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APPLICATION OF A CREATIVE TRAINING MODEL AND THE DEVELOPMENT OF DISPOSITION TO PLAY AMONG YOUNG 10-YEAR-OLD FOOTBALLERS

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Authors' contribution:

A. Study design/planning
B. Data collection/entry
C. Data analysis/statistics
D. Data interpretation
E. Preparation of manuscript
F. Literature analysis/search
G. Funds collection

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Abstract:

Introduction: Modern tendencies of football education lead towards teaching games for understanding based on the development of mental abilities which may result in players' game creativity.

Aim: The aim of the study was to check the impact of the model proposed by the authors regarding creative of teaching young football players on changes in the level of acquiring professional knowledge and the effectiveness of actions in the game - four versus four with goalkeepers (gk. + 4 vs. 4 + gk.).

Materials and methods: The research was conducted on a group of football players from the Sports Club `Słomniczanka` Słomniki. The group consisted of 32 young players age 10 (Junior E). The study was carried out from August 2016 to July 2017. The research implemented the method of pedagogical and natural experiment. The technique of parallel groups (the experimental and control ones) was applied in the study. In the evaluation of players, the test of special knowledge and observation of players effectiveness in the game (gk. + 4 vs. 4 + gk.) was used.

Results: Analysis of research showed that the creative training programme based on intellectual teaching in comparison to the traditional method had better impact on the level of tested parameters. This was proved by the results of yearly experimental research which indicates substantial statistic intergroup differentiation concerning the evaluation of special knowledge and effectiveness in the game. Based on correlation analysis, it was also found that there are significant relationships between the level of specialist knowledge and effectiveness in the game (gk. + 4 vs. 4 + gk.).

Summary: Modern programmes of football teaching should include creative methods of training, providing opportunities to use special knowledge in solving alternative situations referencing to specifics of the game.

Introduction

Analysis of the game of football shows that the circumstances of the game make it possible to choose alternative actions in situations of open motor problems [1]. Not all solutions should be considered optimal. Hence, in the training of young football players, there is a need to develop specialist knowledge regarding the effective implementation of actions during the game [2, 3, 4, 5, 6, 7]. Education carried out in this manner is visible in the concepts of teaching games with understanding - Teaching Games for Understanding [8], which has set the contemporary direction of the development of creativity among young players [9, 10]. In literature on the subject of specialist knowledge, 3 types are distinguished [4]: *declarative* knowledge (what to do), representing factual information, e.g. rules, history, i.e. knowledge that can be remembered and then recalled exactly as it was memorised [11]; *procedural* knowledge (how), consisting in how to do something, it concerns a motor activity (e.g. the process of performing a move-

ment) and choosing an answer (e.g. what move to make in a specific situation) [12]; and *strategic* knowledge (general principles), considered a specific type of procedural knowledge, including goal-oriented procedures that can be used at different times - before, during or after a task [13]. It is assumed that players with more professional experience have a higher level of declarative and procedural knowledge [14]. According to Gonzalez-Vilora et al. [6], having optimal knowledge and specific experiences is the basis for quick decision-making and effective solving of situations with various degrees of uncertainty. Moreover, creative implementation of the obtained knowledge in open training, with regard to movement problems related to the game specifics, may be considered an example of supporting creativity because the players are inspired to make conscious decisions implementing their own action programmes [15].

Taking into account the above information, it seems that the player should expand the scope of his/her specialist knowledge. Thanks to this, it becomes easier to collect relevant information from the game pitch, to interpret it correctly and to make the right decisions during the competition [16, 17, 18]. Hence, in the education of young players, it is worth paying attention to the process of intellectualising sports training, that is, educating the player by exposing her/him to knowledge about the implementation of the activities taught during the game.

Study aim and research questions

The aim of the study was to assess the impact of the training conducted with the use of a creative training model on the development of specialist knowledge and performance in the team game among young 10-yaer-old footballers.

Considering the objective of the work, the following research questions were posed:

1. Does the model of creative training proposed by the authors have advantageous influence on the development of specialist knowledge and efficiency in the team game - four versus four with goalkeepers (gk. + 4 vs. 4 + gk.)?
2. What are the differences in the level of specialist knowledge and performance in the team game (gk. + 4 vs. 4 + gk.) between the experimental and control groups during the one-year experimental research period?
3. Does the knowledge of technical and tactical activities affect the efficiency of their implementation in the team game (gk. + 4 vs. 4 + gk.)?

1. Research materials and methods

The research was carried out among a group of children practicing football at LKS "Słomniczanka" Słomniki - a "satellite" club of the "Wisła" Kraków Football Academy. The group consisted of 32 young footballers aged 10 ("Orlik" / Junior E). During research, the young players took part in the "Orlik" games organised by the Małopolska Football Association - Krakow Sub-district.

In research on the effectiveness of the training process among young footballers, the method of pedagogical experiment [19] was used, based on the technique of parallel groups: experimental (E) and control (C).

The research procedure was carried out in 3 stages. The first consisted in conducting a preliminary trial, the purpose of which was to select the players for survey, to determine their baseline values and divide them into 2 groups, equal in terms of skills: experimental and control (preparatory period / beginning of the starting period – August / September 2016).

The second stage was to observe the changes in the level of the examined indices after the 6-month training period (after the end of the autumn round - December 2016 / January 2017).

The third stage of the research consisted in re-measuring the players' progress during the annual training cycle (transition period after the end of the season – June / July 2017).

On the basis of ranking the assessments (motor skills - 20; coordination motor skills - 21; special techniques - 22; specialist knowledge - 3), the young players were divided into 2, as equal as possible, research groups: the experimental group ($n = 32$), in which the authors' original model of creating training was implemented and the control group ($n = 32$), in which training was carried out in traditional form. The choice of training method for individual groups was randomised [23].

Among the players from the experimental group, a creative training model based on the intellectualisation of teaching was implemented, founded on the concept of teaching games for understanding [8]. This model distinguishes 2 main areas of education among young players. The first one contains 7 closely related elements, the aim of which is to develop a conscious team game (intelligent game) - Fig. 1.

The second area of education for young football players, including the above elements of the discussed model, is the time structure of the training organisation, which included a monthly training plan - training modules (Fig. 2) and the structure of the training unit (Fig. 3):

- **The monthly training plan** has been divided into 4 periodically repeating modules, valid for 1 week. In each module, the main focus was on a different element of training - the main topic of the course. Elements such as goal shots and conscious team game, due to their in-game value, were incorporated into each training module.

- **Training unit design** – based on the teaching method: "from the whole, on through details, to the whole" [24]. In the construction of the training unit, this method manifests itself in the form of "game - training - game" [25] - Fig. 3.

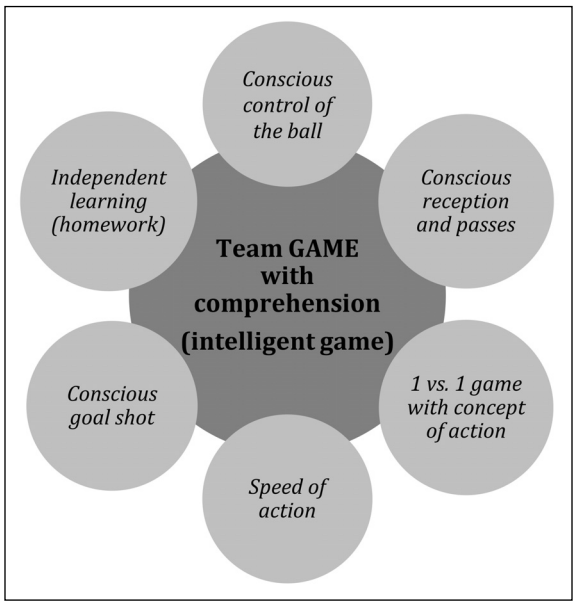

Fig. 1. Elements of creative teaching in football

In the control group, the teaching process was carried out using traditional methods. The same training programme for players was implemented in this group. The difference in education was only with regard to the selection of the teaching method: in the experimental group, the model of creative training proposed by the authors, in the control group, the "traditional" method (Tab. 1).

The scope of research included the measurement of specialist knowledge and the assessment of the players' performance in the game. To obtain an evaluation of the level of knowledge, the authors' specially designed test of knowledge about the actions implemented by the footballers during the game was used (wt = 0.91, rtt = 0.83) - according to Duda's concept [3], which takes into account the basic technical and tactical activities carried out during the game - Fig. 4.

The evaluation of game effectiveness was conducted on the basis of video material analysis with the use of objectified observation sheets (tt = 0.89, rtt = 0.81) [26, 3], where the players selected in an organised manner (according to rank ratings) were assessed in 3 games - four versus four with goalkeepers (gk. + 4 vs. 4 + gk.): players from the experimental group against players from the control group Selected individual actions were analysed (goal shots, leading the ball, dribbling and feints, stealing the ball from the opponent, clearance)

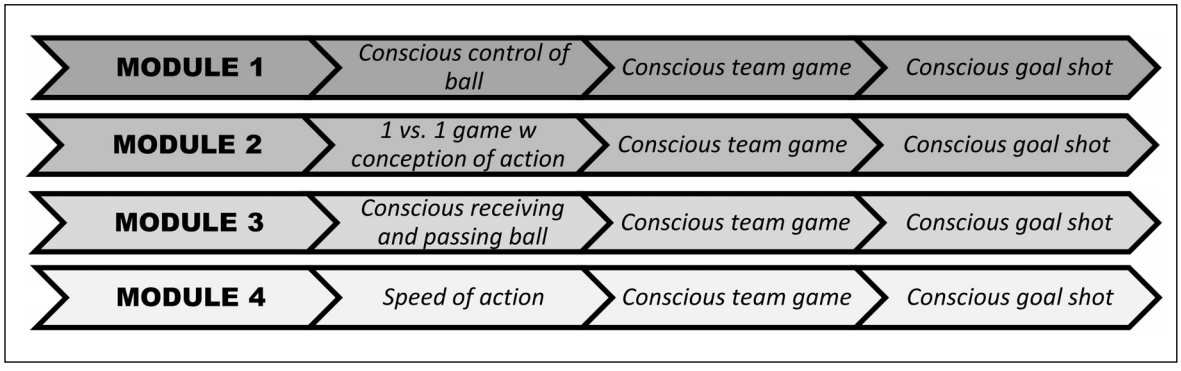

Fig. 2. Month-long training plan – modules of training

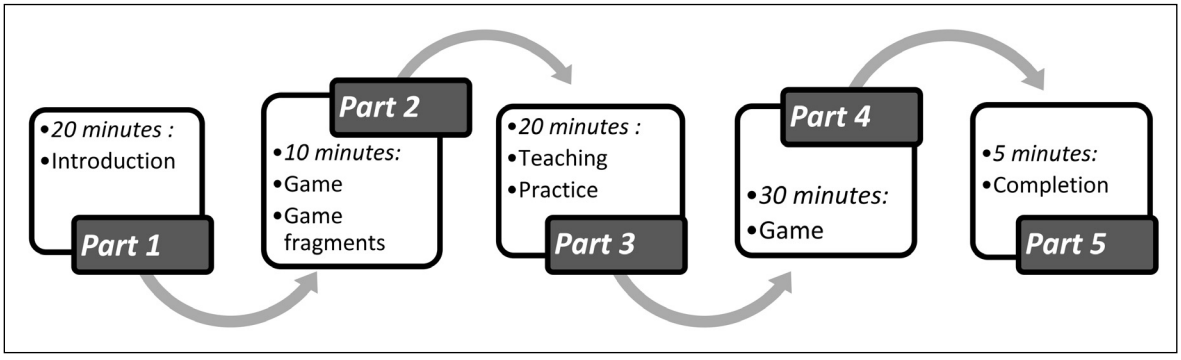

Fig. 3. Training unit design

Tab. 1. Characteristics of the teaching process in the experimental (E) and control (C) groups

Season	Study group	Age	Number of people in group	Number of leading coaches	Content of teaching	Dominant teaching method	Duration of education (in months)	Number of training units	Approximate share of theoretical content in training
2016/ 2017	E	10	16	-Coach -Assistant	Movement action	Authors' original teaching method	10	100	20 %
2016/ 2017	C	10	16	-Coach -Assistant	Movement action	Traditional method	10	100	5 %

1. The scheme presented below presents 3 variations for solving a goal situation. Order the given attack variations according to chance of scoring a goal (from greatest to least): …..

a) Player "A" begins dribbling with the defender/back and takes a goal shot with lace strike

b) Player "A" passes the ball to "B" who takes a goal shot using with sidefoot

c) Player "A" passes the ball to "C" who performs a cross with sidefoot to teammates running into the penalty area

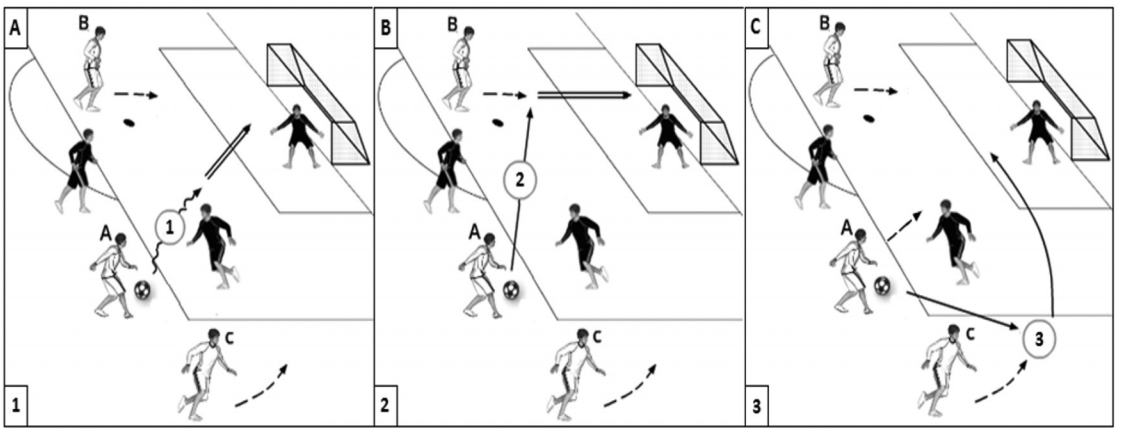

Fig. 4. Example questions of knowledge on actions carried out during the game

and in cooperation with a partner (assistance, passes, reception, assuming position) [3, 27]. Effective and ineffective actions were taken into account, which provided the basis for calculating reliability indices [18] - Tab. 2.

In order to compare the obtained results, basic statistical calculations were used: standard deviation and arithmetic mean. Before performing the analysis of the significance of differences using the Shapiro-Wilk test, it was checked whether the distributions of the examined characteristics are consistent with the norm, which justifies the use of parametric statistical tests. To compare the changes between groups, the Student's *t*-test was used for 2 means. In addition, in order to compare changes within a given group, analysis of variance with repeated measures (ANOVA was) used, while to compare the arithmetic means, Tukey's post-hoc test was applied [28]. On the basis of Pearson's correlation coefficients, correlations between the level of specialist knowledge and efficacy of actions in the team game (gk. + 4 vs. 4 + gk.) were estimated. The calculations were made via the Statistica 10 program. When verifying the hypotheses, the following level of statistical significance was assumed: $p < 0.05$; $p < 0.01$, $p < 0.001$.

2. Presentation and discussion of research results

Analysis of the results was carried out on the basis of 3 stages regarding the pedagogical experiment.

During the commencement of the study, it was found that there were no statistically significant differences between the players from the experimental and control groups ($p < 0.05$).

On the basis of these results, it seems that in terms of the analysed indices, both groups could be considered as equivalent, which justified further research.

Based on the data in Table 3, it can be seen that after a 1-year training cycle, the experimental and control groups obtained statistically significant differences in the results between the first and final measurements of specialist knowledge ($p < 0.01$). However, the upward trend was clearly higher in the experimental group, in which significant differentiation of the results was revealed in the first and second half of the experiment (results: 1 - 2 and 2 - 3) – $p < 0.01$; $p < 0.001$ (Tab. 3).

The greater progression of specialist knowledge indices in the experimental group is the probable reason why calculations of the Student's *t*-test in the second and third stages of the research demonstrated significant differentiation of results between the experimental and control groups - the results were significantly

Tab. 2. Example of complex player evaluation in the game (gk. + 4 vs. 4 + gk.) – according to Panfil's concept [18]

Index / Action	Effectiveness index[1]	Ineffectiveness index[2]	Action index[3]	Reliability index[4]
Goal shot	4	3	7	5.7
Leading the ball	6	3	9	6.6
Dribbling, feints	3	2	7	4.2
Stealing the ball from opponent	5	3	8	6.2
Clearance of the ball	2	0	2	10
Assistance	3	1	3	7.5
Passes	5	2	7	7.1
Reception of the ball	5	3	8	6.2
Assuming position	3	2	5	6.0
Efficacy of action[5]				**6.61**

[1] Effectiveness index = number of effective actions.
[2] Ineffectiveness index = number of ineffective actions.
[3] Action index = effective + ineffective actions.
[4] Reliability index = (effective actions ÷ action index) x 10.
[5] Complex action effectiveness index = (sum of all reliability indices) ÷ 7.

Tab. 3. Changes in level of specialist knowledge indices among players from the experimental (E) and control (C) groups during the 3 stages of research

Variable	Gr.	Test 1			Test 2			Test 3		
		$\bar{x} \pm SD$	p 1 – 2	% 1 – 2	$\bar{x} \pm SD$	p 2 – 3	% 2 – 3	$\bar{x} \pm SD$	p 1 – 3	% 1 – 3
Knowledge	E	10.37 ± 2.00	***0.005***	22.37	12.69± 2.15	***0.000***	22.62	15.56 ± 1.79	***0.000***	50.05
	C	10.44 ± 1.82	0.413	7.76	11.25 ± 1.81	0.088	12.17	12.62 ± 1.75	***0.003***	20.88

Tab. 4. Level of significance of differences regarding specific indices of specialist knowledge between the experimental (E) and control (C) groups during the 3 stages of research

Variable	Gr.	Test 1		Test 2		Test 3	
		$\bar{x}$	p	$\bar{x}$	p	$\bar{x}$	p
Knowledge	E	10.37	0.927	12.69	***0.049***	15.56	***0.000***
	C	10.44		11.25		12.62	

Tab. 5. Changes in the level of action effectiveness indices in the game (gk. + 4 vs. 4 + gk.) in the experimental (E) and control (C) groups during 3 stages of research

Variable	Gr.	Test 1			Test 2			Test 3		
		$\bar{x} \pm SD$	p 1 – 2	% 1 – 2	$\bar{x} \pm SD$	p 2 – 3	% 2 – 3	$\bar{x} \pm SD$	p 1 – 3	% 1 – 3
Game: gk. + 4 vs. 4 + gk.	E	6.04±0.85	0.357	5.79	6.39±0.72	0.152	7.51	6.87 ± 0.55	***0.006***	13.74
	C	6.05±0.84	0.889	2.48	6.20 ± 0.90	0.863	2.26	6.35± 0.85	0.592	4.79

Tab. 6. Level of significance of differences in performance indices for the game (gk. + 4 vs. 4 + gk.) between the experimental (E) and control (C) groups in during 3 stages of research

Variable	Gr.	Test 1		Test 2		Test 3	
		$\bar{x}$	p	$\bar{x}$	p	$\bar{x}$	p
Game: gk. + 4 vs. 4 + gk.	E	6.04	0.927	6.39	0.520	6.87	***0.048***
	C	6.05		6.20		6.35	

Tab. 7. Research results of correlations between the level of knowledge on actions and effectiveness of actions performed during the game (gk. + 4 vs. 4 + gk.) in the experimental group

Experimental group	
Test 1	Game: gk. + 4 vs. 4 + gk.
Knowledge on actions performed during the game	0.714
	p = 0.002
Test 2	Game: gk. + 4 vs. 4 + gk.
Knowledge on actions performed during the game	0.836
	p = 0.000
Test 3	Game: gk. + 4 vs. 4 + gk.
Knowledge on actions performed during the game	0.879
	p = 0.000

Tab. 8. Research results of correlations between the level of knowledge on actions and effectiveness of actions performed during the game (gk. + 4 vs. 4 + gk.) in the control group.

Control group	
Test 1	Game: gk. + 4 vs. 4 + gk.
Knowledge on actions performed during the game	0.806
	p = 0.000
Test 2	Game: gk. + 4 vs. 4 + gk.
Knowledge on actions performed during the game	0.784
	p = 0.000
Test 3	Game: gk. + 4 vs. 4 + gk.
Knowledge on actions performed during the game	0.804
	p = 0.001

higher in favour of the experimental group ($p < 0.05$; $p < 0.001$) - Tab. 4.

At further stages of research, the players' effectiveness in the game was assessed.

When analysing the results of this study in the experimental and control groups, it can be noticed that in the first and second half of the year (measurements: 1 - 2 and 2 - 3), no significant differences were found within any of the groups ($p < 0.05$) - Tab. 5. In the experimental group, significant differentiation of the results was revealed after a 1-year training period when comparing the results from the first and third measurements of game action effectiveness ($p < 0.01$). In this study, no statistically significant differences were found for the control group ($p < 0.05$) - Tab. 5.

When comparing the 2 groups, it can be seen that in the last (third) stage of the study, statistically significant differences were noted within the groups ($p < 0.05$). Based on the results of the Student's *t*-test, it can stated that after a 1-year training period, the performance indices in the game turned out to be significantly higher among the players from the experimental group (Tab. 6).

The search for various factors determining the ability to play football prompts us to think about the importance of the player's level of specialist knowledge on the effectiveness of the player's actions in the game. In order to check this relationship, in the next part of the study, an analysis of the relationship between specialist knowledge and efficiency in the team game was performed (gk. + 4 vs. 4 + gk.).

When analysing the obtained results, it can be noted that both in the experimental and control groups, at all stages of research, a high correlation of the examined indices was noted (Tab. 7 and 8). It is worth noting, however, that in the experimental group, with the passage of time, the links between specialist knowledge and performance in the game became increasingly stronger: $r = 0.714$ (Test 1); $r = 0.836$ (Test 2); $r = 0.879$ (Test 3) - Tab. 7. This tendency was not observed in the control group. Among these players, throughout the research period, the results of the discussed correlation remained relatively constant in terms of the strong correlation: $r = 0.806$ (Test 1); $r = 0.784$ (Test 2); $r = 0.804$ (Test 3) - Tab. 8.

Summarising the results of the discussed correlations for the experimental and control groups, it has been noted that for all calculations, there is a high relationship with a positive value. On the basis of the obtained results, it can therefore be concluded that along with the increase in the level of specialist knowledge, the values of game performance indices also increase and these significant relationships may be considered statistically significant ($p < 0.01$; $p < 0.001$) - Tab. 7 and 8.

Discussion

The dynamic development of the game of football inspires reflection, what dispositions should a young athlete develop in order to meet the requirements of a modern game in a few years? Currently, in theory and practice, more and more attention is being paid to the development of "football intelligence" and creativity in the game [8, 9]. The creative actions of players seem possible thanks to the optimal knowledge of their effective implementation in sports competition [3, 7]. Hence, in the training of young footballers, there is a need for intellectualisation of training, and therefore. the mental participation of the player in the process of learning the game - the game with understanding.

In the conducted research, it was observed that the players belonging to the experimental group achieved greater progress in the level of specialist knowledge. The increase in the indices indicated that the level of knowledge about technical and tactical activities performed during the game improved by 50.05% in the experimental group and by 20.88% in the control group (Tab. 3). A similar trend was also revealed for the performance results in the game (gk. + 4 vs. 4 + gk.). Calculations regarding the percentage progression of results showed that the players from the experimental group improved their performance by 14.58% during the 1-year training cycle, while the players from the control group, by 4.9% (Tab. 5). The greater progression of the examined indices in the group subjected to creative training was probably the reason that the calculations of the Student's *t*-test after a 1-year training cycle showed significant intergroup differentiation in terms of specialist knowledge and performance in favour of the experimental group ($p < 0.001$; $p < 0.05$) - Tab. 4 and 6. Similar results were also obtained in previous research conducted by the authors of this trial [3, 29, 30], as well as in other studies [2, 17], which confirm the trend presented above.

Considering the essence of specialist knowledge within the aspect of creative training in football, the authors noticed that both in the experimental and control groups, the level of the tested knowledge indicates strong correlations with the level of performance in the game (Tab. 7 and 8).

On the basis of the discussed relationship, it may be assumed that among players in the experimental group, the higher level of specialist knowledge was the reason for achieving more favourable action effectiveness indices in test games (gk. + 4 vs. 4 + gk.).

It is also not without significance that in the group subjected to creative learning (E), with the passage of time, the relationships between the discussed indices became increasingly stronger (Tab. 7).

Taking into account the results of the discussed relationship, it can be suggested that in the training of young footballers, in addition to improving motor and physical dispositions, there is also a clear need to develop knowledge about effective operations in the game, because education conducted in this way promotes the progression of performance during sports competition [18, 4, 31]. Based on the above information, it seems that in effective training of children and adolescents, it is worth using creative methods of teaching the game aimed at evoking circumstances of alternative action and making creative decisions based on the acquired skills and information about the game.

Conclusions:

1. The model of creative training contributes to a significant increase in the indices of specialist knowledge and effectiveness in team games (gk. + 4 vs. 4 + gk.).
2. The creative training model based on the intellectualisation of teaching compared to the "traditional" method has greater impact on the development of specialist knowledge and operational efficiency in the team game (gk. + 4 vs. 4 + gk.). This is evidenced by the results of the 1-year experimental research, which showed significant differentiation within the groups in terms of the examined indices.
3. Specialist knowledge determines the efficiency of young footballers during the game (gk. + 4 vs. 4 + gk.).

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