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EFFECTS OF TACTICAL GAME+ENCOURAGEMENT ON IMPROVE DECISION MAKING AND SKILL EXECUTION IN BASKETBALL ATHLETES

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Abstract

This study aims to investigate the effect of TG+E on increasing DM and SE among basketball athletes through true experimental research with a 12 week randomized controlled trial design. The participants involved basketball athletes from the Pasundan Teacher Training and Education College (Indonesia), totaling forty people. Participants were allocated in TG+E (n = 20) and CG (n = 20) groups. The instruments for measuring DM and SE were direct observation and camera recording. Non-parametric with the Mann-Whitney U test was chosen for analysis between TG+E and CG in the initial-test and final-test. The results of this study showed significant differences in all DM and SE variables in TG+E from initial-test until final-test related to Inside shooting (p < 0.05), Outer shooting (p < 0.05), Passing to zone (p < 0.05), 6.25 m passing (p < 0.05), Far passing (p < 0.05) and Dribbling to zone (p < 0.05). Meanwhile, in CG the differences only occurred in DM and SE which was related to Passing to zone (p < 0.05), 6.25 m passing (p < 0.05), and there was no difference in other aspects. Thus, we emphasize TG+E as an alternative and training solution to improve the quality of DM and SE among basketball athletes.

Keywords: Encouragement. Game performance. Tactical game. Team sport

Introduction

Basketball is a team sport that has a high level of competition among athletes (Li & Zhang, 2022; Gür et al., 2022). Therefore, athletes need to work hard in order to develop and improve their performance to be better from day to day. Data from previous studies reported that physical (Fattah & Ali, 2023; Čović et al., 2023), psychological, technical and tactical abilities must be nurtured and developed well (Luo et al., 2023), because these aspects have a great contribution for athletes to show their performance in the competition (Cao et al.,

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2022). Among these aspects, the main focus which needs to be developed is game performance related to decision making (DM) and skill execution (SE).

In sports, DM has an important role and get attention in recent years (Robles et al., 2020). Basically, DM can be interpreted as a selection process from athletes to determine the behavior that will be showed in the competition (Nascimento et al., 2023; Suárez et al., 2020). It is known that basketball has high-intensity characteristics in attacking and defending (Čaušević et al., 2023), thus requires athletes to make multiple decisions throughout the game. Considering this, it is necessary to learn DM in the game (Lubay et al., 2021), which potentially improve the ability of athlete to attack the opponent's area or choose the accurate decisions in defense which as a key performance in the game (Murr et al., 2021). According to Panchuk et al. (2018), athletes need to carry out DM quickly and effectively, because this will influence the results, whether they are success or failure in attacking the opponent. In addition, an accurate DM is influenced by athletes' cognitive ability such as creativity which results in more precise and flexible decisions (Silva et al., 2021). Recent research reported that the ability to detect information from surrounding can be an important factor in determining successful DM during a game (Gil-Arias et al., 2019; Kent et al., 2022; Hinz et al., 2022). Athletes need a good DM to fulfill the requirement.

SE is the next important element in the basketball game that must get attention, because it is related to movements such as jumping, running, throwing (Lubay et al., 2021; Luo et al., 2023). Basically, SE can be interpreted as the level of ability to perform a movement skill in basketball to support DM. An athlete who has a well-developed SE has the potential to shoot the ball into the ring successfully, then passing accurately to team mates and dribbling skillfully pass through opponents (Gil-Arias et al., 2019). On the other hand, low SE can be a factor that cause poor performance in movement. Previous research reported that SE is the key to determine success among athletes in achieving high performance in team sports (Piggott et al., 2019; Farley et al., 2020; Olteanu et al., 2023), or predicting future performance (Koopmann et al., 2020). In addition, the research from Faber et al. (2021), reported that SE is an important component in the career development of athletes to reach elite levels in sports that rely on technical performance. Thus, to optimize the athlete's DM and SE elements, the coach needs to design an approach with representative training tasks, namely those that resemble a basketball competition with actual rules. To achieve this goal, tactical games can be used as a methodological tool in optimizing DM and SE elements.

Tactical games are an approach that can be used in the training process to improve athletes' playing performance related to decision making and execution skills (Borges et al., 2022; Gouveia et al., 2019). Basically, tactical games can provide training that is representative of real matches (Juliantine & Setiawan, 2022), so that it can provide athletes with the opportunity to have more time to make DM and carry out SE in game situations (Sucipto et al., 2021). Recent research reports that tactical games can make athletes learn much more about tactical awareness such as how or what decisions to choose in carrying out effective attacks and defenses as well as how to carry out successful SE (e.g., shooting, dribbling, passing) (Pan et al., 2023). The same thing was explained by Robles et al. (2020), tactical games, Game Sense, Play Practice, Games Concept Approach or Invasion Games Competence have the same training concept, namely using games as the main tool to create situations that allow athletes to develop DM and SE. Several studies have documented the benefits of using tactical games, for example it has been proven to increase better DM and more motor engagement time (Gouveia et al., 2019), improve team functioning (Tassi et al., 2023), and can positively improve motivation, enjoyment, responsibility and game performance (Pan et al., 2023). Considering the many benefits that tactical games provide, this research tries to apply tactical games by integrating verbal encouragement to athletes.

Tactical game+encouragement (TG+E) is an effort from coach to provide verbal motivational stimuli to athletes while carrying out the basketball training process. By providing positive verbal encouragement, athletes will be much more enthusiastic and motivated in carrying out various kinds of exercises given by the coach. Data from previous studies reported that encouragement given by coaches is an important factor in triggering high training motivation among young athletes (Selmi et al., 2017). Recently Hammami et al. (2023), analyzed the effects of verbal encouragement on physical fitness, technical skills and physiological response, and the results showed that providing verbal encouragement can create positive improvements in the physical fitness aspects of technical skills and physiological responses during competitions. Apart from that, giving verbal encouragement has been proven to have an impact on players' internal intensity, mood and enjoyment (Selmi et al., 2023). Thus, this research present innovation in tactical game research combined with providing verbal encouragement.

Research on tactical games has been investigated extensively by several researchers in the world (Calábria-Lopes et al., 2019; González-Espinosa et al., 2021; Güneş & Yılmaz, 2019; Harvey et al., 2020; Juliantine & Setiawan,

2022; Robles et al., 2020; Silva et al., 2021; Sgro et al., 2020; Sgrò et al., 2021; Sucipto et al., 2021). However, there was limited data from previous research on tactical games that investigated the effects of TG+E on improving game performance related to DM and SE in basketball athletes. Based on this gap, researcher presented a novelty, namely analyzing the effects of TG+E through true experimental research with a 12 week randomized controlled trial design. Therefore, this study aims to test the effect of TG+E on increasing DM and SE in basketball athletes through true experimental research with a 12 week randomized controlled trial design.

Material and methods

Ethical considerations

All participants had read about the rules in true experimental research. Apart from that, they signed informed consent to become participants. Ethical approval was obtained from the Ethics Committee of the Pasundan Teacher Training and Education College, Faculty of Teacher Training and Education (letter number: 705/LPPM-STKIP-P/2023). This research was conducted in accordance with the ethical standards of the Declaration of Helsinki.

Participants

The participants involved in this true experimental research were fifty male basketball athletes at the Pasundan Teacher Training and Education College (Indonesia). Participants were selected based on inclusion criteria, namely: (i) Participants are not sick or injured (ii) Participants are not taking part in other activities. There were 40 out of 50 athletes who were selected based on the inclusion criteria (See Fig. 1). Then students were allocated into the experimental group (TG+E, n = 20) and the control group (CG, n = 20) with random analysis (<https://www.randomizer.org/>). The detail data of age, height, weight and training experience is presented in Table 1.

Instruments

DM and SE: The instruments used to measure DM and SE when playing basketball were adopted from previous studies (Gil-Arias et al., 2019). Measurements were carried out by directly observing athletes' decision making and skill in real game situations for 45 minutes. Apart from direct observation, the research team also recorded with a camera, in order to assess them objectively. This observation was carried out in several conditions, such as inside shooting, Outer shooting, Passing to zone, 6.25 m passing, far passing and Dribbling to zone. If the athletes succeed to carried out DM, the score would be 1, but if the athletes were unsuccessful, the score would be 0. Likewise, if the athletes succeed to carried out SE, the score would be 1 but if the athletes were unsuccessful, the score would be 0. This instrument has an inter class correlation (ICC) = 0.86. Observations on athletes were carried out by a research team and assisted by three experts in the TG+E approach and basketball.

Design and procedure: This true experimental research was carried out from September to November 2023. Study was conducted 3 times a week, namely on Tuesdays, Thursdays and Saturdays in the sport fields of the Pasundan Teacher Training and Education College (Indonesia). On September 2 2023, all participants carried out an initial test, namely observing the DM and SE of athletes when playing basketball from 07.00-08.00 noon.

The TG+E and CG programs were carried out from 09.00-10.00 am for 12 weeks. Starting from September 5 2023, the experimental group carried out the TG+E program while the CG only carried out traditional learning, the activities of the two groups were carried out until November 25 2023. Then on November 28 2023, all participants carried out a final test, namely observing the DM and SE of athletes when playing basketball from 07.00-08.00 in the morning.

Table 1: Characteristics of each group

Variables	TG+E (n = 20)	CG (n = 20)
	M±SD	M±SD
Age (year)	18.1 ± 1.10	18.7 ± 0.82
Height (cm)	162.0 ± 3.36	164.2 ± 3.36
Weight (kg)	57.7 ± 2.11	58.4 ± 2.63
BMI (kg/m ²)	21.4 ± 0.96	21.0 ± 0.94
Training experience (year)		
1 year	12 (60%)	11 (55%)
2 years	7 (35%)	8 (40%)
3 years	3 (15%)	1 (5%)

Note: TG+E-Tactical game+encouragement, CG-Control group, M-Mean, SD-Standard deviation, BMI-Body max index.

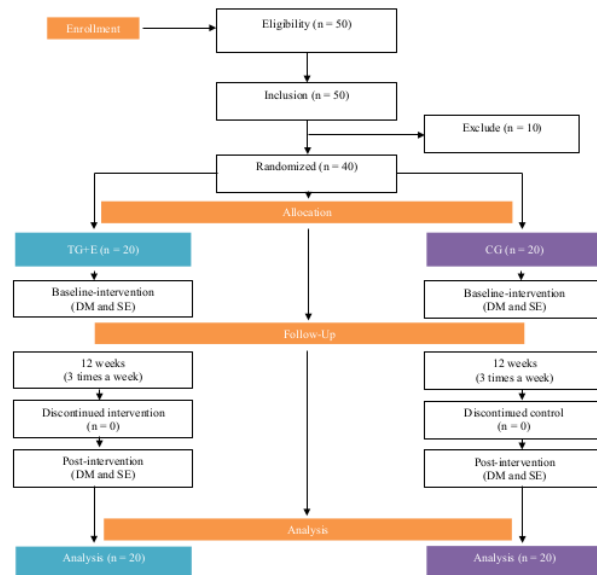


Figure 1: CONSORT diagram.

TG+E program for 12 weeks: The intervention program, namely the TG+E approach, was implemented at 08.00-09.00 morning at the Pasunda Teacher Training and Education College. The first activity was warming-up for 5 minutes then the participants were divided into 4 groups, each group consisted of five athletes. Each group participated in competition for 45 minutes to teach how to make decisions and execute skills successfully. At the end of this activity, all participants carried out a cool-down and evaluation for 10 minutes. This activity was carried out for 12 weeks. The detail about TG+E program for 12 weeks is presented in Table 2.

Statistical analysis

Descriptive statistic (mean \pm standard deviation) was used in this study. This study implemented the Shapiro-Wilk normality test because the data was assumed to be non-normally distributed. The non-parametric Mann-Whitney U test was chosen for analysis between TG+E and CG in the initial-test and final-test (Gil-Arias et al., 2019; Simón-Chico et al., 2023). The effect size test (Cohen's d) was used in this study with the criteria: trivial: 0.00-0.19, small effect: 0.20-0.49, moderate effect: 0.50-0.79, large effect: 0.80 > (Resitas et al., 2023; Hammami et al., 2023). All data were analyzed using the Jamovi v.2.3 application and $p < 0.05$ was set as the significance level.

Results

Data on Table 3 showed that there was a significant difference in DM scores in TG+E from initial-test until final-test related to Inside shooting DM ($p < .001$, $d = 0.98$), Outer shooting DM ($p < .001$, $d = 0.93$), Passing to zone DM ($p = 0.002$, $d = 0.56$), 6.25 m passing DM ($p < .001$, $d = 0.94$), Far passing DM ($p = 0.003$, $d = 0.53$) and Dribbling to zone DM ($p < .001$, $d = 0.67$). Meanwhile, in CG there were differences in DM related to Passing to zone DM ($p = 0.031$, $d = 0.39$), 6.25 m passing DM ($p = 0.005$, $d = 0.51$) but there was no differences in other aspects.

Note: TG+E-Tactical game+encouragement, CG-Control group, DM-Decision making, M-Mean, SD-Standard deviation.

Based on Table 4, there was a significant difference in SE scores in TG+E from initial-test to final-test with regard to Inside shooting SE ($p < .001$, $d = 0.95$), Outer shooting SE ($p < .001$, $d = 0.98$), Passing to zone SE ($p < .001$, $d = 0.89$), 6.25 m passing SE ($p = 0.003$, $d = 0.55$), Far passing SE ($p = 0.005$, $d = 0.51$) and Dribbling to zone SE ($p < .001$, $d = 0.73$). Meanwhile, in CG the differences occurred in SE related to Passing to zone SE ($p < .001$, $d = 0.64$), 6.25 m passing SE ($p = 0.002$, $d = 0.58$) but there was no difference in other aspects

Table 2: TG+ E program.

Week	Content	TG+E principle
1-2	Topic: Introduction and outline of the unit beginning 1. Basic dribble, pass/catch the ball, shoot. 2. 5-on-5 basketball game.	1. Create space to attack. 2. Tactical understanding in games. 3. DM skills. 4. SE. 5. Verbal encouragement (motivation).
3-4	Topic: Effective dribble games 1. Driving lay-up, 3-on-3 attack and defense. 2. 5-on-5 basketball game.	1. Dribble and cut through to create space for attacking. 2. Tactical understanding in games. 3. DM skills. 4. SE. 5. Verbal encouragement (motivation).
5-6	Topic: limited-time delivery offensive and defensive tactics 1. Pass/fake moves, defense/steals. 2. Offensive and defensive tactics. 3. 5-on-5 basketball game.	1. Passing game, use fake moves to lay-ups or pass opportunities. 2. Tactical understanding in games. 3. DM skills. 4. SE. 5. Verbal encouragement (motivating).
7-8	Topic: shoot with great precision 1. Jump shot, driving to the hoop. 2. 5-on-5 basketball game.	1. Should I hold the ball or shoot at the goal? 2. Give and go, fast break. 3. Tactical understanding in games. 4. DM skills. 5. SE. 6. Verbal encouragement (motivating).
9-10	Topic: shoot with great accuracy 1. Pick and roll. 2. Driving to the hoop/catch and shoot. 3. 5-on-5 basketball game.	1. How should I place my body to protect ball? 2. Backdoor cut, give and go. 3. Tactical understanding in games. 4. DM skills. 5. SE. 6. Verbal encouragement (motivating).
11-12	Topic: attack opponent's field 1. Change defense to attack. 2. Defense/attack tactical application. 3. 5-on-5 basketball game.	1. Where should I shoot ? 2. Creating and defending space as a team. 3. Tactical understanding in games 4. DM skills. 5. SE. 6. Verbal encouragement (motivating)

Table 3: Mean and standard deviation of DM from each group.

Variables		TG+E (n=20)	Mann-Whitney U test			CG (n=20)	Mann-Whitney U test		
		M \pm SD	t	p	d	M \pm SD	t	p	d
DM									
Inside shooting DM	Initial-test	29.6 \pm 5.32	2.50	< .001	0.98	16.5 \pm 1.64	151	0.181	0.24
	Final-test	45.8 \pm 4.92				17.8 \pm 2.86			
Outer shooting DM	Initial-test	22.9 \pm 3.25	13.5	< .001	0.93	18.6 \pm 2.03	186	0.701	0.07
	Final-test	30.8 \pm 2.80				18.9 \pm 2.01			
Passing to zone DM	Initial-test	24.3 \pm 4.43	87.0	0.002	0.56	21.1 \pm 3.99	121	0.031	0.39
	Final-test	29.1 \pm 4.15				23.5 \pm 1.47			
6.25 m passing DM	Initial-test	16.9 \pm 2.16	10.5	< .001	0.94	16.1 \pm 1.57	97.0	0.005	0.51
	Final-test	22.1 \pm 1.59				18.5 \pm 2.78			
Far passing DM	Initial-test	10.6 \pm 1.43	92.5	0.003	0.53	9.85 \pm 1.35	169	0.402	0.15
	Final-test	12.4 \pm 2.06				10.4 \pm 2.14			
Dribbling to zone DM	Initial-test	5.85 \pm 0.813	66.0	< .001	0.67	6.05 \pm 0.686	161	0.251	0.19
	Final-test	7.35 \pm 1.23				6.30 \pm 0.733			

Table 4: Mean and standard deviation of SE from each group.

Variables		TG+E (n=20)	Mann-Whitney U test			CG (n=20)	Mann-Whitney U test		
		M±SD	t	p	d	M±SD	t	p	d
SE									
	Inside shooting SE	Initial-test Final-test	30.9 ± 5.52 45.5 ± 4.64	8.50	< .001	0.95	16.3 ± 1.74 16.9 ± 2.48	170	0.404
Outer shooting SE	Initial-test	25.1 ± 2.88	4.00	< .001	0.98	16.8 ± 2.07 17.6 ± 2.09	165	0.337	0.17
	Final-test	33.1 ± 2.43							
Passing to zone SE	Initial-test	26.1 ± 3.43	22.0	< .001	0.89	22.4 ± 2.85 25.6 ± 1.95	72.0	< .001	0.64
	Final-test	33.8 ± 3.04							
6.25 m passing SE	Initial-test	18.9 ± 1.98	89.0	0.003	0.55	19.4 ± 3.91 22.6 ± 2.58	83.5	0.002	0.58
	Final-test	22.0 ± 3.54							
Far passing SE	Initial-test	12.9 ± 2.33	97.5	0.005	0.51	11.6 ± 1.57 11.8 ± 1.97	197	0.934	0.17
	Final-test	15.4 ± 2.89							
Dribbling to zone SE	Initial-test	10.4 ± 2.93	53.5	< .001	0.73	8.00 ± 2.20 8.35 ± 2.28	182	0.629	0.09
	Final-test	16.5 ± 4.75							

Note: TG+E-Tactical game+encouragement, CG-Control group, SE-Skill execution, M-Mean, SD-Standard deviation.

Discussion

Our research aims to investigate the effect of TG+E on increasing DM and SE in basketball athletes through true experimental research with a 12-week randomized controlled trial design.

There were main findings in this study that need to be acknowledged. First, there were differences in DM values in TG+E from initial-test until final-test, while in CG, the differences occur in DM related to Passing to zone DM and 6.25 m passing DM but there was no difference in other aspects. Second, there were differences in SE values in TG+E from initial-test initial final-test, while in CG, the difference occurred in SE related to Passing to zone and 6.25 m passing and there was no difference in other aspects.

These findings proved that TG+E is better than CG in improving the quality of DM and SE (including Inside shooting, Outer shooting, Passing to zone, 6.25 m passing, Far passing and Dribbling to zone) among basketball athletes which showed significant improvement between initial-test and final-test in the same time. This is because TG+E presented a real game-based training approach to athletes (Silva et al., 2021), which provided opportunity to conducted DM and SE more frequently and repeatedly during training sessions (Gouveia et al., 2019; Sgró et al., 2021). In addition, changes regarding tactical understanding in TG+E can be observed from their decisions made, including: knowing suitable time to pass the ball to a teammate (Harvey et al., 2020), and the successful execution skills was obtained when they were passing the ball accurately. This finding is similar to the previous research that revealed TG+E was designed and created as a way to encourage athletes to learn DM and SE more completely than other approaches (Juliantine & Setiawan, 2022; Ortiz et al., 2023). Other research also reported similar results, which stated that athletes' understanding of tactics had increased significantly (Robles et al., 2020), for example athletes were able to take right decisions in attacking and defending (Pan et al., 2023) so that they are able to display a good basic technique (Araújo et al., 2020). One of the aspects that is most highlighted is CG has a coach-centered concept, which is identically with repeated technical training, so that in the CG program athletes have little opportunity to do DM and SE (Sucipto et al., 2021) whereas the TG+E program used real games as a tool in teaching what and how to carry out successful DM and SE (González-Espinosa et al., 2021). On the other hand, research by (Güneş & Yılmaz, 2019), also supported this research, which showed that a tactical game-based approach is more effective than CG in developing game performance related to DM and SE in basketball. Overall, the evidence in previous studies is in line with and supports the current results, they are concluded that the most effective approach in developing tactical understanding in an invasion sport is TG+E (Hodges et al., 2018; Ramos et al., 2020; Sgró et al., 2020; Papagiannopoulos et al., 2023).

Another advantage of the TG+E program is the presence of verbal encouragement from coach to athletes during training situations, which is a positive factor in triggering athletes to carry out DM and SE. This is also explained by previous research that verbal encouragement in training sessions has a positive impact on athlete performance (Pacholek & Zemková, 2022; Selmi et al., 2023). Lastly, the uniqueness and novelty in this true experimental research with a 12 week randomized controlled trial design is TG+E positively improves the quality of DM and SE among basketball athletes.

Conclusions

Thus, we highlight the importance of TG+E implementation in improving playing

performance related to DM and SE of basketball athletes. Apart from that, this research also contributes to training innovation in the basketball sport and can be used as important information for coaches to develop and improve DM and SE aspects. However, these findings are limited in several ways. First, this study only involved participants (athletes) from one department at the Pasundan Teacher Training and Education College (Indonesia). Second, this study only covered male. It is expected that future research will involve a wider range of participants, namely from several Teacher Training and Education Colleges or Universities in Indonesia or other countries and also involved female, in order to observe the differences in DM and SE in athletes. in both genders.

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