



Golf Development Matrix

This Matrix forms part of the overall National Development Framework. The National Development Framework seeks to provide a way of describing a detailed pathway for young golfers from their introduction to the game through to perhaps seeking a playing career in golf. This is one of the major objectives of the High Performance Pathway Review in golf.

The Pathway has been identified elsewhere and the purpose of this document is to provide Golf Australia and its State affiliates, coaches, parents and athletes with a guide as to the competencies which might be expected to be achieved if a young athlete is looking to ultimately have a career as a professional golfer.

The development of the matrix was achieved in collaboration with input provided by Tennis Australia, the Golf Australia High Performance Advisory Group, AIS sports science service providers and members of the PGA of Australia. The input from those involved with these groups is greatly appreciated.

Matrix Rationale

The golf matrix has been established to allow a flexible pathway to be suggested that provides a golfer the best opportunity of becoming a highly talented competitor. The Matrix identifies four stages of development through which a golfer will pass. Each stage includes competencies which are built upon in subsequent stages. The information supporting the rationale has a strong scientific basis in physical, mental, emotional and motor skill pedagogy. It is with the future Tour professional in mind that this Matrix has been constructed.

Stages and Age Groups

From childhood until their early twenties, each person will pass through different stages of development. Along each stage there are 'windows' of optimal opportunity to develop skills. For example, somewhere between the age of 9 and 13, there is a period where the body is most responsive to the development of speed in motor patterns. While this age isn't fixed, it is still correctly identified as a period in the person's development. For this reason each stage of the Matrix makes use of the understanding of these 'windows' and has the requisite skill development tasks identified as being most important points of focus.

A point to note is that while each area of development, particularly in the technical area, obeys the principle of first learning the primary movement and then refining that movement, this does not necessarily apply to someone looking to follow the Matrix when starting at a more mature age. By then, cognitive and social skills may be well developed.

It is quite likely that a young athlete may seem to be 'ahead of the game' in some areas and lagging in others. This is fine as it gives valuable information to the learner and coach about learning priorities and capacities.

Historical background

Much work has been done by scholars and scientists in the past twenty five years on athletic development. In 1983 Tudor Bompa wrote a book called *Theory and Methodology of Periodisation*. In it he proposed that training and development should be planned and structured in a balanced way between the differing types of biomotor abilities: speed, strength, endurance, flexibility and co-ordination. The principles of training should also be observed: active participation, multilateral development, specialisation, individualisation, variety and progressive increase in load. These plans could cover a span of one or two Olympiads (eight years) and they should be divided into annual, monthly and weekly periods.

Istvan Balyi built on this knowledge and is possibly considered the key international authority on training and development theory. We are familiar with the terms he used to describe the different periods of development: FUNdamental Stage, Training to Train, Training to Compete and Training to Win.

It is an understanding of the work particularly of Balyi that underpins the reasoning for this matrix content being as it is.

More recently, the term Deliberate Practice has come into the coaching vernacular through the work of Dr Anders Ericsson, a psychologist at Florida State University. His work has allowed us to understand why it takes such a long time to reach international levels of performance in sports, music and other activities. He proposed the 10-year rule and argues that talent is only a small component of ultimate ability.

Unique aspects of Golf

As golf is an extremely complex motor skill, it is important that the golf athlete specialises early. That is not to say that the specialisation is to the exclusion of all other activities, in fact quite the contrary up until the athlete is in mid to late teenage years. What it does mean is that if the 'windows' of motor skill development – peaking at 9-11 years and again at 15-18 years – are missed, then becoming a very good golfer is much more difficult.

The biomotor abilities required by athletes vary from sport to sport and can vary within a sport. For golf, technical skill and mental and emotional skills are unarguably the most important. The emphasis may shift somewhat in training for a rounded development; however these will always be priorities, even when the athlete has been competing on the world stage for an extended period of time.

Stage Group Names

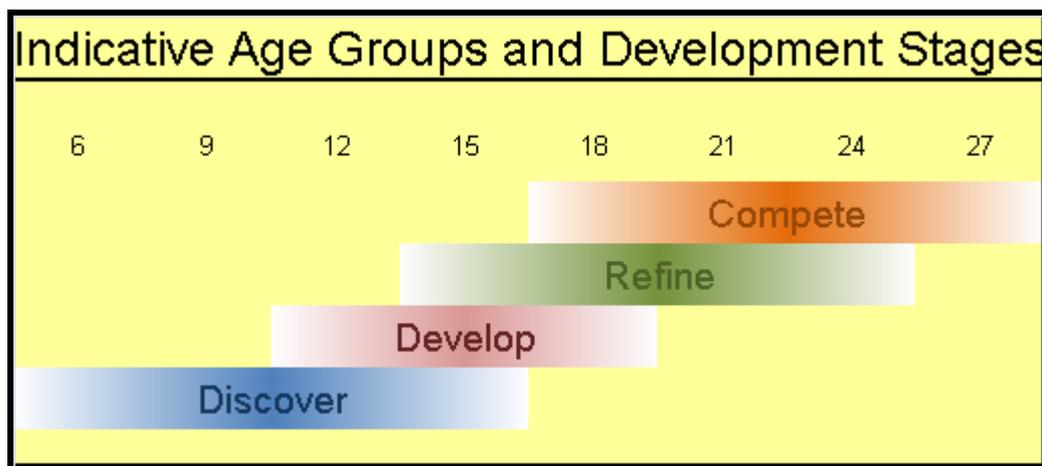
The four stages of the matrix have been named Discover, Develop, Refine and Excel. In practice many athletes may be at a different stage in an area of development than suggested by their age. This actually identifies a training gap, which can be improved upon.

A deliberate attempt was made to provide a unique identifying name rather than use Balyi's or anyone else's as assigning existing names would carry the prejudices associated with those names.

Four Stages of Development

Broadly, the themes for each stage are as follows

Stage	Age group	Peak Playing level	Key identifying themes
Discover	Under 12	Social and virtually no competition	gross motor skill development through a wide variety of athletic endeavours
Develop	13-16	Club and perhaps district level.	specialisation can begin to occur, however continuing with a variety of athletic interests is still important
Refine	17-20	State and National level amateur golf	full individualisation and a greater emphasis on training and competition strategies
Excel	21+	Tour-level professional golf	a Tour-level focus on competition with a continual quest for improvement. Peaking for major tournaments three or four times per year is factored into training and competition



The diagram above shows indicative age groups for each of the development stages. It also seeks to show that these age categories aren't fixed, but may overlap depending on the starting age of the golfer and their rate of development.

Developing these Competencies

While this matrix identifies the competencies to be obtained and also in some cases, a desired skill or knowledge level, it doesn't seek to explain how to achieve them. This is the role of the coaches exercising their understanding and flexibility in knowing how to get the most developmental 'bang for their buck', with their knowledge of motor learning, mental skill development and, most importantly, how to get the most out of the individual athlete in their care.

It is important to identify a way to measure a competency and to track the progress of the athlete. That the athlete is progressing is the most important thing. Rates of progress will vary and this will be considered by the coach on a case-by-case basis.

Stage 1 - Discover

Physical

- Focus: multi-sport
- Agility/Balance/Co-ordination/Speed
- Can perform basic skills: jump, hop, skip, strike, throw, run, side-step, catch
- Strength: some body weight exercises, perhaps including Swiss Ball & Medicine Ball work
- Flexibility: basic stretching as warm-up and recovery
- Co-ordinates and sequences upper & lower / left & right body segments.

Technical

- Understands and has awareness of the concepts of impact, face & path.
- Understands the concepts of grip, stance, posture, ball position and alignment
- Swing: can transfer weight and finish with balance on target-side leg.
- Maintains balance with a steady head.
- Shots: can vary force on chip shots.
- Can contact a ball from on a tee or on the ground
- Putt: understands distance control & alignment
- Understands the concept of striking the ball with a descending blow.

Mental

- Intrinsic motivation
- Understands the benefits of solving problems for positive outcomes.
- Has fun playing and practicing
- Concentration: able to focus on appropriate stimuli
- Imagery: can create images from memory
- Thoughts: displays optimism

Tactical

- Plays and competes on mini courses.
- Can use both woods and irons and see the effect of using different clubs on distance and trajectory
- Understands the use of loft
- Likes to play games with outcomes
- Understands the basic rules of playing the ball as it lies.
- Enjoys fun activities associated with training
- Understands the need for limited competition especially when very young.

Personal/Life Skills/Social

- Shows discipline and understands behaviour and consequences
- Interacts with peers (male, female and adults)
- Able to work co-operatively with others
- Shows respect for other players and officials
- Enjoys coaching and interacts well with coaches.
- Has a variety of non-golf interests
- Education is a priority through life.

Stage 2 - Develop

Physical

- Shows balance and co-ordination with following skills: jump, hop, skip, strike, throw, run, side-step, catch
- Displays rhythm in movement, especially striking movements
- Continues development of speed, agility, balance, co-ordination & function through cross-training and multi-sport activities.
- Develops core control, strength endurance and good posture.
- Continues development of speed, agility, balance, co-ordination & function through cross-training and multi-sport activities.
- Physical screenings: understands their benefits and begins to have assessments.
- Learns and understands sound nutrition/hydration strategies

Technical

- Understands the essentials of ball flight; rules (ball flight laws), essentials (correct set-up, pivot, plane & posture, dynamics) and unlimited possibilities.
- Able to manoeuvre ball flight (shape and trajectory)
- Can control variation in power for both full and short swings/shots.
- Sequences body, arms & club movement to optimise power.
- Has a 'standard' and reliable ball flight.
- Short game: able to hit multiple shots with a variety of clubs.
- Short game: has a high level of competency with basic pitch, chip and bunker shots.
- Putting: capable of reading greens and good control of line and pace.
- Putting: good stroke mechanics

Mental

- Intrinsic motivation
- Seeks solutions to and can adapt to varying challenges
- Displays 100% effort, especially on the course and in competition.
- Can set and work toward both short and long term goals
- Follows principle of improvement cycle: will focus on an element/s for a period of one month, then vary focus.
- Exercises patience while maintaining a competitive edge.
- Displays understanding that positive thinking & self-esteem are conducive to good self-image.
- Displays the use of visualisation in the creation of shots.
- Maintains positive body language, self-talk (reframes if necessary) and breath control
- Makes good decisions in managing risk-taking situations

Tactical

- Understands own game strengths & weaknesses.
- Able to analyse opponents during match play.
- Able to map out and execute a specific game plan.
- Understands and can come up with plan B when not playing at best.
- Uses practice rounds to scout course and prepare a game plan.
- Driving strategies: understands about carry distances, driving zones depending on fairway width, position of hazards, etc.
- Mapping greens: understands how to hit to different parts of green depending on green shape and potential pin positions.
- Develop shot routines and use in all situations to automate under pressure.
- Understands the concept of 'deliberate practice' and practices and plays accordingly.
- Builds a genuine 'game within the game' approach. Sets processes for outcomes and processes for processes - improvement cycle.

Personal/Life Skills/Social

- Able to separate own self-worth from results in competition or ranking.
- Recognises and respects individual differences in other athletes, coaches and officials whether male or female, regardless of age.
- Learn to separate sense of identity of self as a golfer from that of self as a whole person.
- Aware of posture and need to make eye contact with tournament officials and volunteers.
- Enjoys and participates in other sports, social and academic activities outside of golf.
- Able to give a short speech, thanking people and speaking positively about opponents.
- Always displays sportsman-like behaviour regardless of performance.
- Displays sound interpersonal skills and is appreciative of resources given: human, financial, equipment, time, personal, etc.
- Accepts responsibility for own performance and development.
- Shows the ability to organise and execute travel plans.

Stage 3 – Refine

Physical

- Displays excellent static and dynamic balance, rhythm & timing in all striking and movement tasks.
- Follows individualised strength training programme and provides input and feedback on that programme.
- Undertakes golf-specific individualised strength & conditioning, aerobic and flexibility programme (min 3 times/week).
- Able to perform self-administered stretching sessions (pre-round, post-round, recovery and outside of golf) or participate in yoga or Pilates sessions, where appropriate.
- Demonstrates use of nutrition / hydration plan for practice and play

Technical

- Set up: excellent grip, stance & posture.
- Controls body segment movement to regulate and maximise power.
- Can control ball flight from flat and sloping lies.
- Controls combinations of ball trajectory, shape and distance control with all clubs.
- Has a 'standard' ball flight which can be produced reliably with a high degree of precision.
- Good understanding of 'cause & effect' of swing mechanics for shots in long game, short game and putting.
- Short game: able to hit multiple shots with a variety of clubs.
- Short game: has a high level of competency with basic pitch, chip and bunker shots.
- Putting: capable of reading greens and good control of line and pace.
- Putting: good stroke mechanics

Mental

- Intrinsically motivated and highly self-disciplined
- Able to self-evaluate and actively seeks solutions to problems and accepts responsibility for doing so.
- Displays awareness of internal state and external environment.
- Demonstrates responsibility for own actions and results.
- Displays perseverance with game plan, especially on the course and in competition regardless of performance.
- Able to independently set and work towards SMARTER (outcome, performance & process) goals
- Formulates golf specific and life goals.
- Uses refined visualisation techniques for learning, self-confidence, tactical development, relaxation, etc.
- Can switch between broad/narrow & internal/external focus of attention appropriately.
- Can switch focus on and off during play to conserve and maximise mental energy.
- Displays optimism and demonstrates positive self-esteem and self-image.
- Uses posture, breathing, self-talk and eye control behaviours to enhance positive mental and emotional state.
- Utilises mental routines on and off the course to optimise performance state and coping mechanisms.
- Manages risk taking behaviour well.
- Capable of maintaining intensity of training without supervision.
- Able to manage own time.
- Emotionally resilient
- Embraces competition as a development opportunity.
- Demonstrates use of a mind management programme.

Stage 3 – Refine

Tactical

- Able to map out multiple game plans for courses depending on weather conditions and own form.
- Understands own capabilities, strengths & weaknesses.
- Keeps round statistics and able to accurately analyse own game based on statistical data.
- Keeps notes on practice; coaching, swing thoughts, drills, competitive drill scores, etc.
- Understands principles of equipment fitting and able to choose set make-up for specific course conditions.
- Selects appropriate times for attacking or defensive play.
- Can build practice plan around game strengths & weaknesses.
- Understands the concept of 'deliberate practice' and practices accordingly.
- Periodises year with 4-6 peaks per year.
- Understands how to transfer performance from range to course.
- Able to complete Club Level rules exam.
- Makes the right decision from a developed range of options.

Personal/Life Skills/Social

- Develops a sense of 'right'.
- Makes and reviews major decisions regarding career and education.
- Increasingly independent and responsible.
- Proficient at giving post-match speeches and addressing other groups of people.
- Able to speak to and look at interviewers. Capable of developing rapport with reporters and reveal personality during interviews through media training.
- Demonstrates effective time-management strategies.
- Displays competent computer/internet use for leisure and education as well as to assist in skill analysis, maintain diary and perform video-based analysis, statistical data recording and analysis.
- Capable of own tournament logistical planning and budgeting.
- Able to deal with social problems, e.g. peer pressure, drugs and alcohol, etc.
- Understands the role of a strong support network.
- Achieves appropriate balance between study, work, sport and social activities.
- Self-sufficient in regard to shopping and cooking skills.

Stage 4 – Excel

Physical

- Understands diet/hydration requirements when travelling, playing and practising.
- Maintains links with other movement-based activities / cross training.
- Undertakes physical screenings as required.
- Follows individualised strength training programme and provides input and feedback on that programme.
- Understands and applies individual warm up and recovery sessions.
- Understands physical maintenance when competing and travelling.

Technical

- All skills able to be performed with precision under pressure.
- Able to quickly adapt to all types of course and weather conditions.
- Controls ball speed, spin rate & spin type to maximise control of ball flight.
- Short game: controls spin rate and trajectory to produce variation in shots around the green.
- Exhibits technical consistency as measured with biomechanical systems.
- Club movement through impact excellent as measured objectively (biomechanical system, electronic club movement tracking device, etc.)

Mental

- Undertakes individualised and effective psychological enhancement programme.
- Intrinsically motivated.
- Uses posture, breathing, self-talk and eye control behaviours to enhance positive mental and emotional state.
- Proficient at dealing with pressure associated with international competition and travel.
- Confident with robust self-efficacy, self-image and self-concept.
- Able to formulate plans for practice and competition based on current form and results.
- Strongly self-disciplined.
- Self-aware and continuously seeks to improve.
- Refined visualisation skills
- Embraces competition as a continual development opportunity.
- Emotionally resilient

Tactical

- Shows discipline in staying with game plan.
- Optimises own game strategies through understanding of own strengths and weaknesses.
- Full attention on deliberate practice.
- Uses practice rounds to effectively formulate game plans.
- Practice primarily geared to competition requirements but with balance on continual development.

Personal/Life Skills/Social

- Able to balance career, family & social relationships, continued education, ...
- Displays continued respect for and deals appropriately with volunteers, officials, coaches and other players.
- Increasingly proficient at dealing with media.
- Possesses good morals and sportsmanship. Ethically strong person.
- Appreciative of the resources required to achieve optimal performance as well as the benefits received from golf. Willing to give back to the development of young players.
- Deals with support network with honesty and integrity.
- Capable of own tournament logistical planning for both domestic and international competition.
- Maintain interests outside of golf; hobbies, pastimes, social contact with non-golfers.
- Respects cultural diversity and individual differences.

Curriculum, Planning and the Golf Matrix

On the next pages I would like to offer a way to show how the elements of the Matrix can be used by coaches to create drills through which planned improvement can occur.

Using the example of a technical competency from the Refine stage, i.e. "Can control ball flight from flat and sloping lies", a way of assessing this competency is shown, along with a suggested proficiency standard and a means of testing.

	Physical	Technical	Mental	Tactical
Refine	Displays excellent balance, rhythm & timing of strikes and movement tasks	Set up consistent grip stance & posture	Intrinsically motivated and highly self-directed	Ability to map out a long game plan for courses depending on weather, course and own strengths
17-20 years	Shows fully integrated and near optimal systemic balance	Control a body segment and make minor regulate and modify	Clearly aware of own role in problem and accepts responsibility for doing so	Understands own capabilities, strengths & weaknesses
	Understands individualised strength & conditioning, flexibility and flexibility programme (min 3 times/week)	Can control ball flight from flat and sloping lies	Plays 100% effort, especially on the course and in certain circumstances of performance	Keeps records statistics, accurate analysis own game based on statistics when
	Ability to perform self or monitored coaching sees one programme, consistent and a wide of golf, or conditions in page or a data analysis where appropriate	Control a central area of ball trajectory and make minor adjustments	Goal to independently set and work towards SMARTER outcome, performance & process goals	Focuses on on practice, coaching, swing thoughts, drills, competitive drill scores, etc
	Ability to perform all stages and multi-joint tasks with appropriate weights and speed from	Has a intended ball flight which can be perceived reliably with a high degree of precision	Formulate goal based on all the goals	Understands the plus of equipment fitting and able to choose all necessary for assets to course conditions
	Ability to perform tasks with machines, free weights, the ability to work on it, etc	Good understanding of using mechanics for strike in long game, short game and putting	Uses refined & varied on task regime for learning and confidence, tactical development, etc	Seeks appropriate fitness for selecting or performing play
	For several evaluated strength training programme provides input and feedback on that programme	Shot game able to make a shot with a variety of clubs	Can an ability to maintain focus & maintain mental focus of attention appropriately	Performs in a weather condition
Maintains sound core, rubber mat, lower back, arms, musculature	Shot game that a high level of competency with basic club ship and bunker shots	Can an ability to control and manage mental energy	Of course and readily available from range of shot game options	
Understands the form of various courses, making course fitting at least 3 times each week for a minimum of 20-30 minutes	Putting capable of reading greens and good control of line and pace	Displays confidence and a diverse positive self-belief and self-image	Prepares detailed notes for tournament courses during practice rounds	
	Putting: good stroke used	Use posture, breathing, as well as eye control techniques to enhance overall mental and emotional state		
		Utilises mental resources and will the course to optimise performance state and coping mechanisms		
		Manages taking decisions on the course; adaptable and able to think, adjust		
		Capable of maintaining intensity of training without supervision		
		Able to manage own time		
		Emotionally resilient		
		Good control of a course challenge		

The circled area above is expanded in the competency table below

AIS Standard Competency List – Technical and Technical Performance

Category	Competency/Skill	Test	Proficiency – AIS	Proficiency – SIS/SAS	Notes
17-20ys – Technical	Set up consistent grip, stance and posture	Visual and video reference. Can also use 3D parameters	Satisfaction of both AIS and primary coach	Satisfaction of both SIS/SAS and primary coach	<ul style="list-style-type: none"> Verify AIS/SIS/SAS and primary coaches' themes and differences. While the player may not fulfil the ideal model of either coach, they may still have something which is ideal for them.
17-20ys – Technical	Controls body segment movement to regulate and increase power	3D checks. Where this is not possible, then visual and video reference	Within acceptable standards as determined by AIS coach, primary coach and biomechanist	Within acceptable standards as determined by SIS/SAS coach, primary coach and biomechanist	<p>Discussion with primary coach to determine their level of understanding of these principles.</p> <p>As we are dealing with biomechanical correctness, the parameters should be affected by a coach's personal preferences.</p>
17-20ys – Technical Performance	Can control ball flight from flat and sloping lies	Shot shaping from a variety of lies to a specific target area. Tolerances can also be monitored using Trackman	<p>Flat lie success >70%</p> <p>Sloping lie success >60%</p>	<p>Flat lie success >85%</p> <p>Sloping lie success >55%</p>	<p>There will need to be varying target areas for different clubs.</p> <ol style="list-style-type: none"> Short iron (5 iron) – 5 shots to 5 metre wide target (with secondary target area of 2.5m on either side) at 125m. Mid iron (6 iron) – 5 shots to 10 metre wide target (with secondary target area of 5m on either side) at 160m. Long iron (5 iron) – 5 shots to 15 metre wide target (with secondary target area of 7.5m on either side) at 190m. Fairway wood – 5 shots to 20 metre wide target (with secondary target area of 10m on either side) at 210m. Driver – 5 shots to 20 metre wide target (with secondary target area of 10m on either side) at 240m.
17-20ys – Technical Performance	Controls combination of ball trajectory and shape with all clubs	Shot control using targets of Trackman	<p>High and low shots need to differ from standard by 15%.</p> <p>Success >75%</p>	<p>High and low shots need to differ from standard</p> <p>Success >65%</p>	<p>There will need to be varying target areas for different clubs.</p> <ol style="list-style-type: none"> Short iron (5 iron) – 5 shots to 5 metre wide target (with secondary target area of 2.5m on either side) at 125m. Mid iron (6 iron) – 5 shots to 10 metre wide target (with secondary target area of 5m on either side) at 160m. Long iron (5 iron) – 5 shots to 15 metre wide target (with secondary target area of 7.5m on either side) at 190m. Fairway wood – 5 shots to 20 metre wide target (with secondary target area of 10m on either side) at 210m. Driver – 5 shots to 20 metre wide target (with secondary target area of 10m on either side) at 240m. <p>Shots can be started from the secondary target and finish inside the primary target area</p>

COMPETENCY DEVELOPMENT REFINE STAGE

Competency

Technical_–Ability to manoeuvre ball flight; shape and trajectory.

Skill

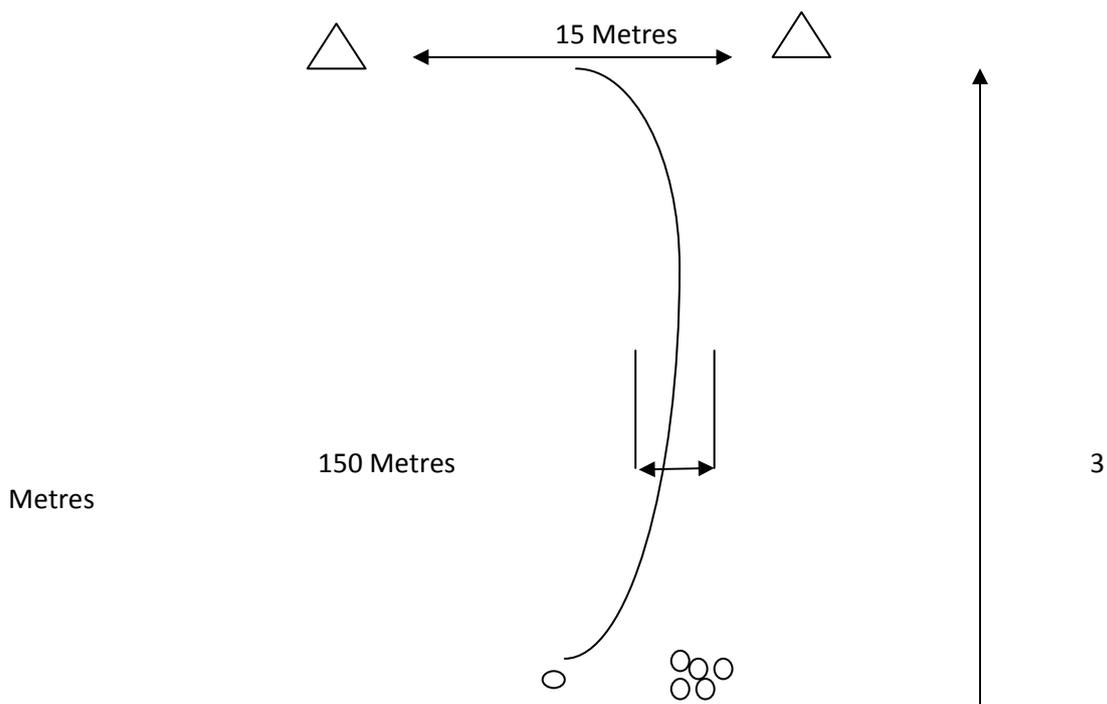
The ability of the player to be able to start the ball on the intended take off line, draw the ball and finish in the target area.

Principle delivery points and student understandings

- ✓ Grip effect on club face angle
- ✓ Club face angle and swing path
- ✓ Alignment and ball position
- ✓

Test Set-Up

- ✓ Target set-up at 150m
- ✓ Target size 15 metres
- ✓ Take off zone 3 metres wide – 10 metres in front of player
- ✓ Players hit 10 balls and record how many balls start through the through the take off zone and finish in the target area.



Skill Levels

>70%	National Level/Elite Amateur Player
60%- 70%	State level Representative Player
30%-50%	Regional level Player – RAS Player
0% -20%	Club Level Player