

Carrying out the methodological approach of the scientific research in the Physical Education and Sport Science field

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Abstract

Background and Study Aim The scientific research activity at the level of academic studies aims to acquire fundamental basic and deontological knowledge. The purpose of the study was to determine the progress of the scientific research approach in the field of Physical Education and Sport Science.

Material and Methods This scientific approach was carried out in the "Research methodology" discipline, in the bachelor's degree for the Physical Education and Sport (PES) specialization, Sport and Motor Performance (SMP) and in the master's degree - Sport Performance (SP). The research participants were 104 students of the Physical Education and Sport department of the University of Pitești: 82 in bachelor's degree (48 at PES, 34 at SMP) and 22 in master's degree (PS). The didactic activity was conducted offline and online; the monitoring was performed by means of the university e-learning platform. The research results were centralized using digital technologies. The continuous evaluation of the performance criteria was made in accordance with the requirements of the subject matter program and the instructions on the credit system and class book filling. The requirements of the activity in seminar were 3 reports, respecting the path of the work assignments. Report no. 1 – method of bibliographic study (Google academic); Report no. 2 – sociological survey (survey method, questionnaire, Google forms) and Report no. 3 – experimental research (personal contributions, scientific argumentation).

Results The results of knowledge evaluation in bachelor's degree reveal 3.3% better level at PES; the other indicators have a better level of success in SMP ($p > 0.05$); the master's degree highlights 15.25% better activity in the seminar, involvement of 82.3% in the elective and mandatory activity and 87.75% success in the final evaluation. Regarding the weight of sports disciplines in achievement of the scientific approach: 65% improved the title of the assignments (an evolution of the titles) and 35% kept the same title, but with different content. At the master's degree, everyone respected the requirements of the discipline.

Conclusions The scientific research approach was carried out by methodologically going through the stages of addressing the work assignments within the bibliographic study, sociological survey analysis and scientific argumentation. The theoretical knowledge was applied in accordance with the current specialized literature, the analysis of the opinions of the specialists and the use of the personal experience in the applied and development scientific research.

Keywords: bibliographic study, sociological survey, experimental research, digital technologies, evaluation, performance criteria

Introduction

Scientific research is one of the most efficient forms of knowledge. In turn, it can be systemized in several approaches, for didactical purposes, depending on effects and means [1, 2, 3]. These approaches are not alternative, but inclusive ones. An example of descriptive research is the scientific

documentation (theoretical, empirical research and a systematic review) [4, 5, 6, 7]. Another example is the *experimental approach* [7, 8], which involves both the descriptive form and the interpretation, systemic and logical one. The most evolved form is the *biocybernetics*, which includes all of them [9]. Other approaches: *qualitative and quantitative research* [10, 11, 12, 13, 14, 15], *relationship between physical education, sport and social inclusion* [16, 17], *socioeconomic differences* [18, 19], *scientometric*

evaluation [20], *social media* [21]. The final target of the research investigations is to identify and establish the cause and effect relationship between or among variables. Applying logical thinking involves a good theoretical framework, appropriate experimental design, selection and control of independent variables, selection and measurement of independent and dependent variables, use of subjects, statistical analysis and correct interpretation of findings [22].

The scientific research activity is the main and mandatory component of the academic activity and innovation process within the specialized higher education institution. A learning process based on the generation of new knowledge is much more valuable and competitive than a learning process reduced to a simple transfer of information from professors to students. The scientific research activity of the students does not stimulate only the development of the creative abilities, but also contribute to the effective acquisition of acmeological training [23, 24, 25, 26].

The students of Romania carry out research activity in the Physical Education and Sport Science field to acquire fundamental basic and deontological knowledge [27, 28]. The target is to apply the main research methods such as the achievement of scientific research works, especially the bachelor or dissertation papers [29]. Three types of research can be identified within the scientific research framework: *fundamental* (theoretical) research [30], *applied* research (improving the work conditions and helping to perfect the work methods) [31, 32] and *development* research (exploration, improvement) [33, 34].

Carp [35] analyzes the acmeology of the skills specific to the activity of the specialist in physical culture field. He believes that the qualifications of the physical education teachers and coaches in different sports branches must be enriched and revised through permanent improvement. This one determines the development of the competencies in the field of didactics, practical and scientific experience and educational policy necessary for the multilateral and harmonious training of the subjects [35]. Generally, the coach (master-teacher) has an adequate self-assessment of personal qualities, but also a continuous professional training system, focused on self-development as professional specialist. Professional adaptability is controlled by the training level of one's own pedagogical skills and by the performance results obtained by the students-athletes [36]. The professional training effectiveness in the field of physical therapy, physical education and sports is mostly regulated by the project competence development level [37]. The continuous professional training of gymnastics coaches can only be efficient through the active participation of the specialists from all gymnastics

branches. These specialists should largely have the same historical origins, so similar principles and methods to train the athletes [38].

Digital technologies are increasingly employed in the instructional-educational process at the level of university studies in Romania. Their use in the field of Physical Education and Sport Science (PESS) was also recommended by the Ministry of Education. Teaching courses both offline and online during the pandemic period by means of digital technologies (e-learning platforms, Zoom, Classroom etc.) completes and ensures continuity in the didactical process [39, 40, 41]. Concentrating on technology in physical education is particularly important taking into account the technologies specific to this discipline. For example, there are available many sport-specific, video-analysis and health-related software and applications, cameras, active video games and wearable devices that can record and track movements. Moreover, it was found out that digital technologies increase the motivation and engagement of pupils. These technologies enhance cognitive understanding and assist in learning and performing motor skills and dance movements [42, 43].

One of the main pedagogical features in higher education was the predominance of traditional methodologies. This tendency affected the evaluation as part of the entire teaching-learning process in the European Higher Education Area (EHEA). As for the Physical Education (PE), evaluation has been rated as one of the most controversial aspects of the teaching-learning process [44]. The continuous evaluation in education (from Europe and member countries of the European Association for Free Trade) is carried out on the basis of the European Credit Transfer System (ECTS) at national or institutional level. Thus, knowledge is permanently evaluated taking into consideration the requirements of the subject matter, the ECTS instructions and those on class book filling within the institution [45].

The analysis of the specialized literature highlights that there is no integral approach of a scientific research to monitor the methodological covering of the research stages, respecting the route of the work assignments.

Purpose of the Study. The study purpose was to determine the level of progress of the scientific research approach in the field of Physical Education and Sport Science.

Materials and Methods

Participants

This scientific approach was done in the discipline "Research methodology" (RM), in the bachelor's degree studies for the specialization programs of Physical Education and Sport (PES), Sport and Motor Performance (SMP) and in the

master's degree studies – specialization program of Sport Performance (SP).

The research participants were students and master students of the Physical Education and Sport department of the Faculty of Sciences, Physical Education and Informatics of the University of Pitești. There were 104 subjects, out of which 82 in bachelor's degree (48 at PES, 34 at SMP and 22 in master's degree – SP). All subjects were informed and gave their consent to voluntarily participate in the research, respecting the Declaration of Helsinki and of the Ethics Committee of the Doctoral School of Physical Education and Sport Science (ID: 01/22.07.2023).

Research Design

The research was carried out along the 2nd semester of the academic year 2021-2022, formed of 14 weeks, divided as follows: bachelor's degree - 14 course sessions and 28 seminar sessions; master's degree – 14 course sessions and 14 seminar sessions (a = 2 physical hours).

The content of the RM subject matter was monitored by means of the university e-learning platform. The teaching activity was performed both offline (physically) and online with the help of Zoom program, while the evaluation was carried out physically. For the evaluation of knowledge, the requirements of the subject matter for each study program and the instructions on the credit system (ECTS) evaluation rules and on the class book filling [38] were respected. Thus, the number of credits was 4 in all programs, the evaluation forms were: colloquium in the bachelor's degree (specialization PES and SMP) and exam in master's degree – specialization SP.

Requirements of the subject matter program:

- at the bachelor's degree, PES and SMP specialization: elective and mandatory activity, $S1 = \sum A1-3$, where A1 (10%) – Attendance, A2 (30%) – Course activity and A3 (30%) – Seminar activity: Project – 3 reports, Final evaluation (F.E.) (30%): Colloquium and $S2 = S1 + F.E.$;
- at the master's degree, SP specialization: elective and mandatory activity, indicator $S1 = \sum A1$ and A2, where A1 (20%) – activity at course + seminar (attendance), A2 (40%) – seminar activity: Project – 3 reports, F.E. (40%): Exam) and indicator $S2 = S1 + F.E.$

The use of digital technologies was recommended for making the reports: Report no. 1 –bibliographic study method (Google academic); Report no. 2 – sociological survey (survey method, questionnaire, Google forms) and Report no. 3 –experimental research (personal contributions, scientific argumentation).

The evaluation of the content of the reports was performed with grades from 1 to 10 points and by multiplying the grade by % corresponding to the

requirements of the subject matter program.

Interpretation: for the grade 5-6 points – theoretical approach of the methods; 6-7 points – theory with practical examples; 8 points – recommendations of the scientific approach by using digital means and 9-10 points – compliance with the recommendations and requirements of the scientific approach (4 research assignments).

Stages of carrying out the research scientific approach:

Stage I – choosing the research general assignment (selected sports branch – topic 1);

Stage II – conducting the bibliographic study of the specialized literature – Report 1 (Google academic / theoretical approach – topic 2);

Stage III – carrying out the sociological case study, using the survey method with the help of the questionnaire– Report 2 (Google forms / theoretical presentation – topic 3);

Stage IV – scientific argumentation using the experiment method (Report 3), with examples from personal experience and contribution – topic 4.

Statistical Analysis

The statistical indicators were calculated using the KyPlot 6.0 (©1997-2020, KyensLab Inc) program, in terms of mean, standard deviation (SD), coefficient of variation (CV%) and Confidence Level of Mean (0.95). The nonparametric Kruskal-Wallis Test was used to calculate the differences of the means between the 3 groups (study programs), considered irregular samples. The differences between the bachelor study programs (PES and SMP) were calculated using Wilcoxon Rank Sum Test (Mann-Whitney U Test) for Unpaired Data. Statistical significance was set at $p < 0.05$.

Results

As mentioned in the experimental design, a number of 104 students participated in the research, namely 70% in bachelor's degree studies (82 students: 48 in PES - 30 of male gender (M) and 18 female gender (F); 34 students in SMP - 26 M and 8 F) and 62.8% in master's degree studies (22 master students - 15 M and 7 F).

In order to monitor the scientific approach, the research results were centralized with the help of the digital tools (technologies), using Microsoft Office Excel and Google forms platform. The choice of the initial work assignment was considered *fundamental research*, where 70 students participated (67.2% in PES and 32.8% in SMP). Experience in the chosen sports disciplines: 0-2 years – 3%, 3-4 years – 9%, 5-6 years – 7.5%, 7-8 years – 16.4%, 9-10 years – 10.4% and 38.8% - over 11 years. The sports disciplines chosen in the research were represented as follows: 22.9% - football; 34.28% - basketball, handball, swimming and judo (each one with 8.57%); 14.28% - athletics and martial arts; 22.84% -fitness, kayaking,

tennis and volleyball (each one with 5.71%) and 5.7% - Greco-Roman wrestling, skiing and sports in general). The evaluation results are presented in tables 1 and 2.

Table 1 shows the results of knowledge evaluation of the bachelor's degree students in the Research Methods discipline in PESS. From the comparison of the obtained data, it can be noticed that the students in the PES study program have a better level of A2 indicator (course activity) by 3.3% than the students in SMP. Conversely, the indicators A3, F. E., S2 and F.G. show a higher achievement level in the students of SMP due to their better practical experience. Given that the requirements were the same in both study programs, the differences between the means are insignificant at $p > 0.05$.

Table 2 highlights the results of the evaluation of master's students in Sports Performance Research Methodology (SPRM) discipline, Sport Performance (SP) specialization. Comparing the evaluation indicators between A1 and A2 with the total score, it can be seen that the seminar activity is better by 15.25% than the course activity. Regarding the results of the S1 indicator, one can notice an involvement of 82.3% in the elective and mandatory activity, a success of 87.75% in the F. E., namely a mean of 8.7 points. As for the value of the sum of indicators S1 and F.E., it is observed a mean of

8.50 points, with 0.18 points (1.8%) in favor of the student when rounding the F.G.

Table 3 presents the results of the differences between the investigated groups in the discipline of Methodology and Research Methods in the Physical Education and Sport Science. The comparative analysis of the median of the study programs highlights differences in the elective and mandatory activity (S1) and final evaluation (30% colloquium and 40% exam), with different weights in the evaluation. It is observed that the indicators S2 and F.G. have higher values in the master's students at SP, with a score of 8.60 at S2 and 9.0 points at F.G. This fact demonstrates their better practical and theoretical experience. Concerning the comparison of the means between the investigated groups, one can notice that the indicator S1 has significant differences at $p < 0.05$ and FE at $p < 0.001$ (different requirements and weights of evaluation) and insignificant differences at $p > 0.05$.

Figure 1 presents the weight of the sports disciplines / the scope of the scientific approach to the Methodology and Research Methods in the Physical Education and Sport Science. The chosen sports branches that went through the methodological approach in all the study programs were the football (with a weight of 36.3% in PES, 22.2% in SMP and 27.3% in SP) and the basketball

Table 1. Results of evaluation in the Research Methods discipline in the Physical Education and Sport Science

Variables	Mean		SD		CV%		With Continuity Correction (for $ABS(Z) \leq 2$)		
	PES	SMP	PES	SMP	PES	SMP	Z	Upper P	Lower P
A1 10% (pts)	0.78	0.78	0.16	0.13	20.2	17.1	0.048	0.482	0.521
A2 30% (pts)	2.34	2.24	0.46	0.41	19.6	18.4	1.005	0.158	0.844
A3 30% (pts)	2.37	2.46	0.43	0.39	18.1	15.7	-0.919	0.822	0.180
S1 (pts)	5.48	5.48	1.00	0.88	18.3	16.2	0.004	0.5	0.504
F. E. 30% (pts)	2.39	2.46	0.45	0.44	18.9	17.9	-0.768	0.780	0.223
S2 (pts)	7.88	7.91	1.42	1.30	17.9	16.4	-0.141	0.558	0.445
F.G. (pts)	7.96	8.15	1.41	1.33	17.8	16.3	-0.617	0.733	0.270

Notes: PES: n=48; SMP: n=34; F.E. – final evaluation; pts – points; F.G. – final grade; SD – standard deviation, CV% – coefficient of variation; P – Probability; Z - Wilcoxon Signed Rank Test for Single Group Median.

Table 2. Results of the evaluation in the Sports Performance Research Methodology discipline

Variables	Mean	SD	CV%	Confidence Level of Mean (0.95)
A1 20% (pts)	1.44	0.18	12.7	0.082
A2 40% (pts)	3.49	0.31	8.79	0.136
S1 (pts)	4.94	0.44	8.87	0.194
F. E. 40% (pts)	3.51	0.33	9.26	0.144
S2 (pts)	8.50	0.69	8.14	0.307
F.G. (pts)	8.68	0.72	8.25	0.317

Notes: n=22; F.E. – final evaluation; F.G. – final grade, SD – standard deviation, CV% – coefficient of variation.

Table 3. Results of the differences between the investigated groups in the discipline of Methodology and Research Methods in the Physical Education and Sport Science

Statistical indicators	Study programs	S1 (points)	F.E. (points)	S2 (points)	Final grade (grades)
Median	PES, n=48	5.3	2.4	7.8	8.0
	SMP, n=34	5.3	2.4	7.75	8.0
	SP, n=22	4.8	3.6	8.6	9.0
	Total, n=104	5.3	2.7	8.0	8.0
Chi-Square	PES				
	SMP	8.797*	53.302***	4.388	4.593
	SP				
P-Value	PES				
	SMP	0.0123	0.0000	0.1115	0.1006
	SP				

Notes: df = 2, Nonparametric Kruskal-Wallis Test; *p<0.05; ***p<0.001; PES – physical education and sport; SMP – sport and motor performance; SP – sport performance.

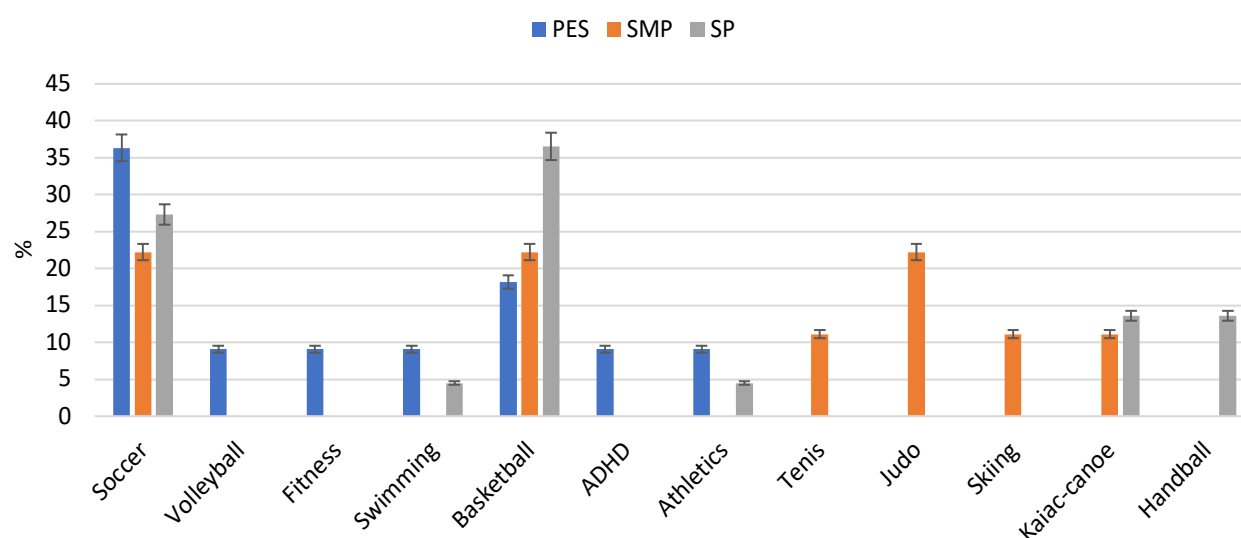


Figure 1. Weight of the achievement of the research scientific approach in the discipline of Methodology and Research Methods in the Physical Education and Sport Science: PES – physical education and sport; SMP – sport and motor performance; SP – sport performance.

(with 18.2% in PES, 22.2% in SMP and 36.5% in SP. As for the fulfilment of the requirements at each stage, it is observed that in the bachelor's degree programs, the title of the research assignments was improved in a proportion of 65%, while the same title, but with different content, was kept by 35 %. On the other hand, in the master's degree studies, all subjects complied with the requirements of the discipline.

Discussion

The continuous evaluation of knowledge in the "Research Methods in the Physical Education and Sport Science" discipline was performed by complying with the requirements of the subject matter, the instructions of the credit system and those on class book filling within the University of

Pitești. This research has a continuity and deepening of the experimental design of the fundamental research [39] into an applied and development research. Thus, analyzing the scientific research activity of the students of the State University of Physical Education and Sport from the Republic of Moldova, the following approach directions were identified: philosophical ones; socioeconomic ones; legal and managerial approach of physical culture; physical education in the educational system; professional training of the teaching staff; innovative technologies and scientific-methodical bases of the current training system of the athletes; sports medicine, kinesiology and recreational physical culture [26].

The scientific research consisted of the methodological covering of the stages. The approach

route of the work assignments was respected within the bibliographic study, sociological study and experimental research. In the bachelor's degree programs, in proportion of 65%, the titles of the research assignments evolved; they were improved and deepened in the 3 reports, while the content remained the same. In 35% the title was kept the same, but the content was changed. This fact demonstrates that the knowledge gained in courses and seminars and the personal experience too are not sufficient to totally address the subject matter requirements. The situation in master's programs (where the requirements of the study discipline were observed by all subjects) is completely different. It shows that the experience gained in the bachelor's degree program (already graduated) and in the activity carried out (some of the subjects are teachers / coaches, others are elite athletes) was sufficient for the full approach of the scientific research.

An experimental approach for the methodological knowledge of the scientific research was proposed for the future specialists in the Physical Education and Sport Science field. This approach is based on the use of 3 methods, found in the three types of research (fundamental, applied and developmental).

Method of bibliographic study – it uses both written and electronic primary and secondary sources. The access of the computerized documentation (digitization of information), using the Google academic search engine, was recommended. An example of using the *method of bibliographic study* in research by means of Academic Google and Scielo database involved the Methodist University of Piracicaba (UNIMEP) in Brazil. A literature review was employed as methodological procedure. The study was intended to bring some pedagogical contributions to the professionals in physical education. This analysis type corresponds to qualitative research [6]. A *qualitative research* is also used in other study that analyzes the curricula for the Professional Training of Distance Learning in Physical Education. As the traditional teaching model focuses on the selection of the most skilled athletes, the pedagogical proposal based on reflection offers an alternative because not all students want to be or will be athletes. Therefore, distance learning for teaching in physical education represents a very good educational strategy for the current society [14]. Taking into account the recent political context in the United Kingdom, a paper provides a review of the results of the participation of children and youth in the curricular physical education and sport and the relationship between this participation and social inclusion. However, further research is needed to demonstrate the benefits of this participation for youth and society [17]. Some specialists focused on the production of *scientific publications on the Philosophy of Sports and Physical Education*. To

collect and analyze publications, there were used Scopus and Web of Science databases and various bibliometric indicators. The research findings show that publications experienced a fluctuating trend in quantity throughout the period 1981 - 2021. Specialists consider that this scientometric research provides important information about future research directions in the philosophy of Physical Education and Sport [20].

Method of survey, used in case studies and sociological surveys, helps to learn certain aspects, mainly by conducting a preliminary (pilot) research or applying questionnaires or interviews. The use of Google forms application was recommended for the research, enabling students to improve the direction of approach of the research assignment after analyzing the specialized literature. By means of the questionnaire, students found out the opinion of the specialists about the issues of the assignment assessed. A study investigated the outsourcing of health, sport and physical educational (HSPE) work in the Australian state of Queensland. The conclusions highlight that HSPE work outsourcing is a practice with the potential to significantly disturb laboring, learning and the politics of expertise in their relation with health, sport and physical education [5]. There are studies aiming to analyze the effectiveness of the flipped learning with reference to traditional methodology. Data were collected with the help of a questionnaire. The results show that the experimental group obtained better evaluations in the academic indicators, revealing the motivation, autonomy and interactions between various agents. As for the efficiency of the flipped learning determined by the educational stage, its potential was demonstrated in both stages, highlighting a significant improvement of the autonomy in the secondary school [46].

Method of experiment - a complex system of knowledge of reality, characterized by the use of the experimental reasoning, which processes both facts resulting from observation and from experiment. It was recommended to employ the personal experience and knowledge. Making a comparison with the results of the scientific research approach, the sports discipline in which the students carried out the most studies was basketball. In this regard, a research study was conducted to investigate the level of physical fitness and physical development in the 6-7-year-old boys before and after the implementation of a program of mini-basketball training sessions at the stage of initial training. This study presents the method of experiment. Further research is required to test the effectiveness of this program of mini-basketball training sessions in the case of girls of same age. The program can be also used to develop a curriculum for 6-12-year-old children in schools, consistent with present-day world trends in the development of mini-basketball [47].

The continuous training of coaches is a priority given the need to update professional skills and knowledge. It is also important for increasing the quality of education from the perspective of adaptation to the requirements of the current society [38]. There were created the theoretical foundations and the pedagogical model for developing the professional skills of the master's degree students in the field of Psycho-pedagogy of Physical Education and Sport in the Republic of Moldova. The theoretical data analysis showed that the process of professional training of the master students in Physical Education and Sport Psycho-pedagogy (PESP) is a complex and multidimensional one. It includes three fundamental components: *motivational component, informational component and operational component*. These components represent the fundamental milestones that determined the conceptual model of training of the specialist in the Physical Education and Sport field [48]. Other author shows that the scientific research activity of the students in the physical culture institutions is currently a system of forms and types of their theoretical and practical scientific training activity. The basic function of this activity consists in the mandatory training of all students, in order to carry out scientific research in the field of the chosen specialty [35]. Modern reforms and fast integration changes in the higher education system of Ukraine focus on training of professional and competent specialists who meet the requirements of contemporary Ukrainian society and international standards. The study experimentally tested the effectiveness of the project competence formation in the future specialists of kinesiology and physical education & sport in the higher education system. The experimental works were performed in three stages: ascertaining, training and control. Each of the identified stages involved solving the relevant tasks and identifying the necessary research methods [37]. The current academic system needs a pedagogical revitalization to train professional skills and prepare efficient professionals, while developing civic and democratic values. Service learning (SL) is an innovative educational strategy that connects theoretical foundations and practice. In particular, it is defined as a pedagogical proposal that combines learning and community service, based on the implementation of skills related to the curricular content carried out in reality context [49].

A study was carried out to monitor the scientific approach by means of digital technologies (tools). From the total number of enrolled students, only 70% of them were from bachelor's degree studies and 62.8% from master's degree. Regarding the research subjects, in the same period, an experimental study was conducted in the Kinesiology discipline in the first semester. A number of bachelor's degree students higher by 11.4% participated in this

research, given that the passing requirements were both theoretical and applied from the chosen sports test [40]. Other specialists studied the way in which it is possible to employ an appreciative inquiry for providing insights into the ongoing use of digital technology by the teachers. This can be achieved by discussing about the appreciative inquiry before presenting examples from a research study that analyzed how the teachers of physical education use the digital technology [21]. It was highlighted that the appreciative inquiry can provide a reflective space for practitioners and researchers in terms of using digital technology. The appreciative inquiry is really helpful in the negotiation of digital practices in the Physical Education and Sport Pedagogy (PESP) [50]. Nowadays, the technological characteristics of the society facilitated the inclusion of information and communication technology (ICT) and the emergence of new training methodologies in education. Thus, specialists addressed in their studies the flipped learning as an innovative approach in the teaching and learning processes of physical education at two educational stages, the primary and secondary education [46].

From the sports disciplines chosen, the most frequently used during the research were: 45.75% sports games, 32.84% individual sports and 21.41% combat sports. A particular case in this scientific approach is ADHD condition. A female student – practitioner of martial arts and even coach in the sports club where she carries out her activity – decided to address this interesting and topical issue regarding the therapy of children with ADHD by means of martial arts.

Following a detailed analysis performed throughout a research carried out during physical education classes, it resulted that the students with special educational needs, respectively those diagnosed with disorders on the autism spectrum, have deviant behavioral manifestations. They always disturb the activities during classes, they often disregard the rules established for conducting classes in optimal conditions. At the same time, these students encounter difficulties in building and maintaining relationships with their classmates [51].

The teaching of the theoretical content was distributed as follows: bachelor's degree - 7 course lessons (14 hours) in accordance with 14 seminar lessons (28 hours); master's degree - 7 course lessons and 7 seminar lessons. In this sense, it was aimed to ensure continuity between the subject of the course and the practical applications in the seminar. Research types and characteristics, basic research methods necessary for the development of a scientific research and last but not least the preparation of bachelor's thesis and master's dissertation are targeted. Given that the students in master's program have been already familiar with

the fundamental knowledge of the subject matter since the bachelor's degree, an attempt has been made to deepen the knowledge through applied and developmental approach of the research. This fact was demonstrated during the scientific approach of the research (Figure 1).

Taking into account that the requirements of the subject matter program and the results of the continuous evaluation in both bachelor study programs were the same, within the elective and mandatory activity the following values were found out. The A1 indicator shows an average of 78% class attendance; the A2 indicator better attendance in PES by 3.3%; the other indicators show a higher level of success in the SMP students, demonstrating their better practical experience. As for the master's degree, the comparative results of the continuous evaluation between A1 and A2 indicators with the total score, a better activity in seminar is noticed (by 15.25%). As they had the possibility to benefit from the online teaching of lessons thanks to Zoom program, the master's students had an involvement of 82.3% in the elective and mandatory activity although most of them lived in different places of the country. This fact led to a success of 87.75% in the final evaluation (F. E.).

Comparing the results of the research with the performance practical activity of the undergraduate students/master's students involved in the research, one can observe that these ones are multiple National Champions in basketball and handball games or even European University Champions and Vice-Champions. These performances justify the results of the research and keep up the tradition of the University of Pitești.

Conclusions

The carrying out of the scientific approach in the field of Physical Education and Sport Science was realized by complying with the requirements of the subject matter for each study program and of the

instructions on the credit system evaluation rules and on the class book filling.

The approach of the scientific research consisted of the methodological going through the stages by addressing the work assignments within the bibliographic study, analysis of the opinions of the specialists and the scientific argumentation through the implementation of personal contributions.

The scientific approach to the bachelor's degree programs demonstrated that the knowledge gained in the lessons taught and the personal experience as elite athletes is not sufficient to entirely meet the requirements of the subject matter. The students in master's degree program have already an experience gained in the bachelor's degree program(graduated), which was sufficient to meet the requirements imposed by the subject matter.

The comparative analysis of the indicators in the elective and mandatory activity and the final evaluation between bachelor's degree and master's degree highlights different evaluation weights and requirements, with higher values in master students, which demonstrates their better experience, both practical and theoretical one.

At the end of the course, students were able to implement their theoretical knowledge according to the current specialized literature, to analyze and compare the information of the sociological surveys and to apply their personal experience in the applied and developmental scientific research.

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Conflict of interest

There are no conflicts of interest to declare.

References

1. Berg KE, Latin RW. *Essentials of research methods in health, physical education, exercise science, and recreation*. Lippincott Williams & Wilkins; 2008.
2. Thomas JR, Silverman SJ, Nelson JK. *Research Methods in Physical Activity*. 7th Edition: Human Kinetics, Inc.; 2015.
3. Bird SR. *Research Methods in Physical Activity and Health*. Routledge; 2018. <https://doi.org/10.4324/9781315158501>
4. Haag H. Development and structure of a theoretical framework for sport science ("Sportwissenschaft"). *Quest*, 1979;31(1):25–35. <https://doi.org/10.1080/00336297.1979.10519919>.
5. Williams BJ, Hay PJ, Macdonald D. The outsourcing of health, sport and physical educational work: A state of play. *Physical Education & Sport Pedagogy*, 2011;16(4):399–415. <https://doi.org/10.1080/17408989.2011.582492>
6. de Souza ÍMM, da Silva CL. Body practices and Brazilian culture: pedagogical contributions to physical education professionals. *Procedia-Social and Behavioral Sciences*, 2015;174:434–440. <https://doi.org/10.1016/j.sbspro.2015.01.686>
7. Mancha-Triguero D, Garcia-Rubio J, Calleja-Gonzalez J, Ibanez SJ. Physical fitness in basketball players: A systematic review. *Journal of Sports Medicine and Physical Fitness*, 2019;59:1513–1525. <https://doi.org/10.23736/S0022-4707.19.09180-1>
8. Peterson JL, Puhl RM, Luedicke J. An experimental investigation of physical education teachers' and coaches' reactions to weight-based victimization in youth. *Psychology of Sport and Exercise*, 2012;13(2):177–185. <https://doi.org/10.1016/j.psychsport.2011.12.005>

- psychsport.2011.10.009
9. Amado D, Del Villar F, Leo FM, Sánchez-Oliva D, Sánchez-Miguel PA, García-Calvo T. Effect of a multi-dimensional intervention programme on the motivation of physical education students. *PLOS one*, 2014;9(1):e85275. <https://doi.org/10.1371/journal.pone.0085275>
10. Gagea A. *Metodologia cercetării științifice în educație fizică și sport* [Methodology of Scientific Research in Physical Education and Sport]. Bucharest; Publishing House of the "Romania de mâine" Foundation; 1999. (In Romanian).
11. Tenenbaum G, Driscoll MP. *Methods of research in sport sciences: Quantitative and qualitative approaches*. Meyer & Meyer Verlag; 2005.
12. Bundon A. *Digital qualitative research in sport and physical activity*. Routledge; 2017. <https://doi.org/10.4324/9781315304557>
13. Smith B. Generalizability in qualitative research: Misunderstandings, opportunities and recommendations for the sport and exercise sciences. *Qualitative Research in Sport, Exercise and Health*, 2018;10(1):137–149. <https://doi.org/10.1080/2159676X.2017.1393221>
14. Silva RCA, Silva VLDF, Silva AP. Distance learning for teaching in physical education. *Motriz: Revista de Educação Física*, 2019; 25: e101832. <https://doi.org/10.1590/S1980-6574201900010002>
15. Hausken-Sutter SE, Boije af Gennäs K, Schubring A, Grau S, Jungmalm J, Barker-Ruchti N. Interdisciplinary sport injury research and the integration of qualitative and quantitative data. *BMC Medical Research Methodology*, 2023;23(1):1–9. <https://doi.org/10.1186/s12874-023-01929-1>
16. Laker A. *Sociology of sport and physical education: An introduction*. Routledge; 2012. <https://doi.org/10.4324/9780203194119>
17. Bailey R. Evaluating the relationship between physical education, sport and social inclusion. *Educational Review*, 2005;57(1):71–90. <https://doi.org/10.1080/0013191042000274196>
18. Federico B, Falese L, Marandola D, Capelli G. Socioeconomic differences in sport and physical activity among Italian adults. *Journal of Sports Sciences*, 2013;31(4):451–458. <https://doi.org/10.1080/02640414.2012.736630>
19. Kelly AL, Williams CA, Jackson DT, Turnnidge J, Reeves MJ, Dugdale JH, et al. Exploring the role of socioeconomic status and psychological characteristics on talent development in an English soccer academy. *Science and Medicine in Football*, 2023; 1–9. <https://doi.org/10.1080/24733938.2023.2213191>
20. Sofyan D, Abdullah KH, Hafiar H. The philosophy of sport and physical education: Four decade publication trends via scientometric evaluation. *Physical Education Theory and Methodology*, 2022;22(3):437–449. <https://doi.org/10.17309/tmfv.2022.3.20>
21. Goodyear VA, Armour KM, Wood H. Young people and their engagement with health-related social media: New perspectives. *Sport, Education and Society*, 2019;24(7):673–688. <https://doi.org/10.1080/13573322.2017.1423464>
22. Byon KK, Zhang JJ. Critical statistical and methodological issues in sport management research. *Measurement in Physical Education and Exercise Science*, 2019;23(4):291–300. <https://doi.org/10.1080/1091367X.2019.1684297>
23. Ambrosi N, Budevici-Puiu A. *Epistemologia și metodologia cercetării în educația fizică* [Epistemology and Research Methodology in Physical Education]. Chișinău: Valinex; 2015 (In Romanian).
24. Budevici-Puiu L. Sustenabilitatea cercetării științifice în educația fizică și sport [Sustainability of Scientific Research in Physical Education and Sport]. *Science of Physical Culture*, 2017;2(28):68–71. (In Romanian).
25. Vechiu CG. Abordarea interdisciplinarității în cercetarea științifică a studenților de la facultățile de sport [Approaching the Interdisciplinarity in the Scientific Research of Sports Faculties Students]. *Science of Physical Culture*, 2019; 2(34):55–59. (In Romanian).
26. Volcu G, Volcu I. Aspecte strategice ale activității de cercetare științifică la studenții facultăților de educație fizică și sport [Strategic Aspects of the Scientific Research Activity in the Students of the Faculties of Physical Education and Sports]. In: *Sports. Olympism. Health*, 2021. P. 87–94. (In Romanian).
27. Voicu AV, Stănescu R, Voicu BI. Professional responsibility of coaches. *Discobolul-Physical Education, Sport & Kinetotherapy Journal*, 2021;60(3):307–327. <https://doi.org/10.35189/dpeskj.2021.60.3.9>
28. Akramova GMQ. The Essence of the Physical Education Teacher's Deontological Readiness for Professional Activity. *Vital Annex: International Journal of Novel Research in Advanced Sciences*, 2023;2(3):98–102.
29. Rienecker L, Jørgensen PS, Skov S. *The good paper: a handbook for writing papers in higher education*. Samfundslitteratur; 2013.
30. Xu Z, Shi Y. Exploring big data analysis: fundamental scientific problems. *Annals of Data Science*, 2015;2:363–372. <https://doi.org/10.1007/s40745-015-0063-7>
31. Bishop D. An applied research model for the sport sciences. *Sports Medicine*, 2008; 38:253–263. <https://doi.org/10.2165/00007256-200838030-00005>
32. Jones B, Till K, Emmonds S, Hendricks S, Mackreth P, Darrall-Jones J, et al. Accessing off-field brains in sport; an applied research model to develop practice. *British Journal of Sports Medicine*, 2019;53(13): 791–793. <https://doi.org/10.1136/bjsports-2016-097082>
33. Knowles Z, Gilbourne D, Borrie A, Nevill A. Developing the reflective sports coach: A study exploring the processes of reflective practice within a higher education coaching programme. *Reflective Practice*, 2001;2(2):185–207. <https://doi.org/10.1080/14623940123820>
34. Nevill A, Atkinson G, Hughes M. Twenty-five years of sport performance research in the Journal of Sports

- Sciences. *Journal of Sports Sciences*, 2008;26(4):413–426. <https://doi.org/10.1080/02640410701714589>
35. Carp I. Acmeologia formării competențelor de cercetare la studenții instituțiilor de cultură fizică [Acmeology of the Formation of Research Skills in Students of Physical Culture Institutions]. In: *The International Conference „Acmeological Problems in the Field of Physical Culture”*. Chișinău: Valinex, 2015. P. 26–31. (In Romanian).
36. Budevici-Puiu A, Carp Iu. Abordarea măiestriei pedagogice prin prisma competențelor specialistului din domeniul educației fizice și sportului [Approach to Pedagogical Mastery through the Prism of the Competencies of the Specialist in the Field of the Physical Education and Sports]. In: *The International Conference „Acmeological Problems in the Field of Physical Culture”*. Chișinău: Valinex; 2015. P. 8–13.
37. Emetc A, Zhamardiy V, Sohokon O, Khyzhniak O. Formation of project competence of future specialists from the field of physical therapy, physical education and sports in the higher education system. *JETT*, 2022;13(2):260–269. <https://doi.org/10.47750/jett.2022.13.02.025>
38. Milevschi A, Ghețiu A. Priorități ale formării profesionale continue a antrenorilor din gimnastică [Priorities of the Continuous Professional Training of Gymnastics Coaches]. In: *Continuous Training of the Physical Culture Specialist in the Modern Acmeological Concept*; 2021. P. 72–77. (In Romanian).
39. Potop V, Manolachi V, Kulbaev A. Interactive Learning Means in Higher Education for Physical Education and Sport. *Postmodern Openings*, 2020;11(2):113–119. <https://doi.org/10.18662/po/11.2/164>
40. Manolachi V, Potop V, Chernozub A, Khudyi O, Delipovici I, Eshtayev S, Mihailescu LE. Theoretical and applied perspectives of the kinesiology discipline in the field of physical education and sports science. *Physical Education of Students*, 2022; 26(6): 316–324. <https://doi.org/10.15561/20755279.2022.0606>
41. Potop V, Manolachi V, Mihailescu LE, Manolachi V, Kulbayev A. Knowledge of the fundamentals necessary for the scientific research activity in the field of Physical Education and Sports Science. *Journal of Physical Education and Sport*, 2022; 22(8):1922–1926. <https://doi.org/10.7752/jpes.2022.08243>.
42. Bodsworth H, Goodyear VA. Barriers and facilitators to using digital technologies in the Cooperative Learning model in physical education. *Physical Education and Sport Pedagogy*, 2017;22(6):563–579. <https://doi.org/10.1080/17408989.2017.1294672>
43. Calderón A, Meroño L, MacPhail A. A student-centred digital technology approach: The relationship between intrinsic motivation, learning climate and academic achievement of physical education pre-service teachers. *European Physical Education Review*, 2020;26(1):241–262. <https://doi.org/10.1177/1356336X19850852>
44. Otero-Saborido FM, Sánchez-Oliver AJ, Grimaldi-Puyana M, Álvarez-García J. Flipped learning and formative evaluation in higher education. *Education+ Training*, 2018;60(5):421–430. <https://doi.org/10.1108/ET-12-2017-0208>
45. Petrov E. Sistemul de credite academice transferabile (strategie de reformare a învățământului universitar) [Academic Credits Transfer System (university education reforming strategy)]. *Didactica Pro... Magazine of Educational Theory and Practice*, 2003;17(1):36–41.
46. Hinojo Lucena FJ, Lopez Belmonte J, Fuentes Cabrera A, Trujillo Torres JM, Pozo Sanchez S. Academic effects of the use of flipped learning in physical education. *International journal of Environmental Research and Public Health*, 2020;17(1):276. <https://doi.org/10.3390/ijerph17010276>
47. Mitova O, Griban GP, Oleniev D, Yakovenko A, Onyshchenko V, Mozolev O, Semeniv B, Lytvynenko A, Khurtenko O, Zamrozevuch-Shadrina S, Kozibroda L, Hres, M. The Impact of Mini-Basketball Training Sessions on the 6-7-Year-Old Boys' Physical Fitness and Physical Development. *International Journal of Human Movement and Sports Sciences*, 2022;10(5):754–767. <https://doi.org/10.13189/saj.2022.100416>.
48. Gonciaruc S, Putin N, Samoteeva R. Formarea competențelor profesionale la studenții masteranzi din perspectiva psihopedagogiei educației fizice [Development of Professional Skills in Master's Students from the Perspective of the Psycho-pedagogy of Physical Education]. In: *Sports. Olympism. Health*, 2021. P. 95–101.
49. Chiva-Bartoll O, Salvador-Garcia C, Ruiz-Montero PJ. Service-learning as a new methodological teaching trend in physical education and sport sciences. *Journal of Physical Education and Sport*, 2018;18(Suppl.1): 335–341. <https://doi.org/10.7752/jpes.2018.s145>
50. Sargent J, Casey A. Appreciative inquiry for physical education and sport pedagogy research: a methodological illustration through teachers' uses of digital technology. *Sport, Education and Society*, 2021;26(1):45–57. <https://doi.org/10.1080/13573322.2019.1689942>
51. Constantin IL, Chirazi M. Manifestări comportamentale deviante ale elevilor din ciclul primar–în special ale celor cu tulburări din spectrul autist [Deviant Behavioral Manifestations of the Primary School Students – especially those with autism spectrum disorders]. In: *Sports. Olympism. Health*, 2022. P. 76–83. (In Romanian).

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