historical basis of motor learning theory originates with Adams' (1971) closed-loop theory of motor control and Schmidt's schema theory of discrete motor learning (1975). The closed-loop theory of motor control was limited regarding task novelty, error detection, and feedback dependency (Sherwood & Lee, 2003). Schmidt developed the schema theory to address the limitations in Adams' theory. Both motor learning models need a demonstration or representation of the movement to form a memory of the movement in the learner. Under these theories, motor learning occurs with feedback provided during practice to form a memory of the motor pattern (Sherwood & Lee, 2003).

Schema theory consists of three main concepts: generalized motor program, recall schema, and recognition schema (Schmidt, 1975). According to Schmidt (1975) the generalized motor program is a mental memory created from the basic pattern of movement. He indicates the creation of the program requires adjustments to vary motions in a systematic pattern with the detection and knowledge of errors. He specifies that recall schema provides the parameters based on prior trials and experiences surrounding the skill or movement and recognition schema informs the student when an error has been made during an attempt. For skill improvement to occur, the student will use trial and error with associated feedback to prompt adjustments in the process (Schmidt, 1975).

The theory of framing feedback for this study aligns with Schmidt's (1975) schema theory of discrete motor learning. A key part of Schmidt's (1975) theory is the

use of augmented feedback. He states that augmented feedback consists of two aspects: knowledge of performance and knowledge of results. Schmidt sought continual refinement of his motor schema theory. In 2003, Schmidt reviewed the past 27 years of motor schema theory to examine the findings and address implications for a new theory of motor learning. Schmidt (2003) acknowledged motor learning as a dynamic process but cautioned against using a dynamical systems theoretical approach to motor learning. Sherwood and Lee (2003) suggest a shift towards information-processing theory to account for the cognitive aspects of motor learning.

Motor skill development is a dynamic process that has both quantitative and qualitative changes in behavior due to practice time and experience (Sherwood, 1988). Sherwood and Lee (2003) view cognitive effort as an aspect missing in earlier motor learning theories. “In specific reference to motor skills, cognitive effort refers to those decisions the result in perceptual and motor processes involved in movement control” (Sherwood & Lee, 2003, p. 378). Performers should not only practice the motor skill but should also practice the decision-making processes of the skilled behavior. Teachers can manipulate practice session variables such as observation, augmented feedback, and the order of practice trials to influence the level of cognitive effort required of the student (Sherwood & Lee, 2003). Schema theory also does not account for the theoretical contributions of mental practice. Imagery shares a relation to cognitive effort. If the mental imagery takes greater effort, then the memory of the skill will strengthen (Sherwood & Lee, 2003).

Current research surrounding motor learning theory examines the nature of change (Erutran & Hulya, 2019), what type of practice helps this change (Lage et al.,

2007; Ellison & Woods, 2016), and the time periods over which change occurs (Badets & Blandin, 2005). Motor learning development occurs when the student refines the skills, and the physical motor patterns are locked into memory, based on feedback through the knowledge of performance (Smith, 2011) or knowledge of results (Sharma et al., 2016). Augmented feedback is a vital part to learning (Kangalgil & Özgül, 2018). According to Smith (2011), instructors must present augmented feedback to the learner as often and as soon as possible after an attempt to enhance the evaluation of movement and reinforce the memory representation. However, Smith only focused on providing the knowledge of results.

Feminist Theory

Feminist research aims to add to the knowledge base and understanding of gender (Van Acker et al., 2010), gender differences (Vanderhasselt et al., 2018), and how to restructure curricula and the school climate to promote social justice and equity (Walton-Fisette & Sutherland, 2018). Within physical education, there is a need to critically examine the assumptions about gender (Mooney & Hickey, 2012). Kamas and Preston (2012) found long standing patriarchal gender ideologies as the primary source of gender inequity. Hannon and Ratliffe (2007) found the opportunities for female students to actively participate in physical education classes varied greatly between coed and single gendered classes. They found that female students in a single gendered class were more likely to participate and actively sought out positive teacher interactions than the female students who participated in coed classes.

Corey (2009) found that feminist scholars view their role as to educate others on the inequities of women. Van Acker et al. (2010) explored the potential to level the

playing field between the sexes using modified games. The feminist researcher should seek out opportunities to promote equality and address inequalities in the classroom (Walton-Fisette & Sutherland, 2018). Feminist theory has looked to quantify and explain the differences of the genders in terms of their biological sex (Constantinou, 2008).

According to Corey (2009), feminist theory is based on the following principles:

> "(a) problems originate in political and social contexts; (b) commitment to social change is necessary; (c) acknowledging different ways of knowing gives voice to women; (d) an egalitarian relationship is central to the therapeutic relationship; and (e) political and social inequity negatively affect all people" (p. 27).

Avci (2016) noted that feminist theory also focuses on empowerment and helping consciousness raising. Avci found that since women have different sensory skills than men the research suggests that female students prefer to gain knowledge and deal with others through verbal communication. Avci suggests that instructors should be prepared to account for gender differences.

A review of the theoretical framework suggests that students who are motivated to take part in class will display more effort while seeking out challenges that will result in skill mastery (Bandura, 1977; Deci & Ryan, 1987; Schmidt, 1991). Self-determination theory suggests that feedback can influence students' motivation to engage or avoid challenges (Deci & Ryan, 1987; Kast & Connor, 1988; Ryan & Deci, 2000). Schema theory highlights the advantages of using augmented feedback to influence learning of motor skills (Schmidt, 1991). Accounting for the differences in gender, the feminist theory suggests there may be different methods of instruction more appropriate for

female students. This study looks to find a method of feedback that is effective for female students.

Examining Teacher Effectiveness

Success in the classroom relies on effective teaching methods and student attentiveness. What makes an effective teacher? Medley (1977) originally examined the relationship between teacher behaviors and measured student outcomes to show key characteristics of an effective teacher. The identified behaviors result in an effective teacher in any subject.

Historical Perspectives

Historically, teacher effectiveness has been based on either a process-process evaluation or a process-product evaluation (Medley, 1977). A focus on performance-based teacher education gave way to the rise of process-product evaluation (Medley, 1977). Rosenshine (1979) found that much of the prior research concerning teacher effectiveness was inaccessible and difficult to understand. Medley examined 289 studies concerning the effectiveness of teachers. Medley found a focus on teacher behavior and student learning outcomes created process-product relationships.

Teacher Behaviors

Effective teachers are skilled in eight classroom behaviors: (1) working with groups; (2) managing the classroom; (3) time management; (4) questioning; (5) teacher reactions; (6) managing behaviors; (7) teaching styles; (8) individualism (Medley, 1977). Effective teachers are fluent in the processes to manage the daily operations of the classroom (Evans, 2013). Effective teachers are skilled at giving individual feedback (Lynch & Curtner-Smith, 2019). Lynch and Curtner-Smith suggest teachers tailor their

feedback processes for each student. They found that teachers who can quickly deliver personalized feedback that included the student's name, an element of the answer that is correct, a brief explanation of necessary corrections, along with encouragement to continue the learning process created enhanced student engagement in their classrooms (Lynch & Curtner-Smith, 2019). Furthermore, Zhang et al. (2012) found that students positively respond to feedback when teachers include their name, corrective cues, and offer positive encouragement.

Student Activity Levels

Lynch & Curtner-Smith (2019) found that effective teachers engage their students in specific activity time more than ineffective teachers. More effective teachers also spend less time discussing information that is not related to class content (Hume, 2018). Research suggests adequate instruction time and planned presentations result in effective lessons (Chatoupis & Vagenas, 2018). Teacher actions have a powerful impact on their students' motivation to participate in classroom activities (Zhang et al., 2012).

Content Knowledge

Teachers who ask more questions of their classes result in higher achievement scores (Medley, 1977). Effective teachers serve as subject matter experts within the classroom (Chatoupis & Vagenas, 2018). Teacher competence has a direct correlation with student achievement (Medley, 1977).

Environment

Instructors who keep a more disciplined learning environment are more effective teachers (Medley, 1977). Drost et al. (2018) found that effective teachers spend less time giving managerial feedback to the students. Effective teachers use feedback and rewards

to help motivate their students' achievements (Rink, 2002). Teachers have a considerable influence on how their students perceive their environment in the classroom (Chng & Lund, 2018).

To build a cohesive intervention, the teacher must have a good understanding of the behaviors and actions of an effective teacher. The literature suggests there are useful behaviors for teachers to employ regardless of the subject they teach. The effective teacher must have control of their environment, student accountability, an elevated level of content knowledge, and be able to maximize student activity levels. The current literature supports the need for effective teachers in the learning process. These behaviors lay the foundation for creating an effective physical education teacher.

Role of the Effective Teacher in Physical Education

While it is important to have the traits of an effective teacher, physical education teachers require some unique teaching behaviors to achieve student success in their classes (Erturan, 2014). Lynch and Curtner-Smith (2019) suggest that physical educators must be adept at verbal communication, visual demonstration, motivation, and feedback techniques. Effective physical education teachers need to give a clear purpose for each activity (Warburton & Spray, 2008). Zhang et al. (2012) found that effective physical education teachers are highly skilled at identifying the purpose and objectives of the daily lessons. Within physical education, instructors should strive to cultivate a lifelong passion for physical fitness (Clark, 2019; Coelho, 2019; Gist, 2016; Voelker, 2016). A goal of physical education is to equip students with the skills, attributes, confidence, and motivation to enjoy a physically active lifestyle (Zhang et al., 2012).

Direction and Modeling

Effective physical education teachers must provide clear directions paired with expert modeling (Erutran & Hulya, 2019). Kangalgil and Özgül (2018) found effective motor learning is related to the viewing of action patterns or modeling. Erturan and Hulya (2019) found that psychomotor skill development can occur with either an expert model or a learning model. The act of observational learning allows the student to view correct or incorrect methods of completing the task (Ferkel et al., 2017). Observational instruction is not enough to learn motor patterns (Erturan, 2014). The observer, when watching a learning model, is actively involved in the problem-solving process as well as watching for errors in the movement patterns (Hattie & Timperley, 2007). The students view different information from each demonstrated attempt, instead of viewing a perfect repetition (Kangalgil & Özgül, 2018). Kangalgil and Özgül found that while students are observing a novice learning model, the student does not try to just copy the performance. The student is also examining what methods work and what methods do not work (Badets & Blandin, 2005).

Focused observation is a critical part for learning (Bandura, 1977). Effective movement demonstrations can encourage focused attention and peak student interest (Boyer et al., 2009). Recently Valentini et al. (2017) found that providing demonstrations, modeling, and teaching students how to self-monitor their performances were critical to learning gross motor skills.

Motivation and Student Interest

Self-determination theory states students must have three psychological needs met for motivation in a skill or task: autonomy, competence, and relatedness (Deci & Ryan,

2000). Autonomy is the student's need to feel like they are engaging in the activity of their own volition (Zhang et al., 2012). Competence is the student's need to feel a sense of accomplishment (Ulstad et al., 2019). Relatedness is the sense of care (Zhang et al.). The physical education teacher can create a supportive learning environment based on their expectations of the class, values, beliefs, and teaching behaviors (Davis & Nicaise, 2011). Warburton and Spray (2008) found that teachers serve as a key source of motivation in the classroom.

Effective teachers spark genuine interest in the subject matter (Voelker, 2016). Whereas ineffective teachers can constrain individual motivation (Vanderhasselt et al., 2018). Ulstad et al. (2019) found that teachers' support for their students has a direct link to students' interest in the subject and motivation to learn. Steinberg and Steinberg (2016) also found that the teaching style the teacher uses in the classroom can affect student enjoyment. Teachers' beliefs and behaviors predict students' motivation and achievement outcomes in physical education (Weaver et al., 2018).

Feedback and Assessment

As students practice the tasks provided, teachers should watch the individual students while giving performance feedback (Turner & West, 2013). Performance based feedback is a key part to effective learning (Hattie & Timperley, 2007; Hatzipanagos & Warburton, 2009; Rink, 2002). The effective physical education teacher is also responsible to continually assessing the class (Boud, 2007). Assessment information allows the teacher to adjust the course content based on the individual level of skill mastery (Rink, 2002). Ideally, the students will develop their own error detection methods and will lead to self-feedback (Hattie & Timperly, 2007).

Purpose of Feedback in Physical Education

“Feedback is one of the most powerful influences on learning and achievement, but this impact can either be positive or negative” (Hattie & Timperly, 2007, p. 81). Feedback can take on many different forms. The type of feedback, the timing of feedback, the purpose of feedback, and the method of feedback delivery all play a role in the effectiveness of the feedback (Kangalgil & Özgül, 2018). At its roots, feedback is information provided by an agent concerning the aspects of one’s performance. Feedback occurs at the completion of a performance. Feedback can motivate (Erturan, 2014), inform (Hume, 2018), assess (Boud, 2007), correct deficiencies (Kangalgil & Özgül), instruct (Palao et al., 2015), and improve autonomy, competence, and relatedness (Black & Deci, 2000; Deci & Ryan, 2002).

Influence on Motivational Environment

The timing (Drost et al., 2018), type (Erturan & Hulya, 2019) and delivery method (Constantinou & Ioannou, 2016) of feedback can all play a role in the motivational climate of the classroom. The use of positive feedback from the teacher to the student can improve the motivational climate (Erturan, 2014). However, Erturan found that if the student perceives the feedback as negative, the intrinsic motivation decreases. Zhang et al. (2012) found that teachers who cultivate a supportive environment while giving positive feedback result in higher motivational constructs for their students. Teachers’ actions have a powerful impact on students’ motivation to participate in class (Roure et al., 2019). Deci & Ryan (2000) studied how teachers’ behaviors can enhance or inhibit individual or class motivation levels. Teacher feedback is one of the most powerful teaching behaviors in the classroom (Hattie & Timperly, 2007).

Knowledge of Results

The knowledge of results is the information related to the performance outcome (Smith, 2011). In physical education results are the achievement of the goal. For example, in the 100-yard dash, the results are the finishing time in seconds. Knowledge of results is beneficial for skill learning for the following reasons:

> (a) students may use results to confirm their own assessment; (b) students may use results because they are not capable of capturing performance; (c) students may use results as motivation to continue practicing; and (d) to establish a discovery learning practice environment, the teacher may want to only give results. (Sharma et al., 2016)

Schmidt's (1975) schema stressed the importance of providing the results with every attempt. Sharma et al. (2016) found that learning improved with longer iterations between the knowledge of results. These studies suggest knowing the result is insufficient at improving technique and form.

While knowledge of results provides some benefits for the student, the teacher should either mask the results or provide some additional measures of feedback to address performance cues (Potdevin et al., 2018). Potdevin et al. (2018) found that only providing the student with the end results does not address the process used to achieve the results. They studied the use of video feedback to support the development of novice gymnastic skills. In gymnastics, the process is just as important as the result.

Knowledge of Performance

The knowledge of performance is related to specific movement component characteristics (Sharma et al., 2016). The knowledge of performance can be observed at

any period during the execution of the task (Sharma et al., 2016). For example, in the 100-yard dash, knowledge of performance would examine the form used to get out of the starting block. Knowledge of performance focuses on the actual performance of the skill and is not concerned with the result (Potdevin et al. 2018). Palao et al. (2015) suggest instructors look at each performance measure within a set task and tailor the feedback based on the performance measures. These performance cues allow the student to know if they are using the proper techniques and methods to complete the task (Roure et al., 2019). Knowledge of performance is beneficial for skill learning "when: (a) skills must be performed according to specified movement characteristics, such as in gymnastics, stunts, or springboard dives; or (b) a specific movement component of skills that requires complex coordination must be improved or corrected" (Sharma et al., 2016, p. 1482). Kangalgil and Özgül (2018) found that most students are more concerned with the results than they are with the performance and are therefore less likely to focus on mastering the skill components. To help develop the proper motor patterns, teachers should try to mask the results until the student has mastered the skill (O'Loughlin et al., 2013).

General Feedback

General feedback is non-specific feedback, sometimes referred to as encouragement, offered to either a single student or the class and does not have the information necessary to make corrections to performance (Kangalgil & Özgül, 2018). General feedback offers little to no value with regards to skill improvement (Hattie & Timperly, 2007). General feedback has shown to have mixed results on student motivation. Nation-Grainger (2017) found general feedback to be effective at encouraging elementary students to participate in physical education class. However,

Drost et al. (2018) found general feedback to have no impact on student motivation levels or skill improvement. In physical education, the use of general feedback is appropriate when used in a large group setting as an encouragement tool for class participation or motivation (Hume, 2018).

Informational Feedback

Informational feedback is task specific, focused on the issue and is based on observations (Zhang et al., 2012). Informational feedback gives the student the tools to address shortcomings, assess current levels of competence, and generate plans to overcome deficiencies (Drost et al., 2018). Winne and Butler (1994) define feedback as the "information with which a learner can confirm, add to, overwrite, tune, or restructure information in memory, whether that information is domain knowledge, meta-cognitive knowledge, beliefs about self and tasks, or cognitive tactics and strategies" (p. 5740). Informational feedback can come in two forms: negative and positive feedback (Evans, 2013).

Negative Feedback

Negative feedback consists of corrective comments that focus on the elements of the performance that were not successful and should not be repeated (Hattie & Timperly, 2007). Negative feedback identifies the aspects of the skill that were performed incorrectly (Hatzipanagos & Warburton, 2009). Negative feedback is useful in error detection and assessment. By identifying the incorrect portions of a skill attempt, the student can quickly address solutions to adapt their technique (Hume, 2018). Negative feedback has shown mixed results for skill improvement and motivation. Lyngstad et al. (2019) found that teachers who primarily use negative feedback in their teaching

strategies creates an extrinsic motivational orientation in their students. Drost et al. (2018) found that negative feedback can have an immediate effect on students' motivation and performance of skills. As the students' skill levels increased, their interest in the class as well as their motivation increased as well (Ridgers et al., 2007). Students who only receive negative feedback report lower levels of intrinsic motivation and slowly increase their skill mastery (Kangalgil & Özgül, 2018).

Positive Feedback

Positive feedback consists of affirming comments that focus on the elements of the performance that were successful and should be repeated (Ridgers et al., 2007). Hattie and Timperly (2007) found positive feedback correlated to levels of intrinsic motivation in students. However, Hattie and Timperly noted that positive feedback was not as effective at skill mastery as negative feedback. The effectiveness of positive feedback rests on the ability for it to challenge the student to work towards the next goal (Hattie & Timperly, 2007).

Time on Task

Research shows that effective feedback can decrease skill mastery time (Hattie & Timperly, 2007) and increase classroom efficiencies (Evans, 2013). Effective feedback informs the student of errors in the performance and identifies methods to correct the action (Erturan & Hulya, 2019). As students increase their competency in the skills, the teacher is free to progress through the lesson. Efficiencies during practice time will result in more class time on task and less time explaining and showing the physical skills (Ellison & Woods, 2016). Ellison and Woods (2016) found that deliberate practice programed within class time is an effective method for skill progression and skill

mastery. While giving students the greatest time for practice does not guarantee learning (Evans, 2013), a lack of practice time will make learning unlikely or difficult to achieve (Hume, 2018). Hume demonstrated that optimizing practice time while incorporating individualized feedback is effective in promoting motor skill development for a tennis serve.

Accounting for Gender Differences in Physical Education

Physical education is steeped with issues of social justice and equity. Social inequality still exists in physical education curriculums and schools today. In elementary schools, boys and girls are steered towards gender specific roles on the playground (An & Meaney, 2015). The hidden curriculum identified in physical education dates to the 1960's (Constantinou, 2008). Beasley (2013) found that female students must learn how to navigate gender expectations in physical education. Bornholt (2000) found the implicit values of the teachers are taught and passed on through student learning in schools. Constantinou challenges physical education teachers to be aware of gender stereotypes while suggesting the key role teachers play in stopping stereotypes.

A recent study analyzing teachers' behavior in physical education classes in Spain revealed sexist behaviors were found in classroom communications, student demonstrator selection, grouping, and monitoring group discipline (Castillo Andrés et al., 2012). The physical education teachers were more likely to acknowledge the presence and actions of the male students. Male teachers are not the only group using gender stereotyping. Castillo Andrés et al. (2012) found that female teachers used male students as demonstrators for sport tasks.

The failure of inclusion of females in sports at an early age compounds into bigger issues in high school and beyond (Davis & Nicaise, 2011). Physical education teachers are faced with the challenge of motivating females to actively take part in sports and physical education classes (Flintoff, 2008). Physical education curriculum that focuses on competitive, contact, male-oriented team sports and activities (Gubby, 2019) tend to perpetuate the socially constructed view of gender and physical activity at the expense of females (Hannon & Ratliffe, 2007). Physical education teachers have struggled to teach mixed-gender classes of students with varying passions and abilities (Gerdin et al., 2019). The promotion of girls and women in sports is not a new concept. In 1899, the National Association for Girls and Women in Sport began promoting social justice and change (Ladda, 2009).

Physical education teachers must consciously fight against the gender biases and stereotypes in their classrooms (Ladda, 2009). There are many things to consider for gender equity within physical education. Males and females are different in as many ways as they are alike. Physical education teachers should take special consideration to account for the gender differences (Kamas & Preston, 2012). Gender equity does not just apply to females. Garrett and Wrench (2018) examined a redesign of pedagogical practices to create opportunities for boys from low SES areas to take part in a dance program in physical education.

Physical education teachers should be aware that females have a different preferred method of feedback. The literature also suggests females react differently than males to the motivational environment of the classroom. Researchers have also found gender differences in autonomy-connectedness. Females may also react differently to

feedback than males. Studies have shown female students prefer games of cooperation versus males' affinity to competition (see Van Acker et al., 2010). Studies also show that females have lower perceived levels of competence than their male peers (Warburton & Spray, 2008).

Gender Differences in Feedback Preferences

Research also shows there are differences in the reception of feedback across genders (Valley & Graber, 2017; Van Acker et al., 2010; Vanderhasselt et al., 2018). Vanderhasselt et al. (2018) found that instructors tend to give males and females distinct kinds of feedback. Gender differences in the receipt of feedback influence students' motivation and relations with teachers (Yeung, 2011). Gender differences in teacher-student relations appear in elementary school and appear consistent by high school (Valley & Graber, 2017; Walton-Fisette & Sutherland, 2018; Yeung, 2011).

Gender Differences in Reaction to Motivational Environment

Physical education teachers must be aware of the types of motivation and how students may react differently to motivational strategies and feedback. Research is mixed on the differences between gender and motivation. Yeung (2011) found females are more likely to be extrinsically motivated in physical education classes than males. Hannon and Ratliffe (2007) found the context of the class was a key determinant of motivation instead of gender. Griffin et al. (2013) found that manipulating the motivational climate in the classroom was effective at achieving higher levels of intrinsic motivation, enjoyment and a less perceived ego-oriented climate in both males and females. The teacher plays a key role in setting the motivational tone for the class (Hattie & Timperly, 2007). Creating a task-oriented motivational climate was enough to overcome social-cultural issues. The

genders were able to overcome stereotypes with both males and females having a positive experience completing tasks traditional assigned to the other sex (Garrett & Wrench, 2018).

Gender Differences in Autonomy

Bekker and van Assen (2008) sought to identify the gender differences in autonomy-connectedness. Autonomy-connected is the "need and capacity for self-reliance and independence, as well as for intimacy and functioning satisfactorily in intimate relationships" (Bekker & van Assen, p. 532). Autonomy is defined as "students' need to perceive a sense of freedom in their own actions when they participate in the learning process" (Black & Deci, 2000, p. 353). Connectedness is "the subjective experience of interpersonal closeness" (Bekker & van Assen, p. 533). Research shows that males and females differ on autonomy and connectedness. Constantinou (2008) found that males tend to respond with higher levels of autonomy and lower levels of connectedness, whereas females tend to have higher levels of connectedness and lower levels of autonomy. Kamas and Preston (2012) also found there are gender differences in autonomy-connectedness along with a willingness to compete. Women are more sensitive to others than men and men have higher levels of self-awareness and a greater capacity for managing new situations (Gerdin et al., 2019). Physical education teachers should modify their approaches to accommodate for the gender differences.

Gender Differences in Reaction to Feedback

Prior research suggests that males and females react differently to feedback (Mooney & Hickey, 2012; Potdevin et al., 2018; Ridgers et al., 2007). Some researchers suggest that positive female student-teacher interactions in elementary school leads to

higher risk-aversion and equates to a greater need for adult feedback compared to male students (Ruvalcaba et al., 2018; Sadker & Zittleman, 2005; So-Chen et al., 2016). Extrinsically motivated females are less likely to engage in a challenging task after receiving constructive feedback from an adult (Ulstad et al., 2019). Tan and Pang (2012) found that females react differently to failure feedback than males. Females are more likely to employ coping and avoiding strategies when presented with failure feedback from a peer or instructor than their male counterparts (Tan & Pang, 2012). According to Tan and Pang, this negative reaction to failure feedback also results in a decrease in motivation to achieve skill mastery.

Gender Differences in Competition Versus Cooperation

Gender equity may not be possible in a setting that only offers competition (Sadker & Zittleman, 2005). The male-oriented curriculum focuses on competition, aggression, and toughness (Van Acker et al., 2010). While competition may appeal to athletes of both sexes, the non-athletes and female students do not value being skilled competitors with the other sex (Voelker, 2016). In fact, female participation in physical activity declines after taking part in a physical education program structured around competitive sports (Ridgers et al., 2007). Instead, physical education curriculum should develop programs that focus on friendship, connection, and cooperation (Hannon & Ratliffe, 2007).

When schools allowed students to select their own physical education classes, students selected their traditionally dominant forms of femininity and masculinity (Cheypator-Thomson et al., 2000). The organizational and instructional patterns used in physical education mirror the current gender stereotypes (Mooney & Hickey, 2012). To

help break down the gender stereotype barriers to physical education classes, physical education teachers should use modified games with simplified rules. Van Acker et al. (2010) found that modified games with simplified rules resulted in higher levels of motivation for girls' physical activity during physical education.

Gender Differences in Perceived Competence

The literature shows perceived competence can affect skill mastery time (Voelker, 2016), ability beliefs (Warburton & Spray, 2008), and students' achievement motivation (Zhang et al., 2012). Warburton and Spray (2008) examined the relationship between perceived competence and achievement goal adoption as well as changes in performance-avoidance goals. Mastery-approach goals focus on developing task competence while mastery-avoidance goals focus on avoiding task incompetence (Weaver et al., 2018). Performance-approach goals focus on normative competence while performance-avoidance goals focus on avoiding a demonstration of incompetence (Warburton & Spray, 2008). Valentini et al. (2017) identified assorted reasons why students adopt different goals during an achievement task.

Theories of perceived ability, expectations of competence, the need for achievement, a fear of failure or rejection, perception of the motivational climate, and gender can all influence a student's adoption strategy (Valentini et al., 2017). Warburton and Spray (2008) found gender differences exist between goals, perceived competence, and student belief in their ability. They found that over the course of an academic year, males and females experienced a decline in perceived competence. However, males reported higher levels of perceived competence than females throughout primary school (Warburton & Spray, 2008). By the time students enter secondary school, male students

have an increase in perceived competence while females perceived competence continues to decline (Hannon & Ratliffe, 2007). Lower levels of perceived competence relate to decreases in intrinsic motivation and an increase in avoidance (Griffin et al., 2013).

Video Feedback

The use of video to inform motor skill development is not a new concept. Coaches and athletes have used video technology to examine the intricacies of movement patterns (Palao et al., 2015; Potdevin et al., 2018), review results (O'Loughlin et al., 2013), enhance learning (Constantinou & Ioannou, 2016), inform skill development (Bowes, 2014), and give expert modeling (Boyer et al., 2009). The current digital environment allows coaches and instructors to use the capabilities of video to enhance learning and skill performance (Boyer et al., 2009). Physical education teachers are in a unique position to capitalize on the use of video in the classroom (Benitez Santiago & Miltenberger, 2016). Potdevin et al. (2018) found video modeling and video feedback are effective tools to aid trainers. A review of literature shows video feedback can influence performance (Roure et al., 2019), motivation (Potdevin et al., 2018), autonomy (Roure et al., 2019), and serve as an assessment tool (Palao et al., 2015).

Video Feedback Influence on Performance

Teachers and coaches have relied on video feedback to influence student and athlete performance in the past. Coaches use video feedback to analyze movement patterns in martial arts (Benitez Santiago & Miltenberger, 2016; Guo, 2018), tennis (Hume, 2018), game play (Koekoek et al., 2018), swimming (Kretschmann, 2017), basketball (Koekoek et al., 2019), and gymnastics (Boyer et al., 2009). Boyer et al. (2009) examined the use of expert video modeling combined with video feedback of

performance execution of three complex gymnastic skills. While the athletes were not able to achieve perfect performance during the study, the gymnasts all demonstrated increases in skill performance and improved skill retention after the intervention (Boyer et al., 2009). Kretschmann (2017) used video feedback to accelerate skill proficiency and performance of the front crawl during a 5th grade physical education swim class.

Video Feedback Influence on Student Motivation

Very little research exists on the impact of video feedback on student motivation or the motivational climate of the classroom. Potdevin et al. (2018) examined the effects of video feedback in physical education gymnastics on motor learning, self-assessment, and student motivation. The study found video feedback was effective at fostering motivation in young children performing a novice task. However, more research is required to examine the relationships between motivation and video feedback.

Video Feedback Influence on Student Autonomy

Physical education teachers strive to develop autonomous students in the classroom (Rink, 2002). An autonomous student can independently manage their learning in the classroom while maintaining a positive relationship with the teacher (Baert, 2014). Student autonomy fosters a safe environment where students feel free to challenge themselves while pushing their boundaries (Bowes, 2014). Video analysis gives a degree of freedom and choice for the student's feedback reception (Laughlin et al., 2019). Students can incorporate select peer feedback to go with the review of video (Potdevin et al., 2018). Students are also able to review their own trials and self-assess, thus taking charge of their learning process (Laughlin et al., 2019).

Assessment of Video Feedback

Potdevin et al. (2018) examined the effectiveness of different delivery methods of feedback to students. The researchers compared the effectiveness of peer, teacher, and video feedback with teacher verbal cues during motor skill development lessons in elementary PE. Results showed that teacher's verbal cues to the students were more effective in the lower grades, while video feedback was more effective for older students (Potdevin et al., 2018). Integration of video feedback into the curriculum needs planning, resourcing, and training of the users (Laughlin et al., 2019). Video analysis for every lesson and every skill is not practical. However, video analysis can serve as an effective tool for supporting quality instruction and assessment of skills.

Summary

A review of the relevant literature for the problem of practice shows evidence of the effectiveness of feedback in physical education (Erturan, 2014; Griffin et al., 2013; Potdevin et al., 2018; Roure et al., 2019). The reviewed studies show the key roles of an effective physical education teacher (Griffin et al., 2013; Erturan, 2014; Warburton & Spray, 2008; Zhang et al., 2012) as well the guiding theories for the framework of this study (Bandura, 1977; Corey, 2009; Ryan & Deci, 2000; Schmidt, 1975). The literature suggests effective feedback is a key element of motor skill development (Boyer et al., 2009; Turner & West, 2013; Valentini et al., 2017). Research showed general feedback was ineffective at skill development (Kangalgil & Özgül, 2018) while negative feedback was the most effective at skill mastery (Erturan & Hulya, 2019; Hattie & Timperly, 2007; Zhang et al. 2012). Research also suggests the use of video feedback may benefit teachers (O'Loughlin et al., 2013; Sharma et al., 2016) with the examination of the intricacies of

movement (Benitez Santiago & Miltenberger, 2016; Guo, 2018) to inform skill development (Potdevin et al., 2018; Kretschmann, 2017).

The literature also identified some social justice and equity issues that exist in physical education curriculum and classrooms (Hannon & Ratliffe, 2007; Warburton & Spray, 2008; Yeung, 2011). Physical education teachers display gender bias in their communication (Sadker & Zittleman, 2005; Valley & Graber, 2017), choice of demonstrators (Van Acker et al., 2010; Vanderhasselt et al, 2018), and choice of activities (Voelker, 2016; Walton-Fisette & Sutherland, 2018). Physical education teachers must also be aware of the differences between the genders in physical education classes. Research suggests that genders react to feedback differently (Sharma et al., 2016; Van Acker et al., 2010; Vanderhasselt et al., 2018).

This study looks to address the gaps in the literature about video feedback's effect on student motivation. A review of the literature suggests that there are many gender differences that teachers should account for when conducting class. A one-size fits all teaching solution is not practical for physical educators. Teachers should consider the gender differences and tailor their methods to meet the needs of each student. The literature suggests that changes in teacher behaviors and techniques can influence improvements in student motivation, competence, autonomy, and willingness to participate in class activities. This study looks to create an intervention specifically tailored for females' preferences. The study will also add to body of literature on the effects of video feedback on skill mastery in physical education. The research questions guiding this study look to identify the perceived benefits of video feedback on skill acquisition.

CHAPTER 3

METHODS

This chapter describes the various methodologies supporting this study. The purpose of this study was to determine how video feedback effects skill performance in physical education classes. Specifically, I was interested in the perceived benefits of video feedback for the low performing females in the class. Additionally, I examined the effect of feedback on product and process performance and the effect of student performance on student motivation.

The methodology section includes a review of the participants and a description of the data collection sites. A discussion of the intervention procedures will outline the various experimental stages: pre-test, test, and post-test. Providing a description of the physical education skills tested and an explanation of the specific video feedback administered will complete the experiment procedural descriptions. Descriptions of data collection will include an examination of quantitative data (pre/post skill test questionnaire and performance scores) and qualitative data collection (interviews and observations). Finally, descriptions of qualitative data analysis, followed by a discussion of validity, conclude the study methodology.

The problem of practice was that our current method of instruction and feedback was insufficient at developing our less skilled students within the physical program. Our low performing female cadets struggle with time-on-task and actively using verbal cues to practice the skills (Ellison & Woods, 2016). The females appear to be more likely to

cope and avoid due to a fear of failure (Baghurst et al., 2015). One of the greatest limiting factors to skill acquisition for the students was the lack of quality feedback provided during instruction (Turner & West, 2013). Finding a better method of feedback for the students in the military movement class was expected to increase their ability to perform the required physical skills and thus improve the passing rate for the class.

This action research study sought to find a more efficient method of providing students individualized feedback with the goal of decreasing the physical skill gap between the males and females at the academy. The purpose of this study was to examine the effects of video feedback on the low performing females in the military movement class. The study examined the benefits of video to inform skill development. Another focus of the study was to determine if the use of video feedback was effective in motivating cadets to practice their skills. The overall goal of the study was to determine a better method of feedback to help cadets inform their skill development.

The current method of feedback used in the class consisted of instructors providing verbal cues to the student after each attempt. The students also received a verbal score after each skill attempt. This method of feedback was enough for high performing students but did little to motivate lower performing students. The theoretical framework supporting the design of this study included social learning theory, self-determination theory, schema theory and feminist theory. The study relied on the assumption of feedback as a method of motivation as well as a tool to enhance skill development. The research questions guiding this study follow:

1. What are female cadets' perceptions of video feedback related to skill evaluation and skill improvement?

2. How do female cadets perceive video as an additional method of feedback?
3. How do female cadets perceive video feedback as a method to promote motivation for deliberate practice?
4. How do female cadets' perceptions of their skills change when video is added as an additional method of instructor feedback?

Design of the Study

To answer the research questions, this study's research design was an action research study using mixed methods. Action research connects theory to practice and has a connection to school improvement (Mertler, 2014). Furthermore, "Action research can also be used to find solutions to problems you have identified and ultimately test their effectiveness" (Mertler, p. 25). Selection of an action research design allowed me to use "problem-solving strategies to arrive at a possible solution" (Johnson, 2008 as cited in Mertler, p. 25).

This study examined a unique subject, low-performing female cadets, in a single setting, military movement class, while incorporating a unique intervention, video feedback. In this study, the researcher was an active participant in the study and aimed to enhance school improvement (Efron & Ravid, 2013, p. 48). Efron and Ravid found the role of the researcher within a mixed methods approach "assumes both objective and subjective stances" (p. 48). The current design of the military movement class offered a unique opportunity to collect data while also allowing the researcher to actively seek improvement in the classroom.

This study employed a mixed method approach for the design. To answer the research questions, I gathered both quantitative and qualitative data. This study followed

a sequential quantitative, then qualitative, mixed-methods study design (Ivankova, 2015). Ivankova suggests that the straightforward design of the quantitative then qualitative study method allows the researcher to identify the individuals required to be selected for the qualitative follow-up. The quantitative data helped identify the lower performing females as well as their current skill level and motivation for the class. However, the major focus of the study revolved around student perceptions. Perceptions are qualitative in nature. I tried to understand "how people interpret their experiences" (Merriam & Tisdell, 2016, p. 30) within the context of the class and the intervention. While there are many theoretical frameworks guiding my design, I am interested in building a substantive theory of feedback that could be useful in practice (Merriam & Tisdell, 2016).

Setting

The research site was a four-year military service academy. The school enrollment was 4,400 with 20% women (PAO, 2019). The study occurred during the military movement course. The student to teacher ratio in the class was 10:1. Each class had between 35-40 students. The average class consisted of about 30 males and 5-10 females. The military movement class is a graduation requirement that all students must complete during their freshman year. The 8-week course consists of 19 lessons with 28 physical skills taught and tested (Coelho, 2019). Each lesson was 50 minutes and consists of roughly two skills per lesson with structured time for a master demonstration, teaching the skill progression, free-practice time, and testing (Coelho). The study coincided with an eight-week quarter of the academic year to align with a class in session. The program of instruction for the class included additional instruction periods scheduled throughout the quarter from 12:40 pm to 1:30 pm. The purpose of the additional instruction sessions

was to provide lower performing students an opportunity to practice and retest on their class skills. The study took place over the course of six weeks during the additional instruction time outside of the regularly schedule class time.

Participants

There were 64 females enrolled in the course during the study. Out of the 64 females enrolled, there were 35 females who had earned less than 50% of the available points in the course. The recruitment email was sent out to the 35 females that represented the lowest-performing females in the class. For this action research study, I used extreme case sampling to select 10 volunteers of the lowest-performing female students currently enrolled in the military movement class. The study focused on the females who actively display avoidance and coping techniques during skill practice time in class. Park and Adler (2003) found that students who lack confidence often use coping methods to avoid attention in class. I theorized that the low performing females lack intrinsic motivation (Deci & Ryan, 1987) and are therefore less likely to use their free-practice time to work on their skills (Lyngstad et al., 2019). The participants were female and had no limiting physical profiles that would inhibit their ability to complete the requirements of the course.

Student participation in the study was completely voluntary. The participants were able to quit the study at any time with no repercussions. Skill points earned during the study counted towards regular class points in the same manner as additional instruction time scoring. There was no extra incentive to take part in the study beyond the potential benefits of the intervention. To avoid perceived pressure to take part in the study, I did not include my rank or position on the flyer for the study. I had a colleague

send out the recruitment email to students currently enrolled in the course (see Appendix A). I did not want my students to feel the need to take part just because I was the one running the study. I was not the primary instructor for any of the students. I provided all the volunteer participants with an informed consent form that detailed the study requirements as well as their right to stop the study at any point (see Appendix B). The informed consent form detailed the use of video recording devices to capture their performance of the skills for further evaluation. The videos were recorded on the participant's personal cell phone and were reviewed along with the instructor feedback. The participants were able to then save or delete their performance after the review. I did not save any footage of the participants' attempts at any of the skills for future review.

As a teacher-researcher, I also worked in coordination with two of my female colleagues on the gymnastics committee to help conduct the test portion of the protocol. The teacher-researcher has the goal of enhancing the learning experience of their students (Herr & Anderson, 2015). The female assistant instructors were responsible for awarding skill points and providing the verbal feedback cues along with the video feedback. Student data were confidential and anonymous. Mills (2011) notes the importance of concealing the identities of participants within action research. Each participant received a unique participant number to use on all surveys, interviews, videos, and assessments. The participants were identified as MM 1-10 to maintain confidentiality. No identifiable information was collected or used in the study. The data collection tools did not hold any identifiable participant information.

Intervention Procedures

The procedures for the intervention were divided into three stages: pre-test, test, and post-test. The pre-test stage included all the activities the participants performed prior to participation in the intervention. The test stage covered all the graded attempts during the intervention with the use of video feedback and instructor feedback to influence skill acquisition. Once the attempts are made for all three skills, the final stage of the intervention, the post-test stage, occurred.

Pre-test Stage

In the pre-test stage, the students had not yet received instruction on the physical skills of the cartwheel, vertical rope climb, and the shelf. The pre-test phase included the primary instructor and the researcher observations of the class to identify the individuals who are avoiding attempts at the skills during testing periods. The researcher asked for volunteers from the group of low performing female students based on the criterion of having less than 50% of the possible points in the course after the fifth lesson. The recruitment email (Appendix A) requested participants who struggled with the selected tasks of the cartwheel, vertical rope climb, and shelf. After receiving informed consent (see Appendix B) to participate in the study, the participants completed a pre-test questionnaire (see Appendix D) to identify their motivation for the class, comfort level with the upcoming skills, and confidence in their abilities to perform the skills during class.

Test Stage

After the participants had been provided with their in-class lessons on the selected skills, the selected individuals were provided video feedback along with instructor

explanations on the points of performance. Each skill occurred during a separate additional instruction period. The first skill was the cartwheel. The second skill was the vertical rope climb. The third skill was the shelf. The skills were selected specifically for the target audience of the low performing females. The shelf and the vertical rope climb are the two most failed events of the Indoor Obstacle Course Test (IOCT). The IOCT is a separate graduation requirement that consists of 18 unique obstacles that cadets are taught how to navigate during their military movement course.

The first skill assessed was the cartwheel. The cartwheel requires balance, agility, coordination, and kinesthetic awareness (Potdevin et al., 2018). The cartwheel was selected as an assessment skill due to the relative familiarity of the skill with most participants in the course. The second skill assessed was the vertical rope climb. The lock climb of the vertical rope requires technical skills to achieve a quality lock on the climbing rope, thus reducing the requirement for upper body strength to climb (Coelho, 2019). The lock climb technique offers a safe and secure method for climbing a 30' vertical rope. During the IOCT, the students are required to climb up to the 25' mark before dismounting onto the platform of the raised track. To score five points during the class, students are required to make two complete climbs of the 30' rope while using the proper locking technique. The final skill assessed was the student's ability to mount the shelf. The shelf is a horizontal board suspended 7' above the surface of the ground. The shelf requires kinesthetic awareness, strength, and coordination (Coelho, 2019). Potdevin et al. found video feedback in gymnastics is most effective when filming physical skills that require attention to technique and body positioning. The three selected skills all fit that criteria.

Each participant was given a total of three graded attempts for each skill. The allowance of three scoring attempts per task during additional instruction aligns with the course objectives and course manual (Coelho, 2019). After each attempt, I provided verbal cues to the student while playing the video feedback with the goal of inducing skill progression. The video feedback provided immediate feedback (Palao et al., 2015) and knowledge of performance (Kretschmann, 2017) for the students to enhance skill acquisition (O'Loughlin et al., 2013) and was expected to influence motivational levels (Potdevin et al., 2018), attitudes towards the class (Haerens et al., 2019), and self-awareness (Koekoek et al., 2019). After completion of each graded attempt, the participant viewed the video replay with the instructor and received information on any deficiencies noted for the attempt. The participant was then provided approximately three minutes of deliberate practice time to work on the skill on their own. Prior to each graded attempt, the student predicted the score of their next attempt. The test stage took each participant approximately 30 minutes to complete all the graded attempts for the three physical skills.

Post-test Stage

After the completion of three attempts on each of the three physical skills, the participants then completed the post-test questionnaire before individual semi-structured interviews concerning the process and the intervention.

Data Collection Methods and Instruments

The study used the earlier work of Standage et al. (2005) and their test of self-determination theory in school physical education for the questionnaire measures of motivation. This study used multiple methods of data collection to answer the research

questions. The data were collected using instructor observations, student questionnaires, interviews, video recording of graded attempts, and assessments.

Observations

To help identify participants who cope and avoid, I used instructor observations of the class behaviors to assess the students who are not using their skill practice time to work on the assigned physical skills. Ivankova (2015) states that observation is "the process of observing and recording behaviors of people in their natural setting to explore individuals' experiences" (p.203). Observational data is an efficient method for examining the need for the intervention while identifying the key participants (Ivankova). Hannon and Ratliffe (2007) suggests students coping and avoiding class participation may be an indicator of lower levels of motivation. I gathered notes on the number of practice attempts for each participant during their free time between graded attempts throughout the intervention. I also recorded whether the student spent time viewing the video footage after the instructor feedback. Creswell (2013) suggests that observational data is useful as a supplemental tool for the action researcher.

Questionnaires

A common quantitative data source is a survey or questionnaire. Ivankova (2015) suggests using a survey of fixed response options to gather attitudes and opinions of the participants or of large groups. The pre-structured online questionnaires were developed using Survey Monkey, a web-based survey application. The participants responded to pre/post-test questionnaires that included measures of autonomy, competence, and motivation (see Appendix D and Appendix E). The same questions were used for pre- and post-tests to check for any changes in autonomy, competence, or motivation

(Standage et al., 2005). The 30-item pre-test questionnaire (Appendix D) included demographic questions for age, race, and gender. The action researcher should gather demographic data to help clarify and identify the sample of participants (Ivankova, 2015). The questionnaires contained several questions to determine the participants' perception of their physical fitness, motivation levels, skill acquisition, and confidence. The questionnaire was comprised of statements to which the participant indicated a level of agreement with the statement based on a 5-point Likert scale (*strongly agree, agree, neutral, disagree, strongly disagree*). Examples of questions include the following:

- I feel like this class is a waste of time.
- The current method of instruction is enough to teach me the new physical skills.
- I understand the value of this course.
- Verbal cues are effective form of feedback to change my motor patterns.

The questions provided in the questionnaire were derived from previous studies. The items were modified for the current study. Some of the items in the questionnaires used reverse coding to ensure the participants took the time to read the complete statement prior to providing a response. Wayne et al. (2009) found the use of reverse coded items increased the validity of the items. Perceived competence and autonomy were assessed using six items from the perceived competence subscale of the 18-item Intrinsic Motivation Inventory previously created by McAuley et al. (1989) and modified by Standage et al. (2005). McAuley et al. found strong support for the validity of the inventory. The distinct types of motivation were assessed using the Perceived Locus of Causality (PLOC) scale developed by Goudas et al. (1994). The nine items were divided

into three subscales that examined intrinsic, extrinsic, and a lack of motivation for the military movement class. The scores from these three subscales were used as indicators for motivation. Wayne et al. (2009) found Cronbach alpha of .75 and test-retest coefficient of .74 over two months for the PLOC. The students also provided a rating level to address their comfort level and familiarity with each task prior to their first graded attempt. The levels were based on a 5-point Likert scale (1= *Not at all familiar* to 5 = *Extremely familiar*).

Interviews

One-on-one interviews provided a qualitative data source that allowed the interviewer to collect rich and in-depth information concerning the participant's views, perceptions, and experiences with the intervention (Ivankova, 2015). I conducted semi-structured interviews with the participants after the intervention and test phase is complete (see Appendix F). The interview consisted of 12 open-ended questions to measure the benefits the cadets identify during the intervention. The interview questions were developed in part from modifications to the Perceived Competency Scale (PCS). Deci and Ryan (1996) created a four-item PCS that has a Cronbach alpha of .80 and is useful in determining student feelings of competence. I also used interviews to assess how giving video feedback affect students' perceptions for skill evaluation and skills improvement. I recorded and transcribed the interviews along with any notes taken during the intervention (Ivankova, 2015).

Video Recording

The use of audiovisual material provided another qualitative data source. Video recordings can help capture crucial details about the participant's behaviors and actions

(Ivankova, 2015). The primary use of video recording during the intervention was to capture the graded attempt of each participant. The assistant instructor recorded each graded attempt of the skills using standard video recording settings on the participant's cell phone. The participant then viewed the recording of their attempt with the instructor to identify the key areas for skill improvement. The assistant instructor visually showed the student what elements of the skill were performed correctly (Roure et al., 2019), incorrectly (Ridgers et al., 2007), as well as provided a grade for the attempt (Potdevin et al., 2018). Each student received three attempts per skill.

The purpose of the video recording and associated feedback was to inform the student of their deficiencies in the execution of the physical task (Ridgers et al., 2007). Video evidence and augmented feedback informs the learner (Turner & West, 2013). The instructor focused the feedback on the visual depiction of the verbal cues of the skill being tested (Roure et al., 2019). For example, in the cartwheel skills test, I may have addressed the need for straight legs and pointed toes throughout the execution of the skill. I used the video recording to highlight the portions of the skill attempt where the student's legs bend.

Assessments

Assessments were another quantitative source for data collection. For this study, the assessment tools were rubrics and records of performance that were assigned scores (Ivankova, 2015). The participants provided an estimate of the score they feel they will get when they perform the skill for a grade prior to each attempt at execution. The performance score for each graded attempt was also collected for each participant based on the 5-point holistic grading scale, see Table 3.1 (Coelho, 2019).

Table 3.1 Holistic scoring rubric

5 - Excellent	Demonstrates complete mastery of skill(s). Maintains smooth transitions between elements. Shows excellent control, poise, rhythm, and flow. Displays outstanding form and technique while performing movements.
4 - Good	Demonstrates competency and ability to perform skill(s). Generally displays control, poise, rhythm, and flow. Performs with good form and technique.
3 - Satisfactory	Displays satisfactory ability to perform skill(s). Performance is inconsistent, lacking some control, poise, rhythm, and form. Displays satisfactory form and technique.
2 - Fair	Demonstrates some ability to perform most basic skill(s). Generally inconsistent performance with minimal control, poise, rhythm, and form. Displays a lack of form and technique on most skills.
1 - Poor	Rarely, if ever, displays ability to perform basic skill(s). Demonstrates little control, poise, rhythm, and form. Lacks form and technique on all skills. Meets minimum standards of performance.
0 – Unsuccessful	Displays no ability to perform basic skill(s). Demonstrates no control, poise, rhythm, and form. Lacks form and technique on all skills. Fails to meet minimum standards of performance.

Note: Holistic scoring rubric by Coelho, J. (2019) in "PE117 Course Manual".

The information sought with the data collection methods was intended to provide a clear picture of the effects on skill improvement as well as the effects on motivation to attempt the skills. I relied heavily on qualitative data to reflect perceptions, feelings, attitudes, and opinions of the intervention.

Data Analysis

Given the sequential quantitative then qualitative study design, this study relied on a connected mixed methods data analysis. Ivankova (2015) states the action researcher should first analyze the quantitative data as that may inform the direction of the qualitative inquiry. The quantitative data were collected from the questionnaires and assessments. The quantitative data were analyzed to illustrate the rate of skill acquisition and improvement. The quantitative data also informed the level of motivation of the

students as well as any changes in their motivation. The focus during the content analysis of the data were on the knowledge of performance of the task, or the participant's form. The researcher used the 5-point assessment tool (Appendix C) based on the elements of the physical skill cues introduced during the skill instruction. Each graded attempt by the student resulted in a score ranging from 0 to 5. Each student attempted each of the three skills three times for a possible total task score of 0 to 45.

Qualitative data from the pre and post-test stage was analyzed for themes through content analysis (Creswell, 2005) as well as emergent coding (Ivankova, 2015). The questionnaire and interview responses were analyzed by word count as well as the creation of a qualitative codebook. Three colleagues coded the responses independently and we discussed the developed themes, categories, and codes to reach agreement. Inter-coder agreement reliability was calculated at 96%. Miles and Huberman (1994) suggest inter-coder reliability is "considered acceptable in the 90% range" (as cited in Ivankova, 2015, p. 241). Creswell (2005) also highlights the importance of using member checking to explore the credibility of results. I also sent the results to the participants to check for accuracy and to ensure the findings resonated with their experiences. In turn, this data helped show the perceived benefits of video feedback. The qualitative data helped demonstrate the autonomy and expectation levels of the cadets prior to each graded attempt. Analysis of the predicted scores and earned scores illustrated whether the students' perception of their skills align closely with their performance after receiving video feedback.

The selection of multiple data sources allowed for triangulation of the data. Sagor (2005) states that triangulation of multiple data sources "enhances the credibility of

research findings, and results in developing more feasible and more reliable action plans" (as cited in Ivankova, 2015, p. 46). Utilizing various data collection tools and methods helped provide a breadth of information to enhance the research.

Summary

This study was designed to enhance skill acquisition rates in a military movement class. The intervention provided a new method for instructor feedback while providing the student video feedback for clarity of knowledge of performance of the skills. Furthermore, data collection procedures were designed to measure the student's performance of the skill as well their motivation level and perceived competence. The data analysis relied heavily on the qualitative data to provide the researcher with an effective means for understanding the relationships between the study variables as defined in the results as detailed in chapter 4.

CHAPTER 4

PRESENTATION AND ANALYSIS OF DATA

The overall purpose of this action research study was to explore how to enhance instructor feedback with the use of video replay. The prevailing method of verbal feedback during instruction can lead to frustration and inhibit motivation to practice (Turner & West, 2013). Turner and West suggest the limiting factor to skill acquisition is the lack of quality feedback during instruction. Within military movement, instructors are pressed for time to provide quality feedback to every student after every attempt. The cadets are left to practice their skills on their own with very little feedback during the practice sessions. The lower performing female cadets struggle with time-on-task and actively using verbal cues to practice the skills (Ellison & Woods, 2016). The females appear more apt to cope and avoid due to a fear of failure (Baghurst et al., 2015). Sharma et al. (2016) found instructor feedback enhances student learning. Berlin and Dargnies (2016) suggests teachers to use a method of feedback that evaluates the student's contributions, discrepancies, and provides the student with the information needed to fix their errors. Finding a better method of feedback for the students in the military movement class should increase their ability to perform the required physical skills and thus improve the passing rate for the class.

Rationale

This action research study sought to find a more efficient method of providing students individualized feedback with the goal of decreasing the physical skill gap between the males and females at the academy. The purpose of this study was to examine the effects of video feedback on the low-performing females in the military movement class. The study examined the benefits of video to inform skill development. Another focus of the study was to determine if the use of video feedback was effective in motivating cadets to practice their skills. The overall goal of the study was to determine a better method of feedback to help cadets inform their skill development.

The standard method of feedback used in the class consists of instructors providing verbal cues to the student after each attempt. The students also receive a verbal score after each skill attempt. This method of feedback is effective for high performing students but does little to motivate lower performing students.

Research Questions

This action research study sought a more efficient method of providing female students individualized feedback with the goal of decreasing the physical skill gap between the males and females at the military academy. The research questions guiding this study were as follows:

1. What are female cadets' perceptions of video feedback related to skill evaluation and skill improvement?
2. How do female cadets perceive video as an additional method of feedback?
3. How do female cadets perceive video feedback as a method to promote motivation for deliberate practice?

4. How do students' perceptions of their skills change when video is added as an additional method of instructor feedback?

Intervention

The procedures for the intervention were divided into three stages: pre-test, test, and post-test. The pre-test stage included all the activities the participants performed prior to receiving video feedback. The test stage covered all the graded attempts during the intervention with the use of video feedback and instructor feedback to influence skill acquisition. The post-test stage occurred after the completion of the graded skill attempts.

Pre-test Stage

In the pre-test stage, the students had not yet received instruction on the physical skills of the cartwheel, vertical rope climb, and the shelf. The pre-test phase included class observations (Lyngstad et al., 2019) by the researcher to identify participants who spent time avoiding and coping (Park & Adler, 2003) during deliberate practice time. The pre-test stage consisted of recruitment, gathering informed consent, and execution of the pre-test questionnaire. The pre-test questionnaire supplied the demographic information as well as assessment items of the familiarity (Potdevin et al., 2018), comfort (Standage et al., 2005), anticipated scores (Koekoek et al., 2019), and motivation (Haerens et al., 2019) to attend the class.

Test Stage

The test stage occurred after the participants had received in-class instruction on the selected skills of the cartwheel, vertical rope climb, and properly mounting the shelf. The intervention took place during regularly scheduled additional instruction time on lessons 13, 15, and 16. The additional instruction was conducted from 12:40 p.m. to 1:30

p.m. during each session. A separate skill was assessed at each lesson. Each participant was given a total of three graded attempts for each of the skills.

Prior to attempting the skill for a grade, the participant provided an estimated grade of the upcoming attempt. The predicted scores were recorded on the data collection tool (Appendix G). I then recorded the performance of the student's graded attempt. A score of 0-5 was awarded for the performance of the skill. The graded score was also captured on the data collection tool. Immediately following the graded attempt, the student reviewed the video footage of their attempt with me. I provided verbal cues based on the points of performance for the skill. I highlighted areas to improve using elements of the video footage of the attempt. The video feedback was capped at 30 seconds per attempt.

After each graded attempt and video feedback was provided, the participant had approximately three minutes of deliberate practice time to work on the skill on their own. I observed the participant's use of free practice time (Lyngstad et al., 2019) to assess whether the student used the free time to practice the skill. The test stage took each participant approximately 30 minutes to complete all the graded attempts for the three physical skills.

Post-test Stage

The post-test stage occurred at the completion of three attempts on each of the three physical skills. Each participant completed the 25-item post-test questionnaire. Once the participant completed the post-test questionnaire, I sat down with each participant individually for a 12-question semi-structured interview concerning the process and the intervention.

Purpose of the Study

The purpose of this study was to determine how video feedback effects skill performance in physical education classes. Specifically, I was interested in the perceived benefits of video feedback for the low performing females in the class. Additionally, I examined the effect of feedback on product and process performance and the effect of student performance on student motivation.

Purpose of the Presentation and Analysis of Data

This chapter describes the various data collected during this study. The data analysis section includes a presentation of the data collected throughout the study. The data is presented in sequential order of the various experimental stages: pre-test, test, and post-test. The presentation of data is followed by an evaluation of the findings. The analysis of data examined the motivation to learn, use of deliberate practice, assessment of skill improvement, changes in autonomy and competence, and examined the students' perceptions. Finally, this chapter concludes with a summary of the key points of the findings.

Pre-test Results

After IRB approval, I began class observations of potential participants. A recruiting email was sent out to 35 of the lower performing females who were enrolled in the course (Appendix A). The email sought volunteers for the study and was sent by an assistant investigator who does not teach the course. The first ten respondents were then sent an informed consent form (Appendix B). Upon receipt of the signed informed consent, I sent each participant their unique identification number. The identification number was used on all data collection instruments to protect the identities of the

participants. Mills (2011) notes the importance of concealing participant identities in action research. A 30-item pre-test questionnaire (Appendix D) was then sent out the participants. The questionnaire was created using a web-based survey tool. The results of the pre-test questionnaire are provided below.

Demographics

Ten students who were currently enrolled in the military movement course volunteered to participate in the study. The ten volunteers all met the criteria to participate in the study and were assigned unique IDs. All participants returned signed copies of the informed consent. All ten participants were female. The age range of the participants was 18-23 with an average age of 19.3 and a SD of 1.4. The participants selected had a diverse mix of ethnicities. The majority (66.7%) of the participants were white. No additional demographic information was collected. The participants also described their overall fitness level at a range from *fair* to *excellent* with a median of *fair*.

Autonomy

Measures of autonomy included six items that corresponded to the participant's level of familiarity and comfort with the selected skills. The participants indicated a median value of familiarity of *slightly familiar* with the cartwheel, *very familiar* with the vertical rope climb, and *moderately familiar* with the shelf. The participants indicated a median comfort level of *neutral* with the cartwheel, *comfortable* with the vertical rope climb, and *uncomfortable* with the shelf.

Competence

During the pre-test stage, measures of competence included six items that corresponded to the participant's confidence level. The items were modified from the

perceived competence subscale of the 18-item Intrinsic Motivation Inventory previously created by McAuley et al. (1989). The questionnaire used a 5-point Likert scale for agreement with statements of competence (1= *Strongly disagree* to 5 = *Strongly agree*).

The participants' self-confidence and competence responses indicate a mixed level amongst the group. Most of the group (90%) felt they would be able to perform the skills well on their third graded attempt. However, the group was split concerning their satisfaction of their performance of the skills. Only 40% of the group agreed they would be satisfied with their performance while 30% disagreed. The participants overwhelming believed the class would boost their confidence. Most of the group (90%) felt they would be confident on the skills after working on the tasks in class. When comparing their performance on the skills with their peers, only 30% of the group felt they would do well compared to their peers.

Motivation to Learn

Measures of motivation to learn were captured with a 10-item questionnaire that used a 5-point Likert scale for agreement with statements of motivation (1= *Strongly disagree* to 5 = *Strongly agree*). There were four items to assess levels of intrinsic motivation, four items to assess a lack of motivation, and two items to assess levels of extrinsic motivation. The distinct types of motivation were assessed using the PLOC scale developed by Goudas et al. (1994). The nine items were divided into three subscales that examined intrinsic, extrinsic, and a lack of motivation for the military movement class. The scores from these three subscales were used as indicators for motivation. A high score in a subscale reflects a strong indication of agreement with the motivational

methods. A low score in a subscale reflects a lack of agreement with the motivational method.

The participants indicated an elevated level of support for intrinsic motivation. Nearly all participants (90%) agreed that they find "pleasure and satisfaction" in learning new things. There was also most of the group (90%) that agreed they go to the class to "prove to themselves" they can complete the class. However, only 30% of the participants agree that military movement class teaches "things that interest me." The participants also indicated an elevated level of support for extrinsic motivation for the course where 60% of the group agreed the course would help them "better prepare for military career." Additionally, only 40% of the group agreed that success in the class will make them "feel important."

The participants also indicated a low level of support for a lack of motivation for attendance and participation in the military movement course. The bulk of the group (80%) felt like they understood the purpose of military movement and why they needed to take the course. Likewise, 70% of the group did not feel like the class was a "waste of time." However, 20% of the group agreed that they did not "understand what they are doing" in the class. Overall, the group indicated an elevated level of motivation to attend the class and saw the value and importance of taking the class.

Test Stage Results

The participants learned the performance cues of the selected skills during the class periods. The students were provided a master demonstration followed by progressions of each skill. The students were then able to practice the skill for about five minutes during the deliberate practice time. Once the student felt comfortable with the

skill, they were able to make one or two graded attempts with instructor verbal feedback on each attempt.

The method of skill progression was in accordance with the instructor manual (Coelho, 2019). I provided verbal cues on the points of performance that the student needed to fix to earn a higher score on the skill. The test stage began once the students had received all the lessons covering the selected skills. The video recordings occurred during lesson 13, 15, and 16. The intervention aligned with the regularly scheduled additional instruction time. The students made three recorded attempts for each of the selected skill. The data for the test stage was collected using the testing phase data collection sheet (Appendix G). I collected the predicted and actual scores for each graded attempt. I also made observations of the participants use of their free practice time between graded attempts.

Predicted Performance

The participants were asked to predict their attempts just prior to making each of their three video recorded attempts. The predicted scores were based on their previous exposure to the skill during the class instruction and deliberate practice sessions. The average predicted score for all video recorded attempts of the cartwheel was 2.37 with SD = 1.61. The average predicted score on the vertical rope climb was 3.67 with SD = 1.69. The average predicted score on the shelf was 3.7 with SD = 1.90.

Graded Performance

After the students provided their predicted performance scores, they completed one graded attempt of the skill. The graded attempt was recorded using the student's video recording application on their cell phone. Each graded attempt was scored on a

scale of 0-5 based on the performance guidelines and grading rubric for the assigned skill (see Appendix C). The average graded score for all video recorded attempts of the cartwheel was 1.47 with SD = 1.53. The average graded score on the vertical rope climb was 3.13 with SD = 2.16. The average graded score on the shelf was 3.33 with SD = 2.14.

Deliberate Practice

After each graded attempt, the participants were allowed three minutes of deliberate practice time to work on their deficiencies prior to taking their next graded attempt of the skill. The participants were free to use the three minutes between attempts in whatever manner they chose. Observations of the participant's active use of their deliberate practice time was recorded on the data sheet. Effective use of practice time during the study was defined as a participant using the practice time to actively work on any of the components of the assigned skill. The number of practice attempts that each student took was noted on the collection sheet. I also captured observational notes on whether the participant spent time viewing their video feedback again during the practice session.

Post-test Results

Upon completion of the intervention, the participants were given a 25-item post-test questionnaire. The questionnaire included the same 25-items as the pre-test questionnaire. The purpose of the post-test data tool was to identify any changes in their perceived measures of autonomy, confidence, predicted performance, and their motivation to learn.

Autonomy

The participants indicated a median value of familiarity of *very familiar* with the cartwheel, *extremely familiar* with the vertical rope climb, and *extremely familiar* with the shelf. The participants indicated a median comfort level of *comfortable* with the cartwheel, the vertical rope climb, and the shelf. A minority of the participants indicated a lack of comfort on the vertical rope climb (30%), the shelf (30%), and the cartwheel (20%).

Competence

The participants' self-confidence and competence responses indicate a mixed level amongst the group. Most of the group (60%) felt they performed the skills well on their third graded attempt. The group was similarly split concerning their satisfaction of their performance of the skills. Only 60% of the group agreed they were satisfied with their performance while 40% disagreed. Overall, the participants felt the class helped their confidence. Much of the group (70%) felt they were confident on the skills after working on the tasks in class. When comparing their performance on the skills with their peers, the group was split with half of the group in agreement and the other half in disagreement that they performed well compared to their peers.

Predicted Performance

The participants were asked to predict their highest graded attempts for each skill. The predicted scores were based on their previous exposure to the skill during the class instruction and deliberate practice sessions. The average predicted score for all video recorded attempts of the cartwheel was 2.9 with SD = 1.79. The average predicted score

on the vertical rope climb was 3.7 with SD = 1.7. The average predicted score on the shelf was 4.0 with SD = 1.89.

Motivation to Learn

The participants indicated an elevated level of support for intrinsic motivation. Most of the study (70%) agreed that they find "pleasure and satisfaction" in learning new things. The entire group (100%) agree that they go to the class to "prove to themselves" they can complete the class. However, only 40% of the participants agree that military movement class teaches "things that interest me." The participants also indicated an elevated level of support for extrinsic motivation for the course. Much of the group (60%) agreed the course would help them "better prepare for military career." Further, 70% of the group agreed that success in the class will make them "feel important."

The participants also indicated a low level of support for a lack of motivation for attendance and participation in the military movement course. All the participants (100%) felt like they understood the purpose of military movement and why they needed to take the course. Furthermore, most of the group (90%) did not feel like the class was a "waste of time." Also, there was 90% of the group that agreed that they "understand what they are doing" in the class. Overall, the group indicated an elevated level of motivation to attend the class and saw the value and importance of taking the class.

Perceptions

Once the participants were complete with their post-test questionnaires, I sat down with each participant to conduct a semi-structured interview. The interview consisted of 12 open-ended questions (Appendix F). The purpose of the interviews was to capture the participants' perceptions of the intervention and to identify any perceived

benefits or disadvantages of the use of video feedback in the military movement course. The interviews were originally planned to occur in person, however, due to risk mitigation factors and safety precautions to limit the risk of COVID 19, the interviews were conducted and recorded online using Microsoft Teams. The change from in-person to teleconference was out of an abundance of caution and to limit the risk of exposure for the participants. The audio was transcribed and analyzed for common themes amongst the participants. Each participant was provided a copy of the transcript to review and verify their responses for accuracy.

Good Feedback

The first question asked, "what is good feedback from an instructor?" The responses were mixed with the majority (90%) focusing on the knowledge of performance while only one focused on the knowledge of results. Additionally, most of the participants (80%) indicated that valuable feedback tells you what you did wrong and how to correct the deficiency. MM4 stated, "Good feedback from an instructor includes exactly what you did wrong and what you need to do to earn more points." MM6 felt similarly when she said, "Good feedback covers what you did wrong, how to fix it, and what you need to do to get full points on the skill." Both participants felt that quality feedback is only concerned with correcting deficiencies.

However, three of the participants felt quality feedback should also capture elements that were performed correctly. MM10 said, "Good feedback explains what was not correct, what was good, and maybe gives a helpful tip to get better." MM8 felt the instructor should "point out what needs to be improved but also tells you what was done correctly." While MM7 summarized helpful feedback as "acknowledging sustains and

then keying in specifically on the improves." These participants appreciated the benefit of acknowledging the correctly performed elements of a skill while also understanding the steps needed to correct the deficiency.

Nevertheless, one of the participants prefers to rely on the knowledge of results as her form of valuable feedback. MM1 said, "Good feedback is a perfect score. I just want to the instructor to tell me what score I earned." When I asked her how she can improve her score if she does not receive a perfect score she responded with, "I like to figure it out on my own. I enjoy the challenge of figuring out where I went wrong. I don't need feedback to tell me what I messed up on." MM1 was the only respondent who felt valuable feedback should only focus on the knowledge of results.

Poor Feedback

The second question asked the participants, "What is poor feedback from the instructor?" This question served as a counterpoint to the examination of quality feedback. The most common response centered around the theme of a lack of specificity. Many of the participants (60%) felt that poor feedback lacked the information needed to improve their skills. MM9 replied, "Poor feedback is using general phrases that are not specific and don't assist the cadet being able to picture what they need to do to succeed." She also explained that poor feedback tends to frustrate her instead of motivating her to practice. MM6 echoed the frustrations with unspecific feedback: "Poor feedback doesn't give you any information on what you did wrong or how to fix it."

Unlike MM1, most of the group were not a fan of feedback that only focused on the knowledge of results. In fact, half of the participants (50%) said that poor feedback only provides a score. MM4 said, "Poor feedback is just saying the points with no

explanation of what needs to be fixed." The participants felt that knowledge of results was not enough feedback to be able to improve their skills. However, MM1 had a unique response regarding poor feedback: "Poor feedback is when an instructor says nothing at all." She was the only participant that said a lack of any type of verbal feedback would be considered poor feedback.

Preferred Feedback

The third question asked, "Which method of feedback do you prefer when learning a new physical skill?" The purpose of this question was to identify the preferred feedback methods for the participants when they are learning how to perform a novel physical skill. The participants were split between two dominant methods of feedback: verbal and visual feedback.

The least common method of preferred feedback was the use of purely visual feedback. There were only two participants (MM2 and 4) who preferred to use visual feedback methods to improve their skills. Both participants indicated they would prefer to have their attempts video recorded and then be allowed to watch it themselves to discern what changes that would have to be made to fix their errors. MM4 preferred to use video recording because it allowed her to "look at one thing at a time and focusing on getting that right first." She stressed the importance of seeing herself performing the skills as a key to her ability to improve.

The sole use of verbal feedback was the preferred method of 40% of the group. MM1 preferred the use of positive verbal encouragement for her feedback process. MM3 and MM6 both preferred when the instructor provides clear and concise verbal cues based on their performance of the skill. MM7 said, "I like when [instructors] just watch

and specifically point out what I did wrong and what was done right." She prefers the verbal feedback technique of addressing both the deficiencies as well as highlighting the portions of the skill that she completed correctly.

A combination of video or visual feedback paired with verbal cues was the preferred method for 40% of the group. MM9 favored the ability to adjust the speed of the video review along with the instructor's verbal feedback method. She said, "I prefer having an attempt recorded so that I can watch it at normal speed and slow motion as well as using the instructor's descriptions on small useful techniques to improve my performance." MM5 agreed, "I prefer verbal and visual feedback with the instructor explaining and showing you exactly what you did wrong." MM6 and MM10 also preferred the mixture of video and verbal feedback due to the quality information it provided to them.

Video Feedback

The fourth question asked, "Which tasks did you find the video feedback beneficial?" The purpose of this question was to help identify whether the participants felt the video feedback process was beneficial for each skill selected. All the participants (100%) found the video feedback was beneficial for at least one of the skills. Furthermore, most of the group (90%) felt the video feedback was helpful for learning the cartwheel. However, only 30% of the group felt the video was beneficial for the vertical rope climb. Half of the group (50%) said that the feedback was beneficial to learning the shelf. Moreover, only two participants (20%) found the video feedback to be beneficial for all three skills. Meanwhile, five of the participants (50%) found the feedback to be beneficial for only one skill.

Video Feedback and Skill Improvement

The fifth question asked, “Did you find the video feedback helpful for your skill improvement? If so, how?” The purpose of this question was to identify the participants’ perceived benefits of the intervention regarding skill improvement. All the participants (100%) found the video feedback to be helpful for improving at least one of their skills. Some of the participants even acknowledged the video feedback was helpful for skill improvement even if they did not earn any additional points on the skill during the three attempts. MM6 said, “I could see what I was doing wrong with my cartwheel not being in a straight line. However, I couldn't improve my score in three attempts.” She felt the video feedback was a key component to her eventually earning maximum points on the skill on her last graded attempt. MM6 was excited to point out, “With further practice, however, I did improve my score from a 3 to 5.”

Many of the students felt the ability to see themselves performing the skill in slow motion gave them valuable insights into their deficiencies and allowed them to make quick corrections on their form and techniques. MM4 noted, “I could see the problem in my form more easily than just trying to imagine it when an instructor in class is trying to explain it to me.” MM10 felt the video was beneficial for improving only certain skills. “Yes, for certain things. It was great for the more ‘gymnastic’ things because I must have an idea what my body is doing since we are focusing on form so much. It's easy to forget about little details.” Overall, the group felt that the video recordings played a key role in their skill improvement.

Video Feedback and Autonomy

The sixth question asked, “Did you find video feedback helpful for autonomy? If so, how?” The purpose for this question was to identify if the group perceived any benefits regarding an increase in their autonomy during the intervention. The most common response centered around the ability of the video feedback to show the participant what elements were performed incorrectly. The video served as a method for the group to better understand how they were performing the skills.

MM2 found the video feedback to be very informative for improving her autonomy. “I thought I was better at the skill than I actually was. It was a nice wakeup call when I could see what was happening during my cartwheel. My understanding of my skills and the actual performance of my skills were far apart.” While MM2 was able to quickly implement the video feedback for improving her self-awareness, it took some of the others a little longer. MM6 felt the improvement in her autonomy was a much slower process. MM6 said, “It took me re-watching the videos multiple times before I was able to really understand what I was doing wrong. I think I may have been overconfident in my skills since I was certain that I had a perfect cartwheel in my mind.” For MM6, it took more attempts to gain a better understanding of her abilities and her performance level than the three iterations during the intervention. MM6 said, “I was slow to understand that the video was giving me a reality check of my skill set.”

Video Feedback and Motivation

The seventh question asked, “Did you find video feedback helpful for motivation to use deliberate practice time? If so, how?” The purpose for this question was to examine the perceptions of the group regarding the use of the intervention to generate

motivation to actively use the deliberate practice time. Most of the group (MM 1-4 and 7-10) found the feedback motivated them to practice the skill. Some of the participants could see how close they were to scoring additional points and used that motivation to practice. For example, MM8 said, “When I saw how close I was to getting the second point on the rope, I wanted to keep trying.” She was able to see her performance and knew she was closer to increasing her score than she had initially thought. MM9 echoed those thoughts: “Seeing how close I am on video motivates me to try harder and finally get it.”

Another common theme among the participants was using the video feedback to understand the incorrect points of performance served as motivation for them to practice. Six of participants (MM 1-4, 7, 10) noted that viewing the video with instructor feedback provided them with the motivation to correct their errors. MM7 said, “Knowing exactly what I did wrong and what I needed to improve motivated me to practice and fix the errors.” She was determined to use her practice time to work on the performance cues. MM10 was impressed with the quality of feedback provided from the video and the instructor. She said, “Instead of just practicing the wrong thing, we got real feedback and we could see the things that were wrong. It was easier to fix [the errors] instead of practicing it wrong until trying to get graded and finding out its [the performance] wrong.” Most of the group (60%) felt the video feedback provided them motivation to practice as well as motivation to improve their scores.

However, two participants (MM 5 and 6) did not feel the feedback was helpful for motivating them to practice. MM5 said, “I did not really think that the two related. I did not feel any more motivated to practice after seeing the videos.” She felt her drive to

practice remained the same throughout the intervention. MM6 was motivated in a different manner. She said, “Seeing myself had no effect on my motivations. My scores did.” MM6 had previously indicated that she was more concerned with the knowledge of results and her motivation based on scores aligns with her extrinsic motivation.

Video Feedback Benefits

The eighth question asked, “What benefits did you perceive from using the video feedback?” The purpose of this question was to help identify any additional perceived benefits of using video feedback that were not previously identified in the interview. There were three major themes identified amongst the group responses: knowledge of performance, detection of errors, and clarity of instructor feedback. The most common theme identified was the ability of the video feedback to allow the participant to see themselves performing the skill. Knowledge of performance was identified as a benefit for 90% of the group. The ability to “see themselves” as they progressed through the points of performance was the most common theme.

MM8 noted, “Seeing myself [on video] and then seeing others perform [the skill] allowed me to make points of comparison. I could then try practicing some of the things [my classmates] were doing.” The ability to slow down the video and focus on sections of the performance was also noted as an important insight into the knowledge of performance by half of the group (MM2-5 and 7). Another common thread that was closely related to knowledge of performance was the ability to identify errors in the performance.

Error detection is a subcomponent of knowledge of performance feedback. The ability to detect errors is a key element to creating steps to fix deficiencies. Most of the

group (70%) identified video feedback as a tool to identify their errors in the execution of the skill. MM7 said, “I really appreciated how the video feedback allowed me to identify errors I needed to work on. The video also allowed instructors to point specific moments in time when the skill started to go poorly and how I could improve in those moments.” She found the ability to go back and view her performance multiple times as the key to her improvement in the cartwheel. MM5 also felt video feedback helped her error detection. She said, “You are able to see exactly what you did wrong from the instructor’s point of view.” MM5 found her videos to be extremely helpful in understanding her deficiencies and then worked with her peers to improve her performance.

The final theme that emerged from this question was the improved clarity of feedback from the instructor. Much of the group (40%) found the instructor feedback, along with the video, to be clearer and more concise. MM6 summed up the clarity issue when she said, “One benefit [of video feedback] is that a student's mistakes can be made clear to the student. Sometimes instructor feedback is unclear, and sometimes students just do not comprehend what they are doing [when performing the skill].” She found the ability for the instructor to visually show her the elements of her performance as a clear method of feedback.

Video Feedback Disadvantages

The ninth question asked, “What disadvantages did you perceive from using the video feedback?” The purpose of this question was to identify any of the perceived disadvantages to using video feedback to inform skill development. The most common response was the amount of time it takes to record and review the videos. Half of the

group (50%) identified the time it takes to watch the video back with the instructor as a possible disadvantage. MM7 noted, “The only disadvantage was the time it took for instructors to film and the hand-off of phones. [However] that is pretty negligible when looking at the benefits.” Most of the participants (40%) agreed that the time requirements only posed a minimal disadvantage for the use of video feedback.

While much of the group (40%) did not perceive any disadvantages to using video feedback, there were two additional disadvantages identified by the group. While MM8 found the video feedback to be beneficial overall, she identified the instructor portion of the feedback review may not be needed. “I didn't feel like I needed the instructor to view the video with me unless it was something I wasn't understanding.” She felt like the addition of the verbal feedback should only be used as needed for clarity. Another unique disadvantage was identified by MM6. She said, “Some students may over analyze and continuously take and watch videos rather than focusing on more repetitions.” MM6 was worried that students may struggle with their time on task and may rely too much on the viewing of the video as a method to improve their skills. She felt that her biggest improvement came from practicing the skill after viewing her attempt.

Video Feedback Future Usage

The final questions asked the participants about future usage of video feedback. The final questions were, “How likely are you to use video feedback as a method for skill improvement in future physical education classes?” and “Please explain whether you feel instructors should use video feedback.” The purpose of these questions was to identify whether the participants would use video in future classes as well as seeking ideas for how instructors should incorporate video feedback in their courses.

The group was provided a Likert scale for their likelihood to use the video feedback process to improve their skills in their future physical education courses. Overwhelming, the group (90%) indicated that they were likely to use video feedback again in the future. There was only one participant (MM5) who indicated they were *unlikely* to use video again.

The participants were also interested to see video feedback processes added into the other physical education classes. All the participants (100%) felt that instructors should incorporate video feedback in their classes. The group had a few suggestions for how the instructors can incorporate the augmented feedback. There were two participants (MM1 and 2) that felt video feedback should be included in additional instruction periods. They both felt this change would require minimal adjustments to the regular coursework.

Another common suggestion was to use video feedback sparingly. Half of the group (50%) felt that some skills were better to use video feedback than other skills. MM5 explained, "I think [instructors] should [use video feedback] on skills like tumbling, but it seems kind of unnecessary for other skills that require more muscular strength than form or technique." MM4 and MM10 echoed MM5's thoughts on using video primarily for tumbling style skills. Much of the group (40%) also felt it should be left up to the students to determine when video replay is used in the class.

MM6 identified two possible groups who would benefit from video feedback in class. She said, "I think this is most helpful for students who are either struggling to get any points and students who keep scoring the same number of points." MM6 went on to further explain that the lower performing students can "compare their technique on video

to what their instructors demonstrate." She also felt the students who are not improving could use the video to "focus on finer details of their technique." MM10 also believed that not every student would benefit from video feedback. She said, "Making everyone record video when some either cannot earn a single point or if they can get a perfect score on the first try is not necessary. [Video feedback] would only be helpful for students trying to get those last few points."

MM7 felt video feedback was helpful for error identification. She explained, "Instructors should use video feedback because it aids in describing the errors made by cadets when performing a skill. The visual tool allows instructors to pinpoint exact moments when the skill degrades and allows them to give specific feedback to improve." She felt the ability to point out deficiencies in technique to the student would be a valuable tool for instructors. MM8 suggested that instructors could save time by only providing their verbal feedback and then allowing the students to view their videos on their own. She said, "The students should only view the video with an instructor if they are still unsure about the feedback after viewing the video." MM8 described the viewing of the video alongside of the instructor as an unnecessary step in the process for most students.

Evaluation of Findings

Autonomy

The participants' responses regarding autonomy were compared from the pre and post-test surveys to provide insight into the perceived changes in the groups' familiarity and comfort level with the skills. The responses from the survey items were also compared with the responses from the exit interviews. The group increased their level of

familiarity with the three skills. The largest shift in familiarity occurred with the cartwheel. All the participants felt at least *very familiar* with the skill after the intervention. The group perceived a mix of changes for their comfort levels on the skills. The group had minimal shifts in their comfort on the cartwheel. There were greater shifts in both directions on the vertical rope climb. There was a 30% increase in feeling *uncomfortable* on the rope while also having a 20% increase in feeling *very comfortable.* The shelf saw the greatest shift in comfort level amongst the group with a 40% increase in feeling *very comfortable*. The results of the survey are in line with the results of the exit interviews. Overall, most of the group (90%) felt the video feedback for improving their self-regulation and autonomy. See Table 4.1 for the changes in the responses for the autonomy items from pre-test to post-test. A positive number represents an increase in the responses for the level of agreement for the question. A negative number represents a decrease. The zero represents no change in the response from pre to post-test for the category.

Table 4.1 Autonomy – Changes Pre to Post Test

Familiarity	Not at all	Slightly	Moderately	Very	Extremely
Cartwheel	-3 (3/0)	-4 (4/0)	-3 (3/0)	+7 (0/7)	+3 (0/3)
Vertical Rope Climb	-1 (1/0)	-1 (1/0)	0 (1/1)	-2 (6/4)	+4 (1/5)
Shelf	-2 (2/0)	-1 (2/1)	-2 (2/0)	+1 (3/4)	+4 (1/5)
Comfort	Very Uncomfortable	Uncomfortable	Neutral	Comfortable	Very Comfortable
Cartwheel	+1 (0/1)	-2 (3/1)	-1 (2/1)	+1 (4/5)	+1 (1/2)
Vertical Rope Climb	-1 (1/0)	+3 (0/3)	-3 (3/0)	-1 (4/3)	+2 (2/4)
Shelf	-3 (4/1)	0 (2/2)	0 (1/1)	-1 (3/2)	+4 (0/4)

Note. The value outside of the parentheses represent in increase (+) or a decrease (-) or no change (0) from pre to post. The values inside the parentheses are the pre/post-test response.

Competence

Comparison of the participants' responses regarding the competence items on the pre and post-test surveys provided insight into the perceived changes in the groups' self-confidence and competence. The group presented minor shifts that were both positive and negative across all the competence survey items. The responses from the survey items were also compared with the responses from the exit interviews. The group indicated that they did not feel good about their performances on the skills in class. There was a 40% increase in agreement that the participants did not perform well on the skill. The group indicated a decrease in confidence that their third attempt of the skills would be "performed well." During the exit interview, most of the group (90%) felt they would perform better on the skills after additional practice attempts. See Table 4.2 for the changes in the responses for the motivation items from pre-test to post-test.

Table 4.2 Competence – Changes Pre to Post Test

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The selected skills will be activities that I will not do well in.*	+1 (0/1)	-1 (3/2)	-3 (4/1)	+4 (1/4)	-1 (2/1)
After working on the skills in class, I will feel confident.	0 (0/0)	0 (0/0)	+2 (1/3)	-3 (7/4)	+1 (2/3)
I will be skilled at the cartwheel, vertical rope climb, and shelf.	0 (0/0)	0 (2/2)	0 (2/2)	-1 (5/4)	+1 (1/2)
I will be satisfied with my performance on the skills.	+1 (0/1)	0 (3/3)	-3 (3/0)	+1 (3/4)	+1 (1/2)
I think I will perform well by my third graded attempt of the skills.	0 (0/0)	+2 (1/3)	+1 (0/1)	-2 (6/4)	-1 (3/2)
I think I will do well compared to others on my performance.	+2 (0/2)	-1 (4/3)	-3 (3/0)	+1 (2/3)	+1 (1/2)

Note. The value outside of the parentheses represent in increase (+) or a decrease (-) or no change (0) from pre to post. The values inside the parentheses are the pre/post-test response. * denotes a reverse coded item to increase trustworthiness of the instrument.

Skill Improvement

The participants recorded scores on their three intervention attempts and their final graded attempt were compared to look for skill improvement. The group scores were analyzed for each skill using repeated measures ANOVA. Repeated measures ANOVA is a data analysis tool used to investigate changes in the mean over the course of three or more points in time.

The findings indicate there was a statistically significant increases in scores within the group for the cartwheel and the shelf. Video feedback had a statistically significant effect on the performance of the cartwheel, F (2, 18) = 21.50, $p < .001$. Additionally, the participants significantly increased their performance on the shelf, F (2, 18) = 3.58, $p = .049$. Contrary to the cartwheel and shelf, the participants did not significantly increase their performance on the vertical rope climb, F (2, 18) = 2.62, $p = .10$. However, the group did increase their average score on the vertical rope climb from their first attempt, mean of 2.9, to their final attempt, mean of 4.1.

Moreover, the students made significant adjustments to their predicted scores on the shelf between attempts, F (3, 27) = 4.23, $p = .014$. The group did not make significant adjustments to their predicted scores on the cartwheel, F (3, 27) = 2.57, $p = .075$, or the rope, F (3, 27) = 2.28, $p = .10$. While the changes in the group's predicted outcomes were not statistically different for the cartwheel or rope, the difference between the predicted and actual scores for the individuals within the groups improved significantly for the cartwheel.

The participants overestimated their abilities on the cartwheel by an average of 1.0 point on their first attempt and underestimated themselves by an average of .2 points

on their final attempt. The improvement in their accuracy of predictions on the cartwheel was significant, F (2, 18) = 14.48, $p < .001$. The participants had overestimated their abilities on the vertical rope climb by an average of .4 points and underestimated their skills by an average of .4 points on their final climb. The group did not significantly improve the accuracy of their predictions on the vertical rope climb, F (2, 18) = 3.23, p = .063. While the group did make significant changes to their predictions on their performance of the shelf, they did not significantly improve the accuracy of their predictions, F (2, 18) = 2.16, p = .14. The group went from overestimating their skills on the shelf by an average of .2 points to underestimating their scores by .5 points.

Overall, the group saw their average scores improve in each skill. The group had an average score increase of 1.5 points with SD = .71 on the cartwheel. The participants increased their performance on the vertical rope climb by an average of 1.2 points with SD = 1.69. Additionally, the group increased their performance on the shelf by an average of 1.4 points with SD = .97. Additional data analysis examined the relationship between practice attempts, score improvement, and final scores.

Pearson's correlation coefficient was used to measure the statistical relationships. Analysis for the cartwheel revealed limited correlation between the number of practices and the final score, r = .37, as well as the relationship between practices and score improvement, r = .52. However, for the vertical rope climb there was a strong positive correlation found between practices and score improvement, r = .88, $p < .001$. There was minimal negative correlation found for the shelf between practices and score improvement, r = -.19, and nearly no correlation between practices and their final score, r

= -.05. See Figure 4.1 for the changes in the groups' averages for their predicted and actual scores on the skills.

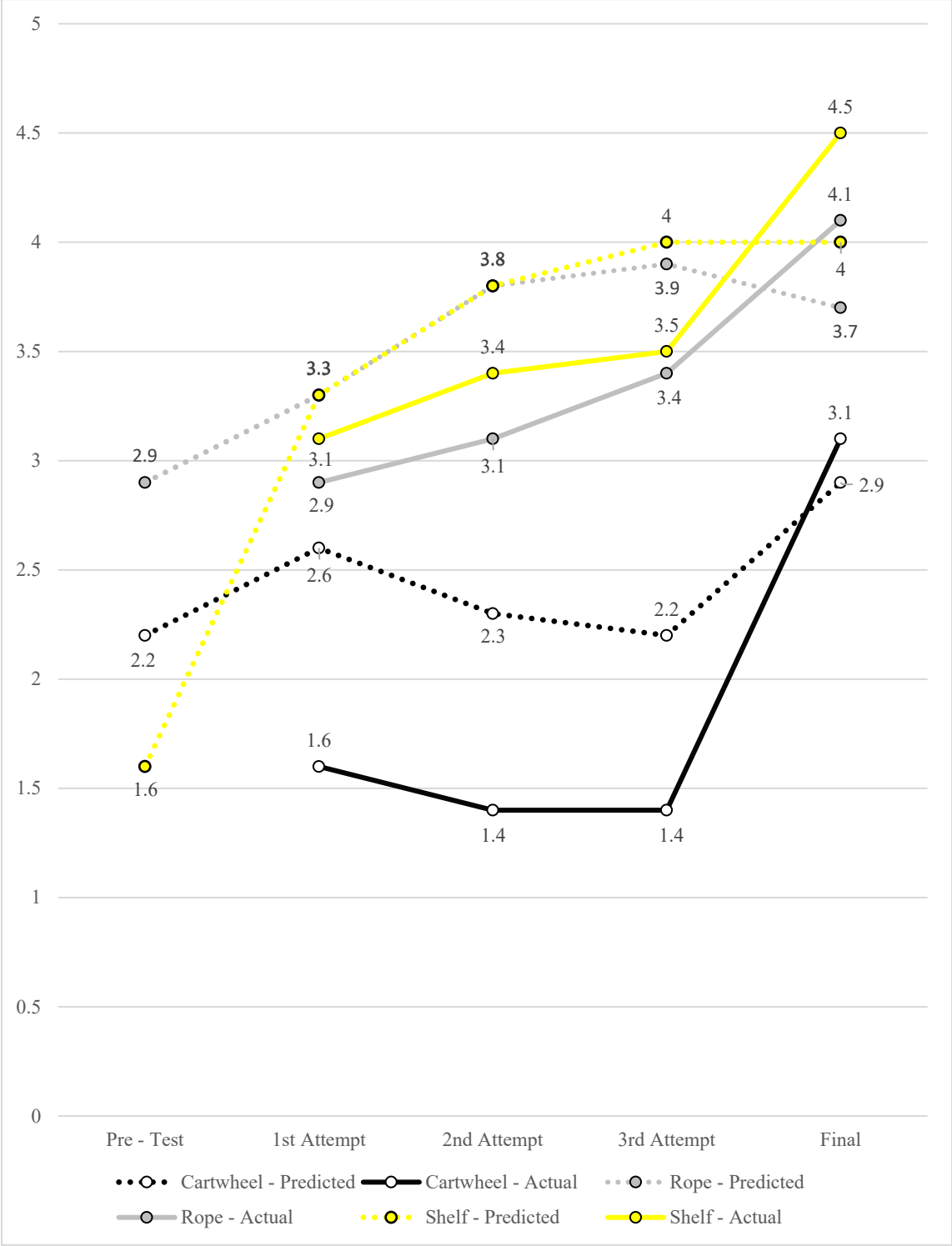

Figure 4.1 Average scores for the predicted and actual attempts.

Motivation to Learn

Comparing the survey responses from the pre-test and post-test questionnaires illustrates the shifts in the responses for the group's motivational levels. Overall, the group indicated an increase in their support for intrinsic motivation for the class. The largest positive change for intrinsic motivation was their support for learning new things. In fact, there was a 50% increase in agreement that they go to gymnastics class "for the pleasure I experience when I discover new things never done before." However, the participants indicated that they did not enjoy the process of learning new skills in class. There was a 30% decrease in agreement that they "experience pleasure and satisfaction" during the class instruction.

The participants also indicated an increase in their level of support for being motivated to attend class. Overwhelmingly, the students felt they understood the purpose for taking the class. The responses were mixed regarding the students' extrinsic motivation. There was a 30% increase in support that the class would help the students to "better prepare for their military career." However, the class was split in their support for "feeling important" when they succeed in class. There was a 30% increase and a 20% decrease for the groups' agreement on "feeling important." Overall, the group indicated an increase in the motivation to attend the class as well as the value and importance of taking the class. See Table 4.3 for the changes in the responses for the motivation items from pre-test to post-test. A positive number represents an increase in the responses for the level of agreement for the question. A negative number represents a decrease. The zero represents no change in the response from pre to post-test for the category.

Table 4.3 Motivation – Changes Pre to Post Test

Why do you go to gymnastic courses?	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Because I experience pleasure and satisfaction while learning new things. (IN)	0 (0/0)	+3 (0/3)	-1 (1/0)	-4 (9/5)	+2 (0/2)
Because I think that military movement will help me better prepare for my military career. (EX)	-1 (1/0)	+1 (2/3)	0 (1/1)	-2 (6/4)	+2 (0/2)
Honestly, I do not know; I feel I am wasting my time in military movement. (UN)*	+3 (0/3)	-3 (7/4)	+1 (2/3)	-1 (1/0)	0 (0/0)
To prove to myself that I can complete military movement class. (IN)	0 (0/0)	-1 (1/0)	0 (0/0)	+2 (5/7)	-1 (4/3)
I once had good reasons for going; however, now I wonder whether I should continue to try during military movement. (UN)*	-5 (7/2)	+6 (2/8)	-1 (1/0)	0 (0/0)	0 (0/0)
For the pleasure I experience when I discover new things never done before. (IN)	-1 (1/0)	0 (0/0)	-4 (4/0)	+4 (5/9)	+1 (0/1)
Because when I succeed in military movement, I feel important. (EX)	-3 (3/0)	+2 (1/3)	-2 (2/0)	+1 (3/4)	+2 (1/3)
I cannot see why I go to military movement and frankly, I could not care less. (UN)*	-1 (6/5)	+2 (2/4)	0 (1/1)	-1 (1/0)	0 (0/0)
Because military movement allows me to continue to learn about many things that interest me. (IN)	-1 (1/0)	0 (3/3)	0 (3/3)	-1 (3/2)	+2 (0/2)
I do not know; I cannot understand what I am doing in military movement. (UN)*	-1 (4/3)	+2 (4/6)	+1 (0/1)	-2 (2/0)	0 (0/0)

Note. The value outside of the parentheses represent in increase (+) or a decrease (-) or no change (0) from pre to post. The values inside the parentheses are the pre/post-test responses. The statements are thematically identified. IN refers to an indicator for intrinsic motivation. EX refers to an indicator for extrinsic motivation. UN refers to an indicator for unmotivated. * reverse coded item to increase trustworthiness of the instrument.

Summary

The purpose of this mixed methods action research study was to examine how to enhance instructor feedback using video replay to inform skill development. The study

used multiple sources and methods of data collection that included assessments, student pre and post-test questionnaires, observations, and semi-structured interviews. Extreme case sampling was used to select 10 volunteers of the lowest-performing female students currently enrolled in a military movement course at a military academy. All the participants identified as female. The focus of the study was to identify the perceived benefits of using video feedback while using the research questions to guide the study.

Analysis of the data revealed support for factors previously identified in the literature regarding students' perceptions of video feedback. Major themes that emerged during analysis included clarity of the feedback, changes in learning, changes in performance, changes in motivation to learn, changes in autonomy, and changes in competence. Further analysis revealed similarities in perceptions within the participants. A significant finding for the addition of video feedback was that video helped provide greater clarity for the knowledge of performance cues for the student as well as a better understanding of their deficient components of the skill. Another significant finding was that participants preferred video feedback as their method of instructor feedback in physical education classes. Video feedback was also shown to significantly improve task scores for the participants as well as increase the accuracy of their predicted performances.

CHAPTER 5

DISCUSSION

The applied gymnastics course at the academy presents some unique challenges to our students learning novel physical skills. Our standard instructional methods and process of providing feedback are insufficient for our less skilled students. The lower performing female students struggle with actively managing their deliberate practice sessions and have some difficulty using verbal cues to correct their deficiencies. Ellison and Woods (2016) found that female students preferred augmented feedback to verbal feedback when correcting errors during deliberate practice sessions. The less skilled students are more likely use avoidance and coping techniques in lieu of active time-on-task. Baghurst et al. (2015) found that females are more likely to cope and avoid when a fear of failure exists.

Rationale

This action research study sought to find a more efficient method of providing students individualized feedback with the goal of decreasing the physical skill gap between the males and females at the academy. The purpose of this study was to examine the effects of video feedback on the low performing females in the military movement class. The overall goal of the study was to determine a better method of feedback to help cadets inform their skill development.

Research Questions

This action research study sought a more efficient method of providing female students individualized effective feedback. The research questions guiding this study were as follows:

1. What are female cadets' perceptions of video feedback related to skill evaluation and skill improvement?
2. How do female cadets perceive video as an additional method of feedback?
3. How do female cadets perceive video feedback as a method to promote motivation for deliberate practice?
4. How do students' perceptions of their skills change when video is added as an additional method of instructor feedback?

Intervention

The study used extreme case sampling to select 10 of the lowest performing female students that were currently enrolled in the applied gymnastics class at the military academy. The study occurred over a six-week period and consisted of three phases. The first phase was the pre-test phase. During the pre-test phase, the participants completed questionnaires. The next phase was the test phase. During the test phase, the participants were videotaped while performing three graded attempts at three unique skills: the cartwheel, vertical rope climb, and mounting the shelf. The students then reviewed the video along with an instructor who provided the students with detailed feedback on their performance as well as cues for the students to improve their skills. The students also made predictions of their graded score prior to each attempt. The final phase was the post-test phase. During the post-test phase, the participants completed a

questionnaire and exit interviews. The data were collected throughout the study using instructor observations, student questionnaires, interviews, video recording of graded attempts, and assessments.

Findings

The participants identified many benefits from the use of video feedback to inform their skill development. Video feedback was shown to increase the participants skill performance significantly for each skill. The video was also shown to increase the accuracy of their predicted performance. Another significant finding from the study was the increase in self-regulation and autonomy that also lead to an increase in the use of deliberate practice time. The participants also experienced an increase in their motivation to learn while identifying support for both intrinsic and extrinsic motivational levels for the class. The study also found video feedback was beneficial for the participants' increased self-awareness.

Purpose of the Discussion

This chapter connects the findings of the study with existing literature. The section on the results related to existing literature addresses the findings that are consistent or inconsistent with the current literature. This section also speculates on the reason for the study findings. The section on the recommendations for practice highlights the implementation plan for the findings. This section identifies the policy and practice changes I will incorporate in my instructional methods. This chapter then addresses recommendations for future research. This section highlights some of the limitations of the study and offers suggestions for expanding future research on video feedback.

Finally, this chapter concludes with a conclusion of the dissertation and suggestions for how the study could further the understanding of the problem of practice.

Summary of the Study

Results Related to Existing Literature

The problem of practice for this study was to find a more efficient and effective manner of providing feedback (Turner & West, 2013) to the lower performing students due to the absence of visual cues (Roure et al., 2019). The purpose of this mixed methods action research study was to explore the benefits of using video replay as a form of enhanced instructor feedback. The four research questions that guided the study are presented along with an exploration of how the findings align with the existing literature.

Research Question 1

What are female cadets' perceptions of video feedback related to skill evaluation and skill improvement?

The first research question sought to identify how the students felt about using video feedback on their skill evaluations. I also wanted to examine if the students felt video feedback helped improve their performance of the skills. While examining the first question, two major themes and subsequent subthemes emerged that aligned with the literature. The first major theme was clarity of feedback with the subthemes of knowledge of performance and knowledge of results. The second major theme was changes in learning with the subthemes of self-awareness and the improvement of physical skills.

Major Theme 1: Clarity of Feedback. The participants identified one of the primary benefits of video feedback was the increased clarity of the provided feedback.

After analysis of the exit interview, the themes of improved knowledge of results as well as knowledge of performance were the main factors of the improved understanding of the video feedback. Prior studies that focused on the knowledge of results relied primarily on providing a final score (O'Loughlin et al., 2013) or elapsed time (Palao et al., 2015) to the participants. Focusing only on the knowledge of results provides little to no information on what caused the score or how to improve on the performance of the skill. However, viewing the video feedback allowed the participant to see their results while also viewing their performance.

The participants identified an additional benefit from seeing their results from the video. The group stated that being able to see their end results alongside the score earned allowed them to have a better understanding of why they earned the given score. They also indicated the video was helpful to understand how close they were to improving their score. For instance, MM1 said that after seeing where her hands were at on the vertical rope climb, she knew she could climb higher on her next attempt. She was not concerned with changing her form. She was only focused on gaining more points by climbing higher on the rope. MM5 had a similar experience on the shelf. After viewing her first attempt at mounting the shelf, she was able to see how close her foot was to touching the shelf. She was immediately motivated to give the shelf another attempt.

MM2 noted that seeing her landing spot on her first attempt of the cartwheel made it clear to her that she could score the maximum points on the skill. In these examples, the students were not concerned with the performance of the skill. Instead, they were concerned with improving their results. These findings are in line with previous studies on the use of feedback to inform results (Kangalgil & Özgül, 2018; Valentini et al.,

2017). Weaver et al. (2018) noted the extrinsically motivated students are more focused on achieving results and are driven by grades. The extrinsically motivated members (MM1-2 and 5) appreciated the additional details the video provided for their knowledge of results. This supports the findings of Kangalgil and Özgül (2018) who found most students are more concerned with their grades than with perfecting their performance.

For the more intrinsically motivated students, the knowledge of performance was deemed to be more beneficial regarding the clarity of feedback. The ability to clearly visualize and understand the points of performance that are performed correctly as well as those parts that are deficient was the top response of the group regarding the clarity of video feedback. The students noted that having the video on their personal phones allowed them to go back and review their performance of the skills. When coupled with slow motion and the ability to pause the video at key points, the instructors and students were able to gather a clear understanding of their faults.

From the clear understanding, the students were able to take steps to rectify their shortcomings. Analysis of movement patterns was shown to be beneficial across a wide variety of sports and physical activities (Benitez Santiago & Miltenberger, 2016; Boyer et al., 2009; Guo, 2018; Hume, 2018; Koekoek et al., 2018; Koekoek et al., 2019; Kretschmann, 2017). Coaches rely heavily upon video replay to review results (O'Loughlin et al., 2013) and address major and minor errors in the performances of their athletes (Palao et al., 2015; Potdevin et al., 2018). In a gymnastics class, Potdevin et. al (2018) found that masking the knowledge of results while focusing on the knowledge of performance helped his students improve in their gymnastic skills. However, the participants disagreed with the suggestion of masking the results and only focusing on the

performance. They felt a combination of knowing what score they earned while also knowing how they performed according to the cues generated improvement and cleared feedback.

Major Theme 2: Changes in Learning. The participants also noted changes in the learning processes of the skills. The students highlighted one of the keys to their learning of the skills as the ability of seeing themselves performing the skill. This self-awareness provided greater understanding for how the skill should be performed. The group stated that seeing themselves was extremely beneficial for understanding what they were doing. Studies suggest that increased self-awareness can accelerate skill proficiency (Bowes, 2014; Constantinou & Ioannou, 2016; Kretschmann, 2017). The participants stated that seeing their deficiencies on video gave them the motivation to try and correct their errors. They were also more open to accepting critical advice from their instructors. MM3 noted, "There is nothing worse than having no clue why you only earned one point on a skill and being told to keep practicing. Without knowing how I am performing the skill; I can't take steps to change."

The participants also identified their ability to improve their skills as a component of their improved learning. Prior studies found that students who achieve steady progress are more likely to continue to work on improving their skills (Bowes, 2014; Kretschmann, 2007). The participants found that by having a clear understanding of their deficiencies combined with the instructor's guidance for corrections, they were able to steadily improve their performance.

In fact, the group had significant skill improvement across all three skills. While the students were not able to achieve perfect performance during the study, they all

demonstrated increases in their skill performance. These findings are in line with previous use of video feedback to improve gymnastic skills (Boyer et al., 2009). Boyer et al. examined the use of expert video modeling combined with video feedback of performance execution of three complex gymnastic skills. While the participants were not able to achieve perfect performance during the study, they all demonstrated increases in skill performance and improved skill retention after the intervention as shown by their increased scores on their final graded attempts.

Research Question 2

How do female cadets perceive video as an additional method of feedback?

The second research question was designed to explore the students' perceptions of video feedback as a method for feedback in the classroom. While examining the second question, two major themes and subsequent subthemes emerged that aligned with the literature. The first major theme was feedback preferences with the subthemes of verbal and video feedback as well as strengths and weaknesses of video. The second major theme was implications of video feedback with the subthemes of targeted skills, targeted individuals, and incorporating peer feedback.

Major Theme 3: Feedback Preferences. While there are many types of feedback used throughout education, the participants identified two primary types of feedback that they prefer when it comes to learning novel physical skills: verbal feedback and video feedback. The participants identified verbal feedback as one of the most common methods of feedback that they have encountered. The instructors in the class primarily rely on verbal feedback due to the ease and timeliness that verbal cues offers the students. Potdevin et al. (2018) found that educators rely on verbal feedback as their primary

method of immediate feedback. While verbal feedback may be the most common feedback method, it was the least preferred method for the group.

The participants overwhelmingly preferred video or augmented feedback in their learning process. These findings are in line with prior studies (Ellison & Woods, 2016) that found female students preferred augmented feedback to verbal feedback when correcting performance errors. Potdevin et al. (2018) found that verbal feedback was more effective for students in the lower grades. However, adult learners found video feedback to be more effective.

The group identified some advantages and disadvantages for the use of video within the physical education classes. The participants liked how the video recording offered them a clear picture of their entire attempt. They liked how they could use slow motion capture on their phones to see the finer points of the skills. The students also highlighted that nearly everyone brings their own personal devices to class and that the technology of video recording is readily available. The group also identified the fact that anybody can record the attempt. There is no requirement for the instructor to record. The students also felt that having their own recordings on their personal phones was a strength. They were able to replay their attempts multiple times. They were also able to watch their multiple attempts to see if they were making the necessary corrections to improve their form. These strengths align with previous research (Turner & West, 2013; Roure et al., 2019).

While the participants identified many benefits of video feedback, they also found some limitations and possible weaknesses to video. The most noted weakness is that video recording can be time consuming. The amount of time needed to effectively video

tape attempts depend heavily on the number of recording devices, the number of personnel to actively record, and the time it takes to review the footage of the attempt. The participants were concerned the constrained time available in class may not lend itself to adding in video recordings. However, during the study the average time it took to record an attempt and play it back with instructor feedback was just under 30 seconds per individual. Depending on the student to teacher ratio, the amount of time needed for a class to review the videos during class time with a teacher may not be practical.

The participants also noted that if people do not have personal cell phones on hand, the recording devices and software can be expensive. Prior studies have also addressed the expense associated with high end recording equipment (O'Loughlin et al., 2013) as well as slow motion capture software (Palao et al., 2015). The participants also noted that video recordings may become a distraction in class. They were worried that a student may spend more time watching themselves in the videos than actively using their deliberate practice time to make attempts at improving their skills. Prior studies avoided this problem by limiting the number of replays during the class to only one per attempt (Benitez Santiago & Miltenberger, 2016; Boyer et al., 2009; Laughlin et al., 2019). Overall, the group felt the benefits outweighed the risks and supported the use of video feedback in class.

Major Theme 4: Implications of Video Feedback. The participants felt that video feedback was most beneficial for their views of the cartwheel. While they agreed that having the video of their vertical rope climb and shelf mounting attempts was helpful, they suggested that some skills may lend themselves better to video recording than others. These findings align with the literature. Erturan and Hulya (2019) found that

video replay is most beneficial for skills that require kinesthetic awareness of body positioning throughout a movement. Ferkel et al. (2017) found video replay to be most effective for skills that require proper technique to improve performance. The literature suggests that most sports and gymnastic skills would benefit from the use of video feedback (Hume, 2018; Kangalgil and Özgül, 2018; Laughlin et al., 2019; Valentini et al., 2017). The participants suggested instructors could select the more difficult skills in the class to incorporate video feedback. They also felt that by limiting the skills that are recorded the instructors could save time in class.

The participants felt that video feedback may not be necessary for all students. They suggested that some students may not need video feedback to improve their skills. The group felt the video may be wasted on the high performing students in the class. While most of the literature focused on low to average performing students, Guo (2018) focused on improving advanced martial artists. The participants felt there is no need for a student who can achieve a maximum score on a skill to need any additional feedback to fine tune their performance. The objectives of the physical education classes are not to make individuals into perfect performers of the tested skills. The reduction of recordings could further reduce the time requirements for the class.

The participants also felt that the lowest performers may not benefit from video feedback early on in their learning process. The group felt that someone who is first learning a motor skill and is struggling with the basic motor patterns may not receive any benefit from watching their limited attempt. However, the group was not in agreement on the lack of benefit for the lowest performers on a skill. Some of the members felt video replay could provide a wealth of information for even the lowest performers.

Kretschmann (2017) found video feedback to be effective in the lowest performing students in a 5th grade swimming class. MM6 noted that video review may cause additional frustration for students who are unable to successfully perform a skill. She suggested video recording as an optional method of feedback offered in class.

The group also identified the use of peer feedback as another option to help reduce a student's anxiety and pressure to perform in front of an instructor. MM1 felt that allowing the classmates to record their partner's performance would reduce the burden for the instructors while also providing a less threatening feedback loop for the students. The use of peer feedback has been shown to be an effective form of feedback in the literature (Benitez Santiago & Miltenberger, 2016; Potdevin et al., 2018; So-Chen et al., 2016; Ulstad et al., 2019). While many studies examine the use of coaches and instructors recording attempts (Boyer et al., 2009; Guo, 2018; Hume, 2018), Benitez Santiago and Miltenberger suggest that peers can easily record each other. Ulstad et al. found that students are more likely to positively receive constructive feedback when presented by a peer versus an adult instructor. The group's suggestions align with the literature.

Research Question 3

How do female cadets perceive video feedback as a method to promote motivation for deliberate practice?

I designed the third research question to identify how the students felt about using video feedback to help use their deliberate practice more effectively. While examining the third question, one major theme and one more subsequent subtheme emerged that aligned with the literature. The major theme was motivation to learn with the subtheme of the use of deliberate practice.

Major Theme 5: Motivation to Learn. The act of learning a novel physical skill requires some form of motivation (Gerdin et al., 2019) to want to learn (Haerens et al., 2019) as well as a desire to improve your performance (Lyngstad et al., 2019). Learning how to perform gross physical skills also requires deliberate practice attempts to perfect the form and performance of the skill (Hume, 2018). The participants identified a few obstacles to their productive use of practice time to work on their skills in class. The first obstacle is a lack of understanding the skill (Erturan & Hulya, 2019). The participants said they were unlikely to attempt a skill if they were not familiar with the skill. The second obstacle identified was a fear of failure (Baghurst et al., 2015). The group noted that they would not likely make repeated attempts at a skill if they felt they would not be successful. The final obstacle noted was a lack of understanding of their current abilities (Constantinou & Ioannou, 2016).

The group said that fear of failure (Baghurst et al., 2015; Tan & Pang, 2012) and frustration (Ulstad et al., 2019) were the two biggest reasons for them to avoid actively using their deliberate practice time in class. They understood the value of taking repeated attempts for skill progression (Roure et al., 2019). However, they found themselves focusing more on practicing skills they felt comfortable with during their allotted practice time without video feedback (Guo, 2018). The group felt the video feedback was beneficial for increasing their motivation to actively work on the assigned skills during their free time. Without any guidance, the participants took it upon themselves to actively work on their skills in between their recorded attempts. The literature suggested that video feedback increases time on task (Lyngstad et al.; Ulstad et al.) during practice sessions.

Although skill improvement was minimally correlated to practice attempts, the group found they were more apt to practice on the elements of the skill after viewing the video. The lack of correlation between practice attempts and skill improvement may be due to two reasons. The first reason is that practice attempts by themselves does not equal skill improvement. The rapid succession of attempts may have hindered the skill progression of some students. Without taking time to assess their performance during the practice attempts, some of the students may have been reinforcing improper techniques or form. Literature suggests that repetition practice is helpful for establishing muscle memory (So-Chen et al., 2016). However, if the practiced forms are not performed correctly, then the student is spending time and effort to mentally program bad habits.

The second probable reason for a lack of correlation between practice attempts and skill improvement is due to the nature of the skills tested. The vertical rope climb is a physically demanding skill. Climbing a rope multiple times over a brief period will likely result in muscle fatigue and could lead to poor performance on the test. To help minimize muscle fatigue, I spaced the vertical rope climb attempts across each day of the intervention. The students only performed one graded attempt per additional instruction session. The shelf is also a skill that requires some upper body strength. While the performance of the shelf is not as physically demanding as the vertical rope climb, the participants may have completed fewer practice trials to save energy for the graded attempts.

The cartwheel is a skill that lends itself well to multiple practice attempts. The skill requires minimal strength and relies primarily on a strong leg kick and push, body awareness, balance, and coordination (Coelho, 2019). With minimal energy expended

during the execution of the cartwheel, the participants are more likely to make multiple practice runs. However, the inability to assess their multiple practice attempts may have led to the minimal score improvement of those individuals who took the most practice attempts.

The groups' overall motivation to attend the class (Haerens et al., 2019) increased slightly from the pre-test survey to the exit survey. They had an increased understanding of the purpose for the class as well as its benefits. While the group had a decrease in their reported pleasure in performing the gymnastic skills, they did report an increased understanding of the benefits the class provides them for future physical demands. The mixed effects on student motivation are in line with the literature. Potdevin et al. (2018) found video feedback effective at fostering motivation to perform novice tasks. However, the literature also suggests that short term motivational changes are more likely to occur with intrinsically motivated students (Haerens et al.). The literature also found that female students are more likely to be extrinsically motived in physical education classes (Yeung, 2011). However, the group was split between being intrinsically and extrinsically motivated to succeed in the physical education class. Overall, the group saw increases in their responses towards both intrinsic and extrinsic motivation with a slight advantage for intrinsic.

The literature also suggests that pleasure in class is positively correlated to performance in class (Griffin et al., 2013; Haerens et al., 2019; Yeung, 2011). The student with the highest earned points in the group, MM10, was also the student with the least amount of improvement. As the highest performer of the group, her staunch support for her motivation to attend class did not change throughout the study. The most

improved student, MM1, ended with the second highest score of the group. She had the largest shifts in her motivational levels from pre to post. She increased her intrinsic responses and decreased her extrinsic support for the class. The student with the least number of points earned, MM 8, had the second highest improvement. Her response remained mixed on her motivation to attend class. These findings align with previous studies (Griffin et al., 2013; Hannon & Ratliffe, 2007; Standage et al., 2005).

Research Question 4

How do students' perceptions of their skills change when video is added as an additional method of instructor feedback?

The final research question was to explore how the students' perceptions of their skills changed from the use of video. While examining the fourth question, two major themes and subsequent subthemes emerged that aligned with the literature. The first major theme was autonomy with the subthemes of comfort, familiarity, and self-regulation. The second major theme was competence with the subthemes of anticipated scores and self-confidence.

Major Theme 6: Autonomy. The participants indicated an increase in their autonomy after receiving their video feedback. The literature suggests that teachers should strive to develop autonomous students in their classrooms (Baert, 2014; Bowes, 2014; Rink, 2002). Bowes found that student autonomy creates an environment where students feel free to challenge themselves in class. The group highlighted three areas that support an increase in their overall autonomy: comfort, familiarity, and self-regulation.

The participants felt that an increased level of comfort with a selected skill made it easier for them to make repeated attempts for a grade or during practice sessions.

Laughlin et al. (2019) found that comfort level was key indicator of a student's willingness to attempt a skill in front of their peers. The participants agreed that video review was able to help increase their comfort level with the skills.

The participants also felt video feedback helped increase their familiarity with the skill. Watching themselves perform the skill while having an instructor point out the unique components of the skill helped clarify the performance cues of the skill. Roure et al. (2019) found that video feedback helped increase autonomy by raising the familiarity of the performance cues for the students.

The group also found the video feedback beneficial for increasing their ability to self-regulate. Watching their performance gave them a degree of freedom and choice for the student's feedback reception (Laughlin et al., 2019). The participants can review their own trials and self-assess while take charge of their learning process (Laughlin et al.). The group felt that independent learning increased from the inclusion of video feedback. These findings align with current literature for increasing autonomy within the classroom.

Major Theme 7: Competence. The literature shows perceived competence can affect skill mastery time (Voelker, 2016), students' ability beliefs (Warburton & Spray, 2008), and students' self-confidence (Zhang et al., 2012). The participants perception of their confidence increased during the study. The group indicated an increase in their competence and self-confidence in their responses to the questionnaires as well as during the exit interview.

The participants were able to improve the accuracy of their anticipated scores. I asked the group to predict their scores on prior to their graded attempts. Analysis of the data revealed that the participants made significant improvement in the accuracy of their

predictions when compared to their actual performance. Koekoek et al. (2019) found video feedback was beneficial for improving the accuracy of the anticipated scores. The group indicated that by seeing their performances on video, they had a better understanding of their current level of performance. The increased understanding of their current performance as well as the increase in accuracy of predicted performance align with the literature (Koekoek et al., 2019; Valentini et al., 2017). The participants significantly decreased the difference between their first prediction on their first attempt and the last prediction for their final attempt.

The participants also indicated an increase in the self-confidence. Video feedback increased their confidence to continue to work on their performance without instructor supervision. During the exit interview and questionnaires, the participants reported an increase in their self-confidence levels from pre to post-test. Valentini et al. (2017) found self-confidence was positively related to competence and motivation to learn. The participants felt the video review provided them confidence in their ability to improve their performance.

Recommendations for Practice.

The results of this study indicate that video feedback combined with verbal critiquing can enhance student performance in physical education classes. Video recordings offer multiple benefits that could assist instructors as well as students seeking a more efficient and effective feedback process. There are several suggestions on how video can be quickly implemented into the existing physical education courses at the academy. The first suggestion is to incorporate the use of video during additional instruction periods. These sessions are designed as a more deliberate practice session

with a lower student to instructor ratio. The use of video recording and replay during the session would reduce the time and resource constraints in each regular class period.

The next suggestion is to align the use of video feedback with both targeted skills and targeted populations. Video was shown to be effective at improving gymnastic skills, but some skills lend themselves better to the use of video than others. I suggest using video replay to examine skills that are technical in nature and require assistance for the student to achieve a visualization of their performance. The use of video may not be applicable for skills where the technical performance is not as important as the results. For example, some skills like running or jumping do not require an in-depth review of the components to improve their results. For self-defense classes like boxing, the use of video recording during the fights or sparing sessions may be beneficial for students to assess their own skills and performance. There may be minimal value in recording a stationary jab that a boxer throws at the air versus reviewing a jab thrown during a bout.

Video feedback is also beneficial for various skill levels. The lowest performers are likely to benefit from seeing themselves perform the skills. However, high performers may not need to view themselves to make significant improvement in their skills. Targeting certain groups or populations can help reduce the time and resources required to record video during class or practice sessions.

Beyond seeing themselves perform a skill, the incorporation of a master demonstration alongside of their performance can further assist in the skill development process. All the physical education classes taught at the academy teach using a whole-part-whole method. This strategy relies heavily upon the use of a master demonstration

model. Using technology to synchronize the master model alongside of the student's attempt could help increase performance.

Another suggestion for the implementation of video feedback is to incorporate peer feedback into the process. Allowing a partner feedback loop reduces the requirement for the instructor to serve as the lone source of feedback in the learning process. A peer could video record a practice attempt and then review the footage with the student. Reviewing the video should help both students gain awareness of the key components of the skill while seeking methods of how to improve upon their deficiencies. To help further reduce the time requirements of reviewing video during the class period, students could have their attempts recorded and then review the footage after class on their own time. There are skills taught in every physical education class that students could benefit from seeing themselves perform on video. I would encourage my colleagues to examine which skills or assessments would be most beneficial to video.

Reflections on the Process

From start to finish, I have enjoyed the challenges presented throughout the process of creating and executing this research study. The first challenge I encountered was narrowing the scope of the study. I knew that I wanted to work on creating an intervention that would help improve the performance of students in the military movement class. After conducting the review of literature, I knew I wanted to explore a more efficient method of augmented feedback for the students. As I built out my research questions, I knew that I wanted to do more than just examine whether video feedback would enhance learning of motor skills.

I wanted to examine the greater effects that enhanced feedback can have on the learning process. When I found the previous studies on the self-determination theory, I knew that I wanted to incorporate those findings into my study. Once I was satisfied with my research questions the next challenge was developing and refining the methodology. Developing my data collection tools was the hardest part of creating my methodology. I wanted to ensure sufficient data collection during each of the phases of the intervention that would allow for data saturation as well as allowance for the triangulation of data.

I felt better about the process once I received IRB approval and began the study. There were a few adjustments necessary due to COVID restrictions, but the execution of the intervention went well. The participants were very motivated to take part in the study and did an excellent job of completing all the requirements. They were open and honest in their responses to the questionnaires and exit survey. At the conclusion of the study, the next challenge was the analyzing of the data. It took more time and effort to organize and analyze the data than I had expected. The final challenge was capturing the results and presenting the data. Throughout the journey, the biggest challenge has been to remain focused and motivated to make it to the finish. In the next section I will highlight some of the limitation that I encountered during the study.

Limitations

While this study helped identify the benefits of video feedback on learning novel gymnastic skills, there are several limitations that should be addressed. The first limitation came from extreme case sampling. Since this study wanted to focus on the perceptions of female students there were no males selected for the study. The sampling

also focused on the lowest performing students in the course. A more diverse sampling of skill levels and genders could provide greater information for future studies.

There were a few limitations created by COVID restrictions. The first limitation was the shortened data collection period. Due to social distancing and increased cleaning requirements, the class held fewer additional instruction sessions during the course. The reduced sessions created a consolidated intervention phase. I provided the participants only one session per skill to complete their three recorded attempts. To help reduce the risk of exposure, the students and faculty wore face masks throughout the intervention. The face masks made it difficult to identify the participants and keep track of them during the instructor observations. I collected the number of practice attempts only during the additional instruction period of the intervention.

One final consideration as a potential weakness of the current study design was the single viewing angle of the video. I made the decision to use a single phone camera to capture each iteration to reduce the time requirements of reviewing the footage. However, some of the skills would likely have benefited from multiple viewing angles. For example, I filmed the shelf from a vantage point below the shelf. There are elements of the technique that are not visible from that angle. The shelf could have benefited from two angles, one below and one above the shelf, to provide greater clarity of the performance of the skill. The limitations in the current study provides areas of improvement as well as recommendations for future research.

Recommendations for Future Research

Throughout this action research study, I identified numerous recommendations for future research. The first suggestion is to examine a diverse population. Future studies

should look at including males in the sample. The current study only examined the effects of video feedback on female students. Previous studies of video feedback had examined both male and females' perceptions (Scraton, 2018; Voelker, 2016). Scraton found that females responded more positively to augmented feedback than the male students. Along with a more diverse population, future studies should also look at increasing the length of the study. The current study only conducted record attempts during three sessions out of a 17-lesson course. Future studies should incorporate the intervention for the entire duration of the course.

The current study purposefully selected the lowest performing female students since they were the population who could benefit from enhanced feedback methods. A third opportunity for future research could be to examine the effects of video feedback on the various skill levels of the students. Previous studies focused primarily on a single skill level for their study (see Boyer et al., 2009; Guo, 2018; Koekoek et al., 2019; Kretschmann, 2017). Boyer et al. examined the effects of video on advanced skills for high performing gymnasts, Guo studied video replay with high level martial artists, Koekoek et al. used video feedback for average skilled basketball students, and Kretschmann studied the effects of video on new swimmers. Future research should examine the effects on low, average, and high performers within the same sport or skill.

A fourth suggestion for future research is to use video recordings of master demonstrations to inform learning. Guo (2018) used a combination of master demonstrations as well as recorded student performances to help increase the performance of martial arts for his students. Future research could examine the student's ability to improve their performance after watching an expert demonstration of the skill.

A further expansion for video recording would require the students to examine a performance and identify the performance errors. Koekoek et al. (2019) had their participants grade themselves after viewing basketball skill in a game like setting. They required the students to assess performance according to the provided rubric. Future research could examine the effects of students' self-assessment of their skills.

A fifth, and final, suggestion for future research is to remove the instructor from the process. Within action research, the researcher usually takes an active role in the study. However, being actively involved in the process may sway the results of the study. I suggest future research using only peer to peer techniques. Peers can use their recording devices to record their partners attempts. The peer group can then review the attempts and offer peer coaching cues to help their partner improve. The research of Gubby (2019) used video feedback and peer coaching, however, their focus was regarding student engagement and teamwork instead of skill acquisition.

Conclusion

The problem for this action research study was that instructors lack an effective and efficient method of enhanced feedback method (Kangalgil & Özgül, 2018) for students to understand due to a lack of visual data (Laughlin et al., 2019). The purpose of this study was to examine the perceived benefits of video feedback on the learning process of low performing female students in an applied gymnastics class. I collected the perceptions of video feedback using observations, questionnaires, assessments, and interviews. The target population was low performing female students currently enrolled in a military movement course at a military academy. I used extreme case sampling to identify the participants for this study.

The significant findings from the study were that participants perceived increases in their autonomy, competence, anticipated performance, motivation to learn, use of deliberate practice time, and improvement in skill acquisition. The group recommended video feedback as the preferred method of feedback for learning physical skills. The participants found video feedback to be more beneficial than instructor verbal cues on all performed skills. The augmented feedback provided a clear understanding of their current ability level as well as an improved understanding of the areas required to improve.

The findings of this study align with the current literature. The results of this study contribute to the self-determination theory (Standage et al., 2005) and social learning theory (Chng & Lund, 2018). I answered the research questions using a triangulation of the data collection sources. The participants perceived video feedback as a key component for their significant increases in skill development during the intervention period. The participants also suggested methods to improve the integration of video in future classes.

In conclusion, a lack of visual cues inhibits learning in lower performing students. The use of video feedback in conjunction with instructor verbal critiques allows learners a better understanding of their current abilities. Video feedback enhanced the learning process and provided an effective and efficient feedback model to be implemented in future classes.

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APPENDIX A

RECRUITMENT EMAIL

My name is Dr. Drew Van Dam. I am requesting volunteers for a study on behalf of MAJ John Borman, who is currently pursuing an Ed.D. through the University of South Carolina. We are performing research about students' views of using video feedback with instructor cues to inform skill development in military movement class. The purpose of the study is to explore more efficient and effective methods of feedback.

You are eligible to take part in this study if you:

- are currently enrolled in the military movement course.
- will be attending additional instruction sessions during the course.
- have difficulty scoring points on the shelf, vertical rope climb, or the cartwheel.

If you choose to take part in the research study, you will be asked to:

- complete two online surveys that take approximately 10 minutes each to complete.
- complete 3 sessions of additional instruction.
- complete an exit interview.
- check the accuracy of the interview analysis.

After the interview, you will be emailed a written copy of the interview analysis. It will take approximately 15 minutes of your time to check for accuracy. You can work with the researcher via email or phone if you would like to make changes.

This is a study involving student perceptions of the intervention. Your input and study results may have benefits for other students in the future.

If you wish to take part in this study, please respond to the email by [insert date]. I will provide you with additional details about the research study along with an informed consent form that will need to be signed electronically.

After consent, I will proceed with providing you access to the online survey and scheduling your additional instruction sessions.

Feel free to contact me at any time.

Dr. Drew Van Dam
DPE – Director of Guidance and Testing
Drew.vandam@westpoint.edu

John Borman, Ed.D. Candidate
University of South Carolina
jborman@mail.sc.edu

APPENDIX B

INFORMED CONSENT

Introduction:
My name is John Borman. I am a doctoral student at the University of South Carolina. I am conducting a research study about students' views of video feedback. The purpose of the study is to explore how to further enhance the use of video feedback in physical education courses. I invite you to participate.

Activities:
If you take part in this research, you will be asked to:
1. complete three sessions of additional instruction.
2. complete two online questionnaire that take less than 10 minutes each.
3. complete an exit interview.
4. check the accuracy of the interview analysis. After the interview, you will be emailed a written copy of the interview analysis. It will take approximately 15 minutes of your time to check for accuracy. You can work with the researcher via email or phone if you would like to make changes.

Eligibility:
You are eligible to take part in this study if you:
1. are currently enrolled in the military movement course.
2. will be attending additional instruction sessions during the course.
3. have difficulty scoring points on the shelf, vertical rope climb, or the cartwheel.
You are not eligible to take part in this study if you:
1. are not enrolled in the military movement course.
2. if you are currently on a physically limiting profile.
I hope to include seven to ten people in this research.

Risks:
There are minimal risks in this study. Possible risks include boredom or awkwardness in answering questions during the interview or electronic questionnaire.
To decrease the impact of this risk, you can: choose to not answer questions at any point during the study or request to withdraw from the study at any time.
Participation (or decision to withdraw from the study) will not impact your grade for the course.

Benefits:
If you decide to take part, you will be able to use any points earned on skills during the graded attempts towards class points. The potential benefits to others are that results may support conclusions about improvements of instructor feedback methods.
While I greatly appreciate your participation, there are no additional benefits beyond possible skill improvement for volunteering in this study.

Confidentiality:
The information you provide will be kept confidential to the extent allowable by law. Some steps I will take to keep your identity confidential are not linking your name or personal information to data collected in the study or linking responses from the online questionnaire to individual participants in the study.

The people who will have access to your information are my dissertation Chair and myself. The Institutional Review Board may also review my research and view your information.

I will secure your information with these steps: data will be collected from an online questionnaire and a telephone interview. The data will be stored, password protected and accessed only by the researcher. Recordings and transcriptions will be stored on a computer that is password protected and only accessible by the researcher.

I will keep your data for 2 years. After 2 years, I will delete electronic data and destroy paper data.

Contact Information:
If you have questions, you can contact me at: john.borman@westpoint.edu or by phone at 845-938-xxxx or cell 254-449-xxxx.

If you have questions about your rights in the research, or if a problem has occurred, or if you are injured during your participation, please contact the Institutional Review Board.

Voluntary Participation:
Your participation is voluntary. If you decide not to participate, or if you stop participation after you start, there will be no penalty to you. You will not lose any benefit to which you are otherwise entitled.

Audiotaping:
I would like to use Microsoft teams to record your interview responses. You can still participate if you do not wish to be recorded.
Please sign here if I can record you: _____

Videotaping:
The intervention will require videotaping of each of your graded attempts of the skills. After a 30 second review of the attempt with the instructor, the video will be deleted.
Please sign here if I can record you: _____

Signature:
A signature indicates your understanding of this consent form. You will be given a copy of the form for your information.

Participant Signature Date

_____ _____

Researcher Signature Date

_____ _____

APPENDIX C

GUIDELINES FOR GRADED SKILLS

(Coelho, 2019, p. 14-16)

Tumbling 4: Cartwheel
Description: A cartwheel is essentially a "traveling sideways handstand". It requires a powerful leg kick and push, coordination, balance, and rhythm. Cartwheels develop the students' ability to move through an inverted position while supporting and balancing body weight. The cartwheel is a prerequisite for the round-off and other more advanced skills. See Figure A.1 for the proper technique of the cartwheel.

Point scale:
5 points: Excellent form/technique, rhythm and stretched handstand position; maximum distance (1-2 feet past seam) and speed; travels in straight line.

4 points: Excellent form/technique, rhythm and stretched handstand position; good speed; travels in straight line.

3 points: Good form/technique, rhythm and stretched handstand position; acceptable distance (to seam in mat) and speed; travels in reasonably straight line.

2 points: Fair form/technique, rhythm, and handstand position; distance is in front of seam; travels in reasonably straight line.

1 point: Poor form/technique, rhythm, and handstand position; distance is in front of seam; travels in reasonably straight line.
0 points: No stretch on handstand (excessive pike); lands two feet at a time; hand(s) remain on floor through entire skill.

Figure C.1 Instructor providing a master demonstration for the cartwheel.

Vertical Ropes: Lock Climb

Description: From a stand, climb the rope 20 feet using lock technique. Descend hand under hand with the lock, touch the floor lightly with one foot, climb 20 feet, and again descend using the lock. The lock climb is a fundamental technique for ascending the vertical rope. The lock is also used as a descending and resting technique for all other vertical rope climbs. It allows a slow, controlled descent with minimal use of the arms. An effective "lock" is necessary to conserve upper body strength. See Figure A.2 for the proper technique of the lock climb.

Point scale:
5 points: Ascends to two hands above final black mark (2 points); momentary and slight touch of foot; 2 hands above final black mark on second trip; utilizes proper technique (i.e., no "false lock); controlled descent in proper lock position.

4 points: Ascends to two hands above final black mark (2 points); momentary and slight touch of foot; 2 hands above second red mark on second trip; utilizes proper technique (i.e., no "false lock); controlled descent in proper lock position.

3 points: Ascends to two hands above final black mark (2 points); momentary and slight touch of foot; 2 hands above first black mark on second trip; utilizes proper technique (i.e., no "false lock); controlled descent in proper lock position.

2 points: Ascends to two hands above final black mark (2 points), momentary and slight touch of foot but unable to reach above 1st black mark on second trip; utilizes proper technique (i.e., no "false lock); controlled descent in proper lock position.

1point: Ascends to two hands above final red mark on 1st trip; able to demonstrate proper lock position.

0 points: Unable to climb to two hands above final red mark on 1st trip; uncontrolled descent – "flame out"; improper technique (i.e., uses a "false lock).

Figure C.2 Instructor providing a master demonstration of the vertical rope climb.

Obstacle 4: Shelf
Description: Mount the shelf without touching metal supports (Only the wood portion of the shelf may be used to get on the shelf). The recommended method is to hook the heel, go to inner thigh, and then raise upper body on to the shelf. See Figure A.3 for the proper technique of the lock climb.

Point scale:
5 points: Excellent form/technique, can smoothly mount the shelf and transition onto the track.

4 points: Great form/technique, can mount shelf with minimal hesitation after achieving heel hook. Able to use muscle or technique to achieve mount of the shelf.

3 points: Good form/technique, able to achieve heal hook. Able to transition to upper thigh on the shelf. Unable to transition upper body onto shelf.

2 points: Fair form/technique, able to achieve heal hook. Unable to transition to upper thigh on the shelf.

1 point: Poor form/technique, able to reach the shelf with heel. Unable to achieve heel hook.

0 points: Unable to achieve heel hook.

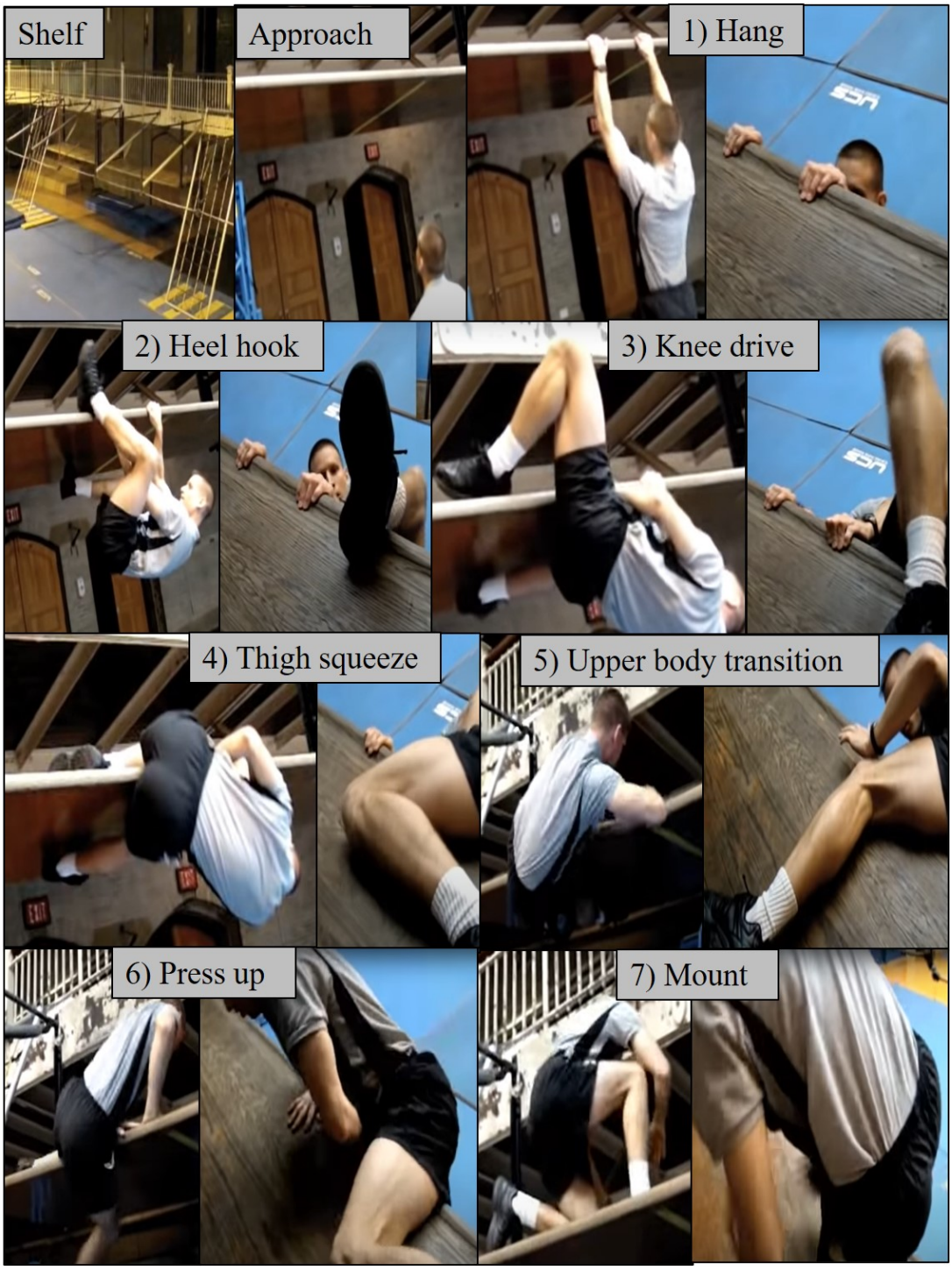

Figure C.3 Instructor providing a master demonstration for mounting the shelf.

APPENDIX D

PRE-TEST SURVEY

The purpose of this study is to examine student perceptions of video feedback in gymnastic learning and further explore how to enhance feedback.
Before you begin the online questionnaire, please be aware of the following:
• Your participation is voluntary. You may choose to discontinue the survey at any time and/or not to answer certain questions.
• Complete confidentiality will be maintained. At no time will your identity be revealed either by the procedures of the study or during reporting of the results.
• No negative consequence will result for choosing not to participate.
Please answer the following questions based on what you really think and feel as this will be the most helpful in trying to find out how to improve feedback for students in the future.
There are 29 questions, and it should take you less than 10 minutes to complete.

Pre-test Survey Participant ID: _____
Please answer the following questions to the best of your ability
Demographics
1. What is your gender? Male Female Prefer not to answer.
2. What is your age in years? _____
3. How would you describe your overall fitness level?
Very Poor Poor Fair Good Excellent
4. What is your ethnicity (select all that apply)?
White, not of Hispanic origin Black, not of Hispanic origin Asian or Pacific Islander
American Indian/Alaskan Native Hispanic Other _____
Familiarity and predictions for selected tasks
5. How familiar are you with the performance cues of the cartwheel? (AU)
Not at all familiar Slightly familiar Moderately Familiar Very Familiar Extremely Familiar
6. How comfortable are you with performing the cartwheel? (AU)
Very Uncomfortable Uncomfortable Neutral Comfortable Very Comfortable
7. What do you anticipate your score will be for your first graded attempt of the cartwheel? (PP)
0 1 2 3 4 5
8. How familiar are you with the performance cues of the vertical rope climb? (AU)
Not at all familiar Slightly familiar Moderately Familiar Very Familiar Extremely Familiar
9. How comfortable are you with performing the vertical rope climb? (AU)

Very Uncomfortable Uncomfortable Neutral Comfortable Very Comfortable
10. What do you anticipate your score will be for your first graded attempt of the vertical rope climb? (PP)
0 1 2 3 4 5
11. How familiar are you with the performance cues of the shelf? (AU)
Not at all familiar Slightly familiar Moderately Familiar Very Familiar Extremely Familiar
12. How comfortable are you with performing the shelf? (AU)
Very Uncomfortable Uncomfortable Neutral Comfortable Very Comfortable
13. What do you anticipate your score will be for your first graded attempt of the shelf? (PP)
0 1 2 3 4 5
Please indicate how much you agree with the following statements:
14. The selected skills of cartwheel, vertical rope climb, and shelf will be activities that I will not do well in. (CP)
Strongly disagree Disagree Neutral Agree Strongly agree
15. After working on the skills in class, I will feel confident. (CP)
Strongly disagree Disagree Neutral Agree Strongly agree
16. I will be skilled at the cartwheel, vertical rope climb, and shelf. (CP)
Strongly disagree Disagree Neutral Agree Strongly agree
17. I will be satisfied with my performance on the cartwheel, vertical rope climb, and shelf. (CP)
Strongly disagree Disagree Neutral Agree Strongly agree
18. I think I will perform well by my third graded attempt of the cartwheel, vertical rope climb, and shelf. (CP)
Strongly disagree Disagree Neutral Agree Strongly agree
19. I think I will do well compared to others on my performance of the cartwheel, vertical rope climb, and shelf. (CP)
Strongly disagree Disagree Neutral Agree Strongly agree
Motivation for military movement coursework (MT)
Why do you go to gymnastic courses?
20. Because I experience pleasure and satisfaction while learning new things. (IN)
Strongly disagree Disagree Neutral Agree Strongly agree
21. Because I think that military movement will help me better prepare for my military career. (EX)
Strongly disagree Disagree Neutral Agree Strongly agree
22. Honestly, I do not know; I feel I am wasting my time in military movement. (UN)
Strongly disagree Disagree Neutral Agree Strongly agree
23. To prove to myself that I can complete military movement class. (IN)
Strongly disagree Disagree Neutral Agree Strongly agree
24. I once had good reasons for going; however, now I wonder whether I should continue to try during military movement. (UN)
Strongly disagree Disagree Neutral Agree Strongly agree
25. For the pleasure I experience when I discover new things never done before. (IN)
Strongly disagree Disagree Neutral Agree Strongly agree
26. Because when I succeed in military movement, I feel important. (EX)

Strongly disagree Disagree Neutral Agree Strongly agree

27. I cannot see why I go to military movement and frankly, I could not care less. (UN)

Strongly disagree Disagree Neutral Agree Strongly agree

28. Because military movement allows me to continue to learn about many things that interest me. (IN)

Strongly disagree Disagree Neutral Agree Strongly agree

29. I do not know; I cannot understand what I am doing in military movement. (UN)

Strongly disagree Disagree Neutral Agree Strongly agree

APPENDIX E

POST-TEST SURVEY

The purpose of this study is to examine student perceptions of video feedback in gymnastic learning and further explore how to enhance feedback.
Before you begin the online questionnaire, please be aware of the following:
• Your participation is voluntary. You may choose to discontinue the survey at any time and/or not to answer certain questions.
• Complete confidentiality will be maintained. At no time will your identity be revealed either by the procedures of the study or during reporting of the results.
• No negative consequence will result for choosing not to participate.
Please answer the following questions based on what you really think and feel as this will be the most helpful in trying to find out how to improve feedback for students in the future.
There are 25 questions, and it should take you less than 10 minutes to complete.

Post-test Survey Participant ID: _____
Please answer the following questions to the best of your ability
Familiarity and predictions for selected tasks
1. How familiar are you with the performance cues of the cartwheel? (AU)
Not at all familiar Slightly familiar Moderately Familiar Very Familiar Extremely Familiar
2. How comfortable are you with performing the cartwheel? (AU)
Very Uncomfortable Uncomfortable Neutral Comfortable Very Comfortable
3. What do you anticipate your score will be for your final graded attempt of the cartwheel? (PP)
0 1 2 3 4 5
4. How familiar are you with the performance cues of the vertical rope climb? (AU)
Not at all familiar Slightly familiar Moderately Familiar Very Familiar Extremely Familiar
5. How comfortable are you with performing the vertical rope climb? (AU)
Very Uncomfortable Uncomfortable Neutral Comfortable Very Comfortable
6. What do you anticipate your score will be for your final graded attempt of the vertical rope climb? (PP)
0 1 2 3 4 5
7. How familiar are you with the performance cues of the shelf? (AU)
Not at all Familiar Slightly Familiar Moderately Familiar Very Familiar Extremely Familiar
8. How comfortable are you with performing the shelf? (AU)
Very Uncomfortable Uncomfortable Neutral Comfortable Very Comfortable

9. What do you anticipate your score will be for your final graded attempt of the shelf? (PP)

0 1 2 3 4 5

Please indicate how much you agree with the following statements:

10. The selected skills of cartwheel, vertical rope climb, and shelf are activities that I did not do well in. (CP)

Strongly disagree Disagree Neutral Agree Strongly agree

11. After working on the skills in class, I felt confident. (CP)

Strongly disagree Disagree Neutral Agree Strongly agree

12. I am skilled at the cartwheel, vertical rope climb, and shelf. (CP)

Strongly disagree Disagree Neutral Agree Strongly agree

13. I am satisfied with my performance on the cartwheel, vertical rope climb, and shelf. (CP)

Strongly disagree Disagree Neutral Agree Strongly agree

14. I think I performed well by my third graded attempt of the cartwheel, vertical rope climb, and shelf. (CP)

Strongly disagree Disagree Neutral Agree Strongly agree

15. I think I did well compared to others on my performance of the cartwheel, vertical rope climb, and shelf. (CP)

Strongly disagree Disagree Neutral Agree Strongly agree

Motivation for military movement coursework

Why do you go to the military movement course?

16. Because I experience pleasure and satisfaction while learning new things. (IN)

Strongly disagree Disagree Neutral Agree Strongly agree

17. Because I think that military movement will help me better prepare for my military career. (EX)

Strongly disagree Disagree Neutral Agree Strongly agree

18. Honestly, I do not know; I feel I am wasting my time in military movement. (UN)

Strongly disagree Disagree Neutral Agree Strongly agree

19. To prove to myself that I can complete military movement class. (IN)

Strongly disagree Disagree Neutral Agree Strongly agree

20. I once had good reasons for going; however, now I wonder whether I should continue to try during military movement. (UN)

Strongly disagree Disagree Neutral Agree Strongly agree

21. For the pleasure I experience when I discover new things never done before. (IN)

Strongly disagree Disagree Neutral Agree Strongly agree

22. Because when I succeed in military movement, I feel important. (EX)

Strongly disagree Disagree Neutral Agree Strongly agree

23. I cannot see why I go to military movement and frankly, I could not care less. (UN)

Strongly disagree Disagree Neutral Agree Strongly agree

24. Because military movement allows me to continue to learn about many things that interest me. (IN)

Strongly disagree Disagree Neutral Agree Strongly agree

25. I do not know; I cannot understand what I am doing in military movement. (UN)

Strongly disagree Disagree Neutral Agree Strongly agree

APPENDIX F

EXIT INTERVIEW PROTOCOL

Please note that your participation is voluntary. You may choose to discontinue at any time. You may choose to not answer certain questions. Your responses are confidential and at no point during the study will your identity be revealed. There are no negative consequences for choosing not to participate.

I want to thank you for agreeing to participate in my doctoral research study. The purpose of this study is to examine student perceptions of video feedback in gymnastic learning and further explore how to enhance feedback. Since you have received video feedback during class, your insights are extremely important to my research.

The questions that I am going to ask will allow you to elaborate on your perceptions and opinions regarding video feedback. Please explain your reasoning as much as possible. Upon completion, I will email you a link for the post-test online questionnaire. The questionnaire should take less than 10 minutes to complete.

Semi-structured interview questions:

1. In your opinion, what is good feedback from an instructor?
2. In your opinion, what is poor feedback from an instructor?
3. Which method of feedback do you prefer when learning a new physical skill?
4. Which tasks did you find the video feedback beneficial? (select all that apply)

Cartwheel Vertical rope climb Shelf None

5. Did you find the video feedback helpful for your skill improvement? If so, how? If not, why?
6. Did you find video feedback helpful for autonomy (self-regulation)? If so, how? If not, why?
7. Did you find video feedback helpful for motivation to use deliberate practice time? If so, how? If not, why?
8. What benefits/advantages did you perceive from using the video feedback?
9. What disadvantages did you perceive from using the video feedback?
10. How likely are you to use video feedback as a method for skill improvement in future physical education classes?

Very unlikely Unlikely Neutral Likely Very likely

11. Please explain whether you feel instructors should use video feedback.
12. Do you have any other insights that may help to improve video feedback for future students?

APPENDIX G

DATA COLLECTION TOOL

Data collection sheet - testing phase						
Participant ID:						
	Graded skill attempts					
	Cartwheel		Vertical Rope Lock Climb		Shelf	
Attempt	Prediction	Actual	Prediction	Actual	Prediction	Actual
1st						
2nd						
3rd						
	Free practice time observations					
	Cartwheel		Vertical Rope Lock Climb		Shelf	
Attempt	Practice	No practice	Practice	No practice	Practice	No practice
Before 1st						
After 1st						
After 2nd						
After 3rd						
Notes:						