



Improvement of Theoretical Tennis Knowledge in Student Coaches at the Sports University of Greece

Alexandros Mavvidis^{1*}, Georgios Dallas², Argiris Theodosiou³, Ioannis Mavvidis⁴

¹Department of Physical Education and Sport Science, Democritus University of Thrace, University Campus, Komotini, Greece

²Department of Physical Education and Sport Science, National and Kapodistrian University of Athens, Athens, Greece

³Department of Physical Education and Sport Sciences, Aristotle University of Thessaloniki, Thessaloniki, Greece

⁴Department of Civil and Environmental Engineering, Imperial College London, London, UK

Email: *argtheodosiou@phed.auth.gr

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Abstract

Background: The primary aim of students specializing in a sport is to acquire full scientific knowledge on that sport. Furthermore, a qualitative objective of the specialization is to enable the future coaches to acquire good knowledge on the theoretical aspects of that sport. **Methods:** On the basis of the curriculum, the students of the Department of Physical Education and Sports (DPES) are examined on the theoretical knowledge they hold on issues related to tennis, e.g., technique, tactics, regulations, etc. at the beginning of the academic year, by answering a questionnaire of 80 questions. In order to assess the level of improvement of this knowledge the students answered the same 80 questions at the end of the academic year. The sample consisted of 23 male (11) and female (12) tennis students of the Department of Physical Education and Sport Science (aged 21.20 ± 1.23 years). **Results:** The results revealed significant improvement in all 5 knowledge groups between the two measurements. Although no significant differences were found between male and female students, this improvement was of a different kind. In the “technique” and “knowledge about the racket” related questions, males prevailed over females, whereas female students were superior in the “rules section”. **Conclusion:** In the field of theoretical knowledge the level of education at the Department of Physical Education and Sport Science was, according to the findings of the study, satisfactory.

Subject Areas

Sports Science

Keywords

Tennis, Theoretical Knowledge, Coaching Education

1. Introduction

Athletes' guidance on acquiring athletic skills, regardless of their age, requires general knowledge of the methodology of movements and exercises, pedagogy and other disciplines related to the learning process of sports movements. The students of the Department of Physical Education and Sport Science (DPES) during their studies, based on the curriculum, specialize in a sport in order to acquire scientific knowledge that will enable them to become qualified coaches in that sport. Coaching is a very versatile process that requires coaches to continuously develop their knowledge and skills to keep up with their ever-changing environment with this improvement being influenced by other factors such as infrastructure, logistics, the environment and others [1] [2]. The coaching mentoring process includes "omologues" (such as psychology, biomechanics, exercise physiology, nutrition), sport specific knowledge (technical/tactical) and pedagogy (kinetic mental learning, coaching behavior) interacting to achieve the ultimate goal of coaching [3] [4] [5] [6] [7].

In order for someone to be an accredited coach, he/she should have knowledge of various fields of science such as physiology, sports technology, psychology, sociology and other fields that have been characterized as "evolutionary in status" [8]. The role of coaches is very crucial for the implementation of the training process. A coach's main goal is to improve the performance of his/her athlete and demonstrate awareness in a variety of situations while carrying out a big number of different tasks, but the main role is to develop and improve the performance of teams and individuals [9] [10]. The training and knowledge level of each coach is the most important asset for the qualitative guidance of their athletes [11].

One of the key elements of players' success is undoubtedly the quality of coaching that players receive [12]. To be a coach and work with excellence in different environments, one needs to master different skills and demonstrate expertise in different areas. According to the International Council for Coaching Excellence [13] the ability to work effectively in a complex and dynamic environment such as the sports coaching industry, requires a solid knowledge base (professional, interpersonal and intrapersonal) that supports various skills such as vision, organization, leadership, communication, building of personal relationships, evaluation, reflection, topped with or followed by a series of values that guide professional practice [13]. Recent literature [14] [15] presented a conceptual definition of the different knowledge that forms the basis of the practice of sports coaching. Although this definition subdivides the types of know-

ledge, the authors reiterated that knowledge is interrelated, and by thinking of this in an isolated way could fail take into account the importance of the complex interactional nature of sports coaching. In this perspective [14] it is understood that the scientific and technical knowledge are the basic pillars that define the capabilities of a professional coach. There is limited knowledge on coaches' perceptions and access to sports science knowledge from other cultures. Moreover, it is unclear what effects years of coaching, gender, educational level, coaching certificate level, coaching team or individual sports, and being paid or unpaid have on coaches' perceptions and access to sports science knowledge. More recently, the ways coaches obtain new scientific knowledge has been a matter of debate [16]. Recent research indicated that the issue of transferring sport science knowledge to coaches has been difficult. Coaches are the intended beneficiaries of the outcomes of a large proportion of sport science research [17]. However, it has been perceived by coaches and researchers that a knowledge gap is present between them. In other words, there is incongruence between what sport research produces and coaches' knowledge needs. The learning process has effects in all kinds of human performance, such as cognitive and verbal, while in the physical performance, the visible result is an improved level of performance, which is not learning, but an indication that learning has taken place [18].

Specialized knowledge is often very important as well. For instance, biomechanical analysis of the motion is essential for the understanding of the technical execution of a specific technique in a particular sport [19]. Furthermore, motor learning, particularly early learning, involves attempts by learners to form an idea of the movement [20] or understand the basic pattern of coordination [18]. To achieve these goals, learners use cognitive [21] and verbal processes [22] to solve problems. The amount of information provided, how often and how long it will be given for, is known to affect the level of learning [23] [24].

There are two ways of receiving a tennis coaching diploma in Greece—through four full-time courses at the five University Departments of Physical Education and Sport Science (DPESS), along with a Physical Education teacher degree and through three-four week courses organized by the Governmental Secretariat of Sport (GSS) in conjunction with the National Tennis Federation. A study of Grivas and Mantis [25] supports that Greek tennis coaches personally estimate that they have a thorough knowledge ($M = 5.2$ out of 7) of tennis issues. Therefore, it is necessary to acquire a high level of theoretical knowledge on those skills, which are fundamental for the performing capability and high results in a sport [26] [27].

However, it is not well known whether the studying material provided during the course of study improves the existing level of theoretical knowledge. So, the purpose of this study was to determine the level of improvement in theoretical knowledge in the Department of Physical Education and Sport in the field of tennis, as well as the differences between men and women. It was hypothesized that both genders will possess the same amount of theoretical knowledge.

2. Methods

2.1. Participants

Twenty-three Physical Education and Sport Sciences university students participated the study. Eleven were men ($n_m = 11$) and 12 women ($n_w = 12$). The mean age of the participants was 21.20 ± 1.23 years.

2.2. Measures

The students completed an 80 item questionnaire related to five fields of theoretical knowledge, which has been compiled with reference to international literature [5] [12] [19] [20] [26] [27] [28]. Out of these questions, 15 referred to technique (e.g. differences in technique between slice and top-spin groundstrokes), 12 to tactics (e.g. how the player moves to the net after a first serve), 33 to teaching-coaching (e.g. parameters for tennis performance), 14 to rules (e.g. how many lets one is allowed in tennis) and 6 to the tennis racket (e.g. what is the best tension for a racket). For every question four different choices were given and students were asked to identify the (unique) correct answer (multiple-choice).

2.3. Procedures

The questionnaire was completed with the presence of a member of the research team, with no bibliography or other assistance. After the completion of 2 semester courses the participants completed the same questionnaire to determine the level of learning.

2.4. Analyses

All analyses that were carried out using the statistical package SPSS v. 20. To test data's normality a Kolmogorov-Smirnoff test was made. Paired sample t-test was used to examine possible differences before and after the education program and independent t-test was used to examine possible differences between groups ($p < 0.05$).

3. Results

The responses from all participants are presented in **Table 1**. According to the results which are shown in **Table 1**, there was a better improvement in “rules” from 34.7% to 52.4% in “tactical” responses from 47.5% to 59.7% and in teaching-coaching from 53.13% to 63.78%.

Even though no statistically significant differences were found between the two genders, small differences were observed. More specifically, as it is demonstrated in **Table 2**, in the improvement of knowledge in the “technical” men demonstrated better results than women, *i.e.* from 41.7% (men)/41.5% (women) to 53.9% (men)/45.2% (women), respectively, as well as in the knowledge of the “racket” from 65.1% (men)/53.53% (women) to 74.2% (men)/68% (women).

Table 1. Differences in the theoretical knowledge before and after the education program.

	Pre		Post	
	<i>M</i> ± <i>SD</i>		<i>M</i> ± <i>SD</i>	
Technique	41.67 ± 11.58		49.39 ± 14.15	<i>t</i> = -2.099 <i>Sig</i> = 0.054
Tactics	47.55 ± 1.65		59.74 ± 12.48	<i>t</i> = -3.431 <i>Sig</i> = 0.004
Teaching-Coaching	53.13 ± 10.58		63.78 ± 10.49	<i>t</i> = -2.314 <i>Sig</i> = 0.036
Rules	34.78 ± 11.99		52.46 ± 15.62	<i>t</i> = -5.435 <i>Sig</i> = 0.000
Racket	59.09 ± 19.55		70.98 ± 19.60	<i>t</i> = -2.584 <i>Sig</i> = 0.022

Table 2. Differences in the theoretical knowledge between genders before and after the education program.

	Pre				Post			
	Male		Female		Male		Female	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Technique	41.79	11.57	41.56	12.10	53.90	14.43	45.26	13.13
Tactics	47.68	11.24	47.44	10.59	61.32	12.53	58.30	12.81
Teaching-Coaching	53.07	10.31	53.18	11.26	64.00	10.90	63.57	10.59
Rules	38.01	11.73	31.82	11.93	50.62	11.27	54.16	19.14
Racket	65.12	24.10	53.57	12.91	74.21	20.22	68.02	19.40

Women demonstrated better improvement over men in the “rules” from 38.0% (men)/31.8% (women) to 50.6% (men)/54.1% (women).

4. Discussion

Improvement in theoretical knowledge is, as this study proved, substantial, as students had a generic learning on theoretical sports sciences for the last three years at the Sports University. This is particularly true for the subject of “Teaching-Coaching” where the general learning also covers the more specific one for the sport of tennis. The improvement in the average values is a good indication of the high-quality learning process for the specialization in tennis.

In other subjects clearly associated with tennis, such as the “Rules”, the improvement was much more significant, a fact that is confirmed by the low mean value in the beginning and the respective value after the training/education (34.78%/52.46%).

In other subjects however, such as “Technique” and “Tactics”, the improvement was considerably smaller, *i.e.* 41.67%/49.39% in Technique and 47.55%/59.75% in Tactics. This finding suggests that there is still space for further development regarding the level of progress on these subjects, which might indicate that the time period of the training is not sufficient to allow for further improvement, without at the same time excluding a possible need for a modified/improved training/education process that is likely to bring better results.

Improvement in theoretical knowledge constitutes the basis for the further development of a professional coach. Male and female students are experiencing similar levels of improvement. This has practical application taking into consideration that the “theoretical knowledge” is the background and the main factor upon which the coaches will have to base their work [9] [16] [29].

In view of the rate of improvement by studying in a Sport University, it can be supported that the training of coaches should take place in such an institution, something that internationally does not happen today, for example, in Canada where 60% of coaches are in fact non-physical education teachers [30]. As discussed, in topics that are more fixed and specifically determined, such as “regulations”, improvement is greater (11.4%/22.3%) among women, while in “technical” topics men show better improvement (4.3%/12.3%), probably because they appreciate and improve more in the act of the sports.

Contributors

All authors have read and approved the final manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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