

THE GAME-BASED CRICKET BOWLING SKILL EXERCISE MODEL FOR CHILDREN AGES 12-15 YEARS

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Abstract The aim of this study is to produce a game-based cricket bowling skill exercise model by testing the effectiveness of improving bowling skills in children aged 12-15 years. The method used in this study is research and development from Borg and Gall by using 10 stages. The research subjects for group trials and effectiveness are (1) small group trials of 16 children at SD Negeri 15 Pagi Pondok Bambu, (2) large group trials of 25 children at SMP Negeri 2 Kebakkramat, and (3) tests effectiveness of 40 children at Karanganyar Cricket Club. The data collection technique used is the result of expert validation and effectiveness test through an assessment instrument with t-test statistical data analysis. The validity test used by expert justification test, presented 3 experts consisting of: 1 games lecturer, 1 cricket lecturer, and 1 national cricket coach. The final model is produced 15 bowling cricket skill exercise models. The effectiveness test model uses the skills results of cricket bowling. The improvement of bowling cricket skills results showed a significance of $t_{count}=14,512$, $db=39$ and $p\text{-value}=0.00<0.05$, which means that there is a significant difference between before and after being given the training model treatment, the pre-test average was 2.23 smaller than the post-test average is 4.47. It can be concluded that the game-based cricket bowling skill training model developed is quite effective for improving bowling skills in children aged 12-15 years.

Keywords: Exercise Model; Cricket; Bowling; Games; 12-15 years.

INTRODUCTION

Cricket is a sport that demands physical, technical, tactical, and mental abilities and requires cooperation to win a match. "Cricket is an exciting game that encourages leadership, friendship and teamwork, which brings together people from different nationalities, cultures and religions, especially when played within the Spirit of Cricket" (Marylebone Cricket Club, 2017). Cricket is a game that is not only playing for fun play according to the existing rules, but still has to uphold the spirit of cricket. The main spirit of cricket is

mutual respect for each other, captain, teammates, opponents and umpires. "The important essence that can be taken from this cricket sport is to direct positive mental development and prioritize: honesty, fairness, respect for others, accepting referee decisions, being polite and able to control oneself." (Cricket Indonesia, 2007).

Cricket is a game played between two teams of 11 players each, in which two teams take turns scoring by hitting and keeping score by bowling and fielding. According to Tudor Bompa in Johansyah Lubis, "athletes have very



intense physical activity because they are required to show optimal performance in every match.” (Lubis, Sukur, Haqiyah, et al., 2021). In Cricket games athletes have very intense physical activity because they are required to show optimal performance in every match of cricket. Cricket has 3 important skills are batting, fielding, and bowling. Batting or hitting the ball aims to collect points and score as high as possible by hitting the ball and holding the ball then running to swap places with other batting pairs. Fielding or guarding the ball aims to try to hold and keep the ball that is hit and returned as soon as possible by throwing it to the bowler's side or the wicket keeper's side, thus limiting the number of scores the opposing team wants to collect. Bowling or releasing the ball from above with elbows and straight arm positions aimed at releasing the ball as well as possible so that the bat is difficult to hit the ball.

Based on field observations, researchers saw that when practicing cricket for athletes aged 12-15 years who are usually said to be junior level athletes, it was seen that in training on the field or in net sessions there was still very little bowling technique. This can be seen at the start of the prefix,

execution, and suffix movements, the lack of coordination of the correct set of movement skills. Having the wrong movement, not in a good and correct unit of movement will affect the outcome of the bowling. Mastery of good and correct bowling skills requires a continuous, measurable and directed training process made by coaches and given to athletes. Exercise is one of the important factors in an effort to hone skills to be maximal, therefore training must be carried out intensively, namely continuous training that pays attention to the correct training principles.

“The desire to be able to demonstrate the best performance at the desired time, is one of the rationale that underlies the terminology of planning and organizing training stages.” (Matakupan et al., 2021). A well-programmed exercise has clear objectives, material according to the characteristics of the sport, sufficient time available, clear time division, and training strategies according to the material provided. Exercises that are efficient, effective and safe and fun should be done, so that there is no saturation during exercise. "Exercise that is carried out inappropriately will affect the development of athletes both

physiologically and psychologically." (Hasibuan et al., 2009). The variety of exercises provided by the coach should create interest in the athlete, so that the athlete does not feel bored with the training program. According to X Yu in Johansyah Lubis, "In addition to feeling bored, fatigue due to sports activities will give up the athlete's physical and psychology, which causes a decrease in the athlete's functional ability and even causes physical injury." (Lubis, Sukur, & Fitrianto, 2021). These variations are designed to improve bowling skills, create a sense of pleasure so that the material provided does not feel bored and happy so that children can easily and understand what has been explained and can be realized. "The training model is a long-term process length continuously and changes continuously because the training model will develop associated with the athlete." (Lubis & Fitrianto, 2018).

Researchers are interested and focused on providing bowling technique exercise with a game approach to players aged 12-15 years. Researchers will create a pleasant and comfortable atmosphere but remain serious in achieving the goals of the training program so that athletes can understand

and absorb what has been given according to an approach to the child's developmental stage. Exercises that are comfortable and fun but do not forget the concept of the goal of improving the bowling skills being trained, one of which is obtained with a game-based approach. "Play is a term so often used so loosely that its main meaning may be lost. The essence of the main meaning of play is that the activities carried out provide pleasure without considering the end result" (Hurlock, 2005).

Games are a form of learning tool in practice. "Games have positive effects on child development in multiple dimensions cognitively, affectively, socially, and physically" (Lestari & Ratnaningsih, 2016). The process of training in accordance with the conditions of the athlete's development. Game-based training is also a tool to train athletes to get used to competing. "Games are a way of learning for children and in such a process children develop and socialize." (Ferkel et al., 2017). Children at this age are very happy with competition, but must also be instilled in how to compete well as in the Spirit of Cricket, like how to respect friends, opponents and impies who lead the match. Good competition in the

future will make athletes have good psychology and be able to control it. "The game still occupies the first position of children's interest, because the game itself can be done anytime and anywhere with the number of actors who do not have to be determined as well, and the game itself is fun so that it creates a lot of interest in children" (Siregar et al., 2018).

In long term athlete development "Children aged 12-15 years in the training program are more directed at the "Train to Train" Stage. Children aged 12-15 years in sports this is known as "training the engine of machines" (Nurjaya, 2009). The concept of long-term athlete development based on chronological age and child development is the basis for the creation of maximum and long-term sports achievements. The period of childhood is a period of great potential, in order to enable the development of the highest possible achievement. "Guidance and development of early childhood training must be carried out in a planned, regular, systematic and deliberate manner." (Mardanto & Rumini, 2014).

This age is optimizing the athlete's fitness as preparation for training in a specific position on the

athlete's talent in the sport he is involved in. "Towards adolescence, increasingly complex movements can be mastered with the ability to utilize movement skills according to their needs." (Hidayat, 2017). Therefore, it is necessary to identify the character of children aged 12-15 years who prefer to do a physical activity that is a fun game. Using this method aims to create a sense of pleasure when carrying out these activities, in implementing the programs provided are not boring and feel happy so that they can be easily understood and carried out. By playing situations that arise will occur spontaneously.

"The play approach is an approach that emphasizes more on the situation to solve the problems that arise." (Widiastuti & Pratiwi, 2017). Playing puts the main emphasis on social interaction and having fun to help enjoy learning new skills and encourage interaction between one another during the practice process. That the purpose of the exercise can be achieved properly and correctly so that a process of change occurs for the better than before. "So that in the child's stage the development of fundamentals should be directed at fun based or game-based activities" (Widiastuti & Setyantoko, 2011)

Cricket Bowling Skill

The player who throws the ball with the elbow position not bent and the straight arm (bowler) of the guarding team releases the ball to the player who hits the ball (batsman) of the batting team who must hit him with the bat to score, while other members of the ball guarding team (fielders) to maintain the score. The duration of the cricket game is not determined by time but uses over or displacement. Over is defined as the number of 6 legal balls thrown by the bowler against the batsman standing from opposite sides, then after finished one over will switch to the other side. "It is a field-based sport between 2 teams of 11 players, and the players are needed to field and bat throughout the game." (Ahamed et al., 2014). Cricket is a contest or fight between bowlers or pitchers who are members of the guard team whose job is to throw the ball with the elbows not bent and arms straight to hold the opponent's score.

Throwing is a movement that directs an object that is held by swinging the hand in a certain direction (Suparman, 2012). In doing the bowling skill movement the target is to throw the ball straight ahead, towards the bat's goal so that the bat is out and does not get a

score. "Throwing is a complex manipulative ability that uses one or two hands to throw an object away from the body into the air, the throw can be done under the hand, above the head, above the arm, or on the side." (Widarmi, 2008). "Throwing is a complex manipulative skill in which one or two hands are used to throw an object away from the body into a certain space." (Hadziq & Musadad, 2005). In the bowling skill movement, the ball is thrown using one hand from above the head with the elbow not bent and the arm straight, while the other hand serves as a guide and balance guard when the movement is carried out.

Throwing motion in cricket is very influential on victory. Movements performed when performing bowling skill movements are using the strength of the hands and arms which require coordination of several elements of movement by throwing the ball, for example arm movements with fingers that must release the ball that is held at the right time, the position of the falling ball that is thrown will affect the batsman to strike. Movement skills in sports require coordination of several parts of the body. This is due to the fact that the movement of the skill is not

possible only by one part of the body. "Skill is one type of activity which in carrying it out requires coordination of several body parts or body parts as a whole." (Sugiyanto, 2005).

"Movement skills are movements that follow certain patterns or forms that require coordination and control of part or all of the body that can be done through the learning process." (Widiastuti, 2011). Movement skills are sports skills in which there are basic sports movements that are carried out with a unified whole and precise technique that is carried out effectively and efficiently to produce accurate results.

Bowling skill is one of the skills that must be mastered by a cricket player. Bowling skill is one of the components of the basic technique of cricket which is used to release the ball as well as possible so that it is difficult for the hitter to hit the ball and hold or suppress the opponent's points. In his book, *Art and Science of Cricket*, Bob Woolmer says: "Encourage children to bat and bowl, and keep a sharp eye out for those who seem to especially enjoy bowling. Remember, batters are the 24-carat gold in your team, but a truly gifted bowler will be the jewel in the

crown." (Woolmers, 2008). So, bowling skills are one of the important things that affect the game of cricket. Mastery of basic techniques is also to be able to provide variations in the game and apply tactics or strategies in matches. So that according to the target desired by players, teams and coaches to be able to get as many points as possible and win the game. "If the bowler is able to do bowling well, it will pressure the opponent because the opponent's score is not optimal. To get good bowling results, good technique mastery and mental and physical readiness are required." (Lubis, Nayyiroh, et al., 2021)

Bowling is the movement of throwing a ball towards a stump with the aim of getting a wicket by means of a person's ability to throw and concentrate in order to be able to drop the ball with a line and length on each ball. The goal of the bowling side is to prevent the batsman from getting a score that goes on. The basic technique of good throwing is to build from an efficient and safe action, the ability to give the ball in a consistent line and a perpendicular line when throwing, physical fitness affects the ability to concentrate on each throwing the ball towards the bat.

The person who throws the ball or bowls is called a bowler. How to do bowling with the body sideways towards the batsman and the hands rotated from the bottom up with the elbows, with the feet not going past the popping crease (the boundary line for hitting and throwing) and the hands straight and then releasing the ball by bouncing on the pitch right in front of the batsman (batter), with the target hit the stump with the ball.

The purpose of bouncing the ball across the pitch is to confuse the batsman so the batsman cannot hit the ball. The main goal of each pitcher is to consistently take the wickets with the smallest possible number of scores. To do this, he must develop good and safe technique, learn to concentrate on the line and the fall of each ball, and be able to think and throw according to a good strategy for the team to be victorious.

It is said to be valid throwing, namely releasing the ball with the elbow not bent and the arm straight and the ball is released towards the bat. The thrower releases 6 valid balls, it is called 1 over. According to Ferdinands in the Marylebone Cricket Club "Bowling in cricket involves the circumduction of a straight arm about the glenohumeral

joint to propel a 155.9–163.0g leather ball at a batter, who stands some distance away (approximately 17–18m) ready to strike the ball with a bat" (Ferdinands & Kersting, 2007). When you are doing bowling, the position of the arm must be straight and should not be bent.

The important things that are the main keys to bowling skills are:

1. Concentration, the thrower must focus on the direction of the ball when making the move.

2. Alignment, the thrower must maintain the position of the arms with the body in a straight line when doing run-ups. The thrower must be in a hip and shoulder position at the same time as landing on the back foot. Keep your balance, keep your head high and stable, with your eyes level and towards the target.

3. Power, the acceleration is done gradually during run-up. The jump made at the time of throwing. Pull your forearm firmly below the target line and keep your elbows close to your body. Rotate arms and shoulders vertically towards the target.

Bowling skill is the process of a series of movements starting from how to hold the ball, then the process of the thrower starts running or walking, doing

the throwing process until the final process of the ball reaching the bat is a series of movements. The most basic way of holding a cricket ball is:

1. The ball is held in a vertical position at the seam of the ball, the first two fingers are on either side of the seam above the ball.

2. Assisted by the position of the thumb in the seam of the bottom of the ball.

3. Keep the grip relaxed and light with the ball resting on your fingers, not your palms.

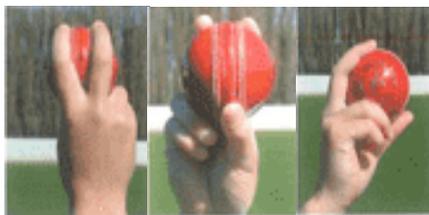


Figure 1.

How to hold a cricket ball seen from behind, from the front and from the side. Source: Alec Astle, *Coaching a Cricket Team*, (Christchurch, New Zealand: Spectrum Print) 2004, p. 147

After how to hold the ball, the next thing to know is how to do a good and correct bowling motion, the steps are as follows:

1. Run-Up

Start the step with a small running motion to gain momentum, when running, swing your arms close to your body, keep your head steady and keep your eyes on the target.

2. Bound

Sideways position, feet shoulder-width apart, hind legs parallel to the stump, front legs pointing forward towards the bat, head upright position, eyes parallel to and pointing at the bat, the hand holding the ball is near the chest under the shoulder.

3. Coil

Spread your arms, the position of the front arm that is not holding the ball is reached and raised as high as possible, the eyes are parallel and the chin is in contact with the front shoulder, the arm holding the ball is pushed past the back of the hip.

4. Release

The arm is then rotated, the elbow of the front arm is pulled up to the front hip, the arm holding the ball is swung up and must touch the ear, making a movement like a wheel that is rotated, then the ball is released.

5. Follow Through

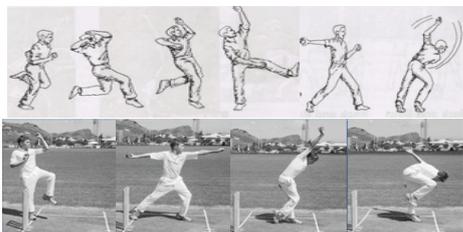
The movement is continued with the position of the front arm moving down past the front hip, followed by the arm that has thrown the ball past the body to the front of the pelvis, the hip position is rotated, the eye position

remains parallel and focused on the target and hitter.

Figure 2.

The bowling motion.

Source: Ian Pont, Coaching Youth



Cricket, (USA: Human Kinetics, Inc.) 2010, p. 97

One of the tasks of a bowler is to turn off the bat by dropping as many bats as possible. This task will become easier if the bowler has control over the line and length of the ball being thrown, this will make the batsman's task more difficult to score. Line is the direction of the ball that is straight with the batting stump, while Length is the area where the ball falls and bounces. According to Amir Bhat, "Bowling in cricket has a vital role. If the bowler is able to bowl in the right line and length of the pitch, more and more chance of deception for the batsman is obvious."(Bhat, 2017). Bowling in cricket has a vital role. If the player can bowl in the right line and throw length, there is more chance to confuse the hitter in making decisions in hitting.

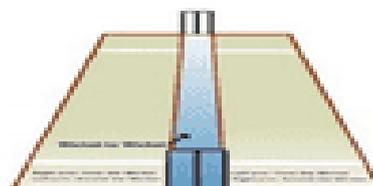
1. Line or ball direction line

Parallel lines are drawn straight between one goal and another. When

throwing a bowler, if the direction of the ball is consistently thrown in the correct line position, it will be difficult for the bat to hit the ball and score.

Figure 3.

Line or the direction of the ball.



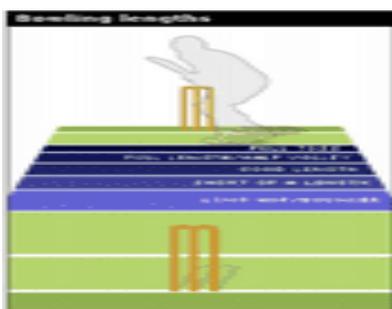
Source: Priya Singh, Missouri Youth Cricket Association Bowling Skill, (Missouri, USA: MYCA) 2014, p. 97

2. Length or the area where the ball falls and bounces

The length of the fall of the ball will determine the type of stroke from the bat, stroke with the foot forward or backward. There are 5 types of areas that the thrower can aim for, namely; 1) Long Hop/Bouncer, 2) Short of Length, 3) Good Length, 4) Full of Length/Half Volley, 5) Full Toss. The length of the fall of the ball can also depend on the type of thrower, for a fast bowler to take advantage of the speed of the throw and the bounce of the ball while for a spin bowler to throw the ball at a good length position and trick the hitter in the position of the ball in the air and the ball falls that rotates.

Ideally the good length position is in a position 2-3 meters in front of the

bat. This position makes it difficult for the hitter to decide what type of stroke he will use. There are several types of pitch used during matches, namely concrete pitches made of cement and covered with synthetic grass, pitches made of compacted soil. “The cricket pitch is divided in various zones or spots where a bowler can bowl to get



maximum benefit.”(Bhat, 2017).

Figure 4.

Length or the area where the ball falls and bounces.

Source: Ian Pont, Coaching Youth Cricket, (USA: Human Kinetics, Inc.) 2010, p. 97

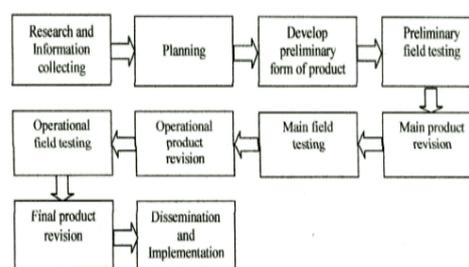
So, to become a smart bowler we must know the basic important things that will certainly support future achievements. Bowling movements that are good and correct when done will certainly also minimize injuries that will occur. The strategy of placing the ball line and the direction of the ball's falling bounce is also one of the game strategies that should be learned by a bowler.

Skill comes from the word skilled which means capable in

completing tasks, capable and agile. “Skills are activities related to the nerves and muscles (neuromuscular) which are usually seen in physical activities such as writing, typing, sports, and so on. Even though they are motor in nature, these skills require careful coordination of movements and high awareness” (Rubiana, 2017). Movement skills in sports require coordination of several parts of the body. Skills in sports are a process of movement and proof in the best possible practice to complete tasks with certainty in sports (Ridwan, 2016).

METHOD

The research approach to developing a game-based cricket bowling skill exercise model for children aged 12-15 years use the Research and Development model from



Borg and Gall which consists of 10 steps:

Figure 5.

Instructional Design R and D (Borg & Gall)

Source: Walter R. Borg and Meredith D. Gall, Educational Research: An Introduction, 7th Edition. (New York: Longman Inc., 2007)

Research and development in this exercise uses the Research & Development (R & D) model of Borg and Gall which consists of ten steps. 1) Research and information collecting, 2) Planning, 3) Develop premier form of product, 4) Preliminary field testing, 5) Main product revision, 6) Main field testing, 7) Operational product revision, 8) Operational field testing, 9) Final product revision, and 10) Dissemination and implementation.

The data analysis used is qualitative and quantitative. Needs analysis, model making, expert validation, testing in small groups, followed by large groups in the form of qualitative data. Then test the effectiveness in the form of quantitative data, namely the "one group pretest-posttest design". Effectiveness test by conducting Pre-Test and Post-Test on 40 athletes.

Table 1
 Research Design in Model Effectiveness Test.

Source: Sumadi Suryabrata, Research Methods. Jakarta: PT. Raja Grafindo Persada, 2014. H. 101.

Subjek	Pre-Test	Perlakuan	Pre-Test
R ₁	O ₁	P	O ₂

RESULT AND DISCUSSION

The results of the development of the bowling cricket exercise model based on games for children aged 12-15 years have the aim of producing an effective bowling skill, presented using data from the needs analysis through interviews by cricket coach and findings in the field. The next step is the model planning stage. The model planning phase is carried out before the product trial is carried out. Planning and drafting a model are a stage that is carried out in order to provide clear guidance in conducting research and development. In the initial step, the researcher compiled a product of the bowling cricket exercise model based on games for children aged 12-15 years, the researcher made a structured product design of 17 exercise model items.

The next step is to conduct expert testing with the aim of obtaining the feasibility or validity of the model based on assessment and advice from experts. The researcher presented 3 experts in the assessment of the feasibility product, they are two lecturers of the Faculty of Sport Sciences at the State University of Jakarta, and one national cricket coach of Indonesia. The research subjects in this study were children aged 12-15 years in cricket extracurricular activities

in DKI Jakarta Province and Central Java Province were collected using the interview method with coach and advice from experts. Subject for group trials and effectiveness are (1) small group trials of 16 children at SD Negeri 15 Pagi Pondok Bambu, (2) large group trials of 25 children at SMP Negeri 2 Kebakkramat, and (3) tests effectiveness of 40 children at Karanganyar Cricket Club. The effectiveness test model uses the skills result of cricket bowling.

Small Group Trial

After the product design and evaluated by expert in the next step revision the model will be tested in a small group trial with 16 research subjects. Based on the results of evaluations and small group trials conducted by researchers it can be said that 15 model items are feasible to use, and 2 item is a fall model because in the process of implementing the standing position which is dangerous for the safety of the athlete, and the unavailability of a wall on the field so that when bowling to the target the ball will come out of the game area. The game-based cricket bowling skill exercise model for children aged 12-15 years has been improved based on the evaluation results at the small group trial

stage, then continued with the large group trial phase.

Large Group Trial

Based on the results of the small group trials 15 models were obtained that were feasible as well as some refinement of training items according to the advice and input of experts and coaches. At this stage researchers used the subject of research as many as 25 athletes ages 12-15 years. The results of a large group trial conducted on the game-based bowling cricket skill exercise model for children aged 12-15 years, based on the results of expert evaluations and input from the trainers, all models are feasible to use.

Tests effectiveness by Bowling Skill Result

The research subjects used by researchers to test the effectiveness of the game-based bowling cricket exercise model for children aged 12-15 years as many as 40 athletes. The pre-test was carried out before the implementation of 15 items of the game-based bowling cricket exercise model. The test was conducted to determine the children's initial abilities and final abilities after being given treatment in 16 meetings.

Data from the test results on the effectiveness of the model are shown in the following table:

Paired Samples Test								
Pair	Paired Differences	Mean	Std. Deviation	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
1	PRETES_HASIL - POST_HASIL	2.251	.98155	2.564	1.936	14.512	39	.000

Table 2.

Results of Paired Sample Statistical Pre-Test and Post-Test on Bowling Skills Results

Paired Samples Statistics

Pair	Mean	N	Std. Deviation	Std. Error Mean
1 PRETES_HASIL	2.23	40	1.143	.181
POST_HASIL	4.47	40	1.062	.168

The table above shows the results of the experimental group pre-test and post-test of athlete when performing the bowling skill test. The average test results of 40 athletes aged 6-12 years before being treated were 2.23. After being given a 15 item of the game-based bowling cricket exercise model, the post-test data revealed that the child's bowling skill increased marked by an increase in the average record yield of 4.47. Based on the description above

there are differences in the results of the bowling skill test between the pre-test and post-test that the training model developed is effective and can increase the bowling skill of athlete.

Table 3. Results of Paired Sample Statistics (Pre-Test) and (Post-Test) on Bowling Skills Results

In the mean difference test with SPSS, the mean = 2.250 shows the difference from the pre-test and post-test results, the results of t-count = 14.512, df = 39 and p-value = 0.00 < 0.05, which means there are significant differences between before and after the treatment of the game-based bowling cricket exercise model for children ages 12-15 years. "With the advent of the design of the preceding test of the bowling accuracy in cricket, coaches & players would find themselves in a much better place to improve & preserve their confidence level during the bowling skill and moreover the selection process will become more objective in cricket."(Murtaza et al., 2014).

CONCLUSION

Based on these results it can be concluded the game-based bowling cricket exercise model for children ages 12-15 years is effective and can increase the bowling skill. The developed

training model has significant effectiveness.

The game-based bowling cricket exercise model for model for children ages 12-15 years can developed and applied in practice bowling skills in cricket and athletes can practice bowling skill exercise model automatically effective and efficient.

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