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The jump shot performance in competitions among youth basketball players aged 13 and 14 in Ho Chi Minh City

Nguyen Ngoc Hai[1], Nguyen Van Vui[1], Nguyen Minh Khoa[2], Nguyen Quang Vinh[3]
[1] University of Labor and Social Affairs (Campus II), Ho Chi Minh City, Vietnam
[2] Can Tho University, Can Tho, Vietnam
[3] Associate Professor, Ho Chi Minh City University of Physical Education and Sports, Ho Chi Minh City, Vietnam

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Abstract
Basketball jump shots (JS) are widely regarded as a high-complexity specific motor talent that needs substantial instruction and practice. The goal of this article was to perform a comprehensive evaluation of JS performance among 13 and 14-year-old basketball players in Ho Chi Minh City. The authors employed the scientific methodologies in sports research to develop 06 criteria for measuring JS performance and to identify 07 typical tactics that young basketball players took in games. According to the assessment results, their JS performance was 1.08% on average. Notably, the second and sixth tactics had the highest JS efficiency (1.6%), while the fifth had the lowest (0.59%). More notably, the findings suggested that the JS performance of youth basketball players was highly related to their competition outcomes. It indicated that school teams with a large number of players with good JS abilities were more likely to get high scores, whereas teams with only a few competent JS-skilled players appeared to perform poorly.

Keywords: JS performance, basketball, 13-14-year-olds, Ho Chi Minh City

Introduction

Today, research on competition behaviors of high-level athletes in developed countries has progressively achieved significant strides, owning to advancements in computer science and technology, digital information, and the application of computer-aided techniques into technical and tactical sports observation. Obviously, accurate evaluation of talents and techniques can provide coaches with the required knowledge to decide suitable strategies and instruct players in contests, which is also the vital step towards developing more reasonable tactics. In a nutshell, handling extensive data is seen as an important science subject that will serve as the foundation for coaching athletes at all levels.

Aside from appropriate tactics, it is apparent that shooting performance has a considerable influence in determining which team will win the games. It is understandable when high accuracy is considered their major concern because the ultimate objective of basketball games is to score a goal. This accuracy is proven by how accurately a ball is passed and shot. Thus, the better a team's shooting performance, the higher its odds of winning. It is widely seen that the world's top teams all have at least one to three "Archers." JB efficiency on 3-pointers is currently 51-55% on average, 60% on 2-pointers, and 80-83% on free throws. Some sportsmen may reach a basketball shooting accuracy of up to 70% on each shot. In the 12th World Basketball Championship, an American athlete earned 71.3% accuracy. Ton Quan, a Chinese athlete, had a free throw efficiency of up to 93.8%. Furthermore, at the 2019 World Championships, the brilliant Spanish athlete Ricky Rubio scored 20 points, while Marc Gasol produced similarly remarkable results by scoring 14 points, grabbing 7 rebounds, and 7 successful passes to help Spain win the World Cup. Maintaining accuracy in JB in competitions, on the other hand, necessitates athletes not only to master their fundamental shooting methods but also their ability to evaluate and react quickly to the opponents' defensive maneuvers. More importantly, they must have strong physical health in order to avoid fatigue which might affect their JB accuracy in competitions.

Conforming to research papers, numerous experts acknowledged that the JB performance of athletes appears to be gradually dropped at the end of the match. As a result, a set of solutions have been proposed to maintain the players' performance and increase their shooting efficiency, including maintaining fitness, allowing athletes to practice shooting in different conditions, and carrying out shooting exercises when the athletes are fatigued like they are at the last minutes of games. To achieve so, a reliable set of criteria is required to fully measure the effectiveness of present approaches, thereby enabling subsequent actions to fix athletes' disadvantages. That is also the motivation for the research team to conduct a study on the topic of:

"The Jump Shot Performance in Competitions among Youth Basketball Players aged 13 and 14 in Ho Chi Minh City".

The study's goal is to identify the criteria that will effectively measure the JB performance of male basketball players aged 13 and 14 in Ho Chi Minh City. The results of the study are hoped to contribute to the improvement of sports training and the overall performance of youth basketball teams.

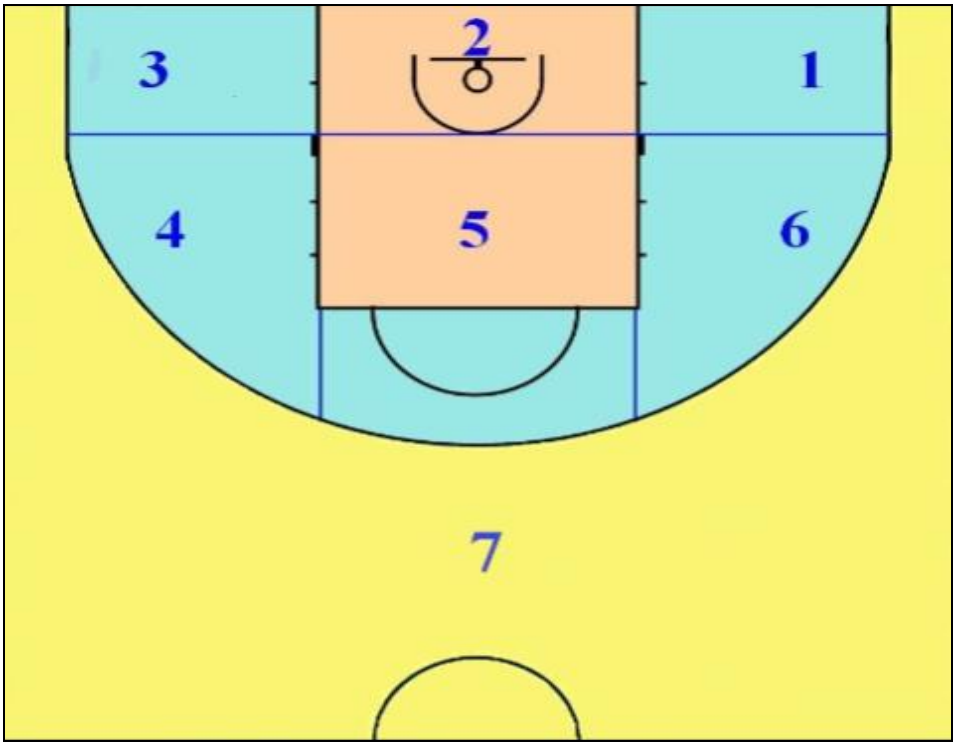
Methodology
Reference documents, interviews, observations, and statistics.

Key performance indicators in basketball
In order to easily record data from matches, the authors suggested the following system of basketball performance indicators, together with specific codes and movement descriptions:

Table 1: Basketball performance indicators

Time to Score Goals		
Criteria	**Code**	**Movements**
Holding the ball 1	1	From the time he tackles
Holding the ball 2	2	Do a basketball steal from the opponents
Holding the ball 3	3	After receiving a throw-in from the goal line
Holding the ball 4	4	After rebound
Holding the ball 5	5	After receiving a throw-in from the sideline
Basketball jump shot skills		
Criteria	Code	Skills
Dribble 1	6a	(Common) dribbling
Dribble 2	6b	Extraordinary dribbling without teammates' support
Dribble 3	6c	Extraordinary dribbling with teammates' support
Pass 1	7a	(Common) passing a ball
Pass 2	7b	Passing a ball with assistance
Basket-shooting conditions		
Criteria	Code	Movements
On the spot throw 1	8	At area 1
On the spot throw 2	9	At area 2
On the spot throw 3	10	At area 3
On the spot throw 4	11	At area 4
On the spot throw 5	12	At area 5
On the spot throw 6	13	At area 6
Jump shot 1	14	Jump shot at area 1
Jump shot 2	15	Jump shot at area 2
Jump shot 3	16	Jump shot at area 3
Jump shot 4	17	Jump shot at area 4
Jump shot 5	18	Jump shot at area 5
Jump shot 6	19	Jump shot at area 6
Jump shot 7	20	Jump shot at area 7
Running hook shot 1	21	Running hook shot at area 1
Running hook shot 2	22	Running hook shot at area 2
Running hook shot 3	23	Running hook shot at area 3
Running hook shot 4	24	Running hook shot at area 4
Running hook shot 5	25	Running hook shot at area 5
Running hook shot 6	26	Running hook shot at area 6
Running hook shot 7	27	Running hook shot at area 7
Free throw	28	Free throw at the free throw area
Scoring Results		
Criteria	Code	Details
Result 1	29	Score 1 point
Result 2	30	Score 2 points
Result 3	31	Score 3 points
Result 4	32	Fail
Result 5	33	Defensive team's fault
Result 6	34	Loss of ball control: loss of ball, attack foul, rule violation, timeout, other cases.

During the data collection process, the authors captured every single action at 7 attacking areas in the front yard and the area 0 in the back yard (Figure 1).



Area 1: Right-sided attacking corridor in the frontcourt
Area 2: Attack area below the goal in the frontcourt
Area 3: Left-sided attacking corridor in the frontcourt
Area 4: Left-wing of the attacking area in the frontcourt
Area 5: Direct attacking area in the frontcourt
Area 6: Right-wing of the attacking area in the frontcourt
Area 7: 3-point line distance from the basket
Area 0: Backyard part

Fig 1: Basketball Court

Apriori math was utilized as a statistical method to figure out the relationships among skills and to illustrate the efficiency of each skill's frequency. Two metrics used to evaluate association rules were Support and Reliability. Minimum Support (min sup) and Minimum Confidence (min conf) were applied to build the association rules. When the figures of Support and Confidence fulfilled (greater than or equal to) both Minimum Support and Minimum Confidence, the association rule was referred to as Strong Rule. The threshold values for Minimum Support and Minimum Confidence had to be specified before Association rules could be generated.
Itemsets whose occurrence frequency ≥ min_sup are called frequent itemsets.

Research objects
32 matches of 8 teams in rounds 1-8 of the Ho Chi Minh City basketball tournament for students aged 13-14.

Results and Discussions
Determining the criteria for evaluating basketball performance in competition in different areas of the competition.
Proceed in 02 steps;
Step 1: Created a list of 21 specific criteria for evaluating JB performance in various contests. Criteria were gathered from trustworthy documents and academic works of local and international writers involving Nguyen Ngoc Hai (2004), Nguyen Ngoc Hai (2012), Nguyen Ngoc Hai, Le Minh Chi (2013).
Step 2: Conducted interviews with experts, coaches, and specialists to determine six criteria for evaluating boys' basketball shooting performance in Ho Chi Minh City competitions: Running hook shot at area 1 (56 tactics), Jump shot at area 2 (225 tactics), Running hook shot at area 3 (49 tactics), Running hook shot at area 4 (96 tactics), Running hook shot at area 5 (190 tactics), Running hook shot at area 6 (73 tactics).
Identified 7 typical shooting tactics:
Tactic 1: Dribble → Pass a ball with assistance → Running hook shot at area 1 → Score 2 points
Tactic 2: Dribble → Pass a ball with assistance → Jump shot at area 2 → Score 2 points
Tactic 3: Take the ball from rebound → Jump shot at area 2 → Score 2 points
Tactic 4: Dribble → Pass a ball with assistance → Running hook shot at area 3 → Score 2 points
Tactic 5: Dribble → Pass a ball with assistance → Running hook shot at area 4 → Score 2 points
Tactic 6: Dribble → Pass a ball with assistance → Running hook shot at area 5 → Score 2 points

Tactic 7: Dribble → Extraordinary dribble → Running hook shot at area 6 → Score 2 points

Evaluation of the JB performance of male basketball players aged 13-14 in Ho Chi Minh city Student Basketball Championship

Table 2 presents the observing results of the basketball performance of eight young teams having used seven typical JB tactics at the first round of the provincial championship.

Table 2: JB performance of 8 male teams participating in Ho Chi Minh City's contest _ Round 1

Approach	JB Performance of each school (%)								
	A Chau	Au Lac	Le Quy Don	Le Van Tam	Luong The Vinh	Nguyen Huu Tho	Nguyen Van Be	Tran Phu	Overall
Tactic 1	1.0	0.9	0.4	0.4	0.5	1.2	0.5	0.5	0.7
Tactic 2	3.1	0.9	2.5	1.4	1.5	0.6	0.0	2.3	1.6
Tactic 3	2.6	2.8	0.8	0.4	0.5	0.6	0.5	1.4	1.2
Tactic 4	1.0	0.9	1.3	0.4	0.5	0.6	0.5	0.5	0.75
Tactic 5	0.5	0.5	0.4	0.4	0.5	0.6	0.5	0.5	0.5
Tactic 6	3.6	1.9	1.3	0.9	1.5	2.8	0.5	0.5	1.6
Tactic 7	1.0	1.4	1.3	1.4	2.0	0.6	1.6	0.5	1.2
JB performance	1.83	1.33	1.14	0.76	1.00	1.00	0.59	0.89	1.08
Ranking of the whole tournament	1	2	3	5	4	5	5	5	

The results of Table 3 indicated

The average basketball performance in competitions of the eight schools was 1.08 %. Notably, A Chau International Secondary School had the best shooting performance (1.83%), while Nguyen Van Be Secondary School had the least shooting efficiency (0.59%). More notably, the data suggested that the teams' success was highly associated with their JB performances. It was noticeable that teams with high JB performance tended to get higher outcomes, whereas teams with low JB performance were likely to receive lower marks as a consequence. The following was a detailed breakdown of each school team's young athletes' JB performance:

A Chau International Secondary School's athletes had an average JB performance of 1.83%; with the JB performance in area 5 being the highest (3.6%) compared to the other areas (≤1%). In area 2, jump shots with teammate coordination had a higher efficiency (3.1%) than individual jump shots from a rebound (2.6%).

Au Lac Secondary School's athletes had an average JB performance of 1.33%; with the JB performance in area 5 being the highest (1.9%) compared to the other areas (≤1.4%). In area 2, individual jump shots from a rebound had a higher efficiency (2.8%) than jump shots with teammate coordination (0.9%).

Le Quy Don School's athletes had an average JB performance of 1.14%; with the JB performance in areas 3, 5, and 6 being all the same (1.3%), whereas the other areas being low efficiency (0.4%). In area 2, jump shots with teammate coordination (2.8%) were more effective than jump shots from a rebound (0.8%).

Le Van Tam Secondary School's athletes had an average JB performance of 0.76%; with the JB performance in area 6 being the highest (1.4%) compared to the other areas (≤0.9%). In area 2, jump shots with teammate coordination had higher efficiency (1.4%) than individual jump shots from a rebound (0.4%).

Luong The Vinh Secondary School's athletes had an average JB performance of 1.0%; with the JB performance in area 6 being the highest (2%) compared to the other areas (≤1.5%). In area 2, jump shots with teammate coordination had higher efficiency (1.5%) than individual jump shots from a rebound (0.5%).

Nguyen Huu Tho Secondary School's athletes had an average JB performance of 1.0%; with the JB performance in area 5 being the highest (2.8%) compared to the other areas (≤1.2%). In area 2, jump shots with teammate coordination had the same efficiency with individual jump shots from a rebound (0.6%).

Nguyen Van Be Secondary School's athletes had an average JB performance of 0.59%; with the JB performance in area 6 being the highest (1.6%) compared to the other areas (0.5%). In area 2, jump shots with teammate coordination had higher efficiency (0.5%) than individual jump shots from a rebound (0%).

Tran Phu Secondary School's athletes had an average JB performance of 0.89%; with the performance of most areas being pretty low (0.5%). In area 2, jump shots with teammate coordination had higher efficiency (2.3%) than individual jump shots from a rebound (1.4%).

It was clearly seen that the highest JB performance (1.6 %) was found in Tactic 2 and Tactic 6, while the lowest Shooting efficiency was found in Tactic 5. Following were the details of each approach:

Tactic 1: Dribble → Pass a ball with assistance → Running hook shot at area 1 → Score 2 points

- Tactic 1 was used most effectively by male basketball players from Nguyen Huu Tho Secondary School's team (1.2%), outperforming the overall tournament (0.7%).
- Tactic 1 was used the least effectively by male basketball players from Le Van Tam Secondary School (0.4%), underperforming the overall tournament (0.7%).

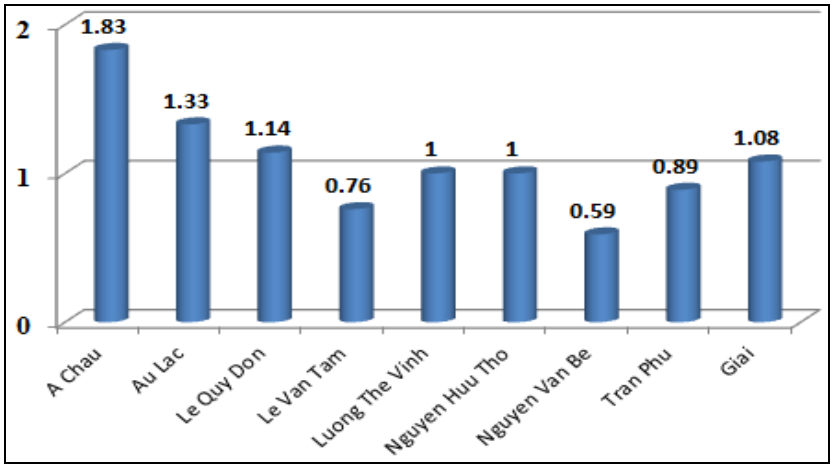


Chart 1: Comparison of the average basketball shooting performance of eight school teams in Ho Chi Minh City

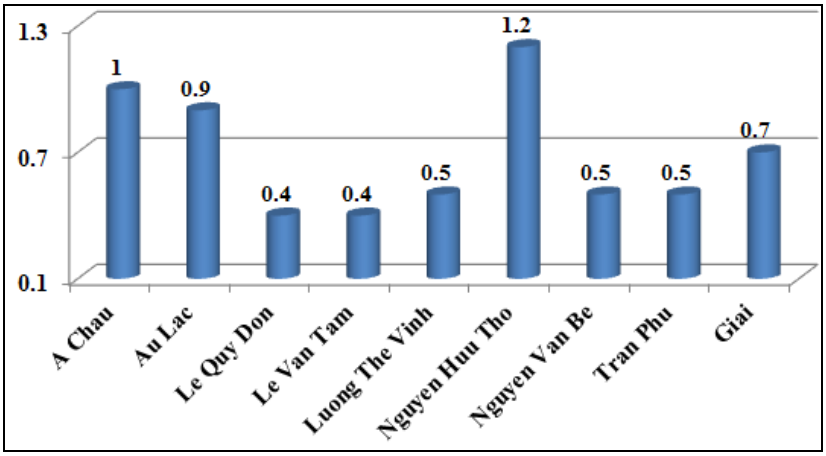


Chart 2: Comparison of shooting performance in Tactic 1 among 8 school teams and the overall performance of the tournament (Giai)

Tactic 2: Dribble → Pass a ball with assistance → Jump shot at area 2 → Score 2 points

- Tactic 2 was used most effectively by male basketball players from A Chau International School's team (3.1%), outperforming the overall tournament (1.6%).
- Tactic 2 was used the least effectively by male basketball players from Nguyen Van Be Secondary School's team (0%).

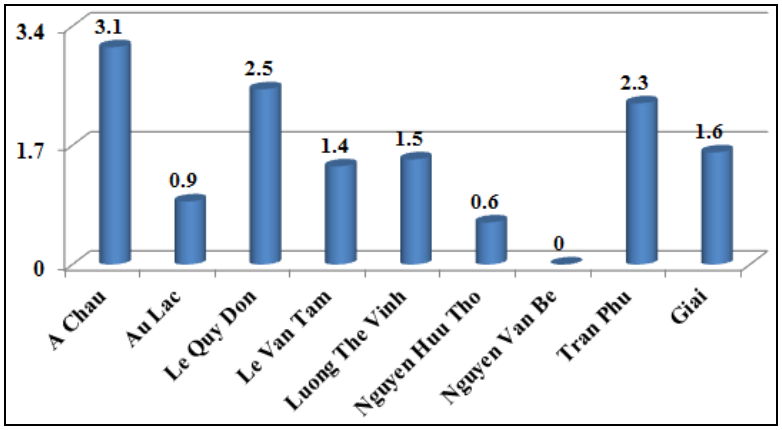


Chart 3: Comparison of shooting performance in Tactic 2 among 8 school teams and the overall performance of the tournament (Giai)

Tactic 3: **Take the ball from rebound → Jump shot at area 2 → Score 2 points**

- Tactic 3 was used most effectively by male basketball players from Au Lac Secondary School's team (2.8%), outperforming the overall tournament (1.2%).
- Tactic 3 was used the least effectively by male basketball players from Le Van Tam Secondary School's team (0.4%), underperforming the overall tournament (1.2%).

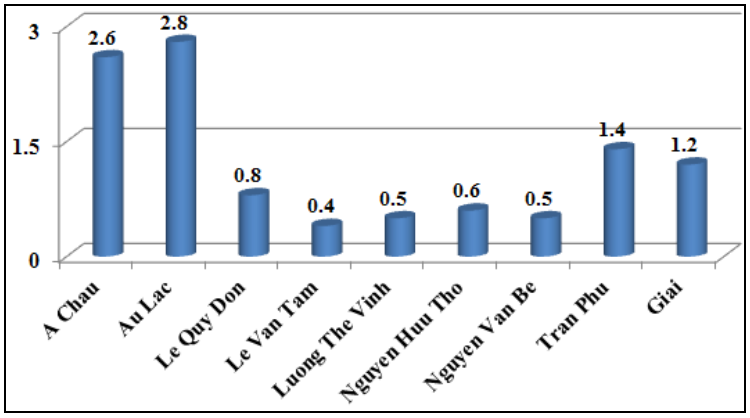


Chart 4: Comparison of shooting performance in Tactic 3 among 8 school teams and the overall performance of the tournament (Giai)

Tactic 4: **Dribble → Pass a ball with assistance → Running hook shot at area 3 → Score 2 points**

- Tactic 4 was used most effectively by male basketball players from Le Quy Don Secondary School's team (1.3%), outperforming the overall tournament (0.75%).
- Tactic 4 was used the least effectively by male basketball players from Le Van Tam Secondary School (0.4%), underperforming the overall tournament (0.75%).

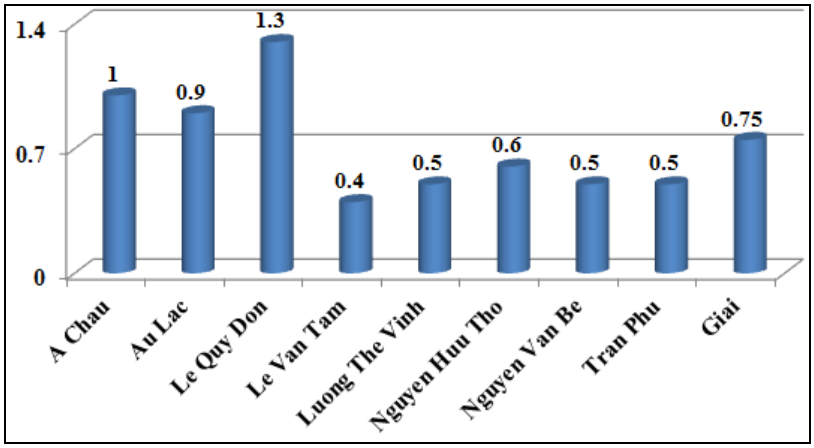


Chart 5: Comparison of shooting performance in Tactic 4 among 8 school teams and the overall performance of the tournament (Giai)

Tactic 5: **Dribble → Pass a ball with assistance → Running hook shot at area 4 → Score 2 points**

- Tactic 5 was used most effectively by male basketball players from Nguyen Huu Tho Secondary School's team (0.6%), outperforming the overall tournament (0.5%).
- Tactic 5 was used the least effectively by male basketball players from Le Quy Don Secondary School (0.4%), underperforming the overall tournament (0.5%).

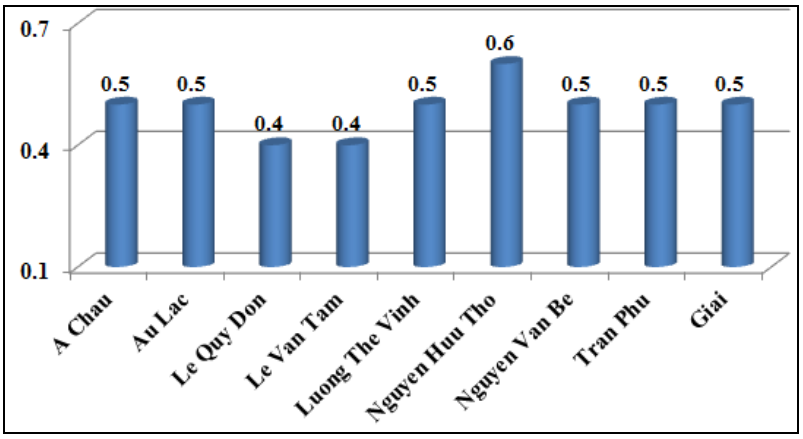


Chart 6: Comparison of shooting performance in Tactic 5 among 8 school teams and the overall performance of the tournament (Giai)

Tactic 6: **Dribble → Pass a ball with assistance → Running hook shot at area 5 → Score 2 points**

- Tactic 6 was used most effectively by male basketball players from A Chau International School's team (3.6%), outperforming the overall tournament (1.6%).
- Tactic 6 was used the least effectively by male basketball players from Tran Phu and Nguyen Van Be Secondary School (0.5%), underperforming the overall tournament (1.6%).

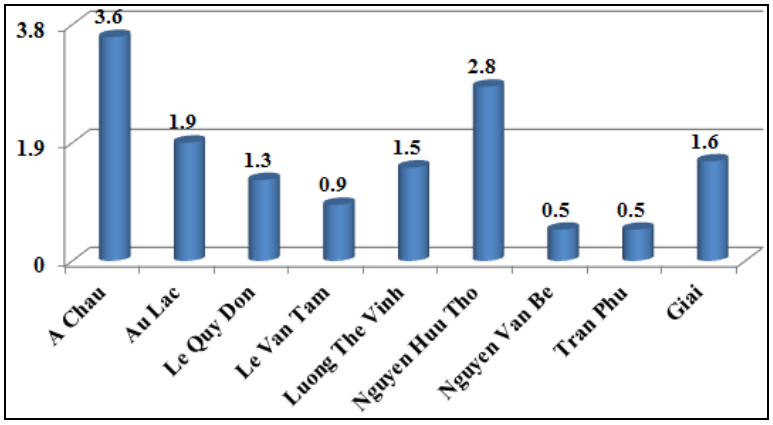


Chart 7: Comparison of shooting performance in Tactic 6 among 8 school teams and the overall performance of the tournament (Giai)

Tactic 7: **Dribble → Extraordinary dribble → Running hook shot at area 6 → Score 2 points**

- Tactic 7 was used most effectively by male basketball players from Luong The Vinh School's team (2.0%), outperforming the overall tournament (1.2%).
- Tactic 7 was used the least effectively by male basketball players from Tran Phu Secondary School (0.5%), underperforming the overall tournament (1.2%).

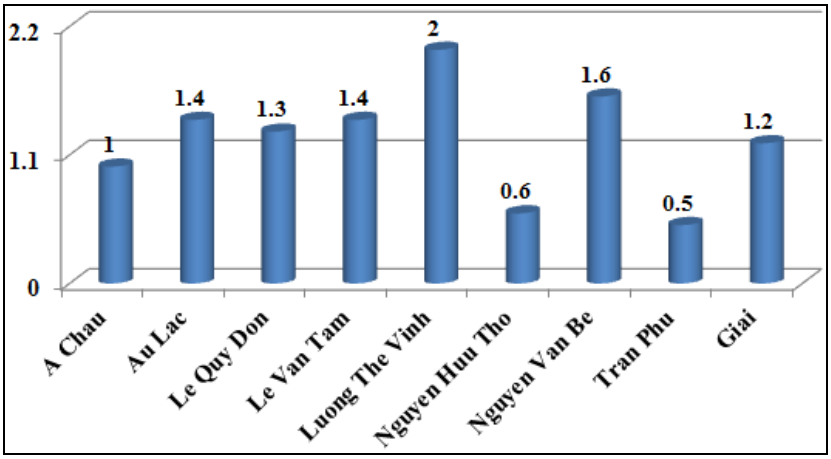


Chart 8: Comparison of shooting performance in Tactic 7 among 8 school teams and the overall performance of the tournament (Giai)

Conclusion

- Based on the results of interviews with experts, coaches, and specialists, 6 criteria for measuring basketball performance in tournaments and 7 typical shooting tactics of male basketball players aged 3-14 in Ho Chi Minh City have been identified.
- Basketball performance in competitions of 13-14-year-old players in Ho Chi Minh City averaged 1.08%; A Chau International School had the greatest JB performance (1.83%) whereas Nguyen Van Be Secondary School had the worst one (0.59%); Among 07 popular tactics, Tactics 2 and 6 were implemented most efficiently (1.6%), whereas Tactic 5 had the lowest shooting efficiency (0.59%). The results also showed that JB performance was significantly linked to the contest results. It suggested that school teams with a large number of good jump shooters tended to obtain more scores than that with a few ones.

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