

Design, Validation, And Reliability Of An Observation Instrument Technique And Tactic In Handball

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Abstract- The aims of this study were to design, validate, and test the reliability of a mixed observational instrument of field formats and category systems to analyze technical and tactical actions in the offense and defense in handball. The study was a research and development (R&D) with mixed method qualitative and quantitative, the sample was 21 international students in Indonesia. The instrument design, validation, and reliability calculation were done in four stages: (a) review of the literature, (b) design the first draft of the instrument, (c) experts' qualitative and quantitative review of the instrument, and (d) observer training test. The content validity was established by 10 experts in which about: (a) comprehension of the criteria, categorical cores, degree of openness, and definitions, (b) pertinence of categorical cores and degree of openness, and (c) other categorical or degree in the observation instrument. **The result** showed that the lowest Aiken's V index was 0.86 while the lowest Kappa index for the inter-reliability was 0.86 (defensive pressing lines) and above 0.86 for the intra-reliability (ball height) for the categorical core. The inter- and intra-observer reliability presented good levels of agreement. The coefficients of analysis showed a high level of accuracy, validity and reliability of the instrument. **Conclusion** showed that the instrument allows obtaining objective, valid and reliable information about the offensive and defense phase.

Keywords: *Design, Validation, Reliability, instrument, Technique, Tactic, Handball*

1. Introduction

The evidence-research on the evaluation techniques and tactics performance in handball still

somehow limited and inconsistent team-handball is an Olympic sport ball game that is characterized by fast pace defensive and offensive action during the game with the objective of the game to score goals. In the first place, there are studies which have analysed the cognitive aspect processes during matches [1-3]. The requirement profile handball involves complex attributes like techniques, tactic, motor skills, tactical-cognitive skills, mental skills, strength, endurance, speed, agility, coordination which are attached to the player. This learn about the moves accomplished by using players and team (i.e., match analysis) is frequent in soccer [4]. The purpose of team evaluation was to provide coaches useful statistics about their players, team, and opponents in order to design training and to prepare their matches [5]

Nevertheless, the various team sports differ greatly from each other. This is due to the different rules (court dimensions, playing time, number of players, substitutions, body contact, etc) of the sport, and thus results in a significantly divergent stress and strain profile. Team handball is a complex sport game that is determined by the individual performance of each player as well as tactical components and interaction of the team, the strategies a trainer can use to influence tactically the game's development are varied [6].

To describe team-handball play, especially to determine factors that influence performance is difficult because team-handball play is complex and multi-factorial. Team-handball players have to coordinate their movements well for running, jumping, pushing, change of direction and team-handball specific movements of passing, catching, throwing, checking and blocking. Intensities during the game always change between standing and walking, jogging and moderate running, sprinting and fast forward, sideward, and backward movements [7,8]

It has been shown that in different team-handball throwing techniques, ball velocity is strongly influenced by maximal pelvis, trunk and shoulder internal rotation angular velocity [9,10]. Handball involves multidirectional changes of direction [11]. Athletes often perform stop-and-go changes of direction in a response to unpredictable stimuli (ball, opponent etc.) over a relatively small court [12]. Therefore the complexity of handball, as described above, requires a thorough and detailed analysis of the attributes of the respective sport. Without this dedicated knowledge it is difficult to obtain sufficient performance diagnostic assessments for each particular sport. In the following article the components of the game and handball specific performance under the primacy of condition technique and tactical will be explained.

Handball is particularly characterized by the acyclic exchange of high-intensity phases and periods of low intensity. On one side there are quick vigorous actions in form of dynamic accelerations, short maximal sprints, direction change, explosive jumps, powerful throws, and the physical confrontation of 1:1- attack vs. defense situation with the opponent. On the other hand there is controlled bridging of the playing field by careful and calm playmaking within the offensive and defensive phases of the game. Intense shock and recoil movements, dynamic cross movements, powerful blocks, transitions in sprint, aggressive and highly intensive cooperation between the defender, alternate with game interruptions (time-out, injury, etc). Overall the game of handball has a high occurrence of intermittent load or stress and these loads will take place at different levels of the human organism.

The aims of this find out were to determinate the purpose of design coaching, validity, and reliability test of a mixed observational instrument of field formats and class systems to analyze technical and tactical actions in handball offense and defense player. The use of observational methodology in the sports context provides coaches and other sports professionals with flexible

equipment that adapt to their needs.

2. Materials and Methods

Design for the improvement of the instrument. An observational, nomothetic, monitoring and multidimensional diagram was once carried out [13]. The observation instrument designed was a mixed field format and classed [14]. The final instrument used to be composed of 6 criteria and 60 express cores. The multifaceted designs for the generalizability. Analysis was once composed of 6 facets: technique, tactical, offense, defence, operational speed, and tactico-technical.

2.1. Participants

The sample studied consisted of 6 matches played by 21 players from international students who study in Indonesia.

2.2. Instrument

The dimensions of the criteria collected by the instrument were divided into 6 groups: technique, tactical, offense, defence, operational speed, and tactico-technical. The first criterion, start of the ball possession; the second criterion, tactical the third criterion, offense, the fourth criterion defence: technique, for a handball player, means: when the player makes the opponent put the ball in a preferred position to deny him a scoring opportunity, by using the right skill of movement, power, balance, speed and timing. Skills are, among others: movement, jumping, turning, sliding and blocking, the fifth criterion operational speed: operational speed is a component that consists of mastering both technical and tactical skills, supported by using the conditional aspect of power/speed and conditioning, and the sixth criterion was development technical-tactical actions performed with the ball. The unit of analysis was the play phase with the ball. The mounted classes had been exhaustive and at the same time exclusive

2.3. Procedure

The instrument design, validation, and reliability calculation have been carried out in four stages: (a) assessment of the literature, (b) layout the first draft of the commentary instrument, (c) experts' qualitative and quantitative evaluate of the instrument, and (d) observer training check (reliability calculation). In the first stage, an evaluation of the following databases was done: Web of Science (WOS) de ISI Thomson Reuters, Latindex, Sports Discus, Scopus, Google Scholar, Scielo, and Dialnet. The keywords of the search were: "handball", and "observational instrument." A assessment of the abstracts used to be carried out to pick the observational contraptions used in the literature. After the resolution of papers with observational instruments, the researchers reviewed their characteristics, criteria and specific cores. Next a draft of a list of categorical cores and diploma of openness was once created from related scientific literature.

The list of standards covered the categories, degree of openness and the behavior's definition. In the 1/3 stage, content material validity used to be installed through 10 specialists (7 Experts Ph.D. in

bodily education, and three coaches with at least of 10 years of coaching experience). The Delphi methodology was once used. Experts did a quantitative (scale 0–10) and qualitative evaluation. Experts were requested about: (a) comprehension of the criteria, specific cores, degree of openness, and their definitions, (b) pertinence of specific cores and diploma of openness, and (c) whether to consist of different categorical cores or degree of openness in the commentary instrument. The content validity was once calculated with the Aikens’s V coefficient [15]. A Visual Basic app used to be used to calculate it [16]. The confidence intervals had been set out in 90%, 95%, and 99% through score method [17]. Items with average values <0.70 had been eliminated, objects ≥ 0.70 and <0.8 had been reviewed in accordance to experts’ proposals, and gadgets that had been ≥ 8.0 had been widely wide-spread [18]. In the fourth stage, the reliability of the instrument used to be calculated via an observer training and an observation test.

The observers had stages in sports science, had 10 years of experience teaching coaching handball, and had journey as observers. After the training, a in shape evaluation was carried out by means of the observers and an expert observer. The inter-and intra-observer Cohen’s kappa, the intra-class correlation coefficient and Kendall’s Tau B was once utilized to consider observer agreement. A generalizability analysis (Tables2) used to be performed to take a look at the validity and accuracy of the commentary instrument and the reliability of the observers [19]. For the statistical evaluation the SPSS software model 24.0 used to be used. For the generalizability analysis, SGAT software program was used [20]

3. Results

The listing of express cores, diploma of openness and their definitions of the observational instrument format was proven in table 1. In the layout of the observational instrument, the categorical cores and degree of openness were chosen by the usage of the categorical cores and diploma of openness.

Table 1 Values of Content Validity (Aiken’s V)

Criteria and Categorical Cores Aiken’s V	
Technique	
Passing: frontal pass, lateral pass, bounce pass, twin handed pass, jump pass Catch: In the Visual field, above the head, knee height, rolling ball	0.96
Dribbling: relays, fast-dribble, slalom dribbles, dribble with a lot of direction change	0.95
Shots on goal: stretch pitch, lead pitch, dive shot (no differentiation)	0.86
Feint	0.91
Road patting the ball	0.92
Offering a running track, to disturb the ball land or running track	0.89
Fight for the ball, attacker with Defender	0.88

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Man marking, space coverage	0.86
Tactical elements: I	0.90
Individual elements.	1.00
Running free, offer to fellow player.	0.86
Fast switching from attack to defence and defence to attack	0.86
Disturb during yielding of the ball through the opponent.	0.89
Men marking in 3-2-1 defence concept apply.	0.92
Interplay:	0.86
Interplay between wing /circle and right/left/middle player.	0.89
Interplay in the 3-2-1 coverage.	0.92
Trying to get the ball back after losing it, do this on the half of the opponent	0.86
Quick counterattack (1st phase). Together with the goalkeeper and wing players	0.86
2nd phase extended fast break.	0.95
Act according to the situation, shoot at goal or play the ball to a free player	0.99
Offense	0.92
Defence	
Techniques of movement: posture, moving with changes in speed and direction; sliding,	0.87
closing	0.89
Out and in (merging), getting back	0.87
Interfere throws: tapping the ball	0.89
Interfering catches: tapping the ball	0.86
Interfering dribbling: tapping the ball	0.89
Interfering the shot:	0.90
Tapping the ball	0.92
Block: defensive or offensive, standing or jumping	0.93
Contact defence	0.86
Block; defensive or offensive, standing or jumping	0.86
Contact defence	0.86
Defending the feint	0.90
Blocking the lanes of movement	0.96
Pressure the lane of movement: force away or outside	0.99
Fight for the loose ball	0.91
Creative	0.86
Attractive	0.86
Operational Speed	0.87
Jump with the left or right leg	0.92
Jump with both legs	0.89

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Complex motoric properties: 3	0.86
Dexterity (combination of speed, agility and power)	0.89
Quickness (combination of speed and power)	
Explosiveness (combination of high velocity and power)	0.89
Speed-endurance (combination of speed and stamina)	0.91
Strength-endurance (combination of power and stamina)	
Tactico-Technical	0.91
Ball reception, catching and passing the ball	1.00
Shooting, throwing a goal	0.97
Dribbling, advancing the ball by dribbling	0.88
Running-inside (to the 6 m line) and opening (freeing oneself, breaking away)	0.87
Feints (faked technical elements)	0.89
Fast-breaks	0.88
Tactical	0.99
Thrusts (run-ups, running starts) or waving	0.87
Give and go	0.89
Crosses	0.86
Lead away (move away, clearance)	0.87
Block, screen setting	0.88
Group counter-attack	0.88
Various combinations	0.89
Group and/or collective counter-attack	0.87
Offense set play with one pivot	0.99
Offense set play with two pivots	0.96
Offense set play with one pivot and one post	0.94
Offense set play in attack in numerical superiority and inferiority	0.93
Offense set play with seven attackers	0.87

Table 1 confirmed how the experts' qualitative and quantitative revision and the use of Aiken's V allowed for measuring the content material validity of the items. The values of the quantitative assessment have been high for all the categorical cores ($V_o \geq 0.70$) and above the minimal values proposed in the literature as a reference ($V_o = 0.70$) [21]. The qualitative comparison helped specifically to clarify some of the factors of the definitions of the different degree of openness of the express cores. The use of professionals from lookup and coaching furnished a greater entire and holistic imaginative and prescient of the sport. The level of intra-reliability, reached between observers after the observer training, confirmed the instrument is enough with regard to reliability [22]. The use of specific cores and diploma of openness nicely hooked up in the area and the qualitative contrast of the specialists contributed to the

Design, Validation, And Reliability Of An Observation Instrument Technique And Tactic In Handball excessive degree of reliability. Finally, the outcomes proven in the generalizability analysis made it possible to verify the excessive levels of validity, precision of the instrument and collaborate the excessive reliability indices of the observers [23]. Data bought via the instrument can furnish beneficial and relevant data to coaches in order to understand sport patterns, face the competition and advance the coaching sessions. The structure of the instrument permits coaches and researchers to stratify the training and comprehend the robust or vulnerable factor of an athlete. Table 2 shows the results obtained by different tests to see if the instrument used really meets a reliability which is required by the standards of the different researchers. The results obtained showed that the value sought was above (.).7 which confirmed that the instrument was ready to be used for evaluating technique and tactics in the game of Handball.

Table2 Observers' Intra and Inter Agreement After Training in The Use of the Observation Instrument

Criteria and categorical cores	Intra-reliability Kappa/ICC	Inter-reliability Kappa/ICC	Intra-reliability Kendall's Tau B	Inter-reliability Kendall's au B
Technique	1.00	0.99	0.96	0.99
Variety of Passing:	0.98	0.97	0.91	0.99
Types of Dribbling	0.99	0.92	0.95	0.94
Shots on goal:	0.97	0.99	0.98	0.89
Feint	0.92	0.96	0.89	0.90
Road patting the ball	0.99	0.89	0.90	0.98
Offering a running track	0.92	0.90	0.99	0.97
Fight for the ball/Defender	0.95	0.97	0.97	0.95
Marking, space coverage	0.93	1.00	0.95	0.93
Tactical elements: I	0.98	0.98	0.96	0.95
Individual elements.	1.00	0.99	0.95	0.98
Running free, offer to fellow player.	0.96	0.97	0.99	0.93
Fast switching attack/defence	0.89	0.92	0.99	0.97
Disturb the opponent.	0.90	0.99	0.94	1.00
Marking 3-2-1 defence concept apply.	0.97	0.92	0.89	0.99
Interplay:	0.90	0.99	0.90	0.95
Interplay between position	0.91	0.94	0.99	0.96
Interplay in the 3-2-1 coverage.	0.95	0.89	0.97	0.94
Trying to get the ball back after losing it	0.98	0.90	0.94	0.99
Quick counterattack (1st phase).	0.93	0.98	0.89	0.99
2nd phase extended fast break.	0.97	0.97	0.89	0.97
Act according to the situation	1.00	0.95	0.96	0.94
Offense	1.00	0.93	0.87	0.89
Defence	1.00	1.00	0.93	0.89
Techniques of movement:	0.94	1.00	0.96	0.96
Out and in (merging), getting back	0.96	1.00	0.91	0.87
Interfere throws: tapping the ball	0.91	1.00	0.95	0.90
Interfering catches: tapping the ball	0.95	0.94	0.98	0.91
Interfering dribbling: tapping the ball	0.98	0.99	0.92	0.95
Interfering the shot:	0.89	0.99	0.99	0.98
Tapping the ball	0.90	0.97	0.92	0.93
Block	0.99	0.94	0.95	0.97
Contact defence	0.97	0.89	0.93	1.00
Contact defence	0.95	0.89	0.98	0.98

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Defending the feint	0.96	0.96	1.00	0.89
Blocking the lanes of movement	0.95	0.87	0.96	0.90
Pressure the lane of movement:	0.96	0.93	0.89	0.99
Fight for the loose ball	0.94	1.00	0.90	0.97
Creative	0.99	0.99	0.97	0.95
Attractive	0.99	0.93	0.99	0.96
Operational Speed	0.97	0.97	0.97	0.95
Jump with the left or right leg	0.94	1.00	0.95	0.96
Jump with both legs	0.89	0.98	0.96	0.89
Complex motoric properties: 3	0.89	0.89	0.95	0.96
Dexterity	0.96	0.90	0.96	0.87
Quickness	0.87	0.99	0.94	0.93
Explosiveness	0.93	0.97	0.99	1.00
Speed-endurance	1.00	0.95	0.99	0.89
Strength-endurance	0.89	0.96	0.97	0.90
Tactico-Technical	0.90	0.95	0.90	0.88
Reception, catching/passing ball	0.88	0.96	0.91	0.90
Shooting,, throwing a goal	0.90	0.96	0.95	0.89
Dribbling, advancing ball by dribbling	0.89	0.87	0.98	0.99
Running-inside	0.99	0.93	0.93	0.94
Feints (faked technical elements)	0.94	1.00	0.97	0.89
Fast-breaks	0.89	0.99	1.00	0.98
Tactical	0.90	0.93	1.00	0.97
Thrusts (run-ups, running starts)	0.98	0.97	1.00	0.95
Give and go	0.97	1.00	0.94	0.93
Crosses	0.95	0.97	0.96	0.87
Lead away (move away, clearance)	0.93	0.95	0.89	0.93
Block , screen setting	0.90	0.96	0.90	1.00
Group counter-attack	0.97	0.95	0.97	0.99
Various combinations	1.00	0.96	1.00	0.93
Group and/or collective counter-attack	0.98	0.96	0.98	0.97
Offense set play with one pivot	0.87	0.97	0.99	0.90
Offense set play with two pivots	0.93	0.99	0.97	0.99
Offense set play with one pivot and one post	1.00	0.97	0.92	0.97
Offense set play in unequal numeric	0.93	0.96	0.93	0.96
Offense set play with seven attacker				

4. Discussion

The current paper describes the tiers done to design, validate, and check the reliability and generalizability of the observational instrument. Considering the growing number of observational studies that use “Ad hoc” contraptions handball, the development of this instrument targets to supply the many observational studies that occur in handball with a legitimate and dependable instrument that lets in enough data collection. In the equal way, the developed instrument has the benefit of using open

categories, as opposed to other research that existing closed categories, in which solely the conducts carried out are registered. In addition, the designed instrument has the gain that it takes into account the continuity of the game. The instrument registers the movements that show up all through the game offense/defense. The fact of being able to document the continuity of the offensive/defense game. In addition, this instrument provides, in spite of analysing the continuity of the offensive/defensive action. The process had different stages, similar to the one followed in the improvement of observational gadgets in other sports activities [24-25]. The first stage involved the overview and evaluation of the reachable commentary instruments. The analysis of the accessible material used to be centered in the plan an instrument that permits acquiring information: (a) about the individual and collective game patterns, (b) about the players evolution in training and competition, (c) about the effect of manipulation of policies in small side-games or in competition, and (d) that guide the education design. After the analysis, the researchers mounted the categorical cores focal point on the following aspects: technique, tactical, offense, defence, operational speed, and tactico-technical.

The six degrees described the actions done via the participant with/without the ball. The researchers tried to use in the sketch of the instrument specific cores close to the standards used by means of coaches with the purpose to amplify the applicability of the instrument. Along with this criterion, it was also used the express cores proposed by researchers in different devices and research research [26-28]. The instrument has as unit of evaluation the methods and procedures of handball players. The pilot studied carried out by using the researchers allowed reviewing the categorical cores, their definitions, and the education test.

5. Conclusion

The outcomes showed that the observational instrument is legitimate and dependable for measuring the technical and tactical actions performed in the offensive and defensive phase by using the player and team. The instrument has some limitations. Only it was assessed the content validity of the instrument (expert evaluation), and the instrument is targeted on the strategies and tactics. However, the instrument can furnish coaches and research with information about methods and tactics the gamers with/without the ball, their characteristics and in which context are done, and the stage of involvement of the field players. These records could permit coaches and lookup to set up the needs of the recreation and to create training plans that the handball gamers to be organized for these needs

Once Again Girl in a jacket

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