RELIABILITY OF ASSESSMENT METHODS OF GAME PERFORMANCE AND GAME SKILLS IN SCHOOL BASKETBALL

GABRIELA OLOSOVÁ – LUDMILA ZAPLETALOVÁ
Faculty of Physical Education and Sports
Comenius University in Bratislava
Slovakia

ABSTRACT

The aim of the study was to design assessment methods of game performance and game skills for school basketball. The assessment method of game performance was constructed on the basis of reliable and valid measurement instruments in team sports, Game Performance Assessment Instrument and Team Sport Assessment Procedure, which enable teachers to evaluate the ability to solve tactical problems by making decisions, moving appropriately and executing skills. Three experts were engaged to verify the reliability of the method by observing and coding performance behaviours in basketball matches through digital recording. Kendall's coefficient was used to evaluate the data. Game abilities were measured by Under basket shot test, Dribbling and Push pass for accuracy test. Reliability was verified by test – retest method on a sample of 263 pupils in the age of 14 to 18 years. Methods of statistical analysis, intraclass correlation and standard test's error were used to evaluate the data. Reliability of the assessment method of game performance was $W=0.86$ ($p<0.05$). The reliability of basketball tests was: Push pass for accuracy $r=0.74$, Under basket shot $r=0.84$, and Dribbling $r=0.95$ (all $p<0.01$). The reliability of all measurement instruments have been considered as a sufficient and thus recommended for practical application in teaching-learning process and for research purposes.

Keywords: game performance, game skills, assessments methods, reliability, basketball

INTRODUCTION

The role of assessment in teaching games is that ensures students develop the skillfulness, competence, and confidence needed to play games – games that are worth learning and worth playing long after students leave Physical Education (Oslin, 2005).

To achieve such a goal the development of assessment instruments is one of essential conditions. There are some basic methods how to assess students' performance in games units. The most common tools are skill tests which (Brown – Hopper, 2006) on one hand reward skill performance but on the other hand neglect personal effort, social engagement and cognitive decisions so imperative in game play. We agree, but although it might not be the most appropriate way of evaluation in school settings, we consider skill tests as an irreplaceable tool for scientific and research purposes.

Beyond the usual motor components, it is generally agreed that performance in team sports results from the interaction of strategy efficiency, tactical efficiency, and specific perceptual motor skills (Gréhaigne – Godbout, 1995). Considering that another way of students' performance evaluation is through observation and coding selected components of game performance. Authentic assessment of game performance, established for TGfU purposes, is Game Performance Asssessment Instrument (GPAI). Seven observable components were identified and formulated in the initial development of the GPAI: base, adjust, decision making, skill execution, support, cover, guide and mark. Teachers can choose to observe any or all components related to particular game, depending on the context of the instructional environment (Oslin et al., 1998).

All assessment instruments used by teachers but primarily researchers should be standardized. In some cases poor reliability and validity of the method is the problem. In this study we've concentrated on verifying reliability of three skill tests and inter-observer reliability of GPAI in basketball.

METHODS

Participants

Two different samples participated either in game performance assessment or in game skills measurement. 263 male students (aged from 14 to 18 years old) took part in game skills measurement (92 of 1st grade, 60 of 2nd grade, 66 of 3rd grade, 45 of 4th grade). Regarding game performance assessment methods 3 basketball experts (basketball players and at the same time doctoral students) assessed the game performance of 5 young basketball players (aged from 9 to 10 years old) in 2 matches.

Assessment instruments

Three basketball skill tests were used:
- Under basket shot (according to Brace, 1966; Hecl, 1995) – make as many successful shots as possible in 30 seconds from under the basket after repetitive rebounds.
- Dribbling (according to Argaj - Rehák, 2007) – to dribble the ball along marked area as fast as possible.
- Push pass for accuracy (according to Brace, 1966; Hecl, 1995) – to hit the vertical target as many times as possible of 20 attempts.

GPAI was used to assess game performance. More specifically, Tally scoring system of GPAI was used to assess individual game performance from videotapes. Three components of GPAI were evaluated:
- decision-making – makes appropriate decisions about what to do with the ball during the game,
- skill execution – efficient execution of selected skills,
- support – provides appropriate support for a teammate with a ball by being in position to receive a pass. Off –the-ball movement to a position to receive a pass (Griffin et al., 1997).

These selected individual observable behaviors were assessed as appropriate / effective and inappropriate / ineffective responses. Definitions were set up as follows:
- Skill execution:
  - effective shot – player scores,
  - ineffective shot – player doesn't score,
  - effective pass – player pass the ball accurately, reaching the intended receiver,
  - ineffective pass – player doesn't reach the intended receiver or the pass is intercepted by an opponent,
  - effective dribble – player dribbles without losing the ball,
  - ineffective dribble – player loses the ball when dribbles or the ball is intercepted by an opponent.

- Decision-making:
  - appropriate decision about shot – player shoots when open and there is no teammate in better position to make a shot (open and closer to basket),
  - inappropriate decision about shot – player shoots covered by an opponent or there is a teammate in better position to make a shot (open and closer to basket),
  - appropriate decision about pass – player passes to unguarded teammate to set up a scoring opportunity,
  - inappropriate decision about pass – player passes to guarded teammate or player passes a teammate despite other teammates are open in better position (pass to whom could set up a scoring opportunity),
  - appropriate decision about dribble – player dribbles to set up a scoring opportunity or when nobody is open to receive a pass
  - inappropriate decision about dribble – player dribbles when there is an open teammate in a good position to shoot.
- Support:
  - appropriate support – player attempts to move into position to receive a pass from teammate (moving forward to space after pass is made, positioning self in a 'passing lane', calling for the ball, making self open by quick changes of direction and speed),
  - inappropriate support – no attempts to move into position to receive a pass from teammate.

Statistical methods

Reliability of skill tests was verified by test – retest method. The interval between the test times was 2 to 4 days to establish reliability. Methods of statistical analysis, intraclass correlation (ICC) and standard test's error were used to evaluate the data.

Three experts were engaged to verify inter-observer reliability of GPAI by observing and coding performance behaviors in basketball matches through digital recording. Kendall's coefficient was used to evaluate the data.

RESULTS

Reliability of Under basket shot test varied within grades from 0.81 to 0.88, of test Push pass for accuracy from 0.73 to 0.80 and of Dribbling test from 0.87 to 0.99 (Table 1). Overall reliability of Under basket shot test was 0.84, of Push pass for accuracy test 0.74 and of Dribbling test 0.95 (Figure 1). Standard test's error of Under basket shot test was 1 shot, of Push pass for accuracy test 1 pass and of Dribbling test 0.66 seconds. Overall reliability of GPAI was 0.86 but it was different between selected components. Reliability of decision-making was 0.73, of support 0.94 and of skill execution 1.00 (Figure 2). All results have been statistically significant.

Table 1 Reliability of tests of game skills and standard tests' error within grades

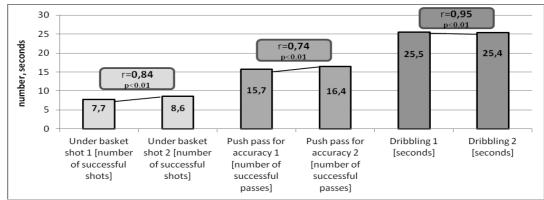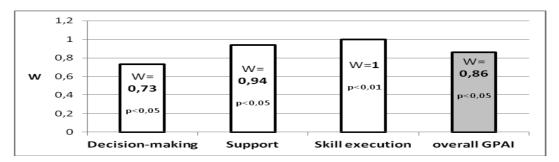|	Under basket shot		Push pass for accuracy		Dribbling	
	Reliability	*Standard rror*	*Reliability*	*Standard error*	*Reliability*	*Standard error*
1st grade	0.81	1.27	0.77	1.27	0.99	0.4
2nd grade	0.88	1.17	0.8	1.27	0.87	1.08
3rd grade	0.83	1.2	0.73	1.28	0.97	0.45
4th grade	0.82	1.23	0.74	1.43	0.97	0.52

Figure 1
Overall reliability of skill tests

Figure 2
Reliability of GPAI

DISCUSSION

Tests of game skills

Reliability of basketball tests verified by American Association for Health Physical Education and Recreation was $r \geq 0.80$ (in case of tests focused on distance) and ≥ 0.70 (in case of tests focused on accuracy) (Brace, 1966).

Mentioned levels of reliability are different one from another. Comparing outcomes from our research (where $r=0.74 - 0.95$) to mentioned statements let us consider all tests of game skills as reliable. As expected, the highest reliability coefficient was in Dribbling test, which is the one not focused on accuracy but speed of leading the ball. We can recommend applying them as reliable measurement instruments of basketball skills in Physical and Sport Education.

GPAI

The GPAI has been shown to be a valid assessment instrument. Content, construct, and ecological validity have all been established during its preliminary development. Furthermore, instrument and observer reliability have also been established (Oslin et al. 1998). Authors state that both teachers and students who have used a version of GPAI in live settings to assess game performance have been considered reliable. In other words they have been consistent with a fellow observer in their assessment of performance approximately 80% of the time.

However we agree with Mitchell – Oslin (1999), Mitchel et al. (2006) that the key to establishing reliability is in quality of the criteria stated for observation. The criteria should be specific and observable.

Especially tactical aspects of game play and off-the-ball movements could be difficult to assess what has been similarly shown in our research. The lowest inter-observer reliability was reached when assessing decision-making ($W=0.73$). On the other hand definition of skill execution has been shown as absolutely specific and clear ($W=1$). Finally we consider GPAI method as convenient and sufficient for further application in Physical and Sport Education.

CONCLUSION

Significant correlation coefficients were found in all skill tests thus reliability is considered as acceptable. Even though significant inter-observer correlation coefficients were found in all variables of GPAI, correlation was low in case of decision-making. It appears that definitions must be even more accurate. On the basis of our results the application of both skill tests and GPAI in Physical and Sport Education settings is recommended.

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