THE EFFECT OF INSTRUCTIONAL VIDEO USE ON PERFORMANCE ENHANCEMENT IN THE HIGH SCHOOL TRACK ATHLETE

A THESIS

Submitted to the Faculty of the School of Graduate Studies and Research
Of California University of Pennsylvania in partial fulfillment of the requirements for the degree of
Master of Science

By
John Ciecko III

Research Advisor, Dr. Ronald Wagner

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California, Pennsylvania

THESIS APPROVAL

Graduate Athletic Training Education

We hereby approve the Thesis of

John Ciecko III
Candidate for the degree of Master of Science

Date        Faculty
May 9, 2006  Dr. Ronald Wagner
May 9, 2006  Dr. Thomas Kinsey
May 9, 2006  Mr. Barry McGlumphy
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Finally, to those who said I couldn’t do it, thank you the most.
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INTRODUCTION

Those in the allied health field have observed the great benefits and physiological adaptations gained from weight training and plyometric training when applied to athletics. We have also seen that proper technique in weight training has resulted in major increases in strength and power for athletes.\textsuperscript{1} What has not been seen however is how proper technique applies to sprinting or short distance running. We also have not seen how instructional videos effect performance enhancement in sprinting or overall performance enhancement. A proper training protocol through instructional videos must be established to determine the efficacy of teaching athletes proper sprinting technique.

Although not much research has been conducted on instructional video use in the performance enhancement world, there has been a prevalence of individuals using instructional and educational videos in many different areas, namely education.\textsuperscript{2} The hypothesis that videos or other stimulating material is more effective than written word and paper has been tested over and over.\textsuperscript{3}

In a study by Lysack et al., the theoretical proposition tested was that patients discharged from a rehabilitative protocol for musculoskeletal injury would
better follow instructional videos rather than written directions. Far from performance enhancement, Janda et al. has shown that instructional videos have facilitated an acceptable learning outcome when dental students use instructional videos while learning proper surgical hand washing. It is easy to see that the use of instructional videos is nearly everywhere, even the allied health field.

In a study by Onate, Guskiewicz, and Sullivan the effects of video intervention on jump landing proved that the intervention worked. In this study the experimental group learned through video feedback, the proper way to land with the expectation that the ground reaction force would decrease. In this study, the ground reaction force measurements did decrease proving that instructional video intervention helps improve performance.

Jorgensen et al. examined the effect of video intervention on injury prevention. Jorgensen et al. postulated that video intervention would help educate novice skiers on proper techniques and injury prevention. Jorgensen et al. proved the hypothesis that injury rates would decrease. In the study the experimental group showed a 7% lower injury rating from the control group. Jorgensen et al. once again proves that video instructional intervention does work, even with injury prevention.
Wilson and Worthington however prove that instructional videos do not work. In the study by Wilson and Worthington, students in an undergraduate biomechanics course only show a higher rating of perceived knowledge but not higher scores then the control group. Although this is not in the performance enhancement realm we can see that video intervention does not work in all areas.\(^6\)

Previous research has shown that there are effects over time when a training protocol that targets the anaerobic system is applied.\(^9,10,11,12,14\) Literature also shows the importance of biomechanics during sprinting and short distance running\(^8\). Biomechanical research has shown how the body, especially how the lower body moves during sprinting\(^8\). According to biomechanics literature, there are two phases in sprinting, the swing phase and the support phase.\(^1,4\) The swing phase of running occurs when the toe leaves the ground and ends when the heel strikes the ground. The support phase on the other hand occurs immediately when contact is made of the forward foot and ends with toe off, the initial motion of the swing phase. With knowledge of how the lower limbs works during sprinting, we must then focus on what is most important in sprinting, stride length and stride frequency.
Two major factors are the basis of what is important in sprinting, stride length and stride frequency. With the increase in an athlete’s stride length and stride frequency, we can then decrease a given athlete’s sprint time. When we teach an athlete to run correctly we can then help increase stride length and stride frequency. What we need to know now is if a training protocol will work over time. Literature has shown that there is a general enhancement in sprinting when a 6-week training protocol is applied.

Technique training, especially in running, has shown increasing popularity especially with the introduction of the Frappier Acceleration Sport Training program in 1990. This copyrighted program pays special attention to sprint mechanics that are included in a training protocol that is, in fact, copyrighted. The question then becomes, would technique training be an acceptable form of training that would show the physiological adaptations needed in sprinting such as decrease in speed? We see that literature supports the idea of sprint mechanic training, but there is very little evidence and literature to suggest the efficacy of a true sprint mechanics training protocol.

The theoretical proposition being tested in this study was that the sprint times, or the dependant variable, of
high school athletes will be reduced over time in the 40-yard and 100-yard sprints, after adhering to a 6-week training protocol adapted from instructional videos.

This study attempted to answer the following questions: 1) Will sprint time reduce between pre and post testing in the 40-yard sprint following 6 weeks of a sprint mechanics training protocol adapted from an instructional video? 2) Will sprint time reduce between pre and post testing in the 100-yard sprint following 6 weeks of a sprint mechanics training protocol adapted from an instructional video?
METHODS

This section will include the following subsections: Research Design, Subjects, Preliminary Investigation, Instruments, Procedures, Hypotheses, and Data Analysis.

Research Design

The type of research used in this study was a pre - post test quasi-experimental study. The dependant variables measured in this study was the sprint times for the 40 and 100-yard sprints. The duration of intervention was 3 sessions a week for 6 weeks to assess the independent variables from the initial pretest to the posttest at the end of the 6-week period.

The purpose of this research is to determine the effects of a 6 - week instructional video intervention on sprint time from the pre test to the posttest. The strengths of this study are that the measurements are simple to attain and easy to replicate with large groups. Limitations of the study are that the dependent variables could be altered by mortality of subjects, outside influences such as off-season conditioning programs, injuries occurring during in-season competition or
complications in understanding the material presented in the instructional videos.

Subjects

The number of subjects that participated in this study was 18 high school boys and girls, \( n = 10 \) (6 boys and 4 girls) for the experimental group and \( n = 8 \) (2 boys and 6 girls) for the control group. Method of sampling used was on a volunteer basis where the students were assigned to either the experimental group or control group on a random basis. A sign up sheet was used to obtain subjects for the purpose of the study. The sign up sheet contained two columns, one for the experimental group and the other for the control group. Subjects signed the sheet knowing of the random sampling.

Subjects who joined the study were given the opportunity to leave at any time during the study. The subjects were high school students between 14 and 18 years of age. The mean age of subjects was 15.94 with a standard deviation of 1.51. Different stages of maturation may have been present while the study was being conducted which have may placed limitations on the study. Three informed consent forms were collected for those subjects considered minors.
(17 & under). A Parent Informed Consent Form (Appendix C2) was used to attain consent from the parents of the minors to release consent to participate in this study. Also a Child Assent Form (Appendix C3) was used for those considered minors to consent to the study. Administrative Informed Consent Form (Appendix C4) was collected for consent of the administration of McGuffey High School for the purposes of the study. Finally, a Liability Waiver (Appendix C5) was collected from all participants due to legal concerns of the school district as stated in Appendix C5. For those subjects considered adults (18 & over) an Adult Informed Consent Form (Appendix C1) was collected for consent to participate in the study as well as the Administrative Informed Consent Form (Appendix C4) and the Liability Waiver (Appendix C5).

Preliminary Investigation

A preliminary investigation was conducted prior to the start of the research study. The preliminary investigation was conducted to determine the reliability of the measurement device and the instructional videos used in the study.
The investigator had one volunteer perform a timed 40 and 100-yard sprint to measure the subject’s time. Measurements for this study were conducted by the researcher and with the help of an assistant. The assistant had the subject ready themselves at the start and gave the verbal command of Ready, Set, GO! At the command of “GO”, the researcher began the time on the stop watch. Once the subject crossed the finish line the researcher stopped the stop watch. After the completion of the pretest the investigator had the subject watch the Perform Better: Developing Linear Speed instructional videos to instruct the athlete on proper sprinting mechanics. Two days post instruction, the athlete then ran a posttest in the 40 and 100-yard sprint. The main purpose of this investigation was to determine if any modifications were needed for the formal investigation involving any phase of the 6-week intervention in this study. As a result of the preliminary investigation, the timing method was changed. It became apparent to the researcher that sound is delayed with respect to motion or light. This information became evident when the researcher reviewed the National Athletic Training Associations position statement on Lightning Safety for Recreational Events, in that light travels faster than sounds. In other words the sound of the assistant’s voice
traveled slower causing the researcher to record a false time. This was changed from the primary investigation so that the researcher would start the time on the motion of the subject, and not the sound of the assistants prompt.

Instruments

This study was conducted by observing subjects perform both the 40 and 100-yard sprints over time to establish the efficacy of instructional videos on sprint mechanic training. Pre and posttests in the 40 and 100-yard sprints were used to measure the dependent variable of subject’s sprint times. The dependent variables were measured in time (seconds). An average time was calculated for the 40 yard sprint in the experimental group along with an average time for the 100 yard sprint. Corresponding measurements were taken for the control group. All the same values were once again calculated for both the experimental and control group for the post test. These measurements can been seen in the Main Data Collection Form (Appendix C6) Reliability for this measurement device has been established through previous studies, namely through the article published by Stokes et al.¹³
Internal consistency of the study was established in that only one tester collected data for both measurements. Validity of the study has been established through previous research performed by Stokes et al.\textsuperscript{13}

Three instructional videos were used for the purpose of the study. These videos include, “Perform Better! Developing Linear Speed”, “Super Speed: Drills and Skills by Don Chu”, and “Training for Sport Specific Speed: Part 1 Straight Ahead Speed.” These videos were chosen on two factors, one being the author of the video. All videos were created by credentialed individuals including the CSCS, NASM-PES, ATC and PhD credentials. Creators include Donald Chu, Mike Boyle and Vern Gambetta.

The other factor was the purpose of the video. Many videos have been created for the purpose of speed, but not linear speed. These three videos demonstrated that need and focus only on straight ahead, linear speed. The videos included many different types of drills that help athletes with running more efficiently. Both the Perform Better: Developing Linear Speed and the Super Speed: Drills and Skills video included drills for a dynamic warm up, sprinting technique drills and a cool down. Both of these videos were very similar in that they followed a similar format, but differed in that the drills were different. The
Training for Sport Specific Speed: Part 1 Straight Ahead

Speed included a dynamic warm up section but then split the video up into three specific areas. The video called the areas the PAL system. The PAL system addressed posture (P), arm action (A) and leg action (L). Each area contained specific drills to help subjects run more efficiently.

The investigator measured time in second with the use of a stopwatch. Other instruments included the high school track at McGuffey High School in Claysville, PA.

Procedures

The California University Institutional Review Board for Protection of Human subjects Form (Appendix C7) was completed and sent to the Institutional Review Board at California University of Pennsylvania. Institutional Review Board approval was obtained before the study began. Once permission was received from the participants, principal, athletic director and parents if needed, the researcher began the study with a pre test measurement in both the 40 and 100 yard sprint. The pre test measurements were recorded on Main Data Collection Form (Appendix C6). For all measurements the researcher had an assistant get the athlete ready at the start. Once ready the assistant
would give the athlete the verbal command of, Ready, Set, GO! Due to the slower speed of sound, the researcher would start the time on the subject’s motion. Once the subject would cross the finish line the researcher would stop the stop watch and record the time in seconds.

Once pretest measurements were recorded, the subjects completed a 6-week training protocol through the use of instructional videos. During the 6-week training intervention, subjects met with the investigator on day one of the week to watch 15 to 30 minutes of the instructional videos. On days two and three of the week the subjects were instructed to practice the skills and drills learned in the videos (Table 1). Since the school’s liability policy (Appendix C5) did not allow school employees to be in attendance during the study, the researcher attempted to be in attendance for most of the training sessions, as an assistant to the experimental group. An independent sample t-test was conducted to determine the effect of the intervention on sprint time.
Table 1: Weekly plan for experimental group.

Hypotheses

The following are the hypotheses for this study.

1. Sprint time will be reduced between pre and post testing in the 40-yard sprint following a 6 week Instructional Video intervention.

2. Sprint time will be reduced between pre and post testing in the 100-yard sprint following a 6 week Instructional Video intervention.

The following are the null hypothesis for the study.
1. Sprint time will not be reduced between pre and post testing in the 40 - yard sprint following a 6 week Instructional Video Intervention.

2. Sprint time will not be reduced between pre and post testing in the 100 - yard sprint following a 6 week Instructional Video Intervention.

Data Analysis

Level of significance was set at Alpha level .05 for this study.

1. An independent sample t - test was used to determine if there will be a decrease in sprint time for the 40 and 100-yard sprints.
RESULTS

Demographic Data

The sample for this study included 18 student athletes from the Track & Field team at McGuffey High School in Claysville, PA (Table 2). The sample of 18 consisted of 9 males and 9 females (Table 3). The age range for this study ranged from 14 – 18 years of age (15.94 ± 1.51) (Table 4).

Table 2 Grade level of the subjects.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>5</td>
<td>27.70%</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td>22.30%</td>
</tr>
<tr>
<td>11</td>
<td>5</td>
<td>27.70%</td>
</tr>
<tr>
<td>12</td>
<td>4</td>
<td>22.30%</td>
</tr>
</tbody>
</table>

Table 3 Gender frequency.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>9</td>
<td>50%</td>
</tr>
<tr>
<td>Females</td>
<td>9</td>
<td>50%</td>
</tr>
</tbody>
</table>
Table 4. Frequency Table for Ages of Subjects.

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>5</td>
<td>27.7%</td>
</tr>
<tr>
<td>15</td>
<td>2</td>
<td>11.4%</td>
</tr>
<tr>
<td>16</td>
<td>3</td>
<td>16.6%</td>
</tr>
<tr>
<td>17</td>
<td>5</td>
<td>27.7%</td>
</tr>
<tr>
<td>18</td>
<td>3</td>
<td>16.6%</td>
</tr>
</tbody>
</table>

All subjects participated in sprinting events such as the 100, 200, 400 yard sprint as well as 100 and 300 hurdles (Table 5). All athletes were allowed to participate in more than one sprinting event.

Table 5. Reports the events participated in.

<table>
<thead>
<tr>
<th>Track and Field Events</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>10</td>
<td>55.50%</td>
</tr>
<tr>
<td>200</td>
<td>2</td>
<td>11.11%</td>
</tr>
<tr>
<td>400</td>
<td>5</td>
<td>27.70%</td>
</tr>
<tr>
<td>100H</td>
<td>3</td>
<td>16.60%</td>
</tr>
<tr>
<td>400H</td>
<td>4</td>
<td>22.20%</td>
</tr>
</tbody>
</table>

All participants were considered healthy and reported no injuries throughout the study.
Hypothesis Testing

The level of significance used for testing in this study was set at an alpha level of .05.

Hypothesis 1: Sprint time will be reduced between pre and post testing in the 40 – yard sprint following a 6 week instructional video intervention.

Null Hypothesis: There will be no reduction in sprint time between the pre and post test in the 40 – yard sprint following a 6 week instructional video intervention.

An independent sample T - Test was used to determine the level of significance between mean sprint times for the experimental and control group in the 40 yard sprint.

An independent sample t - test was calculated comparing the mean score of the experimental group in the 40 - yard sprint to the mean score of the control group in the 40 - yard sprint. No significant difference was found (t(16) = .769, P > .05). The mean gain in seconds for the experimental group (m = .05s, sd = .37s) was not significantly different from the mean gain of the control group (m = .08s, sd = .42s).

Hypothesis 2: Sprint time will be reduced between pre and post testing in the 100 – yard sprint following a 6 week instructional video intervention.
Null Hypothesis: There will be no reduction in sprint time between the pre and post test in the 100 - yard sprint following a 6 week instructional video intervention.

An independent sample $t$ - test was calculated comparing the mean score of the experimental group in the 100 - yard sprint to the mean score of the control group in the 100 - yard sprint. No significant difference was found ($t(16) = .084, P > .05$). The mean loss in seconds for the experimental group ($m = .073s$, $sd = .96s$) was not significantly different from the mean loss in seconds for the control group ($m = .05s$, $sd = 1.13s$).

Table 6. Means and Standard Deviations for sprint times.

<table>
<thead>
<tr>
<th></th>
<th>Time</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experimental</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre Test: 40yrd</td>
<td>5.47s</td>
<td>0.37</td>
</tr>
<tr>
<td>Post Test: 40 yrd</td>
<td>5.52s</td>
<td>0.38</td>
</tr>
<tr>
<td>Pre Test: 100yrd</td>
<td>12.75s</td>
<td>1.13</td>
</tr>
<tr>
<td>Post Test: 100yrd</td>
<td>12.02s</td>
<td>0.79</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre Test: 40yrd</td>
<td>5.99s</td>
<td>0.31</td>
</tr>
<tr>
<td>Post Test: 40yrd</td>
<td>6.07s</td>
<td>0.53</td>
</tr>
<tr>
<td>Pre Test: 100 yrd</td>
<td>13.91s</td>
<td>1.05</td>
</tr>
<tr>
<td>Post Test: 100yrd</td>
<td>13.41s</td>
<td>1.20</td>
</tr>
</tbody>
</table>
Table 7. Mean Gains/Losses of Time by Groups

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>+/- Experimental 40yrd</td>
<td>+ .05s</td>
</tr>
<tr>
<td>+/- Control 40yrd</td>
<td>+ .08s</td>
</tr>
<tr>
<td>+/- Experimental 100yrd</td>
<td>- .073s</td>
</tr>
<tr>
<td>+/- Control 100yrd</td>
<td>- .05s</td>
</tr>
</tbody>
</table>
DISCUSSION

Discussion of Results

This study examined the efficacy of instructional videos on performance enhancement in high school track athletes. More importantly, the study examined sprinting and the impact of the instructional videos on the 40 and 100 yard sprint.

Hypothesis 1 stated that sprint time will be reduced between pre and post testing in the 40 - yard sprint following a 6 week instructional video intervention. The researcher postulated that the experimental group would be able to reduce their sprint time through watching three instructional videos and practicing the skills such as body posture, arm action and leg action addressed in the videos.

No significance was found with respect to the pre and post test of the 40 yard dash. The average sprint time in the experimental group 40 yard dash pre test was 5.47 seconds with a standard deviation of 0.367 seconds. The post test measurement calculated an average of 5.52 seconds with a standard deviation of 0.375 seconds. The average gain in seconds was 0.05 seconds with a standard deviation of 0.37 seconds.

The average sprint time for the control group 40 yard sprint pre test was 5.99 seconds with a standard deviation
of 0.31 seconds. The post test measurements for the control
group 40 yard sprint were 6.07 seconds with a standard
deviceation of 0.53 seconds. The average gain for the control
group was calculated at 0.08 seconds with a standard
deviceation of 0.42 seconds.

The sprint times for both the experimental and control
group increase. Therefore the null hypothesis that no
reduction in sprint time between the pre and post test in
the 40 - yard sprint following a 6 week instructional video
intervention was retained.

Since the null hypothesis was retained, it can be
assumed that one of two possibilities occurred that
affected the outcome of the test. The first assumption is
that the majority of the videos concentrated on 100 yard
sprints and the body mechanics that go along with a 100
yard sprint and not the 40 yard sprint. The second
possibility could have been that the instruction of the
video tape itself was too complicated for high school
students to understand. With a poor understanding of the
instruction students may not have learned proper mechanics
of sprinting.

Hypothesis 2 stated that the sprint time will be
reduced between pre and post testing in the 100 - yard
sprint following a 6 - week instructional video
intervention. Once again the researcher postulated that the experimental group would be able to reduce their sprint time through watching three instructional videos and practicing the skills such as body posture, arm action and leg action addressed in the videos.

No significance was found with respect to the pre and post test of the 100 yard dash. The average sprint time in the experimental group 100 yard dash pre test was 12.75 seconds with a standard deviation of 1.13 seconds. The post test measurement calculated an average of 12.02 seconds with a standard deviation of 0.79 seconds. The average loss in seconds in this case was 0.073 seconds with a standard deviation of 0.96 seconds.

The average sprint time for the control group 100 yard sprint pre test was 13.91 seconds with a standard deviation of 1.05 seconds. The post test measurements for the control group 100 yard sprint were 13.41 seconds with a standard deviation of 1.20 seconds. The average loss in seconds for the control group was calculated at 0.05 seconds with a standard deviation of 1.13 seconds.

The sprint times for both the experimental and control group decrease. However, since both times decrease we cannot assume that instructional videos significantly reduce sprint time in the 100 yard sprint. Therefore the
null hypothesis that no reduction in sprint time between the pre and post test in the 100-yard sprint following a 6 week instructional video intervention was retained.

Since the null hypothesis was retained, it can be once again assumed that the instruction of the video tape itself was too complicated for high school students to understand. With a poor understanding of the instruction students may not have learned proper mechanics of sprinting.

Since both the 40-yard and the 100-yard measurements of this study yielded results that were not significant, it supports the research by Wilson and Worthington, as well as the research by Williams. The research does not support previous literature by Janda et al., or Jorgensen et al. Although past studies show that 6 week training intervention should yield proper physiological adaptation, research in this study does not support that idea.

Conclusions

The results of the study revealed the following two major conclusions. A 40-yard sprint time will not be reduced following a 6 week training intervention with an instructional video as the major focus of the training
protocol. Accordingly, a 100 - yard sprint time will not be reduced following a 6 week training intervention with and instructional video as the major focus of the training protocol. It can be assumed that the subject age may have had an influence on the understanding of the material. The material was presented to high school ages subjects with no further instruction to allow the instructional videos to speak for them. The researcher suggests that the material must be accompanied by proper verbal instruction as stated in previous research by Williams.7

Recommendations

Based on the results of this study, the following research recommendations were made.

1. Future studies should contain a larger population from more high schools or colleges.
2. Future studies should contain a wider range in age.
3. Future studies may want to examine the difference between athletes and non athletes.
4. A more appropriate instructional video must be made to address the exact points a runner must do to perform a proper 40 and 100 - yard dash.
5. Future research with instructional videos should include a questionnaire following final assessment for volunteer response to the instructional videos.

6. Future studies should examine the effect of functional technique training on injuries over time.

7. Future studies should request input on testing procedures from the authors of the videos.
REFERENCES


4. Onate JA, Guskiewicz KM, Sullivan RJ. Augmented feedback reduces jump landing forces. JOSPT. 2001;31: 511-517


APPENDICES
APPENDIX A
Review of the Literature
Review of the Literature

Functional Training has gained popularity over recent years with the National Strength and Conditioning Association\(^1\) as well as National Academy of Sports Medicine placing a large emphasis on proper technique or training better known as functional training.\(^2\) This review of literature will give an overview of the importance of sprinting mechanics as well as teaching athletes to run more efficiently. A discussion of the effect of teaching sprint mechanics through instructional video intervention to athletes over time will also be presented in this review of literature. The goal of this literature review is to examine the parallels between scientific foundations of functional training and its possible outcome with performance enhancement (sprint performance). The sections will include Instructional Video Use, Biomechanics of the Human Body During Sprinting, Influence of Training Over Time, and An Overview of Sprinting Technique. A summary is also provided at the end of the review.
Instructional Video Use

The use of instructional videos has been prevalent for the past few decades with the increase in technology and ease of use. Many different settings use instructional videos, ranging from job training to other educational purposes. There has been documentation on the efficacy of instructional videos. Packer et al demonstrated the effect between instructional videos and live demonstration on teaching dental student proper denture removal.

In the study performed by Janda et al., two forms of instructional videos were used to assess the ability of dental students to correctly wash hands for surgical purposes. Janda et al. used a segmental video tape as well as a complete video tape for two groups of students. It was found that both forms of instructional videos were acceptable to teach students proper procedures on surgical hand washing. We can parallel the study by Janda et al with this study in that instructional videos are an acceptable way to teach people proper ways to perform tasks.

In a more related study, Lysack et al. examined the effect of compliance of discharged patients with home exercise programs. Lysack et al. discusses the importance of improvements in functional status with respect to
rehabilitation. Lysack et al. theoretical proposition was that patients would better understand video instruction better than written word instruction. It was found however that there was no evidence that a visually stimulating source (instructional video) helped patients return to a more functional lifestyle post discharge from physical therapy.\(^5\) It was discussed that the outcomes could have been altered by one of three, if not all possibilities. One was that the follow up was only 4 weeks after discharge which may not have allowed for the patient to reach maximal recovery. Another possibility was that the video instruction was not simple enough for patients to either follow or work. This of course can cause a major problem if the patient cannot see the instruction. Finally the researcher felt there was a possibility of a ceiling effect with the study questionnaire. Although we see that there may be some small and some major factors that can affect the outcome of a study that uses instructional videos, we can only hope that this is not the case with this study.

Although the previous research examined areas outside of the performance enhancement realm, some research has been done in the performance enhancement world. Even though the following research is not analogous with sprinting or running we can draw parallels from this research.
Onate et al. performed a study on video feedback and instruction on landing techniques. Onate et al. postulated that teaching subject’s proper landing technique would decrease the ground reaction force accompanied with landing. Subjects were asked to perform a maximal vertical jump in which the peak vertical ground reaction force was measured. An experimental group was taught the proper way to land softly with the hopes of reducing the peak vertical ground reaction force. These subjects were instructed on proper technique through video feedback and instructional video that corrected the landing style of the subject. The experimental group showed a significant decrease in peak vertical ground reaction force.

We can take from Onate et al. that instructional video intervention does help subjects perform better; in this case it helped subjects land more softly as to allow for a lower ground reaction force.

In a study by Jorgensen et al. we see that instructional video is used to help reduce the rate of injury in downhill skiers. Jorgensen et al. noticed a need for proper instruction with respect to downhill skiing and injury. Jorgensen et al. had subjects in the experimental group watch instructional videos that emphasized starting the downhill ski and ways to properly avoid injury. Part of
the intervention was properly aligning the skis and properly fitting the bindings to the ski boots. Eighty-six percent of the experimental group had properly fitted bindings, while only 59% of the control group had fitted bindings. When injury rates were taken over time it showed that the experimental group had 7% less injuries then the control group. Jorgensen et al. proves that simple video instruction helped skiers avoid injury.\textsuperscript{7}

When applied in the classroom video instruction has used for many years.\textsuperscript{3} In the study by Wilson and Worthington, the researchers examined the effect of videot disk learning with undergraduate biomechanics classes.\textsuperscript{8} Although subjects perception of knowledge was higher in the experimental group, raw scores were actually similar to those in the control group. It can be seen that video instruction in an educational setting does not seem to have a significant effect, but only a perceived effect.

A study by Williams entitled, \textit{Training Perceptual Skills in Sport}, showed that instructional video use can be helpful with teaching subjects proper skills in sports.\textsuperscript{9} However it was found that instructional videos are only useful with proper instructional techniques. The transfer of perceptual skill to the performance context has not been seen, and may be hard to examine. Williams states however
that for proper enhancement in perceptual sports skill
proper instructional techniques must be taught to athletes
or subjects.9

Biomechanics of the Human Body During Sprinting

For a basic understanding of phases that the body goes
trough during sprinting, we must first understand what
each segment of the lower extremity is doing during
running. Hamilton and Luttgens10 give us a basic
understanding of what occurs at the ankle, knee and hip
joint during both the swing phase and the support phase of
running or sprinting.

It is important to know that the swing phase of
running occurs when the toe leaves the ground and ends when
the heel strikes the ground.10 The support phase, on the
other hand occurs immediately when contact is made with the
forward foot and ends with toe off, the initial motion of
the swing phase.10 During the support phase of running the
first segment to move is the ankle joint. During the
support phase the ankle is locked in plantar flexion to
help begin the transfer of force from the ground to the
body.10 The next segment to be moved is the knee joint which
actually does two motions throughout this phase. During the
initial contact the knees flex in an eccentric motion to help reduce the effects of gravity. During push-off the knees begin to extend to begin the second phase of running. During the support phase of running the hip also goes through two motions, flexion and extension in similar fashion as the knees. The swing phase, as stated before, begins when contact is made of the forward foot and ends with toe off. The ankle joint in this phase is in dorsi flexion. The knee in this phase once again goes through two motions, flexion and extension. Flexion occurs during the first two thirds of the motion then quickly extends during the final third of the motion to initiate the support phase. The hips only go though one motion during the swing phase, flexion.

One final factor that plays a major influence on biomechanics is the relationship between ground reaction force and sprinting. Ground reaction force is the force that is created between the foot of the athlete and the ground when an athlete runs. This force is analogous to Newton’s third law of motion in that for every action there is an equal and opposite reaction.\textsuperscript{10} A study performed by Hunter et al.\textsuperscript{11} has shown that 57% of sprint velocity is accounted for by ground reaction force. We can take from this study that the harder the ground is, or the greater
the force the athlete produces to propels themselves during each stride, the faster the athlete becomes due to a greater ground reaction force.

Influence of Training Over Time

A large amount of recent literature has brought to light in the performance enhancement world the knowledge of muscular and neurological adaptations during exercise. However, this literature has focused mainly on exercise of the endurance type. An emphasis has also been placed on the result of endurance exercise and what the outcome has been of endurance training.

As stated in the introduction, this sections will emphasis the literature that examines the results of short term exercise on the human body. Much of the literature has given us an in-depth view of the adaptations that are seen during different time trials and studies. Powers and Howley state that training effects are clearly specific to the type trained.

We can also see that there are other improvements made in the human body during training sessions. When cellular, muscular and neuromuscular adaptations are achieved it can only be assumed that there is an increase in human
performance. Powers and Howley once again give us a schematic approach to the adaptations seen during resistance training. Through this representation we see that over time there is an increase in strength, neural efficiency, and muscular hypertrophy. In a study completed by MacDougall on the changes in skeletal muscle following strength training, we see that “neural adaptations related to strength training include an improved ability to recruit motor unit firing.” This is seen after only 4 weeks of training. Similar results should be seen after a 6-week specific training protocol.

Other adaptations are seen over time as well. We also see a change in the human body at a cellular level with respect to aspects such as Human Growth Hormone, muscle metabolites and enzymes as well as ventilatory and circulatory changes. With improvement in these areas, it would be easy to see that after a training program, performance would be enhanced.

One of the more important hormones in the body when it comes to performance enhancement is growth hormone. Growth hormone is secreted from the anterior pituitary gland during times of stress. Growth hormone stimulates tissues uptake of amino acids which is an important factor in muscular development during training. Growth hormone also
helps create energy for strength and short term exercises because of its important role in protein synthesis.\textsuperscript{17,18} We can then hypothesize from this information that with exercise there is an increase in growth hormone secretion that helps to improve performance in short duration trials.

However, in a study performed by Stokes et al\textsuperscript{17} however we see that this information is not accurate when it comes to sprint performance. The study was done with a similar hypothesis that short duration sprinting on a cycle ergometer would increase the levels of growth hormone as well as sprinting performance. The study was performed with 16 healthy subjects who were instructed to perform a speed training protocol 3 times a week for a 6-week period. Those subjects trained specifically for speed, which is what they were being tested for and completed only the speed training protocol, which was the same means of measurement for the posttest. The subjects of this study were instructed to pedal for 30 seconds and at the end of the trial the growth hormone levels were taken.

At the completion of the 6-week training protocol it was seen that there was an inverse relationship between the levels of growth hormone and sprint performance. As sprinting performance increased after the 6-week training period by a mean of 2\% in speed, the secretion of growth
hormone decreased by 55%. This study helps support the hypothesis of this proposal but does not support other literature in that increase in performance increases growth hormone secretion.

A study performed by Dawson et al., examined the changes in muscle metabolites and performance after short sprint training. In this study, Dawson et al., took nine male subjects and made them perform sprints for 6 weeks to examine the effects of a sprint training protocol on performance and muscle metabolites, enzymes and fiber types. The study was performed 3 times a week for 6 weeks, in which subjects were instructed to perform numerous sprints.

At the completion of the study, a significant decrease in sprint time in the 10 and 40 meter was observed. Along with a decrease in sprint time there was also an increase in the mean score of the subjects VO2 max. This study by Dawson et al. helps support the hypothesis of this study but also showed significant increases in subjects muscular adaptations after the 6 week long sprint training protocol.

One final element specific to biomechanics and muscular adaptations is the idea of specificity. Baechle and Earle define specificity as the distinct adaptations to the physiological system that arise from a training
program. In the case of this study we want a distinct adaptation to take place in the subject’s anaerobic system so that their speed will increase. Hamilton and Luttgens\textsuperscript{10} state however that the training activity must be specific to the demands of the particular activity for what is being developed. The full range of joint action, speed, and resistance demands of the movement pattern should be duplicated in the training activity.\textsuperscript{10}

An overview of sprinting technique

Hamilton and Luttgens\textsuperscript{10} explain that some of the mechanical principles of running are: “Because longer lever develops greater speed at the distal end than does a short lever, the length of the leg in the driving phase should be as great as possible when speed is a consideration\textsuperscript{6}.” In addition, Hamilton and Luttgens\textsuperscript{10} also state, “Efficiency of running, as in any movement, requires the elimination of all unnecessary forces.\textsuperscript{10}” These two mechanical principles show us that increasing the rate at which the lever arm, or leg is turned, the faster an object will move. In this case the faster we can maximize the stride rate the faster we can run. On the other hand the longer a stride we can take the faster we can run. The stride length-rate interaction
is extremely important as a function of running velocity.\textsuperscript{1} The second mechanical principle shows us that decreasing the outside influences during running can also increase performance. Teaching proper technique is a way to decrease the unnecessary forces occurred during sprinting, thus making the athlete faster in their respected sport.

Since the basic goal of sprinting is to reach a maximum horizontal velocity there must be an emphasis on proper technique throughout all phases of sprinting to help the runner achieve this goal.\textsuperscript{10} There are three subcategories to consider when improving speed during sprints. The categories that must be addressed to improve speed are the start, acceleration and the maximum speed phase.\textsuperscript{19} There are many things an athlete must consider in each category or phase to reduce those outside influences to reduce sprint time.

To start the sprint, it has been proposed that the athlete utilize a starting block to begin the sprint. This sprint start has been used in hopes of developing a maximum force production to propel the athlete to a quicker start.\textsuperscript{20} During the set up of the starting phase the athlete must evenly distribute his or her body weight over three or four points depending on what the athlete feels comfortable with.\textsuperscript{20} In a three point start, athletes will have both feet
down as well as one hand, generally the non-dominant hand. In a four-point stance, the athlete will apply both feet and hands on the ground. The blocks at which the athlete will start from must be properly fitted to the athlete. This means that the blocks must be at different location for each individual athlete’s foot. One article on coaching sprint starts states that if the blocks are too close together then there can be too much of a strain on the arms and fingers which can cause the athlete to be off balance and not have his or her body weight evenly distributed over those three or four points. To be properly aligned for the start at the starting blocks the NSCA has proposed that the athlete have the front knee angle at approximately 90° while the back knee angle between 100° and 130° for the best possible explosive start.

There are also five other positions that have been proposed which there is a given distance from the start line to the front foot and a distance between the front and back foot. In these starts there is a distance between 6 and 44 inches from the start line. In the first start position, the feet of the athlete have a distance ranging from one and one half feet to two feet. The second starting stance is called the medium broad start in which the distance between feet is approximately one foot. The third
stance of the narrow foot gap start the athlete spaces the position of the feet approximately 6 inches apart. The fourth stance or the very close position has the feet closer to the starting line, approximately six to eight inches from the line and around 12 to 18 inches between feet. The fifth and final start is called the rocket start with the feet between 40 and 44 inches from the start line and around a foot between the feet.\textsuperscript{20,21}

The criteria given by the NSCA\textsuperscript{1} allows each individual athlete to stagger their feet to a comfortable position that still allows for the most effective start. The major elements of the start are emphasized during the initial motions of the start when the explosive nature of the sprint begins. In the initial phase, the rear leg produces the most force to propel the athlete upwards and onwards, while the front leg has the greatest influence on the starting velocity.\textsuperscript{1} As the front leg completes full extension from the start the trunk begins to form a straight line which will be seen throughout the full motion.\textsuperscript{1} The starting angle of the body is roughly between $42^\circ$ and $45^\circ$.\textsuperscript{1}

Once the athlete has propelled from the start, the athlete must gain speed. This is the acceleration phase or category of sprinting. This phase begins shortly after the
start phase at the completion of the second stride and ends at approximately 22 yards into the sprint. Once the second stride is completed the athlete then eases more over their center of gravity. At this phase the athlete begins to become comfortable in a more upright body position. The athlete will have a strong feeling in their upper body and begin to run tall. Also during this phase the athlete has reached their best stride rate-to-length ratio, which is the most important factor in sprinting.

Once full acceleration has been met the athlete begins to accomplish their maximum speed. In some elite sprinters it has been known that a maximum speed of 44 miles per hour has been reached during this phase. During this phase the athlete exhumes a “striking or clawing action” of the lower body. In this phase a short support time is imperative to decrease sprint time. The time spent between the foot and the ground should be no longer than .12 seconds. During this phase there are three sub phases, the rear support phase, the non support or flight phase, and the forward support phase. During the initial phase the body must be fully erect while the velocity depends on the push off impulse. This means that the rear leg is pushing off of the ground while the front leg pulls in a later phase. In the flight phase the front leg is in full flexion at both the
hip and knee joints. This is the beginning of the claw like motion. During the third phase of the acceleration phase the ball of the forward foot makes contact with the ground at a minimal time (.8 - .12 seconds)\(^2\) and begins to pull the body forward to complete the claw like motion.

While we look at the lower body and the torso throughout the start and into the maximum speed phase we do not examine the upper body as well as its counterpart. At the start, the arms counter act the motion of the legs. Explosive arm action should be approached as a means of facilitating leg action.\(^1\)\(^2\) During forward leg swing the arms are in a backward swing.\(^1\) The arms stay at a 90° angle throughout the whole sprint.\(^1\)\(^2\) The arms staying at 90° and close to the body decreases the outside influences such as wind drag which allows the body to reach its full potential during sprinting. Once the start is completed we see that the body begins to take a more erect and relaxed form. During the final phase of the sprint the head and face becomes very relaxed. The head eases over the shoulders and center of gravity while there is minimal tightening of the facial muscles which causes the mouth be open and allows the jaw to saw.\(^1\)\(^9\)\(^2\)

We see that there are similarities between biomechanics of sprinting and running and true sprinting
technique. We see, however, that in true sprinting
technique there is a major influence on both the start and
the upper body and not just the lower body and torso. With
the control of these elements, we can then reduce outside
influences and help decrease sprint time.\textsuperscript{2}

Summary

We see that sprinting is not just trying to run faster
or just to run harder. There must be an improvement in
other areas other than just strength. Literature has shown
that technique is as important, if not the most important
factor in improving an athlete’s sprint time.\textsuperscript{1,2} We also see
that instructional videos have shown their importance in
numerous settings, mostly in educational settings.\textsuperscript{6,7,8,3,4,5}

The literature differs over instructional video use,
especially in different arenas. There is support for
instructional videos working, as well as the literature
that supports the idea that there is no significant
scientific backing that supports the use of instructional
videos.\textsuperscript{8,9} We must examine this topic over and over to truly
understand the importance of this teaching technique.
It is evident that improving sprinting must address other factors than just repetition of the exercise and those other factors must be addressed when helping an athlete improve sprinting performance.

We see that some major points include biomechanics of the body during sprinting and the ground reaction force that occurs during all human locomotion. With a basic understanding of human locomotion during sprinting we then have an understanding or idea of how to help improve performance through biomechanics or the sprinter.

To go along with the understanding of human locomotion an understanding of cellular level changes should be known when it comes to training adaptations. Muscle physiology and muscular adaptations following different trials to help prove that there is an influence on speed over time at a muscular and cellular level that we then see as improvements in performance, in this case, sprint time.

The understanding of proper technique and the importance of function during human locomotion is seen with many of these references. It is also seen how the use of functional learning tasks help improve these factors during running. The efficacy and importance of instructional videos can be seen through the work of Janda et al., Packer et al. and Lysack et al. If there is a correlation
between teaching function to runners and the efficacy of instructional videos it is easy to see that these two could interconnect with each other very well.

With the basic understanding of biomechanics and cellular level changes we can now see that to improve sprinting we must instruct athletes on the importance of stride length, stride frequency and most importantly proper technique or mechanics of sprinting using instructional videos. To improve stride length and frequency there are phases the sprinter must go through and improve to increase the stride length – stride frequency ratio. More importantly the athlete must understand the importance of sprint mechanics and its roll in reducing outside influences on running, which may decrease an athlete’s sprint time.
APPENDIX B
The Problem
The Problem

Statement of the Problem

Greater physiological adaptations (decrease in speed and increase in reaction time) are seen with plyometric training when compared to general strength training. Functional training (i.e. running mechanics training or training proper technique) however has shown increasing popularity especially with the introduction of the Frappier Acceleration Sport Training program in 1990, which pays special attention to sprint mechanics that are included in a training protocol that is copyrighted. The use of instructional videos has shown its importance in many different arenas, mostly as educational training. The question then becomes, would technique training through the use of instructional videos be an acceptable form of training that would show the physiological adaptations needed in sprinting to decrease time?

The purpose of this study is to examine the efficacy of instructional videos on sprint performance. The teaching of sprint mechanics through instructional videos to athletes has been proposed to reduce outside influences that slow athletes during short distance running. We can use the results of this study to effectively enhance the
performance of our athletes by using simple instructional videos. If it is found that this study helps enhance the performance of athletes it can later be proposed that this is a means of injury reduction through future research.

Definition of Terms

The following are terms defined for better understanding of this study:

(1) **Instructional Video** — Video (VHS or DVD) used to help improve a person's ability or skill in that field.

(2) **Speed** — The ability to move the components of the kinetic chain through the required range of motion in the fastest possible time.

(3) **Sprint Mechanics/Technique** — Biomechanics of the body used during short distance running.

(4) **Posture** — Upright position of sprinters body during running action that must be maintained for peak performance.

(5) **Arm Action** — Motion of the athletes arms that counter the motion of the contra lateral leg motion.
(6) **Leg Action** – Motion of the athletes legs that counter the motion of the contra lateral arm motion.

**Basic Assumptions**

The basic assumptions associated with this study were the following:

(1) Subjects would not participate in extracurricular activities such as an off season training program for other sports.

(2) Subjects are able to understand the proper technique of sprinting.

(3) Subjects will practice drills and skills learned from the instructional videos.

(4) Subjects will attend all training sessions to give the study a degree of validity with post measurements.

**Limitations of the Study**

The following factors may be possible limitations to this study:

(1) High subject mortality rate is possible due to the involvement of high school athletes.
(2) Subjects are limited to McGuffey High School students.

(3) A possible change in subject maturation may take place during the study. Although minor, they may affect the results of this study.

(4) Student-athletes may also be on a weight-training program unknown to the researcher that could have influenced sprint time.

(5) Instructional video may be too complicated for high school students to understand.

Significance of the Study

The study examined the efficacy of sprint mechanics training through the use of instructional video use on performance enhancement in sprint athletes. Functional training can be defined as training proper technique, in this case training the athlete to run properly through instructional videos. With the increased popularity in functional training in the performance enhancement field, a examination of the efficacy of sprint mechanics training when applied to track athletes is needed. We see that when improper technique is used in weight training there is an increased chance of injury.1 When functional training is
applied to weight training there is an inverse relationship between injury and performance, where incidence of injury decreases and performance increases. If it is discovered in this study that sprint mechanics training is useful in training athletes to decrease sprint time there could possibly be a use for sprint mechanics training as a form of rehabilitation for sprint athletes. If improper technique is an underlying cause to injury in sprint athletes, we as athletic trainers can use sprint mechanics training as a form of early rehabilitation before more sport specific techniques are used in the rehabilitation process.
APPENDIX C
Additional Methods
APPENDIX C1
Adult Informed Consent Form
Adult Informed Consent Form

1. John Ciecko III, who is the Graduate Assistant Athletic Training Student assigned to McGuffey High School, has requested my participation in a research study at the High School. The title of this research is The Effect of Instructional Video Use On Performance Enhancement in the High School Track Athlete.

2. I have been informed that the purpose of this research is to determine whether or not using educational videos helps decrease the student’s time in the 40 yard dash and the 100 yard dash. The study will take place three times a week for 6 weeks. During the training regimen I will be watching an educational video on day one, practicing training techniques on day two and day three.

3. My participation will involve both a pre and posttest in the 40 yard dash and the 100 yard dash as well as instructional time that will take place three times a week for six weeks after school.

4. There are no foreseeable risks or discomforts that may occur to your child in this study.

5. I understand that in case of injury I can expect to receive treatment and/or care in the Athletic Training Room in McGuffey High School which will be provided by the Graduate Assistant Athletic Training Student assigned to McGuffey High School, John Ciecko III who can administer emergency and rehabilitative care. Additional services needed for prolonged care past 3 days will be referred to my family physician or orthopedic doctor.

6. There are no feasible alternatives procedures available for this study.

7. I understand that the possible benefits of my participation in the research may include a performance enhancement in my sport.

8. I understand that the results of the research study may be published, however the results and my name or identity are confidential and will not be revealed. In order to maintain confidentiality of my records, John Ciecko III will not release any information concerning my identity. This includes measurements, personal history or any personal information.

9. I have been advised that the research in which my participation does not involve more than minimal risk.
10. I have been informed that I will not be compensated for my participation.
11. I have been informed that I may withdraw at my own discretion at any time during the study and that withdraw will be kept confidential.
12. I have been informed that any question I have concerning the research study or my participation in it, before or after consent, will be answered by John Ciecko III, CIE9244@CUP.EDU, 670 Park St. California, PA 15419, (586) 709-0865 and Dr. Ronald Wagner, Wagner_R@CUP.EDU, 250 University Ave. California, PA 15419, (724-938-6033)
13. I understand that written responses may be used in quotations for publication but my identity will remain anonymous.
14. I have read the above information. The nature, demands, risks, and benefits of the project have been explained to me. I knowingly assume the risks involved, and understand that I may withdraw my consent and discontinue participation at any time without penalty or loss of benefit to myself. In signing this consent form, I am not waiving any legal claims, rights, or remedies. A copy of this consent form will be given to me upon request.

Students
Signature________________________________________
Date_______________

15. I certify that I have explained to the above individual the nature and purpose, the potential benefits, and possible risks associated with participation in this research study, have answered any questions that have been raised, and have witnessed the above signature.
16. I have provided the subject/participant a copy of this signed consent document if requested.

Investigators
Signature________________________________________
Date__________________

Approved by the California University of Pennsylvania IRB
APPENDIX C2
Parent Informed Consent Form
Parent Informed Consent Form

1. John Ciecko III, who is the Graduate Assistant Athletic Training Student assigned to McGuffey High School, has requested my minor child’s participation in a research study at the High School. The title of this research is The Effect of Instructional Video Use On Performance Enhancement in the High School Track Athlete.

2. I have been informed that the purpose of this research is to determine whether or not using educational videos helps decrease the student’s time in the 40 yard dash and the 100 yard dash. The study will take place three times a week for 6 weeks. During the training regimen I will be watching an educational video on day one, practicing training techniques on day two and having my sprint time recorded on day three.

3. My child’s participation will involve both a pre and posttest in the 40 yard dash and the 100 yard dash as well as instructional time that will take place three times a week for six weeks after school.

4. There are no foreseeable risks or discomforts that may occur to my child in this study.

5. I understand that in case of injury my child can expect to receive treatment or care in the Athletic Training Room in McGuffey High School which will be provided by the Graduate Assistant Athletic Training Student assigned to McGuffey High School, John Ciecko III who can administer emergency and rehabilitative care. Additional services needed for prolonged care past 3 days will be referred to my family physician or orthopedic doctor.

6. I understand that the possible benefits of my child’s participation in the research may include a performance enhancement in my child's sport.

7. There are no feasible alternatives procedures available for this study.

8. I understand that the results of the research study may be published, however my child's name or identity will not be revealed. In order to maintain confidentiality of my child's records, John Ciecko III will not release any information concerning my child. This includes measurements, child's history or any personal information.
9. I have been advised that the research in which my child's participation does not involve more than minimal risk.

10. I have been informed that I will not be compensated for my child's participation.

11. I have been informed that any question I have concerning the research study or my participation in it, before or after consent, will be answered by John Ciecko III, CIE9244@CUP.EDU, 670 Park St. California, PA 15419, (586) 709-0865 and Dr. Ronald Wagner, Wagner_R@CUP.EDU, 250 University Ave. California, PA 15419, (724-938-6033)

12. I understand that written responses may be used in quotations for publication but my identity will remain anonymous.

13. I have read the above information. The nature, demands, risks, and benefits of the project have been explained to me. I knowingly assume the risks involved, and understand that I may withdraw my consent and discontinue participation at any time without penalty or loss of benefit to myself. In signing this consent form, I am not waiving any legal claims, rights, or remedies. A copy of this consent form will be given to me upon request.

Students
Signature_________________________________________
Date__________________

Parent/
Guardian Signature_________________________________
Date_______________

14. I certify that I have explained to the above individual the nature and purpose, the potential benefits, and possible risks associated with participation in this research study, have answered any questions that have been raised, and have witnessed the above signature.

15. I have provided the subject/participant a copy of this signed consent document if requested.
APPENDIX C3
Child Assent Form
**Child Assent Form**

I, ________________________________, understand that my parents and/or guardians have given permission for me to participate in a study concerning sprint training in which I will learn proper technique through the use of educational videos with the hopes of decreasing my sprint time in the 40 and 100 yard dash. In this study students will be instructed on sprint technique by watching three educational videos. These videos will include *Super Speed: Drills and Skills* by Don Chu, *Developing Linear Speed* by Mike Boyle and *Training for Sport Specific Speed: Part I Straight Ahead Speed* by Vern Gambetta. This study will be under the direction of the Graduate Assistant Athletic Training Student assigned to McGuffey High School, John Ciecko III.

My involvement in this project is voluntary, and I have been told that withdrawal from the study is confidential and at my own discretion.

______________________________
Signature

Approved by the California University of Pennsylvania IRB
APPENDIX C4
Administrative Informed Consent Form
Administrative Informed Consent Form

____________________________________. (McGuffey High School student) will be participating in a study conducted by the Graduate Assistant Athletic Training Student assigned to McGuffey High School, John Ciecko III. This study will be concerning sprint training in which the researcher will teach proper technique with the hopes of decreasing students sprint time in the 40 and 100 yard dash. This study will take place both in the school and in the stadium twice a week for six weeks from January to March. All instructional time will take place after school so that time is not taken away from the students academic affairs. All students have been informed that involvement in this project is voluntary, that they may withdraw from participation in this study at any time without penalty and loss of benefit to themselves.

____________________________________

Mr. Keith Kucherawy, Principal
Mr. Michael Malesic, Athletic Director

John Ciecko III, Graduate Assistant Athletic Training Student

Approved by the California University of Pennsylvania IRB
APPENDIX C5
Liability Waiver
Liability Waiver

I, ________________________________________, parent of ______________________________________. (McGuffey High School student) grant permission for my child to participate in a study conducted by the Graduate Assistant Athletic Training Student assigned to McGuffey High School, John Ciecko III. It should be known that this study is not in conjuncture with the curriculum of the McGuffey School District and that John Ciecko III is not acting at any time during the study as an agent, servant or employee of McGuffey School District. Participation of this study is not required by McGuffey School District and by participating in this study all claims of liability are waived against McGuffey School District as no employee is in anyway monitoring the study conducted by John Ciecko III.

_____________________________________
Parent/Guardian of Participant

_____________________________________
Student

_____________________________________
John Ciecko
Approved by the California University of Pennsylvania IRB
APPENDIX C6
Main Data Collection Form
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Appendix C8
IRB Human Subjects Form
Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects

Reference IRB Policies and Procedures for clarification

**Project Title**
THE EFFECT OF EDUCATIONAL VIDEO USE ON PERFORMANCE ENHANCEMENT IN THE HIGH SCHOOL TRACK ATHLETE

**Researcher/Project Director** John Ciecko III

**Phone** # (586) 709-0865

**E-mail Address** CIE9244@CUP.EDU

**Faculty Sponsor (if required)** Dr. Ronald Wasner

**Department** Heath Science & Sports Studies

**Project Dates:** March 6, 2006 to April 17, 2006

**Sponsoring Agent (if applicable)**

**Project to be Conducted at** McGuffey High School

**Project Purpose:** ☒ Thesis ☐ Research ☐ Class Project ☐ Other

Keep a copy of this form for your records.

**Required IRB Training**
The training requirement can be satisfied by completing the online training session at [http://www.cpe.cup.edu/]. A copy of your certification of training must be attached to this IRB Protocol. If you have completed the training at an earlier date and have already provided documentation to the California University of Pennsylvania Grants Office, please provide the following:

**Previous Project Title**

**Date of Previous IRB Protocol**

Draft, April 7, 2005
Please attach a typed, detailed summary of your project AND complete items 2 through 6.

1. Provide an overview of your project-proposal describing what you plan to do and how you will go about doing it. Include any hypothesis(ies) or research questions that might be involved and explain how the information you gather will be analyzed. For a complete list of what should be included in your summary, please refer to Appendix B of the IRB Policies and Procedures Manual.

   1. This study will be examining the effects of teaching sprint mechanics to high school athletes by using three educational videos on sprinting and its effects on performance enhancement. There are three hypotheses for this study. One being that sprint time will be reduced over the 6 week training period in the 40 yard dash. The second hypothesis is that sprint time will be reduced over the 6 week training period in the 100 yard dash. The final hypothesis for this quasi-experimental study is that both males and females will show decreases in sprint time. As stated in the first two hypotheses, measurements will be recorded during the last training day of the week. To analyze the first two hypotheses a repeated measures ANOVA will be used to determine if there will be a decrease in sprint time for the 40 and 100 yard dashes. An independent T - Test will be used to determine the difference between males and females.

2. Section 46.11 of the Federal Regulations state that research proposals involving human subjects must satisfy certain requirements before the IRB can grant approval. You should describe in detail how the following requirements will be satisfied. Be sure to address each area separately.

   a. How will you ensure that any risks to subjects are minimized? If there are potential risks, describe what will be done to minimize these risks. If there are risks, describe why the risks to participants are reasonable in relation to the anticipated benefits.

May risks included in this study will be the potential of musculoskeletal injury during the intervention. All risks will be minimized by close supervision by the investigator. In case of musculoskeletal injury, the investigator will care for and treat the injured subject using the facilities available at the McGuffey High School.

   b. How will you insure that the selection of subjects is equitable? Take into account your purpose(s). Be sure you address research problems involving vulnerable populations such as children, prisoners, pregnant women, mentally disabled persons, and economically or educationally disadvantaged persons. If this is an in-class project describe how you will minimize the possibility that students will feel coerced.

Subjects to be used in this study will be high school track athletes. An experimental group will consist of subjects who watch the educational videos while the control group will be of equal size that follows the normal training regimen put forth by the Track and Field Coach for McGuffey High School. Subjects will be attained through a volunteer basis for participation.

   c. How will you obtain informed consent from each participant or the subject’s legally authorized representative and ensure that all consent forms are appropriately documented? Be sure to attach a copy of your consent form to the project summary.

Since some of the subjects that are participating in this study are minors, three forms of consent will need to be filled out as well as a Liability Waiver (C5), requested by McGuffey School District. A Parent Informed Consent (C2) form must be filled out by the subject and their parent or guardian to ensure that the subject’s legal representative consents to the participation of the subject to the study. A Child Assent Form (C3) must be filled out by the child themselves to ensure that the child understands the purpose of the study. A final Administrative Consent Form (C4) must be filled out by the principal of the school as well as the athletic director and be finalized by the study investigator. For the adults that will be participating in the study they must have an Adult Informed Consent Form (C1) completed, the
Administrative Consent Form (C4) as well as the Liability Waiver (C5). All consent forms are included with this document.

d. Show that the research plan makes provisions to monitor the data collected to ensure the safety of all subjects. This includes the privacy of subjects' responses and provisions for maintaining the security and confidentiality of the data.

The Data Collection Form (C6) will only be viewed by the investigator and advising committee. At all other times the data collection form will be kept in a safe location in the investigators place of residence. This document is also included in this document.

3. Check the appropriate box(es) that describe the subjects you plan to use.

☐ Adult volunteers  ☐ Mentally Disabled People
☐ CAL University Students  ☐ Economically Disadvantaged People
☒ Other Students  ☐ Educationally Disadvantaged People
☐ Prisoners  ☐ Fetuses or fetal material
☐ Pregnant Women  ☒ Children Under 18
☐ Physically Handicapped People  ☐ Neonates

4. Is remuneration involved in your project? ☐ Yes or ☒ No. If yes, Explain here.

5. Is this project part of a grant? ☐ Yes or ☒ No If yes, provide the following information:
   Title of the Grant Proposal ___________________________
   Name of the Funding Agency __________________________
   Dates of the Project Period ___________________________

6. Does your project involve the debriefing of those who participated? ☐ Yes or ☒ No
   If Yes, explain the debriefing process here.

7. If your project involves a questionnaire interview, ensure that it meets the requirements of Appendix ___ in the Policies and Procedures Manual.
Project Director's Certification
Program Involving HUMAN SUBJECTS

The proposed investigation involves the use of human subjects and I am submitting the complete application form and project description to the Institutional Review Board for Research Involving Human Subjects.

I understand that Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects. If the Board grants approval of this application, I agree to:

1. Abide by any conditions or changes in the project required by the Board.
2. Report to the Board any change in the research plan that affects the method of using human subjects before such change is instituted.
3. Report to the Board any problems that arise in connection with the use of human subjects.
4. Seek advice of the Board whenever I believe such advice is necessary or would be helpful.
5. Secure the informed, written consent of all human subjects participating in the project.
6. Cooperate with the Board in its effort to provide a continuing review after investigations have been initiated.

I have reviewed the Federal and State regulations concerning the use of human subjects in research and training programs and the guidelines. I agree to abide by the regulations and guidelines aforementioned and will adhere to policies and procedures described in my application. I understand that changes to the research must be approved by the IRB before they are implemented.

Professional Research

Project Director’s Signature

Department Chairperson’s Signature

Student or Class Research

Student Researcher’s Signature

Supervising Faculty Member’s Signature if required

Department Chairperson’s Signature

ACTION OF REVIEW BOARD (IRB use only)

The Institutional Review Board for Research Involving Human Subjects has reviewed this application to ascertain whether or not the proposed project:

1. provides adequate safeguards of the rights and welfare of human subjects involved in the investigations;
2. uses appropriate methods to obtain informed, written consent;
3. indicates that the potential benefits of the investigation substantially outweigh the risk involved.
4. provides adequate debriefing of human participants.
5. provides adequate follow-up services to participants who may have incurred physical, mental, or emotional harm.

Approved □ Disapproved

Chairperson, Institutional Review Board

Date

Draft, April 7, 2005
REFERENCES
REFERENCES


6. Onate JA, Guskiewicz KM, Sullivan RJ. Augmented feedback reduces jump landing forces. JOSPT. 2001;31:511-517


ABSTRACT

Title: THE EFFECT OF INSTRUCTIONAL VIDEO USE ON PERFORMANCE ENHANCEMENT IN THE HIGH SCHOOL TRACK ATHLETE

Researcher: John Ciecko III

Advisor: Dr. Ronald Wagner

Date: May 2006

Research Type: Master’s Thesis

Purpose: The purpose of this study was to examine the efficacy of instructional videos and their impact on performance enhancement on high school track athletes.

Method: Participants included 18 (9 males and 9 females) track athletes ages 14-18 (15.94±1.51) from southwestern Pennsylvania. Participants were split into an experimental group (n = 10) and a control group (n = 8). Both groups participated in a pretest in the 40 and 100 yard sprint. The mean of both groups was taken for both groups. Once completed the experimental group took part in a 6 week intervention which included watching three instructional videos and practicing the skills. Once finished with the intervention both groups participated in a post test in both the 40 and 100 yard sprint. Once again means were taken for both the experimental and control groups. The data was analyzed using repeated measures ANOVA to determine the significance of the sprint times. Alpha level was set at .05 for this study.

Conclusions: Since only a significant affect was found with the 100 yard sprint, it was found that the instructional video intervention was only helpful with reducing the sprint times in the 100 yard sprint and not the 40 yard sprint.