

Word count policy unpacked for Physical Education

All words used in the body of the text are counted for assessment purposes. This includes all words that the assessor reads, from the beginning of the introduction to the end of the conclusion. Argument or analysis that is required for an assessment task should be presented in the body of the text, and not in supporting materials such as tables, flow charts, graphs, and diagrams.

Supporting materials such as tables, flow charts, graphs, diagrams should be used only to illustrate or support the body of the text.

In Physical Education, training programs and training sessions (including details such as intensity, sets and reps, types of exercises) will not be included in the word count. However, training programs and sessions will still provide important evidence of knowledge and understanding and as such will inform the assessment of the student work.

If students include descriptions of the training activities and comparisons to elite players or other evaluation/analysis in tables, these would be required to be included in the word count.

Assessors do not assess beyond the word count. The word count includes:

- all words in the body of the text
- headings
- direct quotations
- footnotes that are used as explanatory notes
- any argument or analysis that is introduced in supporting materials.

The word count does not include:

- the title/question page
- the contents page
- the reference list or bibliography (including footnotes or in-text references that are used to list author, date, and page numbers)
- appendices

Information contained in appendices will not be read if the student's response has reached the maximum stipulated for a particular assessment. For this reason, students should ensure that all information required for their response is included in the main body of evidence.

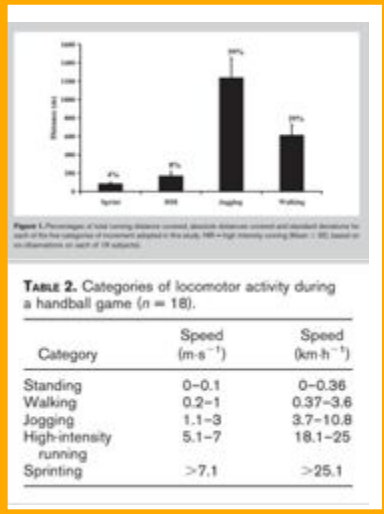
- a reference list or bibliography that is required for an assessment task (however, this will be assessed for accuracy and consistency).

Word count illustrative example

In text referencing - not counted as a part of the formal word count and would be better placed in a reference list at the end of the response

Handball game analysis

From journal article: Match Analysis of Elite Adolescent Team Handball Players in *The Journal of Strength and Conditioning Research*, September 2011 by Chelly, S, Hermassi, S, Aouadi, R, Khalifa, R, Van den Tillaar, R, Chamari, K & Shephard, R



This graph indicates the percentage of total running distance covered. Jogging accounts for the majority of the distance covered. This indicates a strong use of cardiovascular endurance, players go up and down the court. With an overall combined 12% of high intensive running or higher level intensity it shows that the amateur level players were at a lower level of intensity. Although this data can be corrupt due to the fact it took everyone's data. This includes goalkeepers who would be walking or standing the majority of the time. While sprinting the speed

Supporting materials such as tables providing data and text that support identification of the data do not get counted in the word count

this would be used on a fast break or getting back to jogging provided. The majority of the game, with the between 3.7km/h and 10.8km/h. With this information the type of game speed and style played. This indicates defensive strategies implemented.

From my own game play analysis: footage from Denmark vs France, Rio 2016
Key points: (Denmark v France - Full Handball Final, 2020)

- the wall defence
- Lots of passing
- Muscular strength, throwing
- Cardiovascular system
- Power from jumping
- Agility
- Coordination
- Awareness
- Run back after scoring

- Sub after scoring
- Counter attacking
- Flexibility
- Acceleration
- Reaction time
- Balance
- Speed

All of the text in this section would count towards the word count. Students need to consider the value of the text in forming their evidence for assessment. Given the 4000 word maximum for written responses, the dot points could be removed with the focus being on the fitness factors and the associated observations.

- Speed** - attackers on a counter attack, defenders running back to defend after a goal
 - Agility** - evasive manoeuvres: to evade players
 - Reaction time** - for the goalkeeper to react and defend shots coming towards him
 - Flexibility** - for the goalkeeper to reach different parts of the goal
 - Coordination** - to catch and throw the bowl with accuracy, even without looking
 - Balance** - defenders and attackers to not fall into the goa keepers zone
 - Muscular power** - the maximum power a ball can be thrown
 - Muscular strength** - constant jumping when attacking
 - Cardiovascular endurance** - the ability to run up and down the court constantly, defence turning into attack
 - Local muscular endurance**- in the quadriceps to continue the ability to keep jumping
- Summary:**

The key demands of an elite handball player are passing, shooting skills, game awareness, throwing accuracy and game tactics

The most important fitness factors for high level performance in handball are cardiovascular endurance, reaction time, muscular endurance and speed. These core factors create a high level of performance.

Analysis of the fitness level in elite handball players (U16 and U18) between 2003 and 2013

Belka, J, Hulka, K, Safar, M, Weisser, R & Mikova, L, 2016, "Analysis of the fitness level in elite handball players (U16 and U18) between 2003 and 2013", *Journal of Physical Education and Sport*, vol. 16, no. 4, pp. 1381 – 1390

This study uses standardised fitness tests to analyse the fitness level of handball players from a certain age group (10-19 years old) over ten years of age. The tested players were part of the Youth Sports Centre (SCM) in the town of Zuzov.

In text referencing - not counted as a part of the formal word count

The goal of this study was to analyse the fitness level of top junior handball players over ten years of age (from 2003 to 2013). A total of 177 participants were included in testing, including 11 younger adolescents (16–17 years old) and 166 older adolescents (18–19 years old). The players were tested twice each year (summer and winter) in six fitness tests (running 2 x 15m, dribbling 30m, five jump, medicine ball (1kg) throw, running 10 x 20m and 12 minute The Cooper 12 minute run test)."

To establish baseline data for our Improvement Analysis task, we will complete the same tests and compare our results to these elite players.

Name: JC

Age: 17

Date: 25-2-2020 & 26-2-2020

Test	Attempt 1	Attempt 2	Attempt 3	Official result	Comparison to elite handballer
Agility test: 2x15m run	9.81	7.33		7.33 seconds	I was 1.45 seconds above the maximum player in the elite handball group
Specific skill handball speed test: Dribbling 30m	5.42	5.88		5.42 seconds	The average time it took was 4.37 seconds, where it took me 5.42 seconds. I was 0.66 seconds behind the worst elite handball player.
Explosive strength/power test: Five jump	8.4	8.1	9.7	9.7m	I was 6.1 metres off of the best handball player. While being 4.01 metres off of the average throwing distance.
Explosive strength test: medicine ball throw				16.10 m	I was 15.81 metres behind the average distance thrown. While I was 7.3 metres behind the minimum distance.
Anaerobic endurance: Run 1 x 20m				33.77 seconds	I was faster than the average score by 6.26 seconds. While being quicker than the maximum score by 10.96 seconds.

Supporting materials such as tables providing data and text that support identification of the data are not counted in the word count

This section of the table provides explanation and analysis of the student's comparison to the elite performer. This would need to be counted in the word count. The word count document advises that all argument and analysis should be included within the body of the text.

Tests of players (U18)	Mean	Minimum	Maximum	Standard deviation (SD)
Run 2 x 15m (s)	5.43	4.97	5.88	0.18
Dribbling run 30m (s)	4.37	3.94	4.76	0.15
Five jump (m)	13.72	11.70	15.80	0.83
Medicine ball (1kg) throw (m)	31.91	23.40	41.00	3.61
Run 10 x 20m (s)	40.03	10.00	44.72	2.75
Cooper run (m)	2875.92	2050.00	3320.00	215.30
Points	35.69	11.00	55.00	9.22

This section of the table provides explanation and analysis of the student's comparison to the elite performer. This would need to be counted in the word count.

Identifying an area of improvement

Things I do well	Things I could do better
Reaction Time Defence Ability Creating Space Pass Accuracy Counter attacking	Muscular strength in throws Balance awareness sticking/using positions Flexibility

Top 3 possible areas of improvement: Arm Strength to throw at goals, agility to go around players and Flexibility in general game play

Possible area of improvement #1: arm strength	Possible area of improvement #2:Agility	Possible area of improvement #3: flexibility
<p>Data collected to support this:</p> <ul style="list-style-type: none"> - When taking long shots unable to keep the starting trajectory - Passes not making player, getting intercepted - Poor data in medicine ball throw test 	<p>Data collected to support this:</p> <ul style="list-style-type: none"> - Evading players when dribbling - Darting through players to receive the balls - Video footage of struggling to get through opposition teams defensive line 	<p>Data collected to support this:</p> <ul style="list-style-type: none"> - Reaching for the ball in goalkeeper - Defending around the semi circle - Feet stepping into goalkeepers area

Area of improvement identified: Arm Strength with a focus on powerful shooting

Links to fitness factors: Muscular Power

Why it is important to improve this area:

When attacking in a game of handball, it is very important to have a strong arm while shooting. Muscular strength in the arm allows a handball player to throw the ball at faster and higher rates. This enables less time for the goalkeeper to react and could potentially slip through their hands. From watching various videos on YouTube from elite players it shows the harder the throw the less likely the keeper was able to save it. According to Aspeter a journal on upper body strength explains that arm strength is helpful in throwing speed, reduction in injuries and defensive interventions. (Aspetar Sports Medicine Journal - Strength training in handball, 2020)

Program Overview for Improvement

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1	Rest	Resistance Training	Circuit	rest	Resistance Training	Rest	Rest
2	Rest	Resistance Training	Circuit	Rest	Resistance Training	Rest	Resistance Training
3	Rest	Resistance Training	Circuit	Rest	Resistance Training	Rest	Testing
4	Rest	Resistance Training	Circuit	Rest	Resistance Training	Rest	Circuit
5	Rest	Resistance Training	Circuit	Rest	Resistance Training	Rest	Rest
6	Rest	Resistance Training	Circuit	Rest	Resistance Training	Rest	Testing
7	Rest	Resistance Training	Circuit	Rest	Resistance Training	Rest	Rest
8	Rest	Resistance Training	Circuit	Rest	Resistance Training	Rest	Resistance Training
9	Rest	Resistance Training	Circuit	Rest	Resistance Training	Rest	Testing

Supporting materials such as tables providing data and text that support identification of the data are not counted in the word count

Over the nine week training course, multiple stages will be undertaken to show an improvement in muscular power in the arms. These stages include resistance training (weights), a circuit and testing to be undertaken every three weeks to track progress. While resistant training it is important to use large weights with low reps and mid range sets. Each week two resistance training sessions are to be taken, due to a minimum of two training sessions a week to maximise muscle growth. While three resistance training sessions per week would be ideal as this would be the best way to maximise muscle growth but there is limited gym space at school and with the , a circuit session is used instead. This is to show a different type of training and show understanding of different training methods. The circuit includes segments of resistance training as well as components of continuous training. Using weights and working at a high rate this helps burn the fat around the arms while increasing the muscle around it. Three to four rests are scheduled each week this is to allow enough time for muscles to recover and grow, as well as other strength training. Using training principles such as progressive overload, frequency and intensity will be used to maximise growth in workouts. Progressive overload and frequency will be the major principle while resistance training. Whereas intensity is the major principle when completing the circuits. The training principles implemented into this is through progressive overload. This allows for a steady growth of weight used over the 9 week period, without over exerting. Specificity will be used to mimic the movements in a game of handball. Like throwing medicine balls or actions which imitate a throw.

Workout

Name: J

Age:

17

Goal: Improve Muscular powering arms.

Injuries/Considerations: wrist, shoulder

Warm up:

Cardio: 5 minute ergo

Dynamic Stretches: Arm swings, feet touches, arm circles

Conditioning:

Supporting materials such as tables providing data and text that support identification of the data are not counted in the word count

Exercise	Intensity (RPE)	Sets	Reps	Recovery	Notes
Barbell Curl	9	4	5	45 secs	From waist to top of shoulder
Hammer Curl	9	4	5	45 secs	Full contraction, waist to shoulder, slow up and down
Concentration Curl	9	4	5	45 secs	Elbow on Shoulder, full extension
Seated Tricep Extension	8	4	5	45 secs	Slowly release down, quick acceleration up
Bench Tricep Dips	9	4	Fail	1 minute	Slowly Lower body to inch away from ground, quickly push beginning at starting point
Dumbbell Shoulder Press	8	4	5	1 minute	From shoulders, full extension up
Lateral Raise	8	4	5	45 secs	Bent knees, straight back, raise all the way up
Medicine Ball throw up	9	4	5	1 minute	Throw as high up as possible, without bending the knee

Cool down: Walk around rose garden x2

This training program focuses on the specificity of the bicep, tricep and shoulders. Biceps have three different types of exercises. Triceps provide tricky, considering some of the best exercises to improve them like skullcrushers need cable machines. Although using body weighted dips create a resistance as the muscle contracts. Including shoulder exercises give more strength in the upper part of the arm. The medicine ball throw is to replicate the testing done, at a vertical length rather than a horizontal length. Each week the goal is to improve the amount of weight being pushed, hence using progressive overload. Using resistance training to improve the muscular power in the arms is beneficial as it increases muscle mass and improves movement control. This is useful as the more muscle mass the more weight can be exerted, which correlates to the testing. Improving movement control helps with the form of throwing with a weight greater than the average sports ball.

This workout will be trained through progressive overload, when the weight is too comfortable for muscular power, more weight will be added to increase the RPE. This will allow for steady growth without overworking or the weight being too light.

Training Journal

Week	Tuesday	Wednesday	Friday	Sunday
1 (2/3/20)	N/A	N/A	Resistance Training <ul style="list-style-type: none"> weight used was too light for strength training, was more suitable for hypertrophy - next week I will increase the weight 	Rest This section of the table provides explanation and analysis of the student's training and changes to the training. This would need to be counted in the word count.
2 (9/3/20)	Resistance Training <ul style="list-style-type: none"> increased weight from first session Increase of weight for arms to 12.5kg 	Circuit 1 <ul style="list-style-type: none"> testing the circuit, designed to be done at home Exercise time too long, with no recovery, caused poor execution Change time from 45 seconds to 30 	Resistance Training <ul style="list-style-type: none"> identical session from Tuesday Rushed 	Gym Resistance Training <ul style="list-style-type: none"> more resources available then at school Completed a different workout routine (pull {back and bicep})
3 (16/3/20)	Gym Resistance Training <ul style="list-style-type: none"> Tricep weight too light, need to add 2.5kg for next session 1 minute rest too long change to 45 seconds 	Circuit 1 <ul style="list-style-type: none"> changed the time from 45 seconds to 30 seconds no change in recovery time not enough time to change stations 	Resistance Training <ul style="list-style-type: none"> Strong progression in weights Increased amount of reps from 4 to 5 	Testing
4 (23/3/20)	Gym Resistance Training <ul style="list-style-type: none"> Increase of weights for arms to 17.5kg, 20kg for triceps and 15kg for shoulders. The use of cable machines at the gym for triceps and biceps 	Circuit 1 <ul style="list-style-type: none"> Sticking with 30 second intervals, incorporating 1 10 second rest to change stations 	Home Resistance Training <ul style="list-style-type: none"> home training sessions from now on due to COVID-19 Experimenting with different equipment to use Created a home training session 	Rest

5 (30/3/20)	Home Resistance Training <ul style="list-style-type: none"> trying the home workout, using buckets of water as main source for weight 	Circuit <ul style="list-style-type: none"> No change from last week Exercises becoming easier to complete 	Home Resistance Training <ul style="list-style-type: none"> created a barbell using a broken broom and taped bricks to the end of it Instead of water buy sand as water kept slipping out 	Rest
6 (6/4/20)	Home Resistance Training training session missed due to homework	Circuit <ul style="list-style-type: none"> Changed workout time from 30 seconds to 45 seconds Felt more of a burn without overworking 	Home Resistance Training <ul style="list-style-type: none"> hammer curl provided to awkward with buckets and bricks too light, instead swap out with barbell curls 	Testing
7 (13/4/20)	Home Resistance Training too much weight in the bucket causing fatigue which can risk injury next will take out 4kg of and	Circuit <ul style="list-style-type: none"> Rest increased to 6 minutes Completed 4 times instead of 3 Lower intensity in session, bring it up for next session 	Home Resistance Training <ul style="list-style-type: none"> increased number of sets to 5, to make the sets and reps 5-5 Good amount of weight used, could barely lift arms at the end 	Resistance Training <ul style="list-style-type: none"> lighter session than the day before, back to 4 sets- 5 reps Lower intensity
8 (20/4/20)	Home Resistance Training good overall session, included practice test without the measuring of results	Circuit <ul style="list-style-type: none"> 1 minute exercises 20 sec rest between each session 	Home Resistance Training <ul style="list-style-type: none"> session missed 	Rest
9 (27/4/20)	Home Resistance Training <ul style="list-style-type: none"> this workout was my hardest Sand to the top 5 sets, 5 reps 100%, max effort 	Conditioning <ul style="list-style-type: none"> Static/ dynamic Stretching 4km jog for cardio 	Home Resistance Training <ul style="list-style-type: none"> last training session bucket was filled with sand Going at 90% Back to 4 sets, 5 reps 	Testing

Home Workout

Warm up:

Cardio: brisk jog around the block

Dynamic Stretches: Arm swings, feet touches, arm circles

Supporting materials such as tables providing data and text that support identification of the data are not counted in the word count

Exercise	Intensity (RPE)	Sets	Reps	Recovery	Notes
Barbell Curl	9	4	5	45 secs	From 90 degrees to shoulder, using the bucket handle as a point to hold the bucket
Reverse grip front raise	9	4	5	45 secs	Holding the bucket at waist, raising it up towards shoulder level, slowly releasing back to starting point
Concentration Curl	9	4	5	45 secs	Elbow on thigh, full extension
Seated Tricep Extension	8	4	5	45 secs	Slowly release down, quick acceleration up
Bench Tricep Dips	8	4	Fail	1 minute	Slowly Lower body to inch away from ground, quickly push beginning at starting point, using ledge outside as a base
Bucket Shoulder Press	9	4	5	1 minute	Using a bucket of water, grip the bottom of the bucket and push upwards. Rest on top of head to keep centre of gravity in the middle.
Body Skullcrushers	8	4	Fail	1 minute	Laying in a plank position have fists together in front of face, go up like a push up then down like a push up, repeat till failure.

Cool down: Walk around rose garden x2

Limitations include the usage of weights, as the only dumbbells available to use are 2 x 5kg and 1 x 10kg. To include progressive overload in my workout routine, the usage of buckets of water and bricks will be used to show the demonstration of progressive overload. Using the scales, a bucket of water can be weighed to determine the weight, as well as the different size buckets available to use. While using the same training principles, the same fitness factor will be the focal point on improving. In this workout routine, it is supposed to be quick while still controlling the weights. The way the training routine will be utilised is through resistance training. As the weights are used at a higher level, the muscles are being contracted to a greater extent than those weights of less mass. As well as progressive overload, specificity will be used to recreate the specific movements in a game of handball. Like the reverse grip front raise imitates a forward throw, for a quick pass (short and sharp) unlike a long pass across court.

Retesting

Over the duration of this handball course, a certain type of test was done to show if I was improving or not. To test whether my muscular power in the arm had improved, using a testing method of throwing a 1kg object and recording the distance thrown.

Explosive strength test: Medicine ball (1kg throw)

Using a one-handed throwing technique to throw the ball within the marked area as far as possible. While performing the throw, the player must always have at least a part of one foot in contact with the ground. The player can cross the starting line only after throwing. Measure and record where the ball landed. Repeat three times and use the best score.

Testing results

Date	Dis	Supporting materials such as tables providing data and text that support identification of the data are not counted in the word count	Comments
28-2	16.1		This result was the first time doing it, with poor form. The throw was too loopy, causing it to arc to a score of 16.1m. Which was 15.81m behind the training results.
23-3	17.5	1.4	For this test result a proper warm up of light weights was used. This enabled the muscles to warm and be ready for the throw. A 1 kg rock was thrown, to represent the ball in the test. To measure a mark was drawn on the street and measured from the throwing point.
11-4	18.6	1.1 (2.5)	Again using the 1kg brick, the test was completed with another growth occurring. This test was done on a windy day which could have led to change in results. A rushed warm up was done due to limited time to complete the test. The best result occurred on the last throw as the first 2 throws were quite poor due to form.
27-4	19.8	1.2 (3.7)	For the final test a 1kg medicine ball was used in a closed environment. A secondary person measured the landing of the ball to ensure the reliability of the final test. This was the most accurate reading of results. This test did not have the same warm ups as the other tests with only stretching the arms as a warm up.

After the intense 9 week training program a significant improvement has occurred with a total improvement of 3.7m. This has shown a clear improvement of 22.98%. The average distance thrown for elite under 18 handball players was 31.91, therefore the result was 12.21m behind the average. With more training the gap between the two would close if the same improvements were happening.

Tracking the Speed of the Ball

Tracker is a software device that can be used to determine the speed of an object. Using the software tracker I am able to determine the different speeds I have thrown a small soccer ball from the end of February compared to the end of April. The soccer ball represents roughly the same size as a handball ball, although is a little lighter and harder to grip. Tracker will be able to determine the peak velocity of each ball thrown. Velocity is the speed of something in a particular direction, in this case it is the ball being thrown forward. Breaking down the video of myself throwing the ball, I Am able to break it down frame by frame. Each frame a marker is placed on the ball to find the point of mass. The software is able to determine many things like the acceleration, velocity or magnitude. It is then able to break it down into y and x axis, the x axis is useful as it gives the velocity of it going forward.

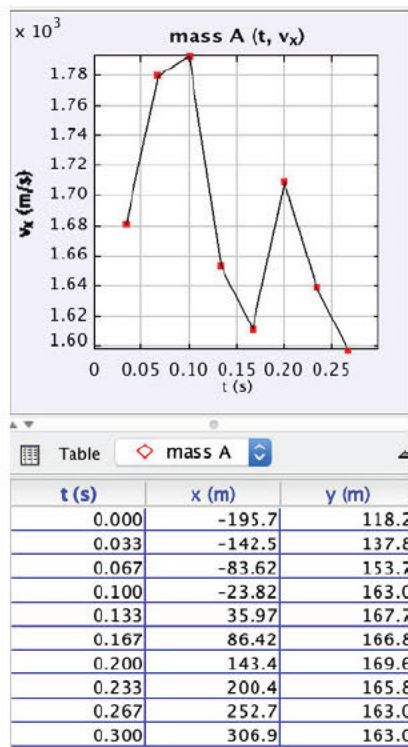


Image 1: Graph of velocity (x) / time (s), of ball thrown in February

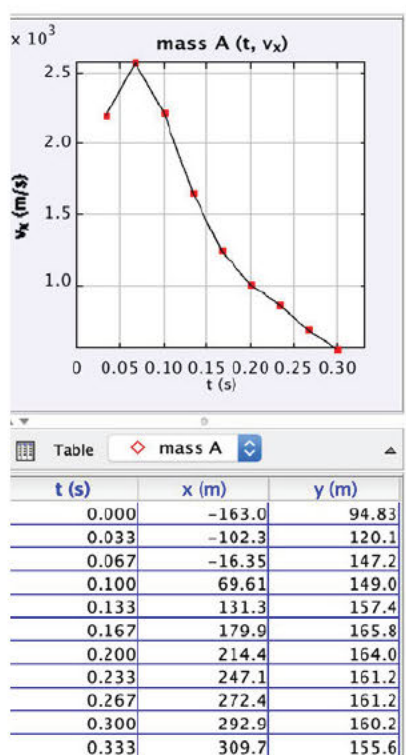


Image 2: Graph of velocity (x) / time (s), of ball thrown in April

Supporting materials such as tables providing data and text that support identification of the data are not counted in the word count

The red dots indicate when a point of mass was recorded, and where it represents the velocity of the ball. Image 1 indicates the peak of the throw was 1.79 m/s at 0.1 of a second, before it reaches a low of 1.6 after 0.25 of a second. This indicates that the throw was of a slower rate, but kept consistent in the air. Image 2 indicates the peak of the throw in April reached a top of just over 2.5 m/s. After the 9 week training session, there has been a positive change in velocity of 0.71 m/s. There are a few problems with using the tracker software as it is not 100% reliable, errors like missing the point of mass can skew the results. This may have happened in image 1, as it spikes down although rises again. Although this does not affect the peak velocity of the throw, from either time. Although some limitations in this make the data skewed, this can be the trajectory the ball is thrown, amount of times the ball is tracked in frame,

missing the exact spot to mark on the ball and environmental factors. The throw was in a closed environment where there was enough time to take the shot, compared to in a game where there is less time and more pressure.

Factors that affect learning in handball

Skill classification

Handball is an invasion game which involves multiple movements and skills to play. These skills come under cognitive, perceptual and motor. Cognitive skills is the ability to solve problems by thinking, in a game this is demonstrated by using game tactics. Perceptual skills is the ability to sense things from the environment and process them. This would be demonstrated in game by using in game acting and reacting to the opposition's plays. Motor skills is the use of a precise muscle movement to form an output, this could be demonstrated by the ball thrown. Handball is a complex game and involves specialised movements skills. This can include having a running shot at goal. It includes running, dribbling, jumping and throwing all in one. Although the game has complex and simple skills to be performed. A simple skill would be dribbling, whereas a complex skill is running while shooting. Handball is closer to a gross muscular involvement than fine movement as it involves large bodily movements. Like throwing is using the whole or dribbling involves running with arm movement to control the motion of the ball. Handball is an open skill game as it is an open environment, therefore anything can happen in it. An example would be when dribbling the ball could lose control and bounce to an opponent. Handball is a combination of discrete, serial and continuous skills. As each component is seen in the game of handball. A discrete skill would be a throw by the goalkeeper, as after the throw there is a clear end point. A serial skill is demonstrated by a dribble, jump and shot. A continuous skill can be demonstrated by running on the court and dribbling, as there is no particular end point.

Stage of learning

Cognitive theory perspective

In the game of handball, I would assume myself as an associative stage in retrospect to the cognitive theory perspective. I am able to apply the basic skills in a game of handball, while struggling with the more advanced decisions and execution of plays. This is demonstrated through the application of basic concepts such as shooting, blocking, making space and game tactics like building a wall for defence. An in game example of this would be when I as a player would be attacking. I know what to do in this situation, whether to pass to an opposing player or take it on my own and take the shot.

Dynamic systems perspective

In the dynamic systems perspective I consider myself in the Control stage. The control stage is where myself as a player, is at an adequate skill level with a few errors occurring. I learn in a nonlinear relationship, caused by the growth in my skill level. This can be seen with my shooting, as the more games are played the percentage of shots on target is higher. as this occurs a higher consistency in task success happens.

Practice

The best type of practices used for would be distributed, fixed, variable and whole part whole practice. Using distributed practice allows the team to practice each skill at a slower rate allowing rest between each skill performed. having these rests between exercises allows for feedback
Both fixed and variable practice techniques are used. Fixed is important in breaking down the smaller movements, like shooting or a goalkeeper diving practice. although using only fixed practices is bad as it cannot correlate into real game play. Variable adds these smaller movements and puts them into a game sense practice. IE: passing and shooting put together. Whole-part whole practice is useful as it can practice the whole skill and put together more advanced techniques. This can be demonstrated by breaking down the team into goalkeepers, defenders and attackers. They can then (in their separate groups) practice strategies and techniques. The team can then come together and form in game-like situations.

Feedback

This section of the table provides explanation and analysis of the factors that affect learning. This would need to be counted in the word count.

While playing handball, during the games feedback was given to myself to show how I was doing. Throughout these games a lot of intrinsic thinking, which is information received during the execution of skills and which came from my own in game thinking. Using my own kinesthetic sense I would be able to evaluate my own game styles and play. For example when attacking and I take a shot which misses, I then decide whether the shot was worth it or should have looked for a passing option. I received external knowledge of results through terminal feedback. This was looked at through the score or game footage.

To further improve my performance the use of knowledge of performance as the feedback of the quality of my movements, techniques or decision. This would help in whether the right decisions were being made in the game, like should there have been a pass or shot.

Individual factors

With a background of Australian rules football, there are both negative and positive factors which can correlate into a game of handball. In football when a mark is taken the game slows down and the marker gets time to dispose of it. Whereas in handball when someone receives the ball the player continues on, and is surrounded by opposing players. A positive is the agility, the agility in football can help get players around in a game of handball. Australian rules has specialised skills, like the catch, run and shot as well as the larger gross movements of a handball to a pass in handball. Other individual factors which factor into the game of handball includes cognitive development, physical development and psychological development.

These tables provide explanation and analysis and would need to be counted in the word count.

Handball Game Play Footage Analysis

Identified area of improvement:	Muscular power in the arms
If I HAVE improved in that area, my game play/performance would look like:	<ul style="list-style-type: none"> - faster throws - more shots going into goal - bullet passes
If I HAVEN'T improved in that area, my game play/performance would look like:	<ul style="list-style-type: none"> - shots that hit the ground, bouncing to the keeper - easy for the keeper to save - Poor shooting form



Figure 1: Shot at goal before training



Figure 2: Shot at goal after training



Figure 3: Shot at goal after training

Supporting materials such as tables providing data and text that support identification of the data are not counted in the word count

There are three photos, 1 from a game before the training programme and 2 after the training programme was complete. The first two photos (figure 1 and 2) indicate myself having a shot at goal, although both shots missed at goal. The first photo shows a shot from a bit out of the goalies semi-circle. The throw was quite weak, it bounced straight at the ground right into the goalkeeper's hands. Photos 2 and 3 were taken after the intense 9 week training program and improvements were made. Not only has my muscular power in the arms improved so has my form.

Each of these shots resulted in a goal, this is because the force projected is much greater not allowing the goalkeeper to react in time. In photos 2 and 3 the ball is eye level and being released in front of the body. Rather than photo 1 which was released at a lower position and behind the body.

Factors which can affect the throw can include the grip, angle and pressure. (Why can't i throw the ball straight?, 2020). Photo 1 the ball is on top of the hand with a poor grip. As there is a defender in the way this adds to the pressure when shooting. Although the angle on goal was not poor as it was on a 45 degree angle making it a moderate to easy shot. Photos 2 and 3 there is a correct grip on the ball, being behind the ball. The angle is straight in front of goal, allowing a larger chance of the ball being scored. The difference between the photos is that in photo 2 there is no pressure when shooting. The right grip allows the ball to be guided better with the direct force.

Comparison of workout routines

Exercise	Intensity (RPE)	Sets	Reps	Recovery	Notes
Barbell Curl	9	4	5	45 secs	From waist to top of shoulder
Hammer Curl	9	4	5	45 secs	Full contraction, waist to shoulder, slow up and down
Concentration Curl	9	4	5	45 secs	Elbow on Shoulder, full extension
Seated Tricep Extension	8	4	5	45 secs	Slowly release down, quick acceleration up
Bench Tricep Dips	9	4	Fail	1 minute	Slowly Lower body to inch away from ground, quickly push beginning at starting point
Dumbbell Shoulder Press	8	4	5	1 minute	From shoulders, full extension up
Lateral Raise	8	4	5	45 secs	Bent knees, straight back, raise all the way up
Medicine Ball throw up	9	4	5	1 minute	Throw as high up as possible, without bending the knee

Figure 1: Workout used before Covid-19

Exercise	Intensity (RPE)	Sets	Reps	Recovery	Notes
Barbell Curl	9	4	5	45 secs	From 90 degrees to shoulder, using the bucket handle as a point to hold the bucket
Reverse grip front raise	9	4	5	45 secs	Holding the bucket at waist, raising it up towards shoulder level, slowly releasing back to starting point
Concentration Curl	9	4	5	45 secs	Elbow on thigh, full extension
Seated Tricep Extension	8	4	5	45 secs	Slowly release down, quick acceleration up
Bench Tricep Dips	8	4	Fail	1 minute	Slowly Lower body to inch away from ground, quickly push beginning at starting point, using ledge outside as a base
Bucket Shoulder Press	9	4	5	1 minute	Using a bucket of water, grip bottom of the bucket and push upwards. Rest on top of head to keep centre of gravity in the middle.
Body Skullcrushers	8	4	Fail	1 minute	Laying in a plank position have fists together in front of face, go up like a push up then down like a push up, repeat till failure.

Figure 2: Workout routine used during Covid-19

Supporting materials such as tables providing data and text that support identification of the data are not counted in the word count

Effectiveness

As covid-19 affected the use of utilising gyms and the school gym equipment a home gym had to be created. These two images replicate the two workout routines that were used, one for the gym one for home. Focusing on the three muscle groups, bicep, tricep and shoulders a similar plan was made. With no weights, the usage of buckets filled with either sand or water worked well. Using texta markings i was able to determine the different type of weight put in each week or session depending how much weight progression was needed. With a large bucket it was easier to add more weight to improve progressive overload. The medicine ball too was scrapped due to nothing being able to replicate it causing it not to be effective. While switching between the original workout to the home workout, was to keep the training principles the same. Keeping progressive overload with the buckets was crucial to improve the muscle mass, while still focusing on the specificity of the muscles (biceps, triceps and shoulders).

Comparison

The bicep is the most important muscle when throwing a ball, hence it had to be worked out the hardest. Bicep curl is crucial for this, hence it was kept for the home workout. Although using the bucket it did provide difficulty to fully lift to the top, with more practice the easier it became. Hammer curls were provided too difficult to do instead using the reverse front grip raise was easier due to the bucket handle. Exercises such as concentration curl, seated bench tricep dip stayed the same due to the little complexity of the exercise. Seated tricep extension provided tricky with the bucket, instead cinder blocks were used to create enough weight. Shoulder press provided tricky on the home workout, as the bucket was tricky to balance causing a spillage of water. To overcome this using a wooden broom taping the buckets on either side worked well. Instead of another shoulder exercise another tricep exercise was added, known as body skullcrushers. The home workout targets more of the bicep and triceps compared to the original gym workout which targeted each muscle group equally.

How the training session was conducted from home

Due to the effects of covid-19 the final 5 weeks of training principles have been altered to allow the completion of my training program. The exercise and rest days will remain the same although the actual exercises taken place have been altered as the school is shut and the gym was shut. Using buckets of water I Am able to substitute the use of weights, the level can change depending on how much water is used.



The bicep curl was a slow and controlled movement. Holding the bucket by its handle, starting at a straight dropped arm, bring upwards bending the elbow at a slow rate. Once fist is near chin, slowly release back to starting point.

The concentration curl was very similar to the bicep curl. Using a slow movement, dropping the bucket till it hit the floor, raising it to the chin.

The shoulder press became difficult as when it became heavy, it lost its centre of gravity when the water sloshed around. Although to complete this exercise, resting it on my head and pushing it upwards to the full extent of my arms. Slowly dropping it back to the starting point.



Future Recommendations

The first time the home workout was used was at the end of week 4. The buckets were filled with water, this caused a problem as the water was uneven. A future way to fix this is using sand as the weight source. This would be effective as it would not move around in the bucket. Another problem which occurred in this session was the amount of weight used. The bucket was filled halfway making it too light. For my first session for week 5 more sand should be added. I will increase the sand in the bucket by 2.5kg measured by scales. In 2 weeks time i plan on having the bucket 80% filled using progressive overload to sustain the weight.



These text provide explanation and analysis and would need to be counted in the word count.

References

Aspetar.com. 2020. *Aspetar Sports Medicine Journal - Strength Training In Handball*. [online] Available at: <<https://www.aspetar.com/journal/viewarticle.aspx?id=134#.XsTGji8r3BI>> [Accessed 20 May 2020].

Let's Talk Pitching Discussion Forum. 2020. *Why Can't I Throw The Ball Straight?*. [online] Available at: <<https://www.letstalkpitching.com/t/why-cant-i-throw-the-ball-straight/2174>> [Accessed 27 May 2020].

Table 3: From: Analysis of the fitness level in elite handball players (U16 and U18) between 2003 and 2013 (Belka, J, Hulka, K, Safar, M, Weisser, R & Mikova, L, 2016)

McNaughton & Wilson 2020 in 2020, Factors that affect learning [PowerPoint presentation],
Stage 2 PE, date accessed: 27 May

YouTube. 2020. *Denmark V France - Full Handball Final*. [online] Available at: <<https://www.youtube.com/watch?v=7x0xwegHBG8>> [Accessed 28 May 2020].