

## SECTION – EXERCISE SCIENCES

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# THE USE OF PROGRAMMABLE SUPPORT IN THE PROCESS OF RATIONAL TEACHING OF FOOTBALL TECHNIQUE IN WOMEN'S GROUPS

**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.** The dynamic development of football and the requirement of an effective game during the performance of footballers' activities, requires the search for more and more efficient methods, which is why programmable support is proposed, which according to the authors, will effectively prepare a competitor to master game technique.

**Aim.** The main objective of the study is to determine the effectiveness of transferring information regarding motor activity of football players using the method based on programmed teaching.

**Materials and methods.** Experimental teaching and testing were carried out as continuous research for a period of 5 months in annual training cycles for a given group, in the years 2006-2015 among 3<sup>rd</sup>-year Physical Education students at the University of Physical Education in Kraków. The female students (120 subjects) who participated in football programmes classes were examined. In the given training cycles, 2 groups were created, of which one - the experimental group (6 individuals in the annual learning cycle) participated in the experimental training unit once a week throughout the study - theoretical and practical classes lasting 90 min. In the second group - the control group, in the annual training cycle (group - 6 people in the annual training cycle), the teaching process was carried out using traditional methods, where messages about the footballer's movement activities were transmitted during practical exercises in the form of instructions.

**Research results and conclusions.** Analysis of the obtained research results confirms the research hypothesis that programmed teaching accelerates the learning of elements of football technique, hence, it can be used as support in the process of effective football teaching.

**1. Introduction**

The development dynamics of modern football are the reason for seeking out effective methods and forms of training. Professional analysis of literature [1-3] shows that in a football game, that is multi-entity in nature, it is required for the training process to include, in addition to the motor and motor sphere, impact on the mental sphere. Therefore, there is a need to use such teaching methods to ensure that information reaching players is applied in a conscious and deliberate manner.

It seems that such requirements can be met by information passed on via verbal and visual channels. It has been proven that when it is used in this way, the general relations of thought processes emphasize the engagement of a player learning sports techniques [4-6]. Such activities are not only aimed at frequently using polisen-sory cognition, but also at understanding its essence, and above all, at stimulating the practitioner's ideomo-torics. While describing particular exercises, mental and imaginary creation and scaling of selected elements in a closed image occur, which during the exercise per-

formed after them, are as if explained in its course. Motor ideas are the “key to efficient teaching” or the “central link in the process of motoric learning” [7-9]. Analysis of problems related to the training process is very important, hence, in this work, experimental procedures were implemented in football teaching techniques based on programmed teaching [5,10]. In this manner of teaching, verbal and visual information in the form of small doses are a kind of “didactic enhancement”.

Research included in this work - regard experimental activities, the aim of which is to improve teaching methodology. For the purpose of this work, these tasks are also intended to facilitate learning how to play football. Such methodical activities are used to overcome difficulties associated with the acquisition of special football skills of beginner players, who are just beginning the process of learning how to play. The research contained in this work was carried out on the example of female students - women learning to play football at sports universities, which, due to the requirement to pass the subject of playing football in practice, had to quickly master the basics of footballer motor activities.

## 2. Research assumptions and objective

Programmed teaching, due to the time consumption of the trainer's prior development of didactic material, is rarely used in traditional training. In professional literature regarding the field of football, there is no significant research on the subject of programmed teaching among footballers, hence, the attempt to apply this method seems interesting from a didactic point of view.

The main goal of the research is to determine the efficacy of providing information on a football player's motor activities, using a method based on programmed teaching.

In this work, the following research questions were posed:

1. To what extent does the transmission of information on motor activity using programmed teaching methods influence the effectiveness of teaching the game technique?
2. Does specialist knowledge of a footballer's (technical) activities affect the level of motor fitness?

The main research question as well as previous analyses of literature on the subject, formed the basis for the hypothesis: **“Players undergoing the teaching process and training with didactic means of supporting football learning, have greater specialist knowledge and motor fitness than players participating in traditional teaching”.**

## 3. Research materials and methods

Continuous experimental teaching and research were carried out for a period of 5 months, in annual training

cycles for a given group, in the years 2006-2015 among 3<sup>rd</sup>-year physical education (PE.) students from the University of Physical Education in Kraków. The group of 120 students who participated in programmed football classes, were examined.

In the given training cycles, 2 groups were created: the experimental and control. Selection for groups included determination regarding the level of special knowledge (knowledge on technical operations) - the test of special knowledge and technical skills - the test of special fitness. In the analysis of knowledge and skill parameters, these groups did not show differentiation at the initial stage of the study ( $p > 0.05$ ).

The experimental group (a group of 6 individuals in the annual learning cycle) participated once a week in the experimental training unit throughout the study - theoretical and practical classes lasting 90 min. In total, 14 lesson units were conducted in training for a given group and for a given training cycle.

In the second group - the controls, in the annual training cycle (group - 6 people in the annual training cycle), the teaching process was carried out using traditional methods, for which information about the footballer's movement activities were transmitted during practical exercises in the form of instructions.

In experimental teaching, programmed teaching [3,5,10,] was used, where coloured boards with individual sequences of football techniques were used, with a brief descriptive instruction (Fig. 1).

The given principles were followed in programmed teaching:

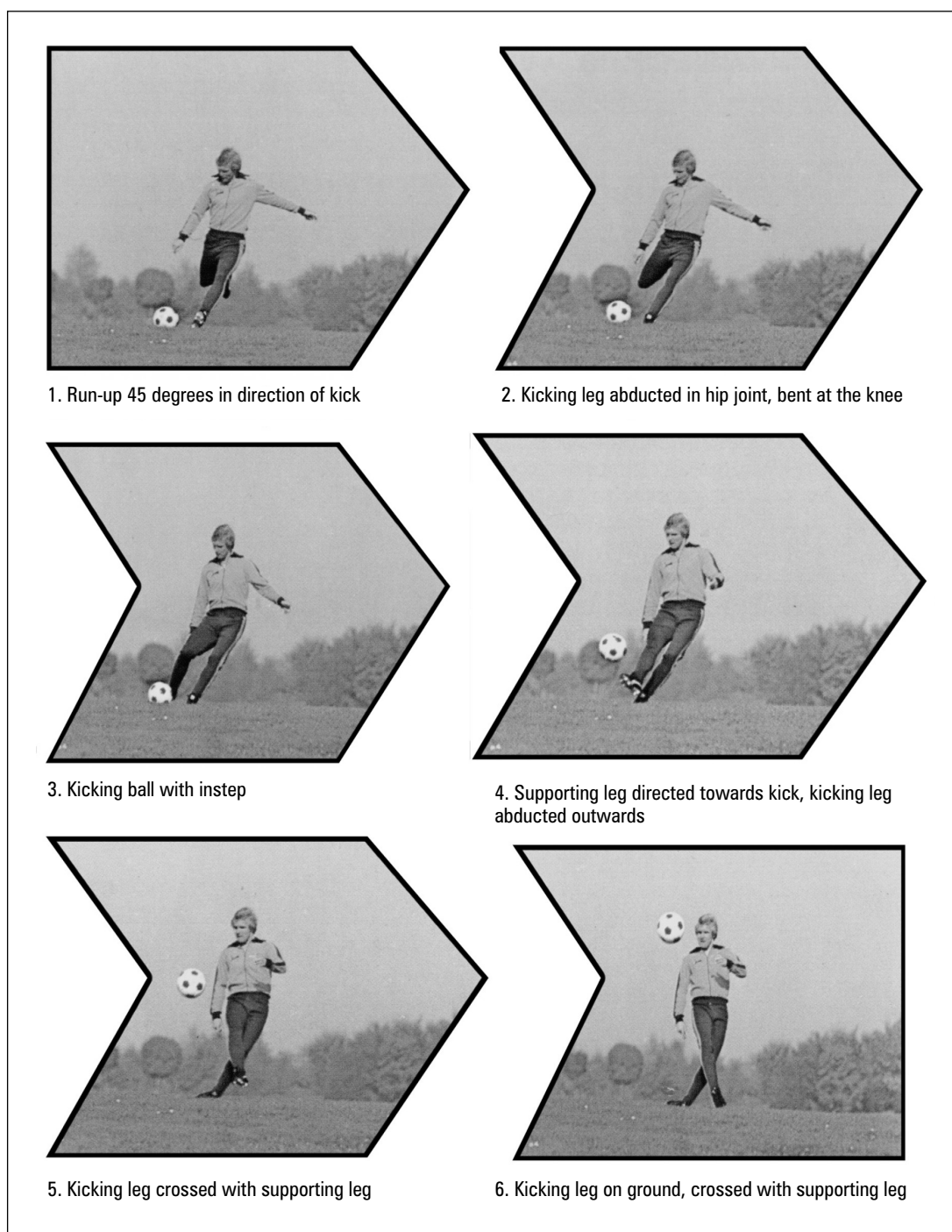
- a) thoroughly familiarising learners with the principles of programmed teaching,
- b) adjusting the number of cards to the number of learners,
- c) card availability during the training lesson,
- d) freedom of student communication during the lesson (exchange of information),
- e) time freedom in using the programmed card

This teaching manner was also supported by a didactic film and programmed cards using computer techniques. The method allowed analysis in slow motion playback and detailed zooming of the presented motion technique.

A technical knowledge test was used to check the level of information about the movement activity of football players [12], containing closed- and open-end as well as demonstrative questions of a problem nature, which, similarly to actions during the game, relates to an alternative choice when solving a given movement task.

The technical fitness test was used to assess the mobility of female students [13].

The test assessed the correct performance of elements of football technique (ball handling, ball hits, ball



**Figure 1.** Example programmed cards used for teaching football techniques (study based on - Bauer [11]).

reception, feint performance, ball steals and ball feeling exercises). The score was noted on a scale of up to 100 points by competent judges, based on an observation sheet [14].

Experimental teaching and control of teaching progress were carried out with the participation of University

employees responsible for the subject - football. They were experienced teachers (3 class 1 coaches).

When assessing the studied groups, the TKI (Technical Knowledge Index) was analysed. This determined the level of knowledge about the footballer's movement activity (technique) and the students' mobility in the spe-

cialised football test. Basic statistical tests were used: standard deviation, arithmetic mean and the level of significance of differences, and correlations were determined from the Student's *t* test [15].

#### 4. Presentation and discussion of research results

The assumptions of the research process were aimed at seeking for a teaching method that would have a high success rate. To achieve this goal, an analysis of football teaching progress in the experimental and control groups was performed. It was assumed that programmed teaching would be a supporting method contributing to the increase of both specialist knowledge and technical efficacy in playing football.

Programmed teaching was used in the experimental group, which was didactic reinforcement in the teaching process [5]. The control group was taught traditional

methods. The division into groups was established after the first study (Tables 1, 2), where as a result of the selection of students for the training groups, no significant differences in the level of knowledge about the player's technical activities were found (significance of differences = 1.12), or in the values of mobility (significance of differences = 0.88) - Tab. 2.

Analysing the results obtained by students from both groups during the second study, after applying the 5-month teaching period, one can notice significant changes in the level of knowledge about motor activities, as well as significant changes in special fitness. By performing this analysis, it can be assumed that programmed teaching significantly increases the value of the Technical Knowledge Index (TKI). The TKI difference between groups in the second study was greatly statistically significant (significance level of  $p < 0.001$ ). A similar dependence can also be seen in the case of the level of special fitness, which was higher for the experi-

**Tab. 1.** Value of technical knowledge index (TKI) obtained by the compared women groups to teaching games in football

Study 1	Control group	Experimental group
Arithmetic mean	32.32	32.04
Standard deviation	2.63	3.67
Significance of differences between groups	1.12	
Study 2		
Arithmetic mean	39.04	45.12
Standard deviation	3.42	3.98
Significance of differences between groups	4.24***	
Level of significance in differences between studies 1 and 2 in the group	6.76***	9.35***

\* $p < 0.05$

**Tab. 2.** Estimate of technical proficiency in the compared groups of women when teaching technical operations

Study 1	Control group	Experimental group
Arithmetic mean	52.78	53.16
Standard deviation	7.12	10.45
Significance of differences between groups	0.88	
Study 2		
Arithmetic mean	57.86	64.38
Standard deviation	6.54	12.73
Significance of differences between groups	2.38*	
Level of significance in differences between studies 1 and 2 in the group	2.27*	3.24***

\* $p < 0.05$

**Tab. 3.** Dependence among results of knowledge on motor operations and results of the technical test in the control group of women learning football

Index	Level of knowledge on motor operations – pts.	Level of motor proficiency in technical test – pts.
Arithmetic mean	39.04	57.86
Standard deviation	3.42	6.54
Correlation	0.807***	

\* $p < 0.05$

**Tab. 4.** Dependence among results of knowledge on motor operations and results of the technical test in the experimental group of women learning football

Index	Level of knowledge on motor operations – pts.	Level of motor proficiency in technical test – pts.
Arithmetic mean	45.12	64.38
Standard deviation	3.98	12.73
Correlation	0.902***	

\* $p < 0.05$

mental group, showing the significance of differences at the level of  $p < 0.001$ , while the control group achieved a lower value - the level of significance of differences was at  $p < 0.05$  (Tab. 2).

High values regarding significance of differences between the results from the first and second studies, in the control and experimental groups, indicate great progress in training. This fact shows that both methods positively influenced learners and fulfilled the tasks posed in the didactic process. In the experimental group, however, a higher value of the significance index of differences between the 1<sup>st</sup> and 2<sup>nd</sup> tests for the level of knowledge about motor activities (TKI), which was  $9.35^{***} > 6.76^{***}$  (Tab. 1), can be seen, indicating same greater dynamics of change for the experimental group where programmed teaching was used.

Similar changes can be seen for the values achieved in special fitness. The experimental group obtained a higher value concerning the level of significance of differences ( $3.24^{***} > 2.27^*$ ) – Tab. 2.

The aim of programmed learning is more efficient learning of motor activities through more effective transfer of specialist knowledge, and thus, learning through understanding. From the presented results (Tab. 3 and 4), it can be assumed that there is a correlation between the level of information and efficiency of a player's motor operations.

Both in the one (experimental group  $r = 0.902^{***}$ ) and the other group (control group  $r = 0.807^{***}$ ), a high correlation was found for these parameters. It can therefore be unequivocally stated that the level of knowledge about the game has significant impact on the performance of a play-

er's motor activities, because according to [16,17,3] - the better the athlete knows the actions, their names, meaning and application, the better s/he perceives and understands the situation in solving motor problems. Understanding motor activity creates mental-motor transfer, where a conscious image of the task is created in the player's mind (in associative fields), which greatly facilitates this task [18]. This thesis is also confirmed by Stroczyński and Stula [19] and Memmert [20], whose views the efficacy of mental processes in the efficiency of the player's performance of motor activities. Maintaining this direction (for full awareness in methodological behaviour) is also confirmed by Masztaler and Holuk [21] as well as Duda [22], who perceive conscious behaviour as greater efficacy in the process of teaching physical actions.

Based on the results of research, it can be concluded that the use of didactic reinforcement, i.e. programmed teaching, could have contributed to more effective teaching movement activities, hence, didactic procedures using the above method should be taken into account in a player's organised training.

**Conclusions:**

- 1. Methodical behaviour based on programmed teaching in learning movement activities, accelerates a player's mastery regarding elements of football technique
- 2. Information about motor movement can have significant impact on the effectiveness of learning football techniques.

**Institutional Review Board Statement:** The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Ethics Committee

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